Top Management Team Incentive Dispersion and Risk Disclosure Quality

Abstract

We investigate how heterogeneity in pay-performance sensitivity (PPS) among top management team (TMT) members affects the quality of risk disclosures in firms' 10-K filings. To assess risk disclosure quality, we utilize linguistic metrics that capture the readability, complexity, ambiguity, and length of disclosures, complemented by a composite quality index using principal component analysis to provide a comprehensive measure of disclosure quality. Our findings reveal a significant positive association between PPS dispersion within TMT and risk disclosure quality. Cross-sectional analyses show that this positive relationship is moderated by factors such as firm structural attributes, executive control, external monitoring, and macroeconomic disruptions. Additionally, path analysis reveals that PPS dispersion among TMT members indirectly impacts risk disclosure quality through its effect on earnings management. Our further analyses indicate that PPS dispersion helps enhance the quality of disclosures in the Risk Factors and MD&A sections, increase disclosure on firm-specific idiosyncratic risks, mitigate managerial optimism, and strengthen the overall information environment of the firm. Our findings remain robust across various methodologies, including two-stage least squares regression, propensity score matching, and alternative measures of 10-K disclosure quality. Overall, our results highlight the importance of TMT equity-based compensation incentives in shaping financial reporting quality, particularly in the context of risk disclosures.

Keywords: risk disclosure quality, composite disclosure quality index, pay-performance sensitivity, top management team, earnings management, firm structural attributes, macroeconomic disruption, text mining, path analysis, principal component analysis

Data Availability: Data are publicly available from the sources identified in the paper.

1. Introduction

In this study, we examine how heterogeneity in pay-performance sensitivity (PPS) among top management team (TMT) members influences the quality of risk disclosures in firms' 10-K filings. Risk disclosures play a critical role in providing investors with valuable insights to evaluate a firm's performance.[1] Comprehensive and transparent disclosures reduce information asymmetry, enabling investors and analysts to better assess a firm's risk exposures, which in turn helps refine their valuation of the firm. (Azmi Shabestari & Romero, 2022; Elshandidy et al., 2018; Kravet & Muslu, 2013). The quality of risk disclosures can influence stock prices, the cost of capital, and market perceptions, underscoring their significance in financial decision-making (Beatty et al., 2019; Campbell et al., 2014; Chiu et al., 2018; Hope et al., 2016; Kohlbeck & Luo, 2022).

Despite the Securities and Exchange Commission's (SEC) regulatory efforts to enhance disclosure quality, concerns persist regarding the effectiveness of risk disclosures in conveying risk exposures of publicly listed companies (AICPA, 1987; Schrand & Elliott, 1998; Kaplan, 2011; Abraham & Shrives, 2014).[2] While timely disclosure of risk information reduces information asymmetry and lowers the cost of capital (Verrecchia, 2001; Healy & Palepu, 2001), agency theory suggests that managerial incentives may lead to selective or ambiguous disclosures. Managers may withhold adverse risk information to safeguard career prospects (Kothari et al., 2009) or proprietary advantages (Verrecchia, 2001), resulting in boilerplate disclosures that obscure a firm's risk exposures (Li, 2008). However, nondisclosure carries legal and reputational risks, as delayed

[1] See https://www.cnbc.com/2014/01/27/how-to-read-a-10-k-like-warren-buffet.html.

[2] In 1997, the SEC introduced Item 7A, "*Quantitative and Qualitative Disclosure about Market Risk*" (Market Risk) to Regulation S-K, supplementing Item 7, "*Management's Discussion and Analysis of Financial Condition and Results of Operation*" (MD&A). In 2005, the SEC further mandated Item 1A, "Risk Factors," requiring firms to disclose significant factors that make them speculative or risky.

disclosure can lead to investor losses and litigation (Skinner, 1994). These competing incentives highlight the complexity of managerial decision on risk disclosures.[3]

Further, heterogeneity in equity incentives among TMT members may shape their collective judgment on risk disclosure, ultimately influencing investor perceptions and firm value. Pay-performance sensitivity, a key dimension of managerial incentives, captures the extent to which an executive's wealth fluctuates with firm performance and valuation through equity-based compensation (Jensen & Murphy, 1990). Since investors rely on financial reporting to assess firm value, variations in PPS within the TMT may create divergent reporting incentives, directly impacting the quality and transparency of risk disclosures.

Prior research focusing on individual executives, such as CEOs (Armstrong et al., 2010; Bergstresser & Philippon, 2006; Burns & Kedia, 2006; Cheng & Warfield, 2005) or CFOs (Feng et al., 2011; Friedman, 2014; Jiang et al., 2010), provides supportive evidence for the link between managerial equity incentives and firm performance. However, publicly traded companies operate within a collaborative management framework where decision-making extends beyond the CEO and CFO. Other TMT members also exert significant influence over the firm's internal environment and disclosure practices (Dichev et al., 2013; Hambrick & Mason, 1984).[4] Moreover, substantial dispersion in equity incentives among TMT members (Bushman et al., 2016) can create conflicting interests, leading to tensions in disclosure decisions. While some executives may advocate for transparency, others might prefer ambiguity to protect firm value or safeguard

[3] Anecdotal evidence of the consequences of inadequate risk disclosure can be seen in the SEC's recent enforcement actions against Unisys Corp., Avaya Holdings Corp., Check Point Software Technologies Ltd., and Mimecast Limited for misleading disclosures regarding cybersecurity risk and intrusions related to the 2020 SolarWinds cyberattack. See https://www.sec.gov/newsroom/press-releases/2024-174.

[4] Anecdotal evidence from the HealthSouth Corporation scandal illustrates this dynamic, as the SEC charged not only the CEO and CFO but also multiple executives, including the Vice President (VP) of Finance, VP of Accounting, Group VP, Assistant VP, Chief Information Officer, and Division Controller, for their roles in orchestrating financial misreporting. See https://www.sec.gov/litigation/litreleases/lr-18044

personal reputations. These conflicts challenge the notion that TMT members act as a unified body. Such internal dynamics raise critical questions about how the broader executive team shapes the quality of financial reporting, particularly risk disclosures.

To our knowledge, no prior study has explored how heterogeneity in equity incentives among TMT members affects risk disclosure quality. Existing research on equity incentive dispersion within TMT and financial reporting quality has yielded mixed findings: while Bushman et al. (2016) suggests that PPS dispersion hinders firm performance, recent studies have documented positive impacts of PPS dispersion on earnings quality (Kim et al., 2022), non-GAAP reporting (Richards et al., 2023), and management earnings forecasts (Kalelkar et al., 2024). While previous studies have focused on structured financial metrics, unstructured textual information, such as risk disclosures, has received limited attention. Given their unique role in reducing uncertainty and shaping investor expectations, we address this gap in the literature by investigating whether equity incentive dispersion among TMT members affects the quality of their firm's risk disclosures.

In exploring this relationship, we consider two contrasting theoretical perspectives. On one hand, dispersed incentives may limit collusion to conceal unfavorable risk information and hinder information manipulation, mitigating groupthink and fostering cognitive conflict and debates that enhance the transparency and accuracy of risk disclosures (Esser, 1998; Hambrick & Fukutomi, 1991; Harrison et al., 1998). The heightened risks associated with misreporting, particularly in the context of risk disclosures, further discourage manipulation in teams with diverse incentives, where coordination and trust are more challenging to establish (Baginski et al., 2018). On the other hand, substantial dispersion in incentives may introduce decision-making frictions by broadening the range of perceptions and preferences among TMT members (Katz, 1982; van Knippenberg &

Schippers, 2007). This can delay the processing of risk-related information and create inconsistencies in disclosures. Additionally, misaligned incentives can weaken team cohesion, hinder consensus-building, and reduce communication efficiency, ultimately impairing the clarity and informativeness of risk disclosures (Daboub et al., 1995; Priem, 1990). Given these competing forces, the net effect of equity incentive dispersion among TMT members on risk disclosure quality remains an empirical question, which our study seeks to address.

We analyze a sample of U.S. firms from 2005 to 2023 to investigate the relationship between PPS dispersion among TMT members and risk disclosure quality.[5] Following Kim et al. (2022) and Kalelkar et al. (2024), we measure PPS dispersion as the standard deviation of pay-performance sensitivities among the five highest-paid executives. To assess risk disclosure quality, we retrieve firms' Form 10-K filings from the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) database and follow existing literature to construct four linguistic metrics that capture the readability, complexity, ambiguity, and length dimensions of textual disclosures (Campbell et al., 2014; Hwang & Kim, 2017; Lehavy et al., 2011; Li, 2008; Lo et al., 2017; Loughran & McDonald, 2016). We analyze the four metrics individually to assess the consistency in the findings, then apply the principal component analysis (PCA) to aggregate them into a composite disclosure quality index.

Our empirical analyses yield the following key findings. In the baseline model, we examine the relationship between PPS dispersion among TMT members and each of the four linguistic metrics of risk disclosure quality, followed by the composite disclosure quality index. Our results consistently indicate a significant positive association between TMT PPS dispersion and risk disclosure quality, suggesting that firms with greater divergence in equity incentives among TMT

[5] Our sample starts in 2005, as the SEC mandates that firms include the Item 1A "Risk Factor" section in Form 10-K starting that year.

members provide more informative risk disclosures. Additionally, our cross-sectional analyses identify three sets of key factors that moderate the relationship between TMT PPS dispersion and risk disclosure quality. First, we find that PPS dispersion improves risk disclosure quality in firms with lower complexity, while more complex firms generally have poorer disclosures. However, for complex firms, PPS dispersion helps mitigate this negative effect. Similarly, broader market participation, as measured by firm scope, complicates disclosures, reducing the positive impact of PPS dispersion. Second, we observe that the positive impact of PPS dispersion on risk disclosure weakens in firms with high CEO power. On the other hand, institutional ownership strengthens risk disclosure quality, and PPS dispersion further amplifies this effect. Third, while PPS dispersion improves risk disclosure quality during stable periods, its impact weakens or reverses during the Great Recession and COVID-19 pandemic, highlighting the disruptive impact of macroeconomic crises on risk disclosures. Finally, our path analysis reveals that the positive relationship between PPS dispersion within TMT and risk disclosure quality is partially mediated by earnings management. Firms with greater PPS dispersion exhibit lower discretionary accruals, which in turn enhances risk disclosure quality, suggesting that reduced earnings management serves as an indirect mechanism strengthening transparency.

Our study expands the literature on managerial equity incentives and financial reporting quality by shifting the focus from solely on CEO incentive to the collective incentive structure of the TMT (e.g., Armstrong et al., 2010, 2013; Bergstresser & Philippon, 2006; Burns & Kedia, 2006; Cheng & Warfield, 2005; Davidson, 2022; Erickson et al., 2006; Feng et al., 2011; Friedman, 2014; Jiang et al., 2010). Adopting a multi-agent perspective, we examine how incentive heterogeneity within the TMT shapes group decision-making and risk disclosures. While prior research suggests that strong equity incentives may encourage obfuscation, our findings indicate

that the team-level incentive structure can enhance financial reporting transparency, underscoring the importance of considering incentive dynamics beyond individual executives.

We further contribute to the literature on corporate disclosure quality by identifying TMT equity incentive variability as a critical yet underexplored determinant of risk disclosure (e.g., Bushee et al., 2018; Campbell et al., 2014; Hasan, 2020; Li, 2008; Rahman & Kabir, 2023; Wruck & Wu, 2021). Our findings reveal that the influence of TMT incentives on disclosure quality is contingent on firm structural attributes, CEO power, external monitoring, and macroeconomic conditions. These findings offer valuable insights for investors, regulators, and policymakers by highlighting the conditions under which executive compensation incentives promote or hinder transparency, particularly in complex firms and uncertain macroeconomic environments.

Finally, we introduce a novel and comprehensive composite index measure to strengthen the empirical assessment of risk disclosure quality, contributing to the methodological approaches in this area. We also establish a connection between quantitative/numerical and qualitative/textual dimensions of financial reporting by demonstrating that dispersion in TMT equity incentives impacts both accrual-based earnings management and risk disclosure. Extending Kim et al. (2022) and Richards et al. (2024), we show that earnings management acts as a mediating channel through which the TMT incentive structure influences the quality of risk disclosures.

The remainder of the paper is organized as follows. Section 2 reviews related literature and develops hypothesis. Section 3 describes variable measurement, sample, and descriptive statistics. Section 4 presents the research design and empirical results of main analyses. Section 5 presents further analyses. Section 6 discusses endogeneity and robustness tests. Lastly, Section 7 concludes.

2. Related Literature and Hypothesis Development

2.1. Related Literature

Prior studies suggest that managers possess privileged information about their firm's risks, and timely disclosure of this information can reduce information asymmetry, lowering the firm's cost of capital (Verrecchia, 2001; Healy & Palepu, 2001). However, agency theory highlights that managers may withhold or downplay risk information when their disclosure preferences conflict with shareholder interests. Managers might avoid disclosing unfavorable risks, such as the potential for default, to protect their career prospects (Kothari et al., 2009) or to prevent revealing proprietary information to competitors (Verrecchia, 2001). This reluctance can result in vague, boilerplate disclosures that obscure a firm's risk exposures (Beatty et al., 2019; Elshandidy et al., 2018; Li, 2008). Besides, managers may choose to withhold risk information, hoping future events will mitigate the situation (Francis et al., 1994; Graham et al., 2005). However, delayed or obscured disclosures can expose managers to legal liability if investors incur losses, leading to legal costs and reputational damage (Skinner, 1994). These conflicting incentives illustrate the complexity of managerial decision-making in risk disclosures. Further, differences in equity incentives among TMT members can influence their collective judgment and joint decision on information disclosures, ultimately affecting investor perceptions and firm valuation.

