Repaying the trust: Social trust and the readability of Form 10-K reports

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Abstract

Purpose: This study explores the relationship between social trust and financial reporting obfuscation, defined as a lack of annual report readability. We propose that social trust is an important informal institution that promotes ethical behavior and accountability, leading corporate managers to produce clearer, more accessible annual reports for stakeholders.

Design/Methodology/Approach: Using a sample of 44,799 firm-year observations from 1,076 publicly listed U.S. firms, we analyze the impact of regional social trust on the readability of financial reports. We further investigate how this relationship varies across different organizational and managerial characteristics, including stakeholder orientation, geographical dispersion, monitoring environments, managerial capabilities, and CEO experience.

Findings: Our results provide strong evidence that firms located in regions with higher social trust produce less obfuscated financial reports. This negative relationship is more pronounced in firms with higher stakeholder orientation, lower geographical dispersion, stronger monitoring environments, more capable managers, and CEOs with broader work experience (generalist CEOs).

Practical Implications: The findings suggest that social trust is a significant driver of financial report readability. This has important implications for external stakeholders, managers, and policymakers in understanding the role of informal institutions in corporate reporting practices.

Originality/Value: This study contributes to the accounting literature by identifying social trust as a key factor influencing the clarity of financial reports and by providing insights into the underlying mechanisms through which this relationship operates.

1 Introduction

The readability of annual reports has garnered significant attention from both policymakers and market participants due to its pivotal role in fostering informed decision-making, enhancing investor confidence, and preserving market integrity (Bonsall IV et al., 2017; Ertugrul et al., 2017; Lehavy et al., 2011; Loughran and McDonald, 2014; Miller, 2010). Prior research highlights the adverse consequences of low readability (or obfuscation) in financial disclosures, including impairments in investment decisions (Lawrence, 2013; Miller, 2010), reduced analyst coverage (Lehavy et al., 2011), higher costs and lower availability of bank loans (Ertugrul et al., 2017), increased bond rating disagreements, elevated debt costs (Bonsall IV et al., 2017), and risks such as stock price crashes (Kim et al., 2019). Additional outcomes include diminished stock liquidity (Boubaker et al., 2019), heightened equity costs (Rjiba et al., 2021), and reduced acquisition premiums (Hussaini et al., 2025). Collectively, these findings underscore the growing importance of improving the clarity of financial reporting within the financial ecosystem.

A traditional viewpoint associates low readability with managerial obfuscation, whereby managers, driven by self-interest, obscure unfavorable information through overly complex and verbose reports (Bloomfield, 2002; Courtis, 1998, 2004; Rahman and Kabir, 2023). Empirical studies reinforce this notion, showing that firms with poor earnings performance (Li et al., 2010), those suspected of earnings management (Lo et al., 2017), and firms engaged in tax avoidance (Nguyen, 2021) often generate less readable reports. Although these insights have advanced our understanding of how managerial actions influence the readability of financial reports, relatively little attention has been paid to the external institutional environment in which firms operate, including informal institutions, social norms, expectations, and broader community factors, that may also shape disclosure practices. Addressing this gap is crucial, as communities constitute an important yet often overlooked stakeholder in corporate decision-making. Accordingly, we explore the influence of an important external factor, social trust, on the readability of financial reports.

To situate our analysis, we draw on institutional theory, which provides a useful framework for understanding how rules, norms, and structures shape the behavior of individuals and organizations within society. Institutions are humanly devised constraints that shape

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political, economic, and social interactions (North, 1990, 1991). They create predictable patterns of behavior and help people coordinate their actions. Institutions include both formal institutions such as laws, regulations, and policies, and informal institutions, such as cultural norms, values, and beliefs that influence behavior (North, 1990, 1991; Solarino and Boyd, 2023; Tashman et al., 2022). Informal institutions, though unwritten, exert a powerful influence on decision-making by establishing moral expectations and social constraints. Solarino and Boyd (2023) demonstrate that informal institutions enhance corporate governance by creating alternative frameworks of incentives and norms, while Pevzner et al. (2015) show that trust can substitute for weak formal institutions by improving how investors interpret earnings news, especially in countries with weaker regulations.

Within this institutional framework, social trust represents a key informal institution that shapes ethical conduct and information transparency. Gambetta (1988) defines trust as "the subjective probability that one agent assigns to the expectation that another agent or group of agents will perform a particular action." In high-trust societies, transparency aligns with core values and creates a culture in which individuals and organizations freely share information (Garrett et al., 2014; Meng and Yin, 2019). High levels of trust discourage opportunistic behavior and motivate managers to act in ways that maintain social legitimacy, including producing higher-quality and more transparent disclosures (Li et al., 2017; Pevzner et al., 2015). Empirical evidence supports this bright-side view of trust, showing its association with improved reporting quality (Du and Kuo, 2025; Garrett et al., 2014; Jha, 2019), auditor conservatism (Chen et al., 2018), information efficiency (Qiu et al., 2020; Wu et al., 2014), audited financial statements (Kuo and Lee, 2024), reduced stock price crash risk (Li et al., 2017), and reduced misconduct or tunneling (Chen et al., 2020; Dong et al., 2018). From this perspective, social trust acts as an informal governance mechanism that strengthens moral norms, reduces information asymmetry, and encourages clarity in corporate communication.

However, emerging evidence suggests that the relationship between trust and transparency is not uniformly positive. For instance, Shi et al. (2023) find that firms in high-trust societies face higher stock price crash risk, implying that managers may exploit shareholders' trust to conceal bad news rather than disclose it. Similarly, Duong et al. (2024) show that CEOs with greater social capital, another dimension of trust and connectedness, produce less readable

annual reports, suggesting that social embeddedness can also facilitate strategic obfuscation. Taken together, these arguments form a dark-side view of trust, in which social cohesion weakens external scrutiny and reduces managerial incentives to enhance disclosure clarity.

To test our hypotheses, we analyze a comprehensive dataset comprising 44,799 firm-year observations from 1,076 unique publicly traded firms in the United States, spanning the period from 1994 to 2018. Consistent with Lins et al. (2017), we measure social trust using survey data from the General Social Survey. The data, publicly accessible on the National Opinion Research Center website, captures regional social trust levels across the United States. To assess the readability of annual reports (Form 10-K filings), we employ widely recognized metrics: the Fog Index, Flesch-Kincaid Index, Bog index, and the Form 10-K file size. These indices are either estimated using Python from parsed 10-K filings (Fog index and Flesch-Kincaid index) or obtained from freely available sources (Bog index and Form 10-K file size). Higher index values indicate lower readability, reflecting more complex or obfuscated language.

We find a significant negative relationship between social trust and annual report obfuscation. In other words, firms operating in regions with higher levels of social trust are associated with more readable 10-K reports. In economic terms, a one standard deviation increase in social trust corresponds to a 9.74 percentage points reduction in annual report obfuscation, as measured by the Fog Index. Our results are consistent across different model specifications, pass a range of robustness tests, and hold after addressing potential sample selection and omitted variable biases. These results are grounded in the institutional theory perspective (North, 1990, 1991; Pevzner et al., 2015; Solarino and Boyd, 2023) and underscore the critical role of social trust, as an informal institution, in influencing corporate disclosure practices (Chen et al., 2020; Dong et al., 2018; Du and Kuo, 2025; Kong et al., 2021; Li et al., 2017; Pevzner et al., 2015). These findings suggest that managers in high-trust environments are more committed to openness in financial reporting and align their disclosures with stakeholders' expectations for clarity and accountability (Zhang et al., 2025). Specifically, social trust as an important informal institution cultivates stakeholders' expectations for elevated corporate disclosure standards, which fosters a culture where clarity and openness in financial reporting are both anticipated and demanded.

In further analyses we find that the negative relationship between social trust and the

obfuscation of annual reports is more pronounced for firms with higher stakeholder orientation, lower geographical dispersion, better monitoring environment, more capable managers, and those whose CEOs have broader lifetime work experience (generalist CEOs). These results underscore the importance of managerial attributes and the governance environment in shaping the social trust—readability nexus. Finally, we find that stakeholder orientation serves as the key mechanism through which this relationship unfolds. In other words, the observed relationship is specifically mediated by stakeholder orientation.

Our study contributes to the accounting literature by showing how social trust, an external informal institution, influences the qualitative dimension of corporate disclosure, specifically the readability of financial reports. While prior studies have examined the role of trust in shaping quantitative disclosure quality and financial outcomes (Chen et al., 2018; Garrett et al., 2014; Kuo and Lee, 2024; Li et al., 2017; Pevzner et al., 2015; Qiu et al., 2020; Wei and Zhang, 2023; Wu et al., 2014; Zhang et al., 2025), its implications for non-financial disclosure characteristics remain underexplored (Du and Kuo, 2025). We address this gap by showing that firms located in high-trust regions tend to produce more readable annual reports. In doing so, we extend Li et al. (2017) and Pevzner et al. (2015), who argue that trust reduces managerial incentives to withhold bad news, by demonstrating that this dynamic also operates through the linguistic clarity of disclosure. Our study differs from Du and Kuo (2025) in both focus and theoretical scope. While their work conceptualizes social trust as a constraint on managerial intent, reducing deliberate manipulation of disclosure tone, we view social trust as shaping the broader communication environment in which firms operate. Readability reflects not only managerial intent but also the overall clarity and accessibility of disclosure, outcomes that emerge from the interaction of societal norms, organizational culture, and cognitive framing. Thus, we extend prior research from examining how trust moderates what managers choose to say (tone) to how it shapes how they communicate (readability), capturing the wider institutional imprint of trust on disclosure quality beyond strategic rhetoric.

Our study also advances theory by recognizing that trust is multifaceted. Unlike prior work focusing on private trust within organizations (Garrett et al., 2014), we emphasize social trust, the generalized trust among strangers that reflects broader cultural expectations

of honesty and cooperation. This perspective offers a novel lens for understanding how informal institutions shape corporate behavior. Building on this view, we propose a firm-centric framework of embeddedness, suggesting that regional social trust shapes managerial communication through its influence on moral norms, monitoring intensity, and collective expectations for transparency.

Additionally, we contribute to the debate on the dual nature of trust. While studies such as Duong et al. (2024) show that social connectedness can facilitate obfuscation, our findings indicate that regional social trust can also reinforce transparency norms, highlighting that the effects of trust depend on contextual and governance factors. In this way, we bridge the contrasting perspectives in prior literature and provide a more nuanced understanding of when trust promotes or undermines disclosure clarity.

Finally, our work broadens the discussion of how the external environment interacts with internal firm characteristics. We show that stakeholder orientation, geographic dispersion, managerial attributes, and monitoring strength condition the influence of social trust on disclosure outcomes (Hasan, 2020; Nadeem, 2022; Nguyen, 2021; Rahman and Kabir, 2023; Soliman and Ben-Amar, 2022). Collectively, these insights highlight the importance of viewing disclosure readability as both a managerial and institutional outcome embedded in a firm's broader social context.

The rest of our paper is structured as follows: Section 2 reviews the prior literature and develops our hypothesis, Section 3 describes the data and methodology used in the empirical analysis, Section 4 presents empirical results, and Section 5 concludes the study.

2 Literature review and hypothesis development

2.1 Annual report readability

The clarity and accessibility of the firm's annual report have emerged as pivotal concerns for both policymakers and market participants. This focus is driven by the crucial role that transparent and easily interpretable financial statements play in the broader financial ecosystem. Not only do these documents enable informed decision-making, but they also create investor confidence and preserve the integrity of financial markets (Bonsall IV et al., 2017; Ertugrul et al., 2017; Lehavy et al., 2011; Loughran and McDonald, 2014; Miller, 2010). As such, the emphasis on ensuring that annual reports are both clear and comprehensible has

grown. For instance, to improve the clarity of financial disclosures, the U.S. Securities and Exchange Commission (SEC) introduced the "plain English rule" in 1998 which mandates firms to use straightforward language in their reporting. However, despite this initiative, research shows that the readability of Form 10-K disclosures has continued to decline over time (Loughran and McDonald, 2014; Tunyi et al., 2025).

Reduced readability of annual reports has negative consequences for the focal firm. Prior research documents several of the negative consequences, including the negative impact on individual investors' investment decisions (Lawrence, 2013; Miller, 2010), reduced analyst coverage and increased analyst effort (Lehavy et al., 2011), stricter loan contract terms (Ertugrul et al., 2017), lower bond ratings and higher cost of debt (Bonsall IV et al., 2017), increased stock price crash risk (Kim et al., 2019), stock liquidity (Boubaker et al., 2019), cost of equity capital (Rjiba et al., 2021), and acquisition premiums (Hussaini et al., 2025), among other factors.

Much of the literature links the reduced readability of annual reports to deliberate efforts by management to obscure information. Several studies suggest that this lack of clarity may be an intentional strategy by executives to make it more difficult for stakeholders to fully understand the firm's financial and operational details (Bloomfield, 2002; Courtis, 1998, 2004; Rahman and Kabir, 2023; Wruck and Wu, 2021). For instance, Chakrabarty et al. (2018) find that managers with high-Vega compensation tend to produce less readable annual reports. The authors demonstrate that obfuscation benefits managers by increasing return volatility, which in turn boosts the value of their options. However, they also show that strong governance mechanisms can mitigate managers' opportunistic behavior. Li et al. (2010) document that firms with lower earnings often produce annual reports that are harder to comprehend. Similarly, Lo et al. (2017) show that firms likely to manipulate earnings for better results tend to have more complex Management Discussion and Analysis sections in their annual reports. Additionally, Nguyen (2021) finds that firms with aggressive tax avoidance strategies generally generate annual reports that are less accessible to readers.

In summary, these studies deepen our understanding of how managerial behavior and practices impact the readability of financial reports and how various firm characteristics influence this relationship. However, limited research exists on how external factors, particularly social

trust, affect the readability of financial reports. In what follows, we develop our hypotheses on the role of social trust in shaping the readability of a firm's annual report.

2.2 Hypothesis: Social trust and annual report readability

Prior research highlights the crucial role of social trust across multiple levels of society including countries, firms, and individuals (Guiso et al., 2008; Li et al., 2017; Pevzner et al., 2015). Trust serves as a fundamental social asset that promotes cooperation, enhances economic performance, and shapes the quality of relationships within and across communities. At the country level, for example, higher levels of social trust are linked to stronger economic growth and more effective institutions (Gual and Das, 2023). At the individual level, the economic value of trust is also evident. Guiso et al. (2008) demonstrate that individuals with greater generalized trust are significantly more likely to participate directly in the stock market, suggesting that trust reduces perceived risks and encourages economic engagement.