Research on managerial incentives and financial reporting explores how the sensitivity of managers' wealth to stock price fluctuations influences misreporting behaviors. Much of the existing literature has focused on CEO incentives, examining the relationship between equity incentives and earnings management (Cheng & Warfield, 2005), discretionary accruals (Bergstresser & Philippon, 2006), and accounting restatements (Burns & Kedia, 2006). Beyond individual incentives, research on CEO-CFO dynamics suggests that CFOs may manipulate

earnings in response to CEO pressure, further shaping financial reporting quality (Jiang et al., 2010; Feng et al., 2011; Friedman, 2014).

Corporate decisions are rarely made by a single individual but result from collaborative efforts within the top management team (TMT). The Upper Echelon Theory suggests that TMT members' values, perceptions, and cognitive styles influence corporate decisions and organizational outcomes (Hambrick & Mason, 1984; Bamber et al., 2010; Carpenter et al., 2004). While some TMT members, such as the COO, CMO, and General Counsel, may not be directly involved in financial reporting, they still play a key role in decision-making (Dichev et al., 2013).[6] TMT dynamics are shaped by the alignment of compensation structures, reflecting the alignment of equity incentives within the team (Core & Guay, 2002; Core et al., 2003). Bushman et al. (2016) show that firm performance improves when TMT equity incentives are closely aligned, suggesting that unified incentives foster collaboration. In contrast, Kim et al. (2022) find that higher PPS dispersion within the TMT mitigates earnings management by reducing the likelihood of collective manipulation. Similarly, Richards et al. (2024) report that higher PPS dispersion lowers non-GAAP reporting, while Kalelkar et al. (2024) document that TMT incentive dispersion improves the accuracy of management earnings forecasts. Collectively, these studies underscore the critical role of TMT incentive structure in shaping financial reporting quality and disclosure practices.

While existing research on TMT incentive dispersion has largely focused on structured quantitative financial metrics, qualitative corporate disclosure quality is equally vital for effective communication between firms and capital markets (Loughran & McDonald, 2014). Li (2008) links

[6] Bamber et al. (2010) and Zhang (2019) document that characteristics of TMT members play an economically significant role in firms' financial disclosure choices. Kwak et al. (2012) and Hopkins et al. (2015) examine the role of General Counsel (GC) in TMT and find mixed evidence that while firms with GCs provide higher quality management forecasts disclosures, however, firms with highly compensated GCs have lower financial reporting quality and aggressive accounting practices. Vafeas and Vlittis (2012) find that the adoption of the COO is associated with firms' information environment. Koo and Lee (2018) find that the presence of an influential CMO is positively associated with the frequency and accuracy of management revenue forecasts.

lower earnings with harder-to-read Form 10-K filings, while more readable filings are associated with persistent earnings. Studies have shown that factors such as managerial ability (Hasan, 2020), board diversity (Nadeem, 2022), and CEO equity incentives (Wruck & Wu, 2021) impact disclosure quality in Form 10-K filings. Complex, difficult-to-read filings are also linked to lower investment efficiency (Biddle et al., 2009), higher volatility (Loughran & McDonald, 2014), and increased stock price crash risks (Ertugrul et al., 2017), highlighting the importance of comprehensible disclosures that mitigate the concerns of information asymmetry. Beyond readability, Campbell et al. (2014) emphasize the critical role of mandatory risk factor disclosures, demonstrating that such disclosures provide valuable information by improving the transparency of firm-specific risks. Their study suggests that the quality and depth of risk disclosures are crucial for effective risk assessment and decision-making in capital markets. These studies underscore the need to examine not only the clarity of reports but also the comprehensiveness of the risk-related content in corporate filings, an area where divergent incentives within the TMT can significantly influence the quality of disclosures.

2.2. Hypothesis Development

In exploring the relationship between TMT incentive dispersion and risk disclosure quality, we consider two contrasting theoretical predictions. On one hand, divergent incentives with TMT could reduce the likelihood of collusion to conceal unfavorable risk information. When incentives are closely aligned, TMT members are more susceptible to groupthink (Harrison et al., 1998), where rationalization of behaviors, selective information processing, and reluctance to cooperate with external mediators occur (Esser, 1998). This dynamic can lead to collective decisions that downplay or obscure risks. In contrast, when incentives are more dispersed, cognitive conflicts

and debates within the team are more likely, reducing the tendency for conformity and hence improving the accuracy and transparency of risk disclosures (Hambrick & Fukutomi, 1991). Additionally, misreporting carries significant risks to managerial reputation and careers, which are particularly heightened in the context of risk disclosures (Baginski et al., 2018). Therefore, TMTs with diverse equity incentives may be less prone to manipulate risk disclosures, as such behavior becomes more difficult to rationalize and coordinate within the diverse team.

On the other hand, substantial dispersion in incentives within the TMT may lead to a broader range of perceptions and preferences (van Knippenberg & Schippers, 2007) and encourage divergent thinking processes (Katz, 1982) in decision-making regarding risk disclosures. While the diversity could potentially enhance the quality of financial disclosures by incorporating varied perspectives, it might also introduce delays in gathering and processing information, leading to inadvertent discrepancies in the final report. Misaligned incentives tend to hinder consensus-building and reduce team conformity (Priem, 1990), complicating the decision-making process for risk-related disclosures. Additionally, the dispersion of incentives may erode trust, cohesion, and coordination (Daboub et al., 1995), fostering conflicts and power struggles within the team. This fragmentation in the team's ability to align on key decisions can reduce the overall efficiency and negatively impact the clarity and transparency of financial reporting, resulting in less informative and incomprehensible risk disclosures.

Given the countervailing effects of TMT incentive dispersion on managerial behaviors and risk disclosure quality, the overall impact remains theoretically ambiguous. Whether dispersion in managerial compensation incentives enhances or undermines the quality of risk disclosures is ultimately an empirical question. This complexity highlights the need to examine how dispersion

in TMT incentives influences the transparency and informativeness of risk disclosures. Based on these considerations, we propose the following non-directional hypothesis:

H1: The dispersion in pay-performance sensitivities (PPS) among top management team (TMT) members is associated with the quality of risk disclosures.

3. Variable Measurement, Sample Selection, and Descriptive Statistics

3.1. Measuring Risk Disclosure Quality

We obtain firms' Form 10-K filings from the SEC's Electronic Data Gathering and Retrieval (EDGAR) database and process them to generate risk disclosure measures. Using Python, we follow the EDGAR parsing methodology outlined by Loughran and McDonald (2016) to remove all original markup language tags (HTML, XBRL, XML), ASCII-encoded graphics, and tables.[7] We then extract the textual content from three key risk-related sections: Item 1A "Risk Factors", Item 7 "MD&A", and Item 7A "Market Risk." From these sections, we construct four linguistic metrics that capture different dimensions of risk disclosure quality.

Readability captures the readability attribute of risk disclosures. It is constructed as the first principal component from the principal component analysis (PCA) of four standardized widely adopted readability metrics in prior literature: Flesch Reading Ease (Flesch), Gunning Fog Index (Fog), Flesch-Kincaid Grade Level (Flesch-Kincaid), and Simple Measure of Gobbledygook (SMOG) (Hwang & Kim, 2017; Li, 2008; Lehavy et al., 2011; Lo et al., 2017).[8] Given the high correlations among these four readability measures, PCA is employed to extract a composite

[7] The Loughran and McDonald (2016) documentation for the EDGAR filings parsing process is available at https://sraf.nd.edu/sec-edgar-data/cleaned-10x-files/10x-stage-one-parsing-documentation/.

[8] Specifically, Flesch is computed as 206.835 − (1.015 × (number of words/number of sentences)) − (84.6 × (number of syllables/number of words)), Fog is computed as 0.4 * ((number of words/number of sentences) + 100 * (number of words with more than two syllables/number of words)), Flesch-Kincaid is computed as 0.39 * (number of words/number of sentences) + 11.8 * (number of syllables/number words) - 15.59, and SMOG is computed as 1.043 * sqrt (30* number of words with more than two syllables/number of sentences) + 3.1291.

readability index. The first principal component captures the largest common variance across these four metrics, effectively summarizing the underlying readability dimension of the text. The resulting index is standardized to have a mean of 0 and a standard deviation of 1, ensuring comparability across firms and time periods. Since Flesch Reading Ease is positively related to readability while Gunning Fog Index, Flesch-Kincaid Grade Level, and SMOG are negatively related, the first principal component assigns weights in a way that aligns higher values with greater readability, suggesting clearer and more accessible disclosures, while a lower index value indicates denser and harder-to-read text. The details on the construction of this readability index are provided in Appendix B.

*(-1)*Complexity* captures the obfuscation or linguistic complexity attribute of risk disclosures. It is calculated as the natural logarithm of the number of words with three or more syllables per 1,000 total words within the risk disclosure sections, based on the complex word list identified by Loughran and McDonald (2024). A higher raw percentage suggests the use of more sophisticated or technical language, potentially making disclosures more difficult to interpret. To ensure that higher values reflect less complex language, the measure is multiplied by -1, so that an increase in the value of the measure corresponds to greater clarity and reduced complexity.

*(-1)*Ambiguity* captures the uncertainty and vagueness attribute of risk disclosures. It is computed as the natural logarithm of the number of uncertain and weak modal words in risk disclosures within the risk disclosure sections, based on the uncertain and weak modal word list identified by Loughran and McDonald (2011).[9] A higher raw value suggests that firms use more hedging language, indicating ambiguity or a lack of firm commitment in their disclosures. To ensure that higher values reflect greater transparency and less ambiguity, the measure is multiplied

[9] The Loughran and McDonald (2011) sentiment word lists is available at https://sraf.nd.edu/loughranmcdonald-master-dictionary/.

by -1, so that an increase in the value of the measure corresponds to more definitive and transparent language.

*(-1)*Length* captures the length attribute of risk disclosures. It is calculated as the natural logarithm of the number of total word count within the risk disclosure sections. The measure is multiplied by -1 so that higher values correspond to less lengthy disclosure.

Integrating the four linguistic metrics, we then construct a composite index, *Disclosure Quality Index,* to comprehensively capture the overall quality of risk disclosures. The index is derived as the first principal component from a PCA of four standardized disclosure quality metrics: *Readability, (-1)*Complexity*, *(-1)*Ambiguity,* and *(-1)*Length*. The first principal component captures the largest common variance among the four measures, effectively summarizing the key underlying dimensions of disclosure quality. The resulting factor is standardized to have a mean of 0 and a standard deviation of 1, where higher values indicate higher-quality risk disclosures, those that are more readable, less complex, clearer, and more concise. The details on the construction of the composite index are provided in Appendix B.

3.2. Sample Selection and Descriptive Statistics

Table 1 describes the sample selection criteria. We focus on firms that are incorporated in the U.S. with positive total assets. The sample period is from 2005 to 2023, given that 2005 is the first year the SEC mandates risk disclosure in the Item 1A Risk Factor section. We exclude firms in the financial (SIC 6000-6999), utilities (SIC 4900-4999), and quasi-regulated (SIC 4000-4499) industries from the sample. We obtain executive compensation data from the Compustat ExecuComp database. We retain only the five highest-paid executives if there are more than five reported in a particular year (Bebchuk et al., 2011). We exclude observations where CEOs' annual

compensation is $1 to mitigate any negative scaling impact resulting from our utilization of annual compensation for scaling PPS (Guthrie et al., 2012). We further retain firms with data available for risk disclosure quality index construction. We also eliminate observations with less than 20 words within a risk disclosure section (Campbell et al., 2015). We match the sample with firms' financial data from Compustat and stock return data from CRSP. The final sample for our main analyses consists of 12,474 firm-year observations from 1,644 unique firms. Table 2 provides descriptive statistics for our final sample. The distributions of the key analysis variables, main analysis variables, and control variables are consistent with those documented in prior literature.

4. Research Design and Empirical Results

4.1. Main Analyses: PPS Dispersion and Risk Disclosure Quality

To test hypothesis H1 on the relation between TMT PPS dispersion and risk disclosure quality, we estimate the following OLS regression model:

$$\textit{Eq. (1): Risk Disclosure Quality}_{i,t} = \beta_0 + \beta_1 DispersionPPS_{i,t} + \beta_2 MeanPPS_{i,t} + \beta_3 CEODelta_{i,t} + \beta_4 CEOCompensation_{i,t} + \beta_5 CEOTenure_{i,t} + \beta_6 CEOPaySlice_{i,t} + \beta_7 MVE_{i,t} + \beta_8 MB_{i,t} + \beta_9 Leverage_t + \beta_{10} ROA_{i,t} + \beta_{11} FirmAge_{i,t} + \beta_{12} EarnVol_{i,t} + \beta_{13} BusSeg_{i,t} + \beta_{14} GeoSeg_{i,t} + \beta_{15} Big4_{i,t} + \beta_{16} LitigationRisk_{i,t} + \textit{Fixed Effects} + \varepsilon_{i,t}$$

In Equation (1), The main variable of interest, $DispersionPPS_{i,t}$, represents the dispersion in PPS among the five highest-paid executives for each firm-year. We construct PPS as the dollar change in an executive's equity portfolio, composing of their stock and option holdings, for one percentage change in stock price, which is then divided by annual total compensation (Coles et al., 2006; Edmans et al., 2009). Specifically, PPS is calculated as *PPS = (# Stock holdings + # Stock options × Option Delta) × (Stock Price / 100) / Annual Compensation*. We then follow prior literature and use the PPS measure for each executive in each firm-year to compute PPS dispersion

(*DispersionPPS*) as the natural logarithm of the standard deviation of the PPS across the top five executives in the TMT for each firm-year (Kim et al., 2022; Kalelkar et al., 2024).

The dependent variable, *Risk Disclosure Quality*$_{i,t}$, is measured using the four linguistic metrics and the PCA-generated composite index, respectively. The details of the construction of these measures are presented in Section 3.1. and Appendix A. If there is an association between the dispersion of PPS and the quality of risk disclosures, we expect the coefficient β_1 will reflect the direction of the relationship, though our theoretical prediction does not provide a clear ex-ante expectation. to be either positive or negative. We incorporate TMT characteristics that are identified in prior research as determinants of financial reporting quality (Bergstresser & Philippon, 2006; Jiang et al., 2010; Kalelkar et al., 2024), including average PPS level across the TMT (*MeanPPS*), the tenure of the TMT (*TeamTenure*), and the pay disparity between the CEO and other TMT executives (*CEOPaySlice*). To account for other compensation incentives, we control for the CEO wealth sensitivity to stock price changes (*CEODelta*), total CEO compensation (*CEOCompensation*), and CEO tenure (*CEOTenure*), which may influence risk disclosure quality.

We also control for firm characteristics, including firm market size (*MVE*), market-to-book ratio (*MB*), leverage (*Leverage*), profitability (*ROA*), firm age (*FirmAge*), earnings volatility (*EarnVol*), the number of business segments (*BusSeg*), the number of geographic segments (*GeoSeg*), whether the firm is audited by a Big 4 auditor (*Big4*), and whether the firm is from an industry with high accounting litigation risk (*LitigationRisk*). We include fixed effects for years , industries based on the Fama and French (FF48) industry classification, and firms. We cluster the standard errors by year and industry classification to control for correlated error terms. Appendix A provides definitions of all variables included in the analyses.

Panel A of Table 3 reports the OLS regression results, where the dependent variable is one of the four linguistic metrics. When *Readability* is the dependent variable, *DispersionPPS* exhibits a positive and statistically significant coefficient (0.044, t-statistic = 4.30), indicating that greater PPS dispersion within the TMT enhances readability. Similarly, the significant positive coefficients of *DispersionPPS* in columns (2), (3) and (4) suggest that greater PPS dispersion among TMT members also helps improve the other three attributes of risk disclosure quality. Panel B presents results using the PCA-generated *Disclosure Quality Index*. The coefficient on *DispersionPPS* remains positive and significant (0.032, t-statistic = 3.91), reinforcing the link between PPS dispersion and higher disclosure quality. Overall, Table 3 consistently shows a significant association between PPS dispersion within the TMT and risk disclosure quality, suggesting that firms provide more useful and informative risk disclosures when there is a greater divergence in equity-based compensation incentives among TMT members.

4.2. Cross-Sectional Analyses

In this section, we present the research design used to test our cross-sectional predictions. We identify three sets of cross-sectional variables (CV) and examine how they impact the relationship between PPS dispersion and risk disclosure quality. For each set of cross-sectional variables, we construct two distinct measures. Observations with value above the sample median are classified as *HighCV*. Finally, we incorporate *HighCV* and its interaction with *DispersionPPS* into Equation (1) to assess their joint effects.

4.2.1. The Moderating Role of Firm Structural Attributes

We first examine how the relationship between PPS dispersion and risk disclosure quality varies with firm structural attributes. Prior studies show that increased firm structural complexity can lead to more opaque financial reporting, as larger or more diversified firms may have more challenges in aggregating and communicating risks effectively (Berger & Hann, 2007; Loughran & McDonald, 2024). To assess the moderating role of firm structural attributes, we employ two cross-sectional measures. The first measure, *Firm Complexity*, is defined as a binary indicator that equals one if the percentage of firm-complexity-related words relative to the total word count in a firm's 10-K exceeds the sample median, and zero otherwise. The firm-complexity-related words, identified and validated by Loughran and McDonald (2024), include terms typically associated with business or information complexity, such as *bankruptcies, counterparties, lawsuit, leases, swaps,* and *worldwide*. These words reflect the firm's complexity from the perspective of estimating future cash flows or auditors conducting financial statement audits (Loughran and McDonald, 2024).

Column (1) in Table 4 reports the regression results, where the cross-sectional variable (*HighCV*) is *Firm Complexity*. The coefficient on *DispersionPPS* remain significantly positive (0.021, t-statistic = 2.11), indicating that for firms with low complexity (*HighCV* = 0), greater PPS dispersion is associated with significant improvement in risk disclosure quality. Additionally, the negative and highly significant coefficients on *HighCV* (-0.127, t-statistic = -2.85) suggest that firms with higher complexity tend to exhibit poorer risk disclosure quality compared to less complex firms, likely due to the challenges in aggregating and communicating risks effectively. Finally, the positive and marginally significant coefficient on the interaction term (0.019, t-statistic = 1.79) indicates that while firm complexity generally reduces risk disclosure quality, greater PPS dispersion within complex firms may help mitigate this negative impact. This suggests that in

highly complex firms, a more diverse distribution of equity incentives among TMT members could enhance clarity and transparency in risk disclosures compared to similarly complex firms with lower PPS dispersion.

The second measure, *Firm Scope*, is defined as a binary indicator that equals one if the Hoberg-Phillips firm scope score is greater than the sample median, and zero otherwise. The firm scope score, developed by Hoberg and Phillips (2025), is derived from a firm's 10-K filing using natural language processing (NLP) and clustering techniques based on the doc2vec embedding model. This measure captures the extent of a firm's market participation and strategic expansion within related industries, reflecting its ability to grow beyond traditional operating segments through acquisitions, R&D investments, and other expansion strategies (Hoberg and Phillips, 2025).

Column (2) in Table 4 presents the regression results using *Firm Scope* as the cross-sectional variable (*HighCV*). The coefficients on *DispersionPPS* remain significantly positive (0.035, t-statistic = 4.15), indicating that in firms with narrower industry scope (*HighCV* = 0), greater PPS dispersion is associated with significant improvement in risk disclosure quality. Additionally, the coefficient on *HighCV* is negative and highly significant (-0.371, t-statistic = -7.28), suggesting that firms with broader market participation tend to exhibit lower risk disclosure quality. This finding is consistent with the notion that operating across a wider range of industry segments can complicate disclosure efforts, potentially leading to information overload or increased ambiguity. Finally, the negative and statistically significant coefficient on the interaction term (-0.026, t-statistic = -2.36) suggest that in firms with broader scope, the positive effect of PPS

dispersion on risk disclosure quality diminishes. This implies that as firms expand their market participation, the benefits of incentive dispersion in improving disclosure clarity may waken.[10]

4.2.2. The Moderating Role of Executive Control and External Monitoring

We next examine how the relationship between TMT PPS dispersion and risk disclosure quality varies with executive control and external monitoring. For executive control, we focus on the role of CEO Power, which shapes the decision-making dynamics within the TMT. Powerful CEOs exert substantial influence corporate governance and strategic choices (Jensen & Meckling, 1976; Hambrick & Mason, 1984). While CEO power can enhance alignment within the TMT, facilitating more coordinated decision-making, it may also entrench management and weaken governance mechanisms (Bebchuk et al., 2011). Moreover, CEO dominance can either strengthen or dilute the benefits of TMT PPS dispersion, depending on whether it fosters cohesion or suppresses the impact of other executives within TMT (Liu & Jiraporn, 2010). To examine moderating role of CEO power, we construct a composite index based on prior literature (Finkelstein, 1992; Han et al., 2016; Peterson et al., 2003). The index captures five dimensions of CEO power: serving as the board chairperson, being a firm founder, having a pay slice above the industry-year median, exceeding industry tenure, and holding an ownership stake above the industry-year median. We then define *CEOPower* as a binary indicator equal to one if the CEO's power index exceeds the sample median and zero otherwise, with higher values indicating greater influence.

[10] While both *Firm Complexity* and *Firm Scope* capture aspects of a firm's structural complexity, they represent distinct dimensions. *Firm Complexity* reflects information processing difficulty for external information users (e.g., investors, auditors), where high PPS dispersion may incentivize clearer risk disclosures, mitigating complexity's negative effect. In contrast, *Firm Scope* represents operational breadth, where high PPS dispersion can lead to different priorities, fragmented decision-making, reduced coordination, weakening the positive impact of dispersion on disclosure quality. This distinction may explain why the interaction term is positive for *Firm Complexity* but negative for *Firm Scope*.

Column (3) in Table 4 presents the regression results. The coefficient on *HighCV*, i.e., *CEOPower*, is insignificant (-0.009, t-statistic = -0.19), indicating that CEO power alone does not have a direct impact on risk disclosure quality. However, we observe that firms with low CEO power (*HighCV* = 0) benefit more from PPS dispersion (0.034, t-statistic = 3.93), likely because other TMT members have relatively greater influence over risk reporting, leading to enhanced transparency. In contrast, the negative and statistically significant interaction term (-0.024, t-statistic = -2.06) suggests that in firms where the CEO has high power, the positive effect of PPS dispersion on risk disclosure quality diminishes. This results implies that powerful CEO may centralize decision-making, reducing the influence of other TMT members in risk disclosure processes, which could hinder transparency.

For external monitoring, we examine the role of institutional investor oversight. Heightened scrutiny can incentivize management to improve risk disclosure quality (Armstrong et al., 2010; Guay et al., 2016). Institutional investors, as major stakeholders in public firms, influencing governance and disclosure practices, often emphasizing financial performance and reporting quality. Their oversight may enhance the relationship between PPS dispersion and risk disclosure. To test this prediction, we construct *Inst Own*, a binary indicator that equals one if institutional ownership exceeds the sample median and zero otherwise.

Column (4) in Table 4 presents the regression results. The coefficient on *HighCV*, i.e., *Inst Own* (0.097, t-statistic = 1.92) is significantly positive, suggesting that firms with higher institutional ownership tend to provide higher-quality risk disclosures. This finding supports the view that institutional investors demand greater disclosure transparency. Additionally, firms with low institutional ownership (*HighCV* = 0) still benefit from PPS dispersion (0.023, t-statistic = 2.52), indicating that dispersed incentives can enhance disclosure quality even in firms with weak

external monitoring. Finally, the coefficient on the interaction term (0.040, t-statistic = 3.28) is positive and highly significant, indicating that the positive impact of PPS dispersion on risk disclosure quality is further amplified in firms with high institutional ownership. This result suggests that institutional investors may help reinforce the beneficial effects of equity incentive dispersion on disclosure quality.

4.2.3. The Moderating Role of Macroeconomic Disruptions

We finally examine how macroeconomic disruptions influence the relationship between TMT PPS dispersion and risk disclosure quality. During periods of heightened uncertainty, divergent risk preferences within the TMT become more pronounced, potentially leading to fragmented decision-making and inconsistent messaging in disclosures (Bourgeois III, 1985). While greater PPS dispersion can typically enhance transparency by preventing collusion under normal environment, in times of crisis, it may instead hinder coordination and reduce the clarity of risk disclosures as executives struggle to align their responses.

To investigate these dynamics, we employ two macroeconomic shock settings and construct corresponding disruption measures. The first, *Great Recession*, is a binary indicator equal to one for fiscal year 2008 and zero otherwise. The second, *COVID Pandemic*, is a binary indicator equal to one for fiscal year 2020 and zero otherwise.

Columns (5) and (6) in Table 4 demonstrate that, during periods of stability, PPS dispersion continues to exhibit positive and significant effects on risk disclosure quality. However, during the Great Recession of 2008 (*HighCV* = 1), this positive impact diminished (coefficient: 0.059, interaction effect: -0.047, net effect: 0.012). More notably, during the COVID-19 pandemic, the relationship reversed, with PPS dispersion negatively affecting risk disclosure quality (coefficient:

-0.052, interaction effect: 0.033, net effect: -0.019). These findings suggest that macroeconomic crises disrupt the usual benefits of PPS dispersion by amplifying internal divisions, weakening coordination, hence reducing disclosure clarity.