At the firm level, prior research supports the view that trust affects managerial decision-making and firms' disclosure behavior (Chen et al., 2020; Dong et al., 2018; Du and Kuo, 2025; Garrett et al., 2014; Guan et al., 2020; Kuo and Lee, 2024; Li et al., 2017; Meng and Yin, 2019; Wu et al., 2014). For example, Dong et al. (2018) show that higher social trust reduces corporate misconduct, while Guan et al. (2020) document that managers in high-trust countries are more likely to issue voluntary earnings forecasts perceived as credible. Du and Kuo (2025) further demonstrate that social trust discourages the use of excessively promotional language in narrative disclosures. These findings collectively suggest that trust not only constrains opportunism but also shapes how firms communicate with their stakeholders.

To explain the relationship between social trust and the readability of the annual report, we adopt an institutional theory perspective (North, 1990, 1991). This framework helps to to clarify how informal institutions, such as social trust, shape firm behavior. Unlike formal institutions, informal institutions influence decision-making through shared expectations of what is considered appropriate or effective behavior within a social context (Tashman et al., 2022; Tonoyan et al., 2010). When norms emphasize trust, individuals are more likely to cooperate and build long-term relationships, while firms tend to adopt transparent and community-oriented practices. In such environments, companies may produce clearer and more readable disclosures to maintain credibility, signal integrity, and strengthen stakeholder

confidence. Conversely, where informal norms tolerate favoritism or opportunism, firms may view opaque or complex reporting as acceptable for protecting private interests or preserving flexibility (Tonoyan et al., 2010). Consistent with this view, Solarino and Boyd (2023) show that informal institutions complement formal governance mechanisms by providing social expectations and norms that guide corporate conduct. Similarly, Pevzner et al. (2015) find that societal trust enhances investor reactions to earnings news, particularly in settings with weaker formal protections. This suggests that trust substitutes for institutional enforcement. Social trust can also influence how readable annual reports are by shaping the environment in which managers operate. In communities with high trust, strong social networks and mutual expectations make it harder for managers to act dishonestly, as doing so would damage their standing and credibility. At the same time, when investors and other stakeholders have greater confidence in management, they are more patient with short-term performance declines. This supportive atmosphere reduces the need for managers to hide poor results behind complicated language, leading to clearer and more transparent reporting. Overall, social trust can improve report readability not only through shared social values but also through these indirect effects.

Building on this perspective, we argue that in high-trust societies, social norms shaped by mutual trust encourage managers to prepare reports that are clear and accessible. The pursuit of social legitimacy and the need to meet stakeholder expectations further drive firms to produce more readable corporate disclosures. Accordingly, we hypothesize that higher levels of social trust are positively associated with the readability of firms' annual reports:

Hypothesis 1: *The obfuscation (readability) of Form 10-k reports decreases (increases) with social trust, ceteris paribus.*

However, it is also plausible that social trust reduces the demand for high-quality financial reporting. In high-trust environments, investors may be less concerned about managerial opportunism and thus rely less on financial reports to monitor corporate behavior (Pevzner et al., 2015). Managers may take advantage of this reduced scrutiny. Shi et al. (2023) find that firms in countries with higher levels of social trust are more likely to experience stock price crash risk, suggesting that managers in such settings may exploit trust by concealing unfavorable information from investors. Extending this line of research, Duong et al. (2024)

provide evidence that CEOs with greater social capital tend to produce less readable annual reports. Their findings suggest that strong social ties and embedded relationships can sometimes weaken external scrutiny, allowing managers to engage in strategic obfuscation under the cover of relational trust. Based on these perspectives, we expect that higher levels of social trust may have a negative effect on the readability of annual reports, as trust could reduce monitoring pressures and enable less transparent reporting practices. Accordingly, we propose the following alternative hypothesis:

Hypothesis 2: *The obfuscation (readability) of Form 10-k reports increases (decreases) with social trust, ceteris paribus.*

3 Sample and Methodology

3.1 Sample and data

We explore our hypothesis of a negative relationship between social trust and obfuscation of annual reports using a sample of U.S listed firms. Our study requires data from various databases, the main databases being Compustat for firm financial data, the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) for copies of Form 10-K reports and NORC for survey data on social trust across different regions. To construct our sample, we start with all US firms listed on the NYSE, NASDAQ, and AMEX during the 1994 to 2018 period with available data on Compustat. In line with previous studies, we exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) due to their distinct financial reporting requirements. Firms' accounting information is also obtained from Compustat. We focus on the period 1994-2018, due to the availability of readability data, discussed below.

Our study focuses on the readability of Form 10-K filings of U.S listed firms. These filings can be freely obtained from the EDGAR through the SEC webpages. It is possible that obfuscation may be more easily applied in less formal disclosures, such as press releases or conference calls, where language is less regulated and content is more flexible. However, we focus on annual reports (10K) precisely because any attempt at obfuscation within these highly structured, audited, and regulated documents is likely to be more meaningful for market participants. In fact, previous research has shown that financial markets respond more strongly to 10-K disclosures than to 10-Q filings (Griffin, 2003). Additionally, Loughran and

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McDonald (2011) find that using the full 10-K document is effective for sentiment analysis, supporting its use in studies of managerial disclosure strategies. For these reasons, 10-Ks provide a more suitable and meaningful source for examining obfuscation.

We measure the readability of Form 10-K corporate filings using four different metrics: the Gunning Fog Index, the Flesch-Kincaid Index, the Bog index and 10-K (net) file size. These readability measures have been frequently employed in literature (Bonsall IV et al., 2017; Hwang and Kim, 2017; Li et al., 2010; Lim et al., 2018; Loughran and McDonald, 2014; Mekhaimer et al., 2024; Xu et al., 2022). For data traceability, we obtained already parsed 10-K filings from Bill McDonald's repository, first analyzed in Loughran and McDonald (2014). The parsing process is discussed in that study (Loughran and McDonald, 2014) and has been used across the literature. We compute the Fog and Flesch-Kincaid indices for each of the parsed 10-K filings using Python software. We obtain information on the gross and net 10-K file size[1] from Loughran and McDonald (2014) and already computed Bog indices from Bonsall IV et al. (2017).[2]

Consistent with prior studies (Lins et al., 2017), social trust data comes from the General Social Survey administered by the National Opinion Research Center at the University of Chicago. The data, publicly accessible on the National Opinion Research Center webpage, captures regional social trust levels based on the average responses to the question: *"Generally speaking, would you say that most people can be trusted, or that you need to be very careful in dealing with people?"*.

We merge our datasets using relevant identifiers (gvkeys, cusips, State of headquarters and financial year). Our final dataset includes 44,799 firm-year observations for U.S.-listed firms from 1994 to 2018. The distribution of our dataset is shown in Table 1. We discuss this further later in our study.

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[1] Our results for using gross versus net 10-K file size are qualitatively similar, so, for brevity, we only present the results from net 10-K file size in the remainder of our study.

[2] We thank Tim Loughran and Bill McDonald for making the File size data available at https://sraf.nd.edu/. Also, we thank Brian Miller for providing the Bog index data that is publicly available at https://kelley.iu.edu/bpm/activities/bogindex.html.

3.2 Research design and variables

We use the following OLS regression to analyze how social trust impacts the obfuscation of annual reports:

$$Obfuscation_{it} = \beta_0 + \beta_1 Social\,trust_{it-1} + \sum \beta_k Controls_{it-1} + \vartheta_j + \vartheta_t + \varepsilon_{it} \qquad (1)$$

Our dependent variable, $Obfuscation_{it}$ of a firm's Form 10-K report in each year, is measured primarily using the Fog Index, but also the Form 10-K file size, the Flesch-Kincaid and Bog Indexes. The Gunning Fog Readability index of parsed 10-K reports is estimated in Python from the number of words (Words), sentences (Sentences), and complex words (Complex Words) in the report following (Bonsall IV et al., 2017; Li, 2008). The model for estimating this is as follows:

$$Fog\,index = 0.4 * (\frac{Words}{Sentences} + 100 * \frac{Complex\,Words}{Words})$$

A higher Fog Index indicates that a document is more difficult to read. The Fog Index is classified based on its score: "unreadable" for scores of 18 or more, "difficult" for scores between 14 and 18, "ideal" for scores from 12 to 14, "acceptable" for scores between 10 and 12, and "childish" for scores between 8 and 10.

Alternatively, the Flesch-Kincaid Index is estimated from Form 10-K filings from the total number of words (Words), sentences (Sentences), and syllabi (Syllabus) in the report as follows:

$$Flesch\,Kincaid\,index = 0.39 \frac{Words}{Sentences} + 11.8 \frac{Syllabus}{Words} - 15.59$$

A score of 8.0 means that an eighth-grader should be able to understand the text. The score can extend beyond these ranges to indicate much more complex texts than the typical grade levels.

The Bog index (Bonsall IV et al., 2017) is generated using StyleWriter, The Plain English Editor. StyleWriter generates the index based on the following model:

$$Bog\,index = Sentence\,Bog + Word\,Bog - Pep$$

Where, *Sentence Bog* captures obfuscation due to long sentences, *Word Bog* captures obfuscation through the use of difficult and problem words, and *Pep* captures the use of names and interesting words that enhance the clarity of texts.

Following Loughran and McDonald (2014), 10-K file size is measured as the natural log of

the net file size of Form 10-K reports. Net file size captures the 10-K file size after submitted files are parsed to exclude pictures and graphics, amongst others, only retaining textual information.

To isolate the causal influence of social trust on the obfuscation of annual reports, we control for the following variables ($\sum \beta_X Controls_{it-1}$) in our analysis, shown in prior studies (Mekhaimer et al., 2024; Rahman and Kabir, 2023), to influence the readability of annual reports. These variables include measures of performance, profitability and firm value (Loss dummy, Tobin's Q, Sales growth), financial resources and distress (Leverage, Free cash flow, Z score, financial constraints), firm size, complexity, and level of investments (Firm size, Firm age, Tangible assets, Capital expenditure), susceptibility to earnings management (Audit quality, discretionary accruals). In further analysis, later in our study, we also control for other factors, including earnings volatility, competition, Delaware incorporation, level of disclosure, special items in financial reporting, and governance factors (including CEO gender, board independence, and CEO-Chair duality). We provide the complete definitions for all variables used in our study in Appendix A.

Our measure of social capital is at the regional level and does not vary significantly over time. Hence, we only control for industry (ϑ_j) and year (ϑ_t) but not firm fixed effects to capture industry and macro-level (year) factors that may affect the level of obfuscation in annual reports.

4 Results and discussion

4.1 Summary statistics

Table 1 presents the distribution of our sample by year and state. We observe that 2003 and 2004 stand out as the years with the highest number of observations, with 2,320 and 2,273 observations, respectively. In contrast, 1994 and 1995 have the lowest observations, with only 704 and 897, respectively. Additionally, Delaware is the dominant state in our sample, followed by Nevada and New York, with 28,307, 1,361 and 1,335 observations, respectively. Overall, the top ten states account for 84.28 percent of our sample.

Insert Table 1 Here

Table 2 summarizes the key statistics for the variables used in this study. The mean (median) social trust score is 0.195 (0.194). For obfuscation measures, the Fog Index has an

average (median) of 19.501 (19.433), which is close to the values reported by Li et al. (2010) and Xu et al. (2022). In particular, these Fog Index values surpass the score of 18, the cutoff point at which a document is considered "unreadable" (Li et al., 2010; Xu et al., 2022). The average Flesch-Kincaid Index is 17.007, with a median value of 16.876. These figures also suggest that Form 10-K filings are, on average, more difficult to read than standard texts.

Regarding control variables, mean (median) values are broadly consistent with those reported in previous studies covering a similar period (Tunyi et al., 2025). The first and 99th percentile values suggest that, after data cleaning and winsorization, there are no remaining outliers in our dataset. In our sample, 26.70% of the firms reported a loss, while 71.80% were audited by a Big 4 firm. Among other control variables, we find that the mean values of Tobin's Q, leverage, sales growth, firm size, firm age, free cash flow, tangible assets, capital expenditures, net working capital, Z score, financial constraints, and discretionary accruals are 1.85, 0.15, 0.07, 19.81, 3.12, 0.02, 0.25, 0.05, 0.27, 4.58, 0.39, and -0.01, respectively.

Our moderator variables that we discuss later include stakeholder orientation, geographic dispersion, managerial ability, general ability index, equity compensation, and board independence with average values of 0.02, 6.29, -0.003, 0.07, 0.09, 0.65, respectively. Importantly, these moderators do not have as much data coverage as our dependent, independent, and control variables. For robustness of our key findings, we also use additional control variables such as religiosity, population density, and income per capita whose average values are 0.43, 11.68, and 0.39, respectively.

Insert Table 2 Here

We start our analysis by simply comparing the mean or average readability of Form 10-K reports of firms in low- and high-trust regions—i,e., a T test. For this analysis, we define "low" and "high" based on whether the values are lower or higher than the mean, median (top and bottom 50% of firms), tercile (top and bottom 33.3% of firms), and quintile(top and bottom 20% of firms). Specifically, Table 3 shows results for the univariate analyses between groups of low and high social trust using mean (Panel A), median (Panel B), tercile (Panel C), and quintile (Panel D) as cut-off for identifying groups of low and high trust. In panel A of Table 3, the mean Fog index for firms in Low (high) Trust regions is 19.660 (19.303). The difference (0.355) is statistically significant at the 1% level (t-statistic of 24.550 and

standard error of 0.015). Our results using alternative readability measures (Flesch-Kincaid, Bog, and File size) are qualitatively similar; firms in low-trust regions consistently produce 10-K reports with higher obfuscation (lower readability) than their counterparts in high-trust areas. The results from using alternative cut-offs including the median (panel B), Terciles (panel C) and Quintiles (panel D) are qualitatively similar. These results, together, provide some early support for our hypothesis (H1) that firms in high social trust areas produce more readable reports.

<div align="center">**Insert Table 3 Here**</div>

In Appendix B, we present the correlations of our key variables. As shown in row 5, a negative correlation exists between social trust and readability measures, as expected. Notably, the correlation between our independent and control variables is generally low, allaying concerns about multicollinearity. We further confirm this in unreported analyses by computing and examining variance inflation factors (VIF). Having allayed concerns around multicollinearity, we move on to examine our hypotheses under a multivariate framework as specified in Eq.(1).

4.2 Social trust and annual report readability

Table 4 provides estimates from OLS regressions (Eq.(1).) that examine how social trust influences the obfuscation of annual reports. Column 1 shows the effect of social trust on the Fog Index without any control variables. Column 2 controls for industry and year effects. In column 3, we include control variables in the model. In columns 4 to 6, we use alternative readability measures. Standard errors, clustered at the firm level, are reported in parentheses.