4.3. Path Analysis: The Mediation Role of Earnings Management

We further conduct a path analysis to explore the potential mechanisms, such as earnings management, through which TMT PPS dispersion may influence risk disclosure quality. Previous research by Li (2008) and Hasan (2020) suggests that managers may intentionally obscure risk disclosures to hide unfavorable performance or negative information. Lo et al. (2017) find that firms that are more likely to engage in earnings management tend to present more complex disclosures in their 10-K filings. In contrast, our findings suggest that higher PPS dispersion is associated with better risk disclosure quality. Therefore, our path analysis tests whether the positive relationship between PPS dispersion and risk disclosure quality stems from its potential to mitigate earnings management, thereby enhancing transparency in annual reports.

To assess the mediation role of earnings management, we estimate the Structural Equation Modeling (SEM) that includes two regressions: a regression of the mediating variable *Discretionary Accruals* on the *DispersionPPS* variable (Jollineau & Bowen, 2022), as described in Equation (2), and a regression of *Risk Disclosure Quality* on the *DispersionPPS* variable and the mediating variable *Discretionary Accruals*, as described in Equation (3).

Eq. (2): $Discretionary\ Accruals_{i,t} = \beta_0 + \beta_1 DispersionPPS_{i,t} + \Sigma\beta_j Controls_{j,t} + \varepsilon_{i,t}$

Eq. (3): $Risk\ Disclosure\ Quality_{i,t} = \alpha_0 + \alpha_1 DispersionPPS_{i,t} + \alpha_2 Discretionary\ Accruals_{i,t} + \Sigma\alpha_j Controls_{j,t} + \varepsilon_{i,t}$

In the SEM regressions, the discretionary accruals variable is the absolute value of discretionary accruals computed using the modified cross-sectional Jones model for each 2-digit SIC and fiscal year following Cohen et al. (2008) and Kim et al. (2022). The direct path of the PPS dispersion on risk disclosure quality is measured by α_1 in Equation (3), and the mediated path is measured by the product of α_2 in Equation (3) and β_1 in Equation (2), that is, $\alpha_2 \times \beta_1$. To establish mediation, we expect to observe that the product of α_2 and β_1 to be positive, i.e., $\alpha_2 \times \beta_1 > 0$. The significance of the mediation effect is estimated using the Sobel (1982) test statistics.

Panel A of Table 5 reports the results from the regression specified in Equation (2), and Panel B reports the results from the path analysis examining the mediating role of earnings management, as represented by the discretionary accruals variable. The direct path results from estimating Equation (3) show that *DispersionPPS* continues to have a significant positive impact on risk disclosure quality index (α_1 = 0.032, t-statistic = 3.88). The mediated path results from estimating Equation (2) show that *DispersionPPS* significantly reduces *Discretionary Accruals* (β_1 = -0.649, t-statistic = -4.78), suggesting the potential for mitigated earnings management as an indirect path for PPS dispersion affect risk disclosure quality. In addition, *Discretionary Accruals* itself is negatively associated with risk disclosure quality (α_2 = -0.002, t-statistic = -4.01). Thus, the mediation effect of *Discretionary Accruals* on *Risk Disclosure Quality* is computed as $\alpha_2 \times \beta_1$ = 0.002 (Sobel's Z-statistic = 3.069). These results from the path analysis suggest that the PPS dispersion within TMT indirectly affects the quality of risk disclosures by mitigating the mediating variable of earnings management.

5. Further Analyses

5.1. Variation in Risk Disclosure Quality across Risk Items

We apply the same methodology to generate a risk disclosure quality index for Item 1A, Item 7, and Item 7A, respectively, and conduct OLS regressions for each Item. Panel A of Table 6 reveals that the positive effect of TMT PPS dispersion on risk disclosure quality is more pronounced for Item 1A (0.023, t-statistic = 3.41) and Item 7 (0.061, t-statistic = 7.87), highlighting a particularly strong impact on Item 7 MD&A section. However, PPS dispersion does not significantly improve the disclosure quality of Item 7A. This finding aligns with the notion that each section of the 10-K filing serves a distinct purpose and addresses distinct aspects of a firm's operations and risk exposures.

Item 1A (Risk Factors), is the mandatory risk disclosure section, designed to highlight significant risks faced by the firm. Item 7 (MD&A) involves substantial managerial judgment in explaining the firm's financial performance and operational risks, making it particularly sensitive to the effects of TMT incentive heterogeneity. Greater dispersion in the equity incentives within TMT fosters diverse perspectives and richer discussions, leading to more transparent, high-quality disclosures. In contrast, Item 7A (Market Risk) primarily involves standardized, quantitative assessments of market risks (e.g., interest rate and currency risks), where managerial discretion plays a limited role, explaining the lack of a significant effect. Thus, our findings suggest that the impact of TMT PPS dispersion on disclosure quality is most pronounced when managerial judgment and strategic interpretation play a greater role.

5.2. Variation in Idiosyncratic and Systematic Risk Disclosures

Next, we examine how TMT PPS dispersion influences the content of risk disclosures, focusing on the intensity with which firms disclose idiosyncratic and systematic risks. To measure this, we construct two distinct variables: *Idio Risk Intensity* and *Sys Risk Intensity*. *Idio Risk*

Intensity is the natural logarithm of the percentage of idiosyncratic risk-related keywords (relative to the total word count) within risk disclosure sections. These keywords are related to firm-specific risks, such as acquisition, downsizing, labor relations, technological obsolescence, and supply chain issues.[11] On the other hand, *Sys Risk Intensity* is the natural logarithm of the percentage of occurrences of systematic risk-related keywords occurrences within risk disclosure sections, which refer to broader, market-wide risks like economic uncertainties, financial crises, fiscal policy, inflation, and general business risks.[12] The keyword lists used to define these two measures were sourced by Campbell et al. (2014), and further details on construction and validation of these keyword lists are available in Appendices 1 and 2 in their study.

We then use OLS regressions to assess the impact of TMT PPS dispersion on these two types of disclosure contents. The results, shown in Panel B of Table 6, reveal a significant positive effect of PPS dispersion on the disclosure of idiosyncratic risks (0.008, t-statistic = 2.06), suggesting that greater PPS dispersion leads to more detailed disclosures about firm-specific risks. In contrast, PPS dispersion has a significant negative effect on the disclosure of systematic risks (-0.017, t-statistic = -4.51), implying that when PPS dispersion is high, firms tend to provide less detailed information about broader, market-wide risks. Collectively, these results suggest that TMT PPS dispersion influences the content of risk disclosures in a way that aligns with the focus on idiosyncratic risks over systematic risks. Specifically, firms with greater PPS dispersion appear to prioritize the disclosure of risks that are more specific to their operations, likely due to differing perspectives and priorities within the TMT regarding firm-specific challenges. In contrast, when

[11] Words are classified as idiosyncratic risk if they closely relate to firm-specific risks, such as *acquisition, California power crisis, cost control, downsizing, economies of scale, labor relation, shortages, special purpose entity, strike, supply chain, technological obsolescence, natural disasters, proprietary* (Campbell et al., 2014).

[12] Words are classified as systematic risk if they relate to market-wide risks, such as *Asian crisis, economic uncertainties, energy, financial crisis, fiscal policy, foreign currency, fuel, GDP, general business risks, gold, hedge, industry environment, inflation, political climate, U.S. dollar* (Campbell et al., 2014).

there is more PPS dispersion, systematic risks that are harder to mitigate may receive less attention, possibly due to a lack of internal alignment on how to address broader market-related challenges.

5.3. PPS Dispersion and Optimistic Tone in Risk Disclosures

Managerial strategic optimism often influences how investors interpret disclosures, serving as a signaling mechanism (Hribar and Yang, 2016; Davis et al., 2015). We further examine the relationship between TMT PPS dispersion and risk disclosures by re-estimating Equation (1), using the tone metric as the dependent variable. Following Davis et al. (2015), we construct the *Optimistic Tone* measure as the difference between positive and negative words in risk disclosures, using tone words identified by Loughran and McDonald (2011). We split our sample into two subsamples: one with PPS dispersion above the sample median and the other below it. Panel B of Table 6 reveals that, in the high-dispersion subsample, the coefficient on *DispersionPPS* is negative and statistically significant (-0.047, t-statistic = -3.59), indicating that higher PPS dispersion among TMT significantly reduces managerial optimistic tone in risk disclosures. In contrast, no such effect is observed in the low-dispersion subsample (0.024, t-statistic = 1.39).

The results suggest that greater heterogeneity in TMT incentives constraints overly optimistic disclosure strategies, resulted from increased internal scrutiny and more balanced perspectives on risks. In contrast, low PPS dispersion aligns managerial incentives, making optimistic narratives less likely to be challenged, reinforcing cognitive biases or intentional signaling. Thus, our findings suggest that incentive heterogeneity among TMT members may foster transparency by moderating strategic optimism in risk disclosures.

5.4. PPS Dispersion and Post-Disclosure Information Environment

Prior literature links higher-quality corporate disclosures to an improved information environment for the firm (Beatty et al., 2019; Campbell et al., 2014; Easley & O'Hara, 2004). Research shows that more complex and difficult-to-read disclosures are associated with greater information asymmetry (Leuz & Verrecchia, 2000). Thus, we investigate whether PPS dispersion among TMT members further exacerbates or mitigates the effect of risk disclosure obfuscation on a firm's information environment. Specifically, we estimate the following OLS regression model:

$$Eq.\ (4):\ InfoEnvironment_{,t+1} = \beta_0 + \beta_1 DisclosureQualityIndex_{i,t} \times DispersionPPS_{i,t} + \beta_2 DisclosureQualityIndex_{i,t} + \beta_3 DispersionPPS_{i,t} + \Sigma\beta_j Controls_{j,t} + \varepsilon_{i,t}$$

Columns (1) to (2) in Table 7 presents the results from estimating the regression in Equation (4) when the dependent variables are *Illiquidity (t+1)* and *BidAskSpread (t+1)*, respectively. *Illiquidity (t+1)* is the Amihud (2002) measure of illiquidity for the 250 trading days beginning with two trading days after the Form 10-K release date, where illiquidity is calculated as the daily return divided by daily dollar volume. *BidAskSpread (t+1)* is the average value of the bid-ask spread for the 250 trading days beginning two trading days after the Form 10-K release date, where the bid-ask spread is calculated as (ask-bid)/price using data on closing prices and quotes from CRSP.[13] Across both columns, we observe significant and negative associations between the interaction terms and the two metrics that gauge the firm's information environment. Specifically, the coefficient for *Illiquidity (t+1)* is -0.015 (t-statistic = -4.35), and for *BidAskSpread (t+1)* is -0.009 (t-statistic = 04.88). These results suggest that when there is high PPS dispersion among the TMT members, improved risk disclosures are further associated with mitigated illiquidity and decreased bid-ask spread in the post-disclosure period, thereby amplifying the positive impact of risk disclosure quality on the firm's information environment.

[13] We follow Chung and Zhang (2009) to exclude all CRSP spreads that are greater than 50% of the quote midpoint.

6. Robustness Tests

6.1. Addressing Endogeneity with 2SLS and Propensity Score Matching

In our baseline model outlined in Equation (1), we control for key determinants of financial reporting quality, utilizing fixed-effect regressions to address potential time-invariant omitted variable bias. To further address concerns related to time-variant omitted variables correlated with both the TMT PPS dispersion measure and risk disclosure quality, we first use an instrumental variable approach through two-stage least squares (2SLS) regressions. Following the methodology of prior studies (Kim et al., 2022; Kalelkar et al., 2024), we introduce the PPS dispersion among non-CEO and non-CFO executive officers (*DispersionPPS_NoCEOCFO*) within the TMT as the instrumental variable. This instrumental variable is calculated as the standard deviation of PPS for the top executives, excluding both CEO and CFO. It is expected to exhibit a high correlation with the endogenous variable, *DispersionPPS*. Importantly, since these executives are not heavily involved in financial reporting, this variable is less likely to have a direct influence on the dependent variable, *Disclosure Quality Index*. Therefore, it serves as a suitable instrumental variable, impacting risk disclosure only through its association with the PPS dispersion among all five TMT members.

Panel A of Table 8 presents the outcomes of the 2SLS regressions. In the first-stage regression, where the dependent variable is *DispersionPPS*, we incorporate the instrumental variable alongside all other control variables specified in the baseline regression model. The results indicate a positive and significant association between *DispersionPPS_NoCEOCFO* and *DispersionPPS* (0.571, t-statistic = 71.52), with an adjusted R-squared of 78.21% and the Cragg-Donald Test for Instrument Strength statistic of 203.8. These results suggest that the instrumental variable satisfies the exclusion restriction. In the second-stage regressions, we utilize the *Fitted*

DispersionPPS values obtained from the first-stage regression to replace *DispersionPPS* in the baseline model. We observe that the coefficients on *Fitted DispersionPPS* remain statistically significant and positive (0.040, t-statistic = 3.44), and their economic significance surpasses those on *DispersionPPS* in the baseline model reported in Table 3. This provides robust evidence that our main results are unlikely to be driven by time-invariant omitted variables.

To mitigate the concern of the potential influence of confounding factors, we then conduct our analysis using the propensity score matching (PSM) technique. We divide our sample into two groups based on the median of the PPS dispersion measure. We consider the group with high (above-median) PPS dispersion as the treated group, and the group with low (below-median) PPS dispersion as the control group. We match the treated and control groups using a logit propensity score model that predicts the probability of belonging to the high-PPS-dispersion group as a function of firm characteristics and Fama-French 48 industry classification. We then use the nearest neighbor matching without replacement method to match each high-PPS-dispersion firm to a single control firm with the smallest absolute difference in propensity scores, i.e., predicted values from the logit model.