Our hypothesis (H1) suggests that social trust incentivizes management to produce more readable reports. In support of this hypothesis, we find a significant negative association between social trust and the obfuscation of annual reports across the different model specifications in Table 4. The coefficient of social trust across all model specifications is negative and statistically significant at the 1% level. In column 3, for example, a unit increase in social trust coincides with a 1.541 unit decline in the Fog index. Put differently, a one standard deviation increase in social trust leads to a corresponding 9.70 percentage points decrease in financial reporting obfuscation measured by the Fog index.[3] These results are economically

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[3]Table 2 shows that the standard deviation of social trust is 0.063. Considering Model 3 of Table 4, we find

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significant and suggest that consistent with our hypothesis, social trust, as an important informal institution, plays a major role in reducing financial reporting obfuscation.

Our results are consistent with Li et al. (2017) who find that managers of firms from areas of high social trust are less inclined to obscure or withhold information. Instead, social trust incentivizes managers to provide financial disclosures that are clear, concise, and easily accessible. Our findings support the notion that social trust serves as an important informal institution that pushes managers to adopt behaviors that are consistent with societal expectations (Dong et al., 2018; Du and Kuo, 2025). High levels of trust within society create expectations for ethical behavior and accountability (Kondo et al., 2021). As these informal institutions become social norms, they pressure managers to comply by providing high-quality, transparent annual reports (Dong et al., 2018).

Insert Table 4 Here

Table 4 also provides supporting evidence for several control variables that previous studies have shown to influence the complexity of annual reports. In line with prior literature (Lim et al., 2018; Nadeem, 2022; Xu et al., 2022), we find that firms reporting losses produce less readable annual reports, while aged firms provide clearer and more accessible reports. Moreover, firms experiencing sales growth, with higher leverage ratios, and larger firms are more likely to generate less readable annual reports. Conversely, firms with higher free cash flow and more substantial tangible assets tend to provide more transparent annual reports. Finally, audit quality and financial constraints are associated with reduced readability, while discretionary accruals and net working capital are negatively associated with annual report obfuscation.

Having established our baseline and provided robust support for the existence of a negative relationship between social trust and obfuscation, we turn our attention to the potential and theoretically important moderators and channels through which the relationship ensues.

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that the beta coefficient of social trust is -1.542. Thus, one standard deviation increase in social trust decreases reporting complexity (Fog index) by 9.74 (0.063 x -1.542 x 100 = -9.74) percentage points. Corresponding levels of decrease in reporting complexity using the Flesch-Kincaid index, Bog index, and 10-K file size for a one standard deviation increase in social trust are 8.50, 47.27, and 3.74 percentage points, respectively.

4.3 Additional analyses and channels

4.3.1 Stakeholder orientation and the social trust—readability nexus

We first argue that social trust may lead to the production of more readable financial reports by enhancing firms' stakeholder orientation. As emphasized in H1, firms operating in societies characterized by high social trust face heightened expectations for ethical behavior and transparency—values that align closely with the priorities of stakeholder-oriented firms. Prior research argues that stakeholder-oriented firms, often guided by corporate social responsibility (CSR) standards, demonstrate greater sensitivity to societal expectations (Cho et al., 2013; Gao et al., 2014; Kim et al., 2019; Soliman and Ben-Amar, 2022). These firms may also prioritize their responsibility to all stakeholders, not just shareholders. Consequently, they may be incentivized to produce Form 10-K reports that are not only transparent but also accessible to their various stakeholder groups. In other words, clear communication with stakeholders through the provision of readable or accessible financial reports may be seen as a vital component of these firms' ethical commitment to transparency, reflecting societal expectations and fostering trust among various stakeholder groups, including shareholders, communities, employees, and customers, amongst others (Dong et al., 2018; Li et al., 2017; Pevzner et al., 2015).

Based on the preceding argument, we anticipate that social trust may impact financial statement readability by enhancing firms' commitment to their stakeholders. We explore this through the mediation analysis in columns 1 and 2 of Table 5. Specifically, we test the extent to which stakeholder orientation mediates the social trust—readability nexus. Following the literature, we use a firm's corporate social responsibility (CSR) performance in five areas (Community, Employment, Environment, Diversity, and Human rights) as a proxy for its level of stakeholder orientation (Bettinazzi and Zollo, 2017; Servaes and Tamayo, 2013). The data for these scores come from the Kinder, Lynderburg, and Domini (KLD) database.

We follow Servaes and Tamayo (2013) to derive our "Stakeholder orientation" index. Specifically, for each dimension, we first divide a firm's total number of CSR strengths (weaknesses) reported in KLD by the maximum possible number of strengths (weaknesses) to generate two indices that range from 0 to 1 (or 0 to 100%). We then compute stakeholder orientation as the difference between the strength index and the weakness index. This index

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lies between -1 and +1. Finally, we combine the stakeholder orientation scores across the five dimensions to generate a new score, "Stakeholder orientation", that ranges from -5 to +5. In addition to our "Stakeholder orientation", we also define a dummy variable, "High stakeholder orientation", that takes a value of one for firms with values above the median and a value of zero, otherwise.

<p align="center">**Insert Table 5 Here**</p>

We already established a negative relation between social trust and obfuscation in Table 4. In column 1 of Table 5, we test whether social trust has a positive relationship with stakeholder orientation, as we claim. Our evidence suggests that this is the case. A unit increase in social trust coincides with a 0.705 unit increase in stakeholder orientation, suggesting that firms increase their orientation towards stakeholders as social trust increases. In column 2, we document a negative relationship between stakeholder orientation and the Fog index after controlling for social trust (amongst other variables), suggesting that stakeholder orientation partly mediates the social trust—obfuscation nexus. To confirm this mediation effect, we run Sobel-Goodman Mediation Tests. Our test results (untabulated) suggest that the mediation effect is statistically significant (the coefficients of the Sobel, Aroian, and Goodman statistics is -0.048, with a p-value of 0.002 in all cases). The indirect effect and the direct effect are both statistically significant at the 1% level. However, only about 2.8% of the total effect of social trust on readability is mediated by stakeholder orientation, suggesting that other channels might be at play.

One of the concerns in our mediation analysis is the fact that our measure of social trust applies to the cross-section of firms located in a specific region, but the level of stakeholder orientation clearly varies across firms. So, while social trust may lead to improvements in stakeholder orientation, it is unlikely to be the sole determinant. To further deepen insights from our analysis, we take stakeholder orientation as a given and explore whether the level of stakeholder orientation across firms moderates the social trust—readability nexus.

We anticipate that stakeholder orientation will strengthen or enhance the trust—readability link because firms with lower stakeholder orientation often lack a strong commitment to societal values or ethical practices, focusing instead on short-term financial objectives over transparency (Jamali and Mirshak, 2007). By prioritizing relationships with stakeholders,

<p align="center">17</p>

firms with a stronger stakeholder orientation align their practices with societal demands for transparent and readable communication (Belal and Cooper, 2011). This alignment may amplify the relationship between social trust and financial report readability, as stakeholder-oriented firms are more likely to provide clear and comprehensible information. Accordingly, if the results we observe are indeed driven by social trust, as we propose, we would expect these effects to be more pronounced in firms exhibiting stronger stakeholder orientation. We explore this issue in columns 3 and 4 of Table 5.