Panel B of Table 8 reports our analysis of the baseline model using the propensity score matched sample. Consistent with the results reported in Table 3, we continue to find that PPS dispersion is significantly positively associated with risk disclosure quality (0.034, t-statistic = 3.74), suggesting that our main finding is robust to the propensity score matched sample.

6.2. Evidence from using a Binary Independent Variable

Table 9 presents the results from estimating the main regression using a binary indicator variable of TMT PPS dispersion. We construct *DispersionPPS_Binary*, which equals one if the

PPS dispersion among TMT members is greater than the sample median and zero otherwise. We continue observing statistically significant positive associations between *DispersionPPS_Binary* and measures for risk disclosure quality. These findings reinforce our main analysis, demonstrating that greater dispersion in equity compensation incentives among TMT members is consistently associated with improved risk disclosure quality.

6.3. Evidence from Overall Disclosure Quality in 10-K

Finally, we estimate the main regression using disclosure quality metrics and a composite index constructed for overall disclosures within 10-K filings. Specifically, *10K Bog Readability* is the natural logarithm of the Bog Index developed by Bonsall et al. (2017), which measures the readability of 10-K filings based on plain English. The index consolidates attributes identified by the SEC's plain English advocate, capturing both simplicity and specificity in the text (Bonsall et al., 2017). We multiply -1 to this measure so that a higher value in *Bog Readability* indicates greater readability of the 10-K document. The construction details for *10K Complexity*, *10K Ambiguity*, *10K Length*, and *10K Disclosure Quality Index* are provided in Appendices A and B. In Table 10, across all specifications, we observe significant positive associations between *DispersionPPS* and measures of 10-K disclosure quality. Taken together, our findings demonstrate that greater PPS dispersion among TMT members is not only linked to improved risk disclosures but also correlates with enhanced overall disclosure quality in the entire Form 10-K.

7. Conclusion

This study examines how heterogeneity in pay-performance sensitivity (PPS) among top management team (TMT) members affects the quality of risk disclosures in firms' 10-K filings.

We use a combination of linguistic metrics, and a composite quality index derived through principal component analysis to measure risk disclosure quality. Our findings reveal a significant positive association between TMT PPS dispersion and risk disclosure quality, with cross-sectional analyses showing that this relationship is moderated by factors such as firm structure, executive control, external monitoring, and macroeconomic disruptions. Additionally, path analysis reveals that PPS dispersion indirectly impacts risk disclosure quality by influencing earnings management. Overall, our study highlights the significant role of TMT equity-based compensation incentives in shaping financial reporting quality, particularly in the context of risk disclosures, and offers valuable insights for investors, regulators, and policymakers in mitigating misreporting and preventing fraudulent financial reporting.

References

Abraham, S., & Shrives, P. J. (2014). Improving the relevance of risk factor disclosure in corporate annual reports. *The British Accounting Review*, *46*(1), 91-107.

American Institute of Certified Public Accountants (AICPA). Task Force on Risks and Uncertainties, "Report of the Task Force on Risks and Uncertainties" (1987). AICPA Committees. 198.

Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31-56.

Armstrong, C. S., Guay, W. R., & Weber, J. P. (2010). The role of information and financial reporting in corporate governance and debt contracting. *Journal of Accounting and Economics*, *50*(2-3), 179-234.

Armstrong, C. S., Larcker, D. F., Ormazabal, G., & Taylor, D. J. (2013). The relation between equity incentives and misreporting: The role of risk-taking incentives. *Journal of Financial Economics*, *109*(2), 327-350.

Azmi Shabestari, M., & Romero, J. A. (2022). Textual Analysis and Future Performance: Evidence from Item 1A and Item 7. *Journal of Accounting, Auditing & Finance*, 0148558X221107849.

Baginski, S. P., Campbell, J. L., Hinson, L. A., & Koo, D. S. (2018). Do career concerns affect the delay of bad news disclosure?. *The Accounting Review*, *93*(2), 61-95.

Bamber, L. S., Jiang, J., & Wang, I. Y. (2010). What's my style? The influence of top managers on voluntary corporate financial disclosure. *The Accounting Review*, *85*(4), 1131-1162.

Beatty, A., Cheng, L., & Zhang, H. (2019). Are risk factor disclosures still relevant? Evidence from market reactions to risk factor disclosures before and after the financial crisis. *Contemporary Accounting Research*, *36*(2), 805-838.

Bebchuk, L. A., Cremers, K. M., & Peyer, U. C. (2011). The CEO pay slice. *Journal of Financial Economics*, *102*(1), 199-221.

Berger, P. G., & Hann, R. N. (2007). Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review*, *82*(4), 869-906.

Bergstresser, D., & Philippon, T. (2006). CEO incentives and earnings management. *Journal of Financial Economics*, *80*(3), 511-529.

Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency?. *Journal of Accounting and Economics*, *48*(2-3), 112-131.

Borghesi, R., Houston, J., & Naranjo, A. (2007). Value, survival, and the evolution of firm organizational structure. *Financial Management*, *36*(3), 5-31.

Bonsall IV, S. B., Leone, A. J., Miller, B. P., & Rennekamp, K. (2017). A plain English measure of financial reporting readability. *Journal of Accounting and Economics*, *63*(2-3), 329-357.

Bourgeois III, L. J. (1985). Strategic goals, perceived uncertainty, and economic performance in volatile environments. *Academy of Management Journal*, *28*(3), 548-573.

Burns, N., & Kedia, S. (2006). The impact of performance-based compensation on misreporting. *Journal of Financial Economics*, *79*(1), 35-67.

Bushee, B. J., Gow, I. D., & Taylor, D. J. (2018). Linguistic complexity in firm disclosures: Obfuscation or information?. *Journal of Accounting Research*, *56*(1), 85-121.

Bushman, R. M., Dai, Z., & Zhang, W. (2016). Management Team Incentive: Dispersion and Firm Performance. *The Accounting Review*, 91(1), 21-45.

Campbell, J. L., Chen, H., Dhaliwal, D. S., Lu, H. M., & Steele, L. B. (2014). The information content of mandatory risk factor disclosures in corporate filings. *Review of Accounting Studies*, *19*, 396-455.

Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management*, *30*(6), 749-778.

Cheng, Q., & Warfield, T. D. (2005). Equity incentives and earnings management. *The Accounting Review*, *80*(2), 441-476.

Chiu, T. T., Guan, Y., & Kim, J. B. (2018). The effect of risk factor disclosures on the pricing of credit default swaps. *Contemporary Accounting Research*, 35(4), 2191-2224.
Chung, K. H., and H. Zhang, 2014, A simple approximation of intraday spreads using daily data, *Journal of Financial Markets*, 17, 94-120.
Cohen, D. A., Dey, A., & Lys, T. Z. (2008). Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods. *The Accounting Review*, *83*(3), 757-787.
Coles, J. L., Daniel, N. D., & Naveen, L. (2006). Managerial incentives and risk-taking. *Journal of Financial Economics*, *79*(2), 431-468.
Core, J., & Guay, W. (2002). Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting Research*, *40*(3), 613-630.
Core, J. E., Guay, W. R., & Larcker, D. F. (2003). Executive equity compensation and incentives: a survey. *Economic Policy Review*, *9*(Apr), 27-50.
Daboub, A. J., Rasheed, A. M., Priem, R. L., & Gray, D. (1995). Top management team characteristics and corporate illegal activity. *Academy of Management Review*, *20*(1), 138-170.
Davidson, R. H. (2022). Who did it matter: Executive equity compensation and financial reporting fraud. *Journal of Accounting and Economics*, *73*(2-3), 101453.
Davis, A. K., Ge, W., Matsumoto, D., & Zhang, J. L. (2015). The effect of manager-specific optimism on the tone of earnings conference calls. *Review of Accounting Studies*, *20*, 639-673.
Dichev, I. D., Graham, J. R., Harvey, C. R., & Rajgopal, S. (2013). Earnings quality: Evidence from the field. *Journal of Accounting and Economics*, *56*(2-3), 1-33.
Easley, D., & O'hara, M. (2004). Information and the cost of capital. *The Journal of Finance*, *59*(4), 1553-1583.
Edmans, A., Gabaix, X., & Landier, A. (2009). A multiplicative model of optimal CEO incentives in market equilibrium. *The Review of Financial Studies*, *22*(12), 4881-4917.
Elshandidy, T., Shrives, P. J., Bamber, M., & Abraham, S. (2018). Risk reporting: A review of the literature and implications for future research☆. *Journal of Accounting Literature*, *40*(1), 54-82.
Erickson, M., Hanlon, M., & Maydew, E. L. (2006). Is there a link between executive equity incentives and accounting fraud?. *Journal of Accounting Research*, *44*(1), 113-143.
Ertugrul, M., Lei, J., Qiu, J., & Wan, C. (2017). Annual report readability, tone ambiguity, and the cost of borrowing. *Journal of Financial and Quantitative Analysis*, *52*(2), 811-836.
Esser, J. K. (1998). Alive and well after 25 years: A review of groupthink research. *Organizational Behavior and Human Decision Processes*, *73*(2-3), 116-141.
Feng, M., Ge, W., Luo, S., & Shevlin, T. (2011). Why do CFOs become involved in material accounting manipulations?. *Journal of Accounting and Economics*, *51*(1-2), 21-36.
Finkelstein, S. (1992). Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, *35*(3), 505-538.
Francis, J., Philbrick, D., & Schipper, K. (1994). Shareholder litigation and corporate disclosures. *Journal of Accounting Research*, *32*(2), 137-164.
Friedman, H. L. (2014). Implications of power: When the CEO can pressure the CFO to bias reports. *Journal of Accounting and Economics*, *58*(1), 117-141.
Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, *40*(1-3), 3-73.
Guay, W., Samuels, D., & Taylor, D. (2016). Guiding through the fog: Financial statement complexity and voluntary disclosure. *Journal of Accounting and Economics*, *62*(2-3), 234-269.
Guthrie, J., Ricceri, F., & Dumay, J. (2012). Reflections and projections: a decade of intellectual capital accounting research. *The British Accounting Review*, *44*(2), 68-82.
Hambrick, D. C., Cho, T. S., & Chen, M. J. (1996). The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly*, 659-684.
Hambrick, D. C., & Fukutomi, G. D. (1991). The seasons of a CEO's tenure. *Academy of Management Review*, *16*(4), 719-742.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, *9*(2), 193-206.
Han, S., Nanda, V. K., & Silveri, S. (2016). CEO power and firm performance under pressure. *Financial Management*, *45*(2), 369-400.
Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond relational demography: Time and the effects of surface-and deep-level diversity on work group cohesion. *Academy of Management Journal*, *41*(1), 96-107.
Hasan, M. M. (2020). Readability of narrative disclosures in 10-K reports: does managerial ability matter?. *European Accounting Review*, *29*(1), 147-168.
Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1-3), 405-440.
Hoberg, G., & Phillips, G. M. (2025). Scope, Scale, and Concentration: The 21st-Century Firm. *The Journal of Finance*, *80*(1), 415-466.
Hope, O.-K., Hu, D., & Lu, H. (2016). The benefits of specific risk-factor disclosures. *Review of Accounting Studies*, 21(4), 1005–1045.
Hopkins, J. J., Maydew, E. L., & Venkatachalam, M. (2015). Corporate general counsel and financial reporting quality. *Management Science*, *61*(1), 129-145.
Hribar, P., & Yang, H. (2016). CEO overconfidence and management forecasting. *Contemporary Accounting Research*, *33*(1), 204-227.
Hwang, B. H., & Kim, H. H. (2017). It pays to write well. *Journal of Financial Economics*, *124*(2), 373-394.
Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
Jensen, M. C., & Murphy, K. (1990). Performance pay and top-management incentives. *Journal of Political Economy*, 98(2), 225-264,
Jiang, J. X., Petroni, K. R., & Wang, I. Y. (2010). CFOs and CEOs: Who have the most influence on earnings management?. *Journal of Financial Economics*, *96*(3), 513-526.
Johnson, S. A., Moorman, T. C., & Sorescu, S. (2009). A reexamination of corporate governance and equity prices. *The Review of Financial Studies*, *22*(11), 4753-4786.
Jollineau, S. J., & Bowen, R. M. (2022). A practical guide to using path analysis: Mediation and moderation in accounting research. *Journal of Financial Reporting*.
Kalelkar, R., Shi, Y., & Xu, H. (2024). Top management team incentive dispersion and management earnings forecasts. *Journal of Business Finance & Accounting*.
Kaplan, R. S. (2011). Accounting scholarship that advances professional knowledge and practice. *The Accounting Review*, 86(2), 367-383.
Katz, R. (1982). The effects of group longevity on project communication and performance. *Administrative Science Quarterly*, 81-104.
Kim, T., Kyung, H., & Ng, J. (2022). Top Management Team Incentive Dispersion and Earnings Quality. *Contemporary Accounting Research*, *39*(3), 1949-1985.
Kohlbeck, M., & Luo, X. (2022). The Association of the Qualitative Informativeness of Market Risk Disclosures with Stock Liquidity. *Journal of Accounting, Auditing & Finance*, 0148558X221117938.
Koo, D. S., & Lee, D. (2018). Influential chief marketing officers and management revenue forecasts. *The Accounting Review*, *93*(4), 253-281.
Kothari, S. P., Shu, S., & Wysocki, P. D. (2009). Do managers withhold bad news?. *Journal of Accounting Research*, 47(1), 241-276.
Kravet, T., & Muslu, V. (2013). Textual risk disclosures and investors' risk perceptions. *Review of Accounting Studies*, 18, 1088–1122.
Kwak, B., Ro, B. T., & Suk, I. (2012). The composition of top management with general counsel and voluntary information disclosure. *Journal of Accounting and Economics*, *54*(1), 19-41.

Lehavy, R., Li, F., & Merkley, K. (2011). The effect of annual report readability on analyst following and the properties of their earnings forecasts. *The Accounting Review*, *86*(3), 1087-1115.
Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research*, 91-124.
Li, F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics*, *45*(2-3), 221-247.
Liu, Y., & Jiraporn, P. (2010). The effect of CEO power on bond ratings and yields. *Journal of Empirical Finance*, *17*(4), 744-762.
Lo, K., Ramos, F., & Rogo, R. (2017). Earnings management and annual report readability. *Journal of Accounting and Economics*, *63*(1), 1-25.
Loughran, T., & McDonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *The Journal of Finance*, *66*(1), 35-65.
Loughran, T., & McDonald, B. (2014). Measuring readability in financial disclosures. *the Journal of Finance*, *69*(4), 1643-1671.
Loughran, T., & McDonald, B. (2016). Textual analysis in accounting and finance: A survey. *Journal of Accounting Research*, *54*(4), 1187-1230.
Loughran, T., & McDonald, B. (2024). Measuring firm complexity. *Journal of Financial and Quantitative Analysis*, *59*(6), 2487-2514.
Nadeem, M. (2022). Board gender diversity and managerial obfuscation: Evidence from the readability of narrative disclosure in 10-K reports. *Journal of Business Ethics*, *179*(1), 153-177.
Peterson, R. S., Smith, D. B., Martorana, P. V., & Owens, P. D. (2003). The impact of chief executive officer personality on top management team dynamics: one mechanism by which leadership affects organizational performance. *Journal of Applied Psychology*, *88*(5), 795.
Priem, R. L. (1990). Top management team group factors, consensus, and firm performance. *Strategic Management Journal*, *11*(6), 469-478.
Rahman, D., & Kabir, M. (2023). Does Board Independence Influence Annual Report Readability?. *European Accounting Review*, 1-28.
Richards, H. E., Shi, Y., & Xu, H. (2023). The impact of top management team incentive dispersion on Non-GAAP reporting. *Journal of Contemporary Accounting & Economics*, 100396.
Schrand, C. M., & Elliott, J. A. (1998). Risk and financial reporting: A summary of the discussion at the 1997 AAA/FASB conference. *Accounting Horizons*, 12(3), 271.
Skinner, D. J. (1994). Why firms voluntarily disclose bad news. *Journal of Accounting Research*, 32(1), 38-60.
Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*, 290-312.
Vafeas, N., & Vlittis, A. (2012). An agency-based perspective on the performance consequences of COO adoption. *Review of Quantitative Finance and Accounting*, *39*, 361-382.
Van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annu. Rev. Psychol.*, *58*, 515-541.
Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, 32(1-3), 97-180.
Wruck, K. H., & Wu, Y. (2021). The relation between CEO equity incentives and the quality of accounting disclosures: New evidence. *Journal of Corporate Finance*, *67*, 101895.
Zhang, D. (2019). Top management team characteristics and financial reporting quality. *The Accounting Review*, *94*(5), 349-375.

Appendix A Variable Definitions

Variable	Definition
Key Analysis Variables	
DispersionPPS	The natural logarithm of the standard deviation of the pay-performance sensitivities (PPS) among the top five executives, following Bushman et al. (2016) and Kim et al. (2022), where PPS is calculated as the dollar change in an executive's wealth for a one percentage change in firm value, divided by annual total compensation.
Disclosure Quality Index	The first principal component from a Principal Component Analysis (PCA) of four standardized disclosure quality metrics: readability, complexity, ambiguity, and length. Each metric captures one attribute of the quality of risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. This factor serves as a composite measure of risk disclosure quality. This factor is standardized to have a mean of 0 and a standard deviation of 1, with higher values indicating higher risk disclosure quality.
Readability	The first principal component from a Principal Component Analysis (PCA) of four standardized readability metrics: Flesch Reading Ease, Gunning Fog Index, Flesch-Kincaid Grade Level, and SMOG. This factor serves as a composite measure of readability for risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. This factor is standardized to have a mean of 0 and a standard deviation of 1, with higher values indicating greater readability.
*(-1)*Complexity*	The natural logarithm of the number of words with three or more syllables per 1000 total words in risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. The list of complex words are identified by Loughran and McDonald (2024). The measure is multiplied by -1 so that higher values indicating less complex language.
*(-1)*Ambiguity*	The natural logarithm of the number of uncertain and weak modal words in risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. The key words are identified by Loughran and McDonald (2011). The measure is multiplied by -1 so that higher values indicating less ambiguity.
*(-1)*Length*	The natural logarithm of the number of total word counts in risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. The measure is multiplied by -1 so that higher values indicating less lengthy disclosure.
Additional Analysis Variables	
BidAskSpread (t+1)	The average value of the bid-ask spread for the 250 trading days beginning two trading days after the Form 10-K release date, where the bid-ask spread is calculated as (ask-bid)/price using data on closing prices and quotes from CRSP.
CEO Power	Constructed using a composite index based on five criteria: (1) whether the CEO also serves as the chairman of the board, (2) whether they are the firm's founder, (3) whether their pay slice exceeds the industry median, (4) whether their tenure surpasses the industry median, and (5) whether their ownership stake in the firm is greater than the industry median. *CEO Power* is a binary indicator variable that equals one if the CEO's power index is above the sample median and zero otherwise. A higher *CEO Power* value indicates a more influential CEO.
COVID Pandemic	A binary indicator variable that equals one for fiscal year 2020 and zero otherwise.
Discretionary Accruals	The absolute value of discretionary accruals computed using the modified cross-sectional Jones model for each 2-digit SIC and fiscal year following Cohen et al. (2008) and Kim et al. (2022).
DispersionPPS_NoCEOCFO	The natural logarithm of the standard deviation of the pay-performance sensitivities (PPS) among executive officers excluding CEOs and CFOs within the top five members of the management team.
Firm Complexity	A binary indicator variable that equals one if the percentage of firm-complexity-related words relative to the total word count in a firm's Form 10-K is greater than the sample median and zero otherwise. The firm-complexity-related words are identified and validated by Loughran and McDonald (2024). *Source* : *https://sraf.nd.edu/complexity/*

Appendix A (Continued)

Variable	Definition
Additional Analysis Variables (Cont.)	
Firm Scope	A binary indicator variable that equals one if the Hoberg-Phillips firm scope score is greater than the sample median and zero otherwise. The firm scope score is developed by Hoberg and Phillips (2024) using a firm's Form 10-K. Scope for each firm year is the number of industry-level markets that each firm likely operates in based on NLP processing and clustering techniques using the doc2vec embedding model. Higher values of scope score indicates that the given firm operates in a lot of different product markets in the given year.*Source* : *https://faculty.marshall.usc.edu/Gerard-Hoberg/HobergPhillipsScope/index.html*
Great Recession	A binary indicator variable that equals one for fiscal year 2008 and zero otherwise.
Idio Risk Intensity	The natural logarithm of the percentage of idiosyncratic-risk key words relative to the total word count in risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. The risk-related key words are identified and validated by Campbell et al. (2014).
Illiquidity (t+1)	The Amihud (2002) measure of illiquidity for the 250 trading days beginning two trading days after the Form 10-K release date, where illiquidity is calculated as the daily return divided by daily dollar volume.
Inst Own	A binary indicator variable that equals one if the percentage of institutional ownership of the firm is greater than the sample median and zero otherwise.
Item1A/Item7/Item7A Index	The first principal component from a Principal Component Analysis (PCA) of five standardized quality metrics (readability, complexity, ambiguity, length, and keyword intensity) that captures the risk disclosure quality of Item1A/Item7/Item7A of a firm's Form 10-K. Each factor represents a composite measure of risk disclosure quality for the respective Item section. The factor is standardized to have a mean of 0 and a standard deviation of 1, with higher values indicating higher risk disclosure quality.
Optimistic Tone	Constructed as the difference between the positive words and negative words in risk disclosures within Item1A, Item7, and Item7A of a firm's Form 10-K. The tone words are identified by Loughran and McDonald (2011).
Sys Risk Intensity	The natural logarithm of the percentage of systematic-risk key words relative to the total word count in risk disclosures within Item1A, Item7, and Item7A of a firms' Form 10-K. The risk-related key words are identified and validated by Campbell et al. (2014).
*(-1)*10K Bog Readability*	The natural logarithm of the Bog Readability Index developed by Bonsall et al. (2017). A higher Bog Index means that a firm's Form 10-K is more difficult to read. The measure is multiplied by -1 so that higher values indicating greater readability. *Source* : *https://host.kelley.iu.edu/bpm/activities/bogindex.html*
*(-1)*10K Complexity*	The natural logarithm of the number of words with three or more syllables per 1000 total words in a firm's Form 10-K. The complex words are identified by Loughran and McDonald (2024). The measure is multiplied by -1 so that higher values indicating less complex language.
*(-1)*10K Ambiguity*	The natural logarithm of number of uncertain and weak modal words in risk disclosures in a firm's Form 10-K. The key words are identified by Loughran and McDonald (2011). The measure is multiplied by -1 so that higher values indicating less ambiguity.
*(-1)*10K Length*	The natural logarithm of the total number of words in a firm's Form 10-K. The measure is multiplied by -1 so that higher values indicating less lengthy disclosure.
10K Disclosure Quality Index	The first principal component from a Principal Component Analysis (PCA) of four standardized disclosure quality metrics: readability, complexity, ambiguity, and length. Each metric captures one attribute of the quality of disclosures of a firm's annual reports. This factor serves as a composite measure of disclosure quality. This factor is standardized to have a mean of 0 and a standard deviation of 1, with higher values indicating higher 10-K disclosure quality.

Appendix A (Continued)

Variable	Definition
Control Variables	
Assets	The natural logarithm of a firm's total assets (AT).
Beta	The firm's coefficient loading on the market excess return (Fama & French) for the 250 trading day period beginning two trading days after the Form 10-K release date.
Big4	A binary indicator variable that equals one if the firm's auditor is a Big 4 auditor in the fiscal year and zero otherwise.
BusSeg	The natural logarithm of the number of the firm's business segments.
CEOCompensation	The natural logarithm of the total cash compensation received by the CEO.
CEODelta	The natural logarithm of the sensitivity of the CEO's equity portfolio to a one percentage change in stock price.
CEOPaySlice	CEO's total compensation, scaled by the sum of total compensation for the top five executives.
CEOTenure	The natural logarithm of the number of years after an executive is hired as the CEO of the firm.
EarnVol	The standard deviation of Return on Assets of the firm in the past five fiscal years.
FirmAge	The natural logarithm of the number of years after a firm first appears in Compustat.
GeoSeg	The natural logarithm of the firm's geographic segments.
Leverage	The sum of the book value of short-term liabilities (DLC) and long-term debt (DLTT) scaled by total assets (AT).
LitigationRisk	A binary indicator variable that equals one if the firm is in the following industries: Pharmaceutical/biotechnology (SIC codes 2833-2836, 8731-8734), computer (3570-3577, 7370-7374), electronics (3600-3674), or retail (5200-5961), and zero otherwise (Francis et al., 1994).
Loss	A binary indicator variable that equals one if the firm reports a net loss and zero otherwise.
MB	Market value of equity (PRCC_F*CSHO) divided by book value of equity (SEQ).
MeanPPS	The average value of the pay-performance sensitivities (PPS) among the top five executives, following Bushman et al. (2016) and Kim et al. (2022), where PPS is calculated as the dollar change in an executive's wealth for a one percentage change in firm value, divided by annual total compensation.
MVE	The natural logarithm of the market value of equity (PRCC_F*CSHO).
Revenue	The natural logarithm of the firm's total annual revenue.
ROA	Return on Assets, calculated as net income (NI) scaled by total assets (AT).
Spread	The average ending bid-ask spread (divided by ending stock price) during the 250 trading day period beginning two trading days after the 10-K release date.
TeamTenure	The number of top management team tenure in the firm since the last member turnover.
Volatility	The standard deviation daily stock returns for the 250 trading days beginning two trading days after the 10-K release date.

Appendix B Details on Disclosure Quality Indices using Principal Component Analysis

This table presents the results of the principal component analysis (PCA) applied to measures of disclosure quality. All disclosure variables are defined such that higher values indicate higher-quality disclosures. Detailed variable definitions are provided in Appendix A. The table reports the eigenvalue, the proportion of variance explained by the first principal component, and its factor loadings. The disclosure quality index variables are constructed by applying the first principal components' factor scores to the standardized index components. The first principal component, which has the highest eigenvalue, serves as the composite measures of disclosure quality.