The results in columns 3 and 4 of Table 5 provide evidence of a negative moderating effect of stakeholder orientation (using either measure of stakeholder orientation) on the social trust—obfuscation nexus, significant at the 1% level. The nature and magnitude of the moderation effect are demonstrated through the assessment of average marginal effects in Figure 1a. Here, we show that the effect of social trust on obfuscation is positive when stakeholder orientation is low (0) and negative when it is high (1). These results suggest that the documented negative impact of social trust on readability is more pronounced in firms with high stakeholder orientation.

4.3.2   Geographic dispersion and the social trust—readability nexus

We have argued that adherence to informal institutions rooted in specific communities or geographic locations explains the observation that firms in regions with high social trust tend to produce more readable (and less obfuscated) 10-K reports. Our second strategy for evidencing the importance of social norms in driving our results is to show that the results will be stronger for firms that are geographically focused (in terms of their business activity) within specific locations, as opposed to firms that operate across several locations (i.e., geographically dispersed firms), with potentially varying social expectations. In other words, we argue that geographically dispersed firms may exhibit weaker alignment with local informal institutions, as these norms vary across their multiple locations. In contrast, geographically focused firms are more likely to align closely with a single, consistent set of informal institutions. Consequently, if social trust driven by local norms and institutions indeed explains our results, as we argue, we would expect the observed negative relationship between social trust and obfuscation to be more pronounced among geographically focused firms and less pronounced among their geographically dispersed counterparts.

We use data on the firms' number of geographic segments to measure the level of dispersion. Firms with fewer geographic segments are likely to have stronger exposure to a single set of informal institutions relative to their counterparts operating across several geographic regions. We first create a dummy variable to capture the level of geographic focus or dispersion. Our variable, "High focus", takes a value of one for firms with the number of geographic segments lower than the median while and a value of zero for their counterparts with more than the median number of geographic segments. We also capture focus as a continuous variable by taking the natural log of a firm's number of geographic segments multiplied by negative 1.[4]

In Table 6, we explore whether our results are stronger in geographically focused as opposed to dispersed firms. In columns 1 and 2, we re-estimate our baseline model for firms with high (i.e., "High focus" = 1) and low geographic focus (i.e., "High focus" = 0), respectively. We find that the negative relationship between social trust and obfuscation, which we document in our baseline analysis (i.e., Table 4), mainly persists in a subsample of firms with high geographic focus. Specifically, a unit increase in social trust amongst geographically focused firms leads to an average 1.222 unit decline in the Fog index (column 1). In contrast, a unit increase in social trust amongst geographically dispersed firms leads to a 0.437 increase in the Fog index (column 2). These results are statistically significant at the 1% level.

The results in columns 3 and 4 show that the differences in the coefficients documented in columns 1 and 2 are statistically significant. Specifically, we document a significant moderating effect of geographic focus on the social trust—obfuscation nexus. The average marginal effect of geographic dispersion on the relation is shown in Figure 1b. Here, we show that the effect of social trust on obfuscation is positive when geographic dispersion is high (0) and negative when it is low (1). These results underscore the importance of social norms embedded within specific geographic locations in shaping managerial behavior around corporate disclosures.

Insert Table 6 Here

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[4]The natural log of the number of geographic segments captures the level of geographic dispersion. We reverse this variable by multiplying by -1, so higher values capture lower dispersion or higher focus.

4.3.3 Managerial attributes and the governance environment

We turn our attention to managerial attributes as a key factor that might influence our results. The role of managerial ability in shaping corporate decisions and outcomes is well-developed in accounting literature (Dong and Doukas, 2021; García-Meca and García-Sánchez, 2018; Hasan, 2020). Prior studies suggest that more able managers have a deeper understanding of their firm, industry, and stakeholder needs and are thus better equipped to communicate value-relevant information to market participants (Baik et al., 2018; Demerjian et al., 2013). We therefore expect our results to be stronger in firms with more able managers.

Our proxy for managerial ability is standard in the literature (Demerjian et al., 2012)[5] In Table 7, we use the Demerjian et al. (2012) measure of management ability to explore whether our results are more pronounced in firms with more able managers. Our evidence is consistent with this view. Specifically, in column 1, we document a negative interaction effect (coefficient of -3.239 significant at the 5% level), suggesting that social trust spurs firms with more able managers to produce more readable financial disclosures than their less able counterparts. These results underscore the importance of managerial ability in driving the quality of financial disclosures as documented in Hasan (2020).

In column 2 of Table 7, we go beyond overall managerial ability (as conceptualized in Demerjian et al., 2012) by looking at the CEO's functional expertise drawn from their lifetime work experience (Custódio et al., 2013). Prior research (Custódio et al., 2013) suggests that CEOs can be classified as "generalists" or "specialists" based on their lifetime work experience. Following (Custódio et al., 2013), we use five aspects of a CEO's professional career to measure their general managerial skills. These factors include the past number of (1) positions, (2) firms, and (3) industries in which a CEO worked; (4) whether the CEO held a CEO position at a different company; and (5) whether the CEO worked for a conglomerate (Custódio et al., 2013). The estimate of the general ability index is the first factor of the principal components analysis (PCA) of these five proxies.[6] Per the measure (i.e., the general ability index), generalist CEOs have varied experience through past experience across several positions, firms, and industries. In contrast, specialists have deep expertise

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[5]We are grateful to the authors for making this measure and the relevant data publicly available.

[6]PCA gives more weight to factors that more accurately reflect a CEO's general skills.

through extended experience within a few industries and firms. By virtue of their broad experience, generalist CEOs may have a greater ability to respond to social pressures and norms. This is consistent with prior research suggesting that generalist CEOs have broader networks and focus their corporate social responsibility efforts on a broader range of areas than their specialist counterparts (Lu et al., 2024). We may, therefore, find our results to be more pronounced for firms with generalist CEOs as these CEOs are, perhaps, more responsive to external social pressures within their operating environment.

The results for this analysis are presented in column 2 of Table 7. Here, we document a negative moderating effect (coefficient of -0.693), significant at the 1% level. These results suggest that our findings—social trust leads to the production of more readable reports— are more pronounced in firms with generalist CEOs, i.e., those with a broader lifetime work experience.

Our final additional analysis explores the role of the governance environment on the social trust—readability nexus. Specifically, we focus on board independence (the proportion of board members that are independent directors) and board co-option (the proportion of directors appointed after the CEO assumes office) as indicators of the governance quality and agency conflicts within the firm. Prior research suggests that board independence enhances governance quality and monitoring while board co-option weakens it with consequences on financial disclosure quality (Balsmeier et al., 2017; Coles et al., 2014; Goh et al., 2016; Tunyi et al., 2025). For example, Goh et al. (2016); Hussain and Kumar (2025); Hussain and Shams (2022) contends that board independence reduces information asymmetry and improves the monitoring environment by enhancing voluntary disclosures. Tunyi et al. (2025) provide evidence that board co-option—the lack of adequate monitoring—leads to the obfuscation of financial reports. We, therefore, expect the effect of social trust and readability to be stronger with board independence and weaker with board co-option.

Our results on the moderating role of the governance environment are presented in columns 3 and 4 of Table 7. As expected, we find a negative and statistically significant (at the 5% level) interaction effect, suggesting that board independence strengthens the negative relationship between social trust and obfuscation of financial reports. Board co-option indicates the absence of adequate monitoring. So our finding or a positive interaction effect of board

co-option in columns 4 (coefficient of -1.380, significant at the 10% level), suggest that co-option weakens the negative relation between social trust and obfuscation. Taken together, our results suggest that the role of social trust in enhancing the readability of financial reports is strengthened in the presence of good governance.

Insert Table 7 Here

4.4 Robustness checks

4.4.1 Addressing sample selection bias through entropy balancing

Our results suggest a negative association between social trust and the readability of financial reports. Our measure of social trust is largely exogenous to the firm as firms are unlikely to determine the level of social trust in their location. However, we acknowledge that certain firms may self-select into specific regions with high social trust to leverage their benefits. Such sample selection bias may weaken our inferences of a causal relationship between social trust and the readability of financial reports. We use a matching strategy (entropy balancing) to address this form of endogeneity.

Recent studies (Jiang et al., 2018; Shahab et al., 2024) suggest that the entropy balancing matching strategy improves propensity score matching as it is based on an equal percent bias-reducing technique. Entropy balancing employs a repetitive process to allocate weights to the control group so that moments of the treated group align with those post-weighted control group (Hainmueller and Xu, 2013). Firstly, we split the sample into treated (i.e., firms from high social trust areas) and control (i.e., firms from low social trust areas) subsamples, defining "high" and "low" relative to the median value. Secondly, we match treatment and control groups on the first moment (mean) of all controls used in baseline models. Finally, following Hainmueller and Xu (2013), we converge the mean of all controls in the groups of treated and control firms. This re-weighting process ensures that the control sample has the same features (moments) as the treated sample without the need to exclude any observations.

We report variable distributions before (Panel A) and after (Panel B) entropy balancing in Table 8. We re-estimate our baseline models in Panel C using the balanced sample. For robustness, we present results across different measures of readability. As shown in columns 1 to 4 of Panel C, our results hold after addressing sample selection bias through entropy balancing. Specifically, we find that social trust leads to the production of more readable

Form 10-K reports.

<div align="center">**Insert Table 8 Here**</div>

4.4.2   Addressing omitted variable bias through two-stage least squares regressions

We use two instrumental variables for social trust: (1) historical religiosity in 1958, measured as the proportion of church members in a state, and (2) the percentage of women in the state legislature. Both instruments are theoretically grounded. Historical religiosity captures enduring norms of institutional trust and social cohesion, yet it is unlikely to influence firms' reporting readability directly. Data on historical religiosity are obtained from the Association of Religion Data Archives. The second instrument, women's political representation, is theoretically linked to cooperative norms and social capital (Beaman et al., 2009; Croson and Gneezy, 2009). However, the share of female legislators is unlikely to directly affect firms' disclosure readability except through its impact on social trust, thus satisfying the exogeneity condition (Knack and Keefer, 1997).

Table 9 presents the two-stage least squares (2SLS) estimates examining the causal effect of social trust on the obfuscation of firms' financial statements. The first-stage results confirm that both historical religiosity and the proportion of women in state legislatures are strong and significant predictors of regional social trust. The Kleibergen–Paap LM statistic (1063.399, $p < 0.001$) rejects underidentification, while the Cragg–Donald and Kleibergen–Paap F-statistics (708.496 and 581.291, respectively) far exceed the Stock–Yogo critical values, indicating that weak identification is not a concern. The Hansen J statistic ($\chi^2 = 8.736$, $p = 0.0031$) suggests some caution regarding instrument exogeneity, although the overall pattern of results remains consistent with the main hypothesis.

The second-stage results, presented in columns 2 to 5, show that instrumented social trust is negatively and significantly associated with various measures of financial statement obfuscation. Firms located in high-trust regions produce 10-K filings with lower Fog, Flesch–Kincaid, and Bog indices, indicating clearer and more readable disclosures. The coefficient for 10-K file size is negative but insignificant, suggesting that social trust enhances the quality but does not necessarily reduce the quantity of disclosure.

Overall, these results provide strong evidence of a causal link between social trust and readability, suggesting that trust promotes corporate transparency by reducing the complexity

of financial reporting. The results suggest that trust operates as an informal governance mechanism that constrains managerial obfuscation and fosters clearer communication with stakeholders.

Insert Table 9 Here

4.4.3 The impact of relevant regulations

Our results so far suggest that social trust positively enhances the readability of financial disclosures. However, two relevant regulations during our sample period, the Sarbanes-Oxley Act of 2002 (SOX) and the 1998 SEC Plain English Mandate (SPEM), could have the same effects, thus weakening the currency of our inferences. First, we presume that SOX may weaken our inferences as it emphasizes strengthening corporate governance through the independence of boards and auditors. It also increased scrutiny on CEOs by making them legally responsible for the accuracy of financial reports and individually liable for any misrepresentation. We may, therefore, find that the results we have documented disappear after the SOX. If so, then our findings will, unfortunately, lack currency or policy implications. Secondly, and more importantly, the SEC Plain English Mandate (SPEM) enacted in 1998 required firms to directly enhance disclosure readability by using plain English (Bonsall IV et al., 2017). Again, if this mandate effectively enhanced the readability of corporate disclosures to the extent that our results disappeared after the mandate, then our study will have limited policy implications.

To allay these concerns, we split our sample into two groups; pre and post-regulation, and re-estimated our results. In the case of the SOX, we split our sample into pre-SOX (1994 to 2002) and post-SOX (2003 to 2018) and re-estimate Eq.(1). The results are reported in columns 1 and 2 of Table 10 and show that the coefficient on social trust is negative and statistically significant for both subsamples. Differences in coefficient tests, as well as the use of interaction effects, reveal no notable differences. In the case of the SPEM, we split our sample into pre-SPEM (1994 to 1998) and post-SPEM (1999 to 2018) and re-estimate our baseline model. The results, reported in columns 3 and 4 of Table 10, show a negative coefficient on social trust for both models, but only significant for post-SPEM. This confirms that our results are relevant, if not stronger, after the SPEM. Summarily, the findings in Table 10 allay concerns around the currency or our findings and its relevance following regulations

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that seek to address financial statement quality and readability issues directly.

<center>**Insert Table 10 Here**</center>

4.4.4   Alternative measures, dominant subsamples, and additional controls

To conclude our analysis, we conduct further robustness checks to address biases that may arise from our methodological choices. Our first set of checks deploys an alternative measure for social trust. Our social trust measure captures the depth of social norms and faith that individuals and institutions within a specific locale will adhere to those norms or behave in a certain way. Shleifer et al. (1997) contends that social trust is a key element of social capital, defining social capital as the propensity for individuals and institutions in a society to cooperate to produce socially efficient outcomes. Our social trust measure comes from survey data which may lack objectivity and the quality of the survey instrument. Thus, the administration and collation processes might influence its quality. If our findings are valid, we should also find that they largely hold when we use an alternative proxy for the underlying concept.

In the literature (Hasan et al., 2017), social capital is measured very differently from social trust based on objective data. Specifically, following Hasan et al. (2017), we measure social capital by extracting the first principal component from a list of variables that capture the presence and number of religious organizations, civic and social associations, bowling centers, business associations, labor organizations, physical fitness facilities, political organizations, public golf courses, and sports clubs, as well as voter turnout and census response rates, in each county. This data is available from the Northeast Regional Center for Rural Development at Pennsylvania State University. In columns 1 to 4 of Table 11, we use this objective measure of social capital as an alternative measure for social trust and re-estimate our baseline model for different proxies of readability. As shown in columns 1 to 4 of Panel A, our results remain robust to this alternative measure. Specifically, we find that the obfuscation of 10-k filings reduces with the level of social capital in a firm's county.