Panel A: Principal component output for *Readability*[14]

Factor	Eigenvalue	Proportion of the variation explained	Cumulative proportion of the variation explained	Readability measure	First principal component factor loading
1st	3.6764	91.91%	91.91%	*Flesch*	0.4865
2nd	0.2407	6.02%	97.93%	*Fog*	-0.4863
3rd	0.0642	1.60%	99.53%	*Flesch-Kincaid*	-0.5174
4th	0.0187	0.47%	100.00%	*SMOG*	-0.5091

Panel B: Principal component output for *Disclosure Quality Index*[15]

Factor	Eigenvalue	Proportion of the variation explained	Cumulative proportion of the variation explained	Disclosure quality measure	First principal component factor loading
1st	2.7400	68.50%	68.50%	*Readability*	0.0518
2nd	1.0169	25.42%	93.92%	*(-1)*Complexity*	0.5662
3rd	0.1839	4.60%	98.52%	*(-1)*Ambiguity*	0.5744
4th	0.0592	1.48%	100.00%	*(-1)*Length*	0.5889

Panel C: Principal component output for *10K Disclosure Quality Index*

Factor	Eigenvalue	Proportion of the variation explained	Cumulative proportion of the variation explained	10K disclosure quality measure	First principal component factor loading
1st	2.6190	65.48%	65.48%	*(-1)*10K Bog Readability*	0.3238
2nd	0.8531	21.33%	86.80%	*(-1)*10K Complexity*	0.5283
3rd	0.3305	8.26%	95.07%	*(-1)*10K Ambiguity*	0.5733
4th	0.1974	4.93%	100.00%	*(-1)*10K Length*	0.5361

[14] Among the four readability metrics, by definition, a higher *Flesch* score indicates greater readability and better quality. In contrast, lower *Fog*, *Flesch-Kincaid*, and *SMOG* scores correspond to greater readability and better quality. The positive factor loading on *Flesch* (0.4865) suggests that a higher *Flesch* score increases the first principal component, i.e., the *Readability* index. Conversely, the negative factor loadings on *Fog* (-0.4863), *Flesch-Kincaid* (-0.5147), and *SMOG* (-0.5091) indicate that lower values of these metrics increase the *Readability* index. Overall, a higher *Readability* index reflects greater readability of the risk disclosures.

[15] Among the four disclosure quality metrics, a higher *Readability* score indicates better risk disclosure quality. The other three metrics - *Complexity*, *Ambiguity*, and *Length* - are multiplied by -1 so that higher values correspond to better disclosure quality. The positive factor loadings on all four metrics suggest that higher values in each metric contribute to an increase in the principal component, i.e., *Disclosure Quality Index*. Thus, a higher *Disclosure Quality Index* reflects risk disclosures that are more readable, less complex, clearer, and more concise.

Table 1 Sample Selection

This table describes the selection criterion used in selecting the final sample used for the main analyses.

Sample Selection Criteria	# Firm-years	# Firms
Firm-year observations of U.S. firms in Compustat from 2005 to 2023 (total assets > 0)	135,623	15,885
Retain: Firms outside financial services, utilities, and quasi-regulated industries	96,614	12,446
Retain: Firms with data available for top five management team (TMT) compensation and pay-performance sensitivity (PPS) calculation	23,576	2,188
Retain: Firms with data available for Form 10-K risk disclosure quality metrics construction	17,598	2,010
Retain: Firm with non-missing values for control variables in the main analysis	12,474	1,644

Table 2 Descriptive Statistics

This table reports summary statistics of key analysis variables, main analysis variables, and control variables used in this study. Variables are defined in Appendix A.

Variable	Mean	Std. Dev.	P25	Median	P75
Key Analysis Variables					
DispersionPPS	0.063	0.171	0.008	0.019	0.043
Disclosure Quality Index	-0.085	0.719	-0.547	-0.185	0.239
Readability	0.156	0.875	-0.453	0.232	0.813
*(-1)*Complexity*	2.617	0.684	2.163	2.501	2.957
*(-1)*Ambiguity*	-6.242	0.562	-6.608	-6.303	-5.958
*(-1)*Length*	-9.702	0.562	-10.042	-9.779	-9.492
Additional Analysis Variables					
BidAskSpread (t+1)	0.132	0.247	0.035	0.069	0.131
CEO Power	0.335	0.472	0.000	0.000	1.000
COVID Pandemic	0.053	0.224	0.000	0.000	0.000
Discretionary Accruals	8.449	10.257	2.080	5.030	10.578
DispersionPPS_NoCEOCFO	0.036	0.108	0.005	0.011	0.026
Firm Complexity	0.454	0.498	0.000	0.000	1.000
Firm Scope	0.183	0.387	0.000	0.000	0.000
Great Recession	0.062	0.241	0.000	0.000	0.000
Idio Risk Intensity	1.008	0.295	0.810	1.040	1.228
Illiquidity (t+1)	0.103	0.559	0.009	0.026	0.071
Inst Own	0.235	0.424	0.000	0.000	0.000
Item1A Index	-0.290	0.541	-0.669	-0.361	0.009
Item7 Index	-0.287	0.681	-0.690	-0.299	0.088
Item7A Index	-0.071	0.820	-0.580	-0.245	0.188
Optimistic Tone	-1.715	0.687	-2.150	-1.686	-1.248
Sys Risk Intensity	1.009	0.287	0.854	1.012	1.159
*(-1)*10K Bog Readability*	-88.702	7.379	-93.000	-88.000	-84.000
*(-1)*10K Complexity*	1.421	0.553	1.041	1.398	1.778
*(-1)*10K Ambiguity*	-2.427	0.370	-2.673	-2.419	-2.179
*(-1)*10K Length*	-5.868	2.889	-6.738	-5.127	-4.011
10K Disclosure Quality Index	0.144	0.868	-0.381	0.181	0.717

Table 2 (Continued)

Variable	Mean	Std. Dev.	P25	Median	P75
Control Variables					
Assets	7.733	1.523	6.643	7.666	8.713
Beta	1.224	0.569	0.854	1.161	1.530
Big4	0.916	0.277	1.000	1.000	1.000
BusSeg	1.705	0.669	1.386	1.609	2.303
CEOCompensation	8.422	0.902	7.815	8.508	9.075
CEODelta	0.115	0.286	0.019	0.043	0.095
CEOPaySlice	0.402	0.104	0.340	0.410	0.469
CEOTenure	1.964	0.706	1.386	1.946	2.485
EarnVol	0.040	0.041	0.015	0.028	0.049
FirmAge	3.262	0.601	2.833	3.258	3.761
GeoSeg	1.920	0.704	1.386	1.946	2.485
Leverage	0.243	0.196	0.082	0.228	0.357
LitigationRisk	0.356	0.479	0.000	0.000	1.000
Loss	0.186	0.389	0.000	0.000	0.000
MB	3.720	7.585	1.516	2.493	4.166
MeanPPS	0.061	0.107	0.016	0.032	0.062
MVE	7.877	1.643	6.750	7.773	8.942
Revenue	7.565	1.514	6.535	7.519	8.558
ROA	0.135	0.098	0.089	0.131	0.180
Spread	0.132	0.247	0.035	0.069	0.131
StockReturn	0.161	0.573	-0.127	0.096	0.339
TeamTenure	1.587	1.183	1.000	1.000	2.000
Volatility	0.026	0.016	0.016	0.021	0.030

Table 3 PPS Dispersion and Risk Disclosure Quality

Panel A presents the OLS regression analysis of the relation between PPS dispersion and the four risk disclosure quality metrics, as described in Equation (1). The four columns report the regression results when the dependent variable is one of the four metrics, *Readability*, *Complexity*, *Ambiguity*, and *Length*. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel A: PPS Dispersion and Four Risk Disclosure Quality Metrics

	Risk Disclosure Quality Metrics			
Dependent variable =	*Readability*	*(-1)*Complexity*	*(-1)*Ambiguity*	*(-1)*Length*
	(1)	(2)	(3)	(4)
DispersionPPS	0.044 ***	0.039 ***	0.018 ***	0.021 ***
	(4.300)	(5.410)	(2.810)	(3.290)
MeanPPS	-0.172	0.374 ***	0.239 **	0.193 *
	(-1.260)	(3.040)	(2.180)	(1.720)
CEODelta	-0.162 ***	-0.285 ***	-0.200 ***	-0.162 ***
	(-3.380)	(-7.020)	(-5.520)	(-4.230)
CEOCompensation	-0.255 ***	-0.197 ***	-0.170 ***	-0.123 ***
	(-13.150)	(-13.230)	(-14.800)	(-10.870)
CEOTenure	0.017	0.004	-0.010	-0.009
	(1.420)	(0.400)	(-1.220)	(-1.150)
CEOPaySlice	0.719 ***	0.659 ***	0.533 ***	0.487 ***
	(7.670)	(8.870)	(8.720)	(7.730)
TeamTenure	0.018 ***	0.017 ***	0.007 *	0.007 *
	(2.830)	(3.260)	(1.870)	(1.760)
MVE	-0.099 ***	-0.043 ***	-0.007	-0.006
	(-10.240)	(-5.910)	(-1.080)	(-0.940)
MB	0.000	0.001	-0.001	-0.001
	(-0.260)	(0.660)	(-0.770)	(-1.330)
Leverage	-0.095 **	-0.573 ***	-0.220 ***	-0.273 ***
	(-2.160)	(-14.780)	(-6.730)	(-8.970)
ROA	0.944 ***	1.413 ***	0.936 ***	0.817 ***
	(8.550)	(13.170)	(12.480)	(12.200)
FirmAge	0.024	0.144 ***	0.208 ***	0.175 ***
	(1.640)	(12.250)	(18.540)	(16.960)
EarnVol	-1.796 ***	-0.809 ***	-0.688 ***	-0.524 ***
	(-6.870)	(-3.310)	(-4.380)	(-3.820)
BusSeg	0.139 ***	0.062 ***	0.147 ***	0.043 ***
	(8.740)	(4.760)	(12.530)	(4.050)
GeoSeg	0.084 ***	-0.148 ***	0.040 ***	0.026 **
	(5.020)	(-9.540)	(3.130)	(2.420)
Big4	0.115 ***	0.034 *	0.036 **	0.005
	(4.480)	(1.760)	(2.020)	(0.290)
LitigationRisk	-0.110 ***	0.000	-0.121 ***	-0.071 ***
	(-3.450)	(-0.020)	(-4.230)	(-3.450)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	12,474	12,474	12,474	12,474
Adjusted R^2	18.74%	18.11%	22.66%	11.62%

Table 3 (Continued)

Panel B presents the OLS regression analysis of the relation between PPS dispersion and the risk disclosure quality index, as described in Equation (1). The regression includes industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel B: PPS Dispersion and Risk Disclosure Quality Index

Dependent variable =	*Disclosure Quality Index*
DispersionPPS	0.032 ***
	(3.910)
MeanPPS	0.344 **
	(2.400)
CEODelta	-0.272 ***
	(-5.650)
CEOCompensation	-0.202 ***
	(-13.710)
CEOTenure	-0.007
	(-0.660)
CEOPaySlice	0.693 ***
	(8.750)
TeamTenure	0.013 **
	(2.440)
MVE	-0.019 **
	(-2.390)
MB	0.000
	(-0.480)
Leverage	-0.438 ***
	(-10.550)
ROA	1.316 ***
	(13.310)
FirmAge	0.231 ***
	(17.200)
EarnVol	-0.803 ***
	(-3.990)
BusSeg	0.104 ***
	(7.280)
GeoSeg	-0.026 *
	(-1.680)
Big4	0.028
	(1.330)
LitigationRisk	-0.088 ***
	(-2.700)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Firm Fixed Effects	Yes
Observations	12,474
Adjusted R^2	16.13%

Table 4 Cross-sectional Analyses of the Relation between PPS Dispersion and Risk Disclosure Quality

This table reports the results from examining whether the relation between PPS dispersion and the risk disclosure quality index varies with the moderating variables. The six columns report the regression results when the dependent variable is one of the six moderating variables, *Firm Complexity*, *Firm Scope*, *CEO Power*, *Inst Own*, *Great Recession*, and *COVID Pandemic*. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Dependent variable =	*Disclosure Quality Index*					
Cross-sectional variable (CV) =	*Firm Complexity*	*Firm Scope*	*CEO Power*	*Inst Own*	*Great Recession*	*COVID Pandemic*
	(1)	(2)	(3)	(4)	(5)	(6)
DispersionPPS	0.021 **	0.035 ***	0.034 ***	0.023 **	0.059 ***	0.033 ***
	(2.110)	(4.150)	(3.930)	(2.520)	(3.890)	(4.080)
HighCV	-0.127 ***	-0.371 ***	-0.009	0.097 *	-0.568 ***	-0.289 ***
	(-2.850)	(-7.280)	(-0.190)	(1.920)	(-7.860)	(-3.870)
*DispersionPPS * HighCV*	0.019 *	-0.026 **	-0.024 **	0.040 ***	-0.047 ***	-0.052 ***
	(1.790)	(-2.360)	(-2.060)	(3.280)	(-3.070)	(-3.180)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,325	6,432	12,474	7,464	12,474	12,474
Adjusted R^2	17.77%	18.01%	16.31%	16.30%	20.68%	16.23%

Table 5 Path Analysis: The Mediating Role of Earnings Management

Panels A reports the results from the OLS regression analysis of the relation between PPS dispersion and the earnings management measure, *Discretionary Accruals*, as described in Equation (2). This regression includes industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel A: PPS Dispersion and Discretionary Accruals

Dependent variable =	*Discretionary Accruals*
DispersionPPS	-0.649 ***
	(-4.780)
MeanPPS	1.952
	(0.930)
CEODelta	1.221 *
	(1.900)
TeamTenure	0.033
	(0.410)
Revenue	-0.523 ***
	(-6.810)
MB	0.022 *
	(1.720)
ROA	-2.742 *
	(-1.870)
EarnVol	28.789 ***
	(7.810)
BusSeg	0.665 ***
	(2.670)
GeoSeg	1.079 ***
	(4.280)
Big4	0.052
	(0.150)
LitigationRisk	-1.382 ***
	(-3.170)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Firm Fixed Effects	Yes
Observations	12,017
Adjusted R^2	3.99%

Table 5 (Continued)

Panels B reports the results from the path analysis of the mediating role of the earnings management measure, *Discretionary Accruals*, on the relation between PPS dispersion and the risk disclosure quality index, as described in Equations (2) and (3). All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Eq. (2): $Discretionary\ Accruals_{i,t} = \beta_0 + \beta_1 DispersionPPS_{i,t} + \Sigma\beta_j Controls_{j,t} + \varepsilon_{i,t}$

Eq. (3): $Disclosure\ Quality\ Index_{i,t} = \alpha_0 + \alpha_1 DispersionPPS_{i,t} + \alpha_2 Discretionary\ Accruals_{i,t} + \Sigma\alpha_j Controls_{j,t} + \varepsilon_{i,t}$

Panel B: Path Analysis of the Mediating Role of Discretionary Accruals

Path = *Discretionay Accruals*	Dependent variable = *Discloaure Quality Index*
Direct Path	
α1: Path (*DispersionPPS, DisclosureQualityIndex*) in Equation (3)	0.032 ***
	(3.880)
Mediated Path	
β1: Path (*DispersionPPS, DiscretionaryAccruals*) in Equation (2)	-0.649 ***
	(-4.780)
α2: Path (*DiscretionaryAccruals, DisclosureQualityIndex*) in Equation (3)	-0.002 ***
	(-4.010)
Mediation Effect	
α2 * β1:	0.002 ***
Sobel-Statistics	(3.069)
Controls	Yes
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Firm Fixed Effects	Yes
Observations	12,474

Table 6 Further Analyses: Additional Risk Disclosure Quality Dimensions

Panel A presents the OLS regression analysis of the relation between PPS dispersion and the risk disclosure quality by Form 10-K Item. The three columns report the regression results when the dependent variable is *Item1A Index, Item7 Index,* and *Item7A Index*, respectively. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel A: Variation in Risk Disclosure Quality across Risk Items

	Risk Disclosure Items		
Dependent variable =	*Item1A Index*	*Item7 Index*	*Item7A Index*
	(1)	(2)	(3)
DispersionPPS	0.023 ***	0.061 ***	0.003
	(3.410)	(7.870)	(0.310)
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	12,474	12,474	12,474
Adjusted R^2	13.56%	9.25%	5.61%

Table 6 (Continued)

Panel B presents the OLS regression analysis of the relation between PPS dispersion and the risk disclosure content by risk category. The two columns report the regression results when the dependent variable is *Idio Risk Intensity* and *Sys Risk Intensity*, respectively. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel B: Variation in Idiosyncratic and Systematic Risk Disclosures

	Risk Disclosure Contents	
Dependent variable =	*Idio Risk Intensity*	*Sys Risk Intensity*
	(1)	(2)
DispersionPPS	0.008 **	-0.017 ***
	(2.060)	(-4.510)
Controls	Yes	Yes
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	12,474	12,474
Adjusted R^2	15.83%	10.29%

Table 6 (Continued)

Panel C presents the OLS regression analysis of the relation between PPS dispersion and the risk disclosure optimistic tone. We partition the firm-year observations into a subsample with PPS dispersion above the sample median and a subsample below the sample median. The two columns report the regression results using these two subsamples and when the dependent variable is *Optimistic Tone*. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel C: PPS Dispersion and Optimistic Tone in Risk Disclosures

Dependent variable =	*Optimistic Tone*	
Sub-samples	*DispersionPPS_Hi*	*DispersionPPS_Lo*
DispersionPPS	-0.047 ***	0.024
	(-3.590)	(1.390)
Controls	Yes	Yes
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	6,403	6,071
Adjusted R^2	11.70%	9.72%
p-value of testing difference-in-coefficients across subsamples = 0.0011		

Table 7 Further Analysis: PPS Dispersion on Post-disclosure Information Environment

This table reports the results from examining the impact of PPS dispersion on the post-disclosure capital market information environment of the firm, as described in Equation (4). The two columns report the regression results when the dependent variable is *Illiquidity (t+1)* and *BidAskSpread (t+1)*, respectively. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

	Capital Market Information Asymmetry	
Dependent variable =	*Illiquidity (t+1)*	*BidAskSpread (t+1)*
	(1)	(2)
DisclosureQualityIndex DispersionPPS (β3)*	-0.015 ***	-0.009 ***
	(-4.350)	(-4.880)
DisclosureQualityIndex(β1)	-0.021 *	-0.009
	(-1.720)	(-1.460)
DispersionPPS (β2)	0.009 **	-0.002
	(2.010)	(-1.300)
StockReturn	-0.047 ***	-0.050 ***
	(-3.690)	(-5.010)
Volatility	0.027 ***	0.037 ***
	(4.270)	(7.610)
Beta	-0.133 ***	-0.084 ***
	(-6.580)	(-9.180)
MVE	-0.071 ***	-0.059 ***
	(-13.560)	(-23.370)
MB	0.001 ***	0.001 ***
	(3.530)	(4.410)
Leverage	-0.081 ***	0.004
	(-3.370)	(0.380)
ROA	-0.314 ***	-0.362 ***
	(-3.580)	(-7.890)
FirmAge	0.041 ***	0.018 ***
	(5.540)	(5.380)
Big4	-0.053 **	-0.049 ***
	(-2.210)	(-5.510)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	12,474	12,474
Adjusted R^2	6.38%	31.07%
p-value of F-test β1+β3≠0	0.020	0.023

Table 8 Robustness Tests: Evidence from Addressing Endogeneity

Panel A reports the results from the instrumental-variable two-stage regressions. The first column presents the results from the first-stage regression where the dependent variable is the *DispersionPPS* measure, and the instrumental variable is *DispersionPPS_NoCEOCFO*. The next column presents the results from the second-stage regressions, where *Fitted DispersionPPS* is the predicted value of PPS dispersion based on the first-stage regression. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel A: 2SLS Regressions

Instrumental Variable regressions	Stage 1	Stage 2
Dependent variable =	*DispersionPPS*	*Disclosure Quality Index*
Fitted DispersionPPS		0.040 ***
		(3.440)
DispersionPPS_NoCEOCFO	0.571 ***	
	(71.520)	
Controls	Yes	Yes
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	12,474	12,474
Adjusted R^2	78.21%	16.07%
Cragg-Donald Test for Instrument Strength F-stat = 203.8		

Table 8 (Continued)

Panel B reports the results from the OLS regressions of the relation between PPS dispersion and risk disclosure quality index using the propensity score matched sample. All regressions include industry, year, and county fixed effects. t-statistics are based on standard errors clustered at Fama-French 48 industry classification level and county level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

Panel B: Propensity Score Matching

PSM Sample Regression	
Dependent variable =	*Disclosure Quality Index*
DispersionPPS	0.034 ***
	(3.740)
Controls	Yes
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Firm Fixed Effects	Yes
Observations	9,821
Adjusted R^2	16.42%

Table 9 Robustness Tests: Evidence from using a Binary Independent Variable

This table presents the OLS regression analysis of the relation between PPS dispersion and the six risk disclosure quality measures, as described in Equation (1). The five columns report the regression results when the dependent variable is one of the five measures, *Readability*, *(-1)*Complexity*, *(-1)*Ambiguity*, *(-1)*Length*, and *Disclosure Quality Index*. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

	Disclosure Quality Measures				
Dependent variable =	*Readability*	*(-1)*Complexity*	*(-1)*Ambiguity*	*(-1)*Length*	*Disclosure Quality Index*
	(1)	(2)	(3)	(4)	(6)
DispersionPPS_Binary	0.047 **	0.067 ***	0.037 ***	0.039 ***	0.059 ***
	(2.510)	(4.850)	(3.230)	(3.270)	(3.950)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,474	12,474	12,474	12,474	12,474
Adjusted R^2	18.62%	18.08%	22.67%	11.61%	16.13%

Table 10 Robustness Tests: Evidence from Overall Disclosure Quality of 10-K

This table presents the OLS regression analysis of the relation between PPS dispersion and a firm's overall disclosure quality of 10-K. The five columns report the regression results when the dependent variable is one of the five disclosure quality measures, *(-1)*10K Bog Readability*, *(-1)*10K Complexity*, *(-1)*10K Ambiguity*, *(-1)*10K Length*, and *10K Disclosure Quality Index*. All regressions include industry, year, and firm fixed effects. t-statistics are based on standard errors clustered at the Fama-French 48 industry classification and year level. ***, **, * indicate statistical significance at p<0.01, p<0.05, and p<0.10 (two-tailed), respectively. Variables are defined in Appendix A.

	Form 10-K Disclosure Quality				
Dependent variable =	*(-1)*10K Bog Readability*	*(-1)*10K Complexity*	*(-1)*10K Ambiguity*	*(-1)*10K Length*	*10K Disclosure Quality Index*
	(1)	(2)	(3)	(4)	(5)
DispersionPPS	0.517 ***	0.038 ***	0.018 ***	0.001 ***	0.061 ***
	(5.770)	(7.670)	(5.140)	(4.080)	(7.410)
MeanPPS	-1.401	0.282 ***	0.148 **	0.003	0.266 **
	(-0.930)	(4.060)	(2.710)	(0.920)	(2.230)
CEODelta	-0.810 *	-0.239 ***	-0.146 ***	-0.006 ***	-0.323 ***
	(-1.830)	(-9.080)	(-7.740)	(-4.110)	(-7.640)
CEOCompensation	-1.414 ***	-0.193 ***	-0.141 ***	-0.007 ***	-0.327 ***
	(-7.090)	(-17.060)	(-18.780)	(-12.260)	(-17.920)
CEOTenure	-0.238 **	0.029 ***	0.006	0.001 **	0.022 *
	(-2.110)	(4.130)	(1.060)	(2.330)	(1.830)
CEOPaySlice	1.461 *	0.580 ***	0.457 ***	0.026 ***	0.979 ***
	(1.680)	(9.710)	(11.720)	(7.970)	(10.120)
TeamTenure	0.227	0.020 ***	0.010 ***	0.001 **	0.030 ***
	(3.720)	(5.090)	(3.660)	(2.770)	(5.090)
MVE	-0.657 ***	-0.064 ***	-0.030 ***	-0.002 ***	-0.091 ***
	(-6.860)	(-12.540)	(-7.890)	(-5.490)	(-10.270)
MB	-0.002	0.003 ***	0.001 **	0.000 **	0.003 ***
	(-0.200)	(4.200)	(2.400)	(2.560)	(2.970)
Leverage	-2.812 ***	-0.678 ***	-0.229 ***	-0.018 ***	-0.790 ***
	(-6.120)	(-20.930)	(-10.150)	(-11.660)	(-15.060)
ROA	15.682 ***	1.317 ***	0.809 ***	0.043 ***	2.172 ***
	(10.980)	(14.800)	(14.210)	(11.610)	(14.760)
FirmAge	0.569 ***	0.058 ***	0.131 ***	0.004 ***	0.193 ***
	(4.130)	(7.100)	(21.010)	(7.720)	(15.020)
EarnVol	-6.410	-0.413 **	-0.751 ***	-0.041 ***	-1.369 ***
	(-1.520)	(-1.990)	(-6.160)	(-4.800)	(-3.980)
BusSeg	1.361 ***	-0.056 ***	0.027 ***	-0.004 ***	0.001
	(7.760)	(-5.850)	(4.060)	(-7.360)	(0.090)
GeoSeg	0.685 ***	-0.162 ***	0.003	0.000	-0.066 ***
	(3.670)	(-13.890)	(0.390)	(0.200)	(-3.720)
Big4	0.705 ***	-0.010	0.005	-0.002 **	0.009
	(3.080)	(-0.630)	(0.410)	(-2.340)	(0.320)
LitigationRisk	-1.263 ***	0.032	-0.051 ***	-0.001	-0.069 *
	(-2.850)	(1.540)	(-2.920)	(-1.400)	(-1.760)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,474	12,474	12,474	12,474	12,474
Adjusted R^2	16.83%	34.59%	25.89%	12.47%	28.21%