Many firms are known to be headquartered in Delaware, a state with a unique set of legal statutes that offer firms more flexibility and protection. In our sample, for example, over 63.19% of firm-year observations (28,307 out of 44,799) are headquartered in Delaware. To ensure that our results are not driven by this dominance and the underlying institutional

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features, in column 1 (Panel B) of Table 11, we drop observations from the State of Delaware and re-estimate our baseline results. Our findings remain robust despite this exclusion and indicate that the dominant subset does not influence our conclusions about the negative effect of social trust on the obfuscation of annual reports.

Further, we explore the extent to which our results are robust to the set of control variables we have used in our analysis. Following existing studies (Mekhaimer et al., 2024; Rahman and Kabir, 2023), we include additional firm-level (earnings volatility, concentration, Delware incorporation, non-missing items, and special items), governance-related (female CEO, board independence, and CEO-Chair duality), and state-level (religiosity, population density, and income per capita) control variables. We provide detailed definitions for these variables in Appendix A. Note that the number of observations decreases significantly from 44,134 to 41,432 in column 2, from 44,134 to 15,352 in column 3, and from 44,134 to 15,342 in column 4 after including these variables. Nonetheless, the results show that our findings are robust, i.e., social trust leads to reduced financial reporting obfuscation.

Insert Table 11 Here

5 Conclusion

In this study, we investigate whether social trust influences the readability of firms' annual reports. We propose that social trust fosters an environment where managers are incentivized and driven to create high-quality reports. This is so because social trust, as an important informal institution, can develop into a strong social norm that shapes the behavior of corporate managers (Chen et al., 2020; Dong et al., 2018; Kong et al., 2021; Li et al., 2017). When the level of social trust in a society is high, it creates an expectation for ethical behavior and accountability (Du and Kuo, 2025; Kondo et al., 2021; Zhang et al., 2025). As these expectations become ingrained as informal institution, they push managers to behave in ways that match these norms (Dong et al., 2018). Drawing on a large sample of US firms from 1994 to 2018, our findings support the argument that social trust discourages managers from producing obfuscated financial reports. Specifically, we find that the readability of Form 10-K reports issued by managers increases with the level of social trust in the firms' location. Our results are robust to endogeneity from sample selection and omitted variables, as well as several methodological choices, including the choice of proxies for readability and social trust.

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Further analyses show that the negative relationship between social trust and the obfuscation of annual reports is more pronounced for firms with higher stakeholder orientation, lower geographical dispersion, better monitoring environment, more capable managers, and those whose CEOs have a broader lifetime work experience (generalist CEOs). These results highlight the channels through which the relationship ensues (i.e., stakeholder orientation) and underscore the importance of managerial attributes and the governance environment in shaping the social trust—readability nexus.

Our study offers valuable insights for external stakeholders, managers, and policymakers. For stakeholders depending on firm financial reports, we show that informal institutions influence the readability of these reports. The cost of unpacking firms' financial reports (e.g., time and specialist skills required) will depend on the communities in which firms are located. For managers, it highlights the importance and influence of social trust, an often-neglected factor in business operations. By recognizing the dynamic between trust and disclosure, managers can better respond to informal institutions to avoid actions that could harm their firm's reputation. Finally, for policymakers, our findings highlight the governance role of informal institutions. Here, we show that social trust as an important informal institution may force managers to behave in certain ways. To reduce the cost of enforcing certain regulations like the SPEM, policymakers may redeploy monitoring resources from firms in high to those in low social trust regions.

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Table 1

Distribution by year and U.S. State

Distribution by year			Distribution by U.S. State		
Years	Number of observations	Percentage of observations	U.S. State	Number of observations	Percentage of observations
1994	704	1.57	Delaware	28,307	63.19
1995	897	2.00	Nevada	1,361	3.04
1996	1,311	2.93	New York	1,335	2.98
1997	1,672	3.73	Minnesota	1,174	2.62
1998	1,651	3.69	Ohio	1,090	2.43
1999	1,589	3.55	Pennsylvania	1,082	2.42
2000	1,518	3.39	Florida	1,002	2.24
2001	1,528	3.41	California	852	1.90
2002	1,823	4.07	Massachusetts	801	1.79
2003	2,320	5.18	Texas	748	1.67
2004	2,273	5.07	Other States	7,047	15.72
2005	2,215	4.94			
2006	2,144	4.79			
2007	2,071	4.62			
2008	2,052	4.58			
2009	2,146	4.79			
2010	2,119	4.73			
2011	2,041	4.56			
2012	2,033	4.54			
2013	1,975	4.41			
2014	1,953	4.36			
2015	1,843	4.11			
2016	1,796	4.01			
2017	1,758	3.92			
2018	1,367	3.05			
Total	44,799	100		44,799	100

The table describes the distribution of the dataset by year and by State. Source: Authors' own work.

Table 2
Descriptive Statistics

Variables	N (1)	Mean (2)	SD (3)	p1 (4)	p25 (5)	Median (6)	p75 (7)	p95 (8)
Panel A: Dependent and independent variables								
Social trust	44,799	0.195	0.063	0.093	0.143	0.194	0.223	0.363
Social capital	44,134	-0.227	0.726	-1.663	-0.689	-0.387	0.166	1.838
Fog index	44,799	19.501	1.533	16.207	18.500	19.433	20.382	24.062
Flesch-Kincaid Index	44,799	17.007	1.469	14.065	16.068	16.876	17.752	21.887
Bog index	25,014	81.987	7.684	63.000	77.000	82.000	87.000	100.000
10-K file size	44,799	12.597	0.571	11.218	12.235	12.619	12.961	13.959
Panel B: Firm-level controls								
Loss Dummy	44,799	0.267	0.442	0.000	0.000	0.000	1.000	1.000
Tobin's Q	44,799	1.854	1.351	0.562	1.082	1.462	2.140	7.177
Leverage	44,799	0.157	0.166	0.000	0.001	0.114	0.262	0.639
Sales growth	44,799	0.078	0.191	-0.383	-0.022	0.063	0.164	0.700
Firm size	44,799	19.812	2.025	15.573	18.333	19.766	21.210	24.542
Firm age	44,799	3.124	0.438	1.946	2.833	3.258	3.526	3.584
Free cash flow	44,799	0.027	0.113	-0.366	-0.015	0.040	0.089	0.267
Tangible assets	44,799	0.257	0.220	0.008	0.087	0.190	0.365	0.891
Capital expenditure	44,799	0.051	0.054	0.000	0.018	0.034	0.064	0.278
Net working capital	44,799	0.270	0.223	-0.174	0.103	0.250	0.419	0.821
Audit quality	44,799	0.718	0.450	0.000	0.000	1.000	1.000	1.000
Z score	44,799	4.584	5.308	-6.113	2.119	3.485	5.510	28.660
Financial constraint	44,799	0.392	1.458	-4.309	-0.028	0.500	1.077	2.502
Discretionary accruals	44,799	-0.017	0.089	-0.300	-0.054	-0.012	0.027	0.222
Panel C: Interaction variables								
Stakeholder orientation	18,747	0.025	0.587	-1.019	-0.333	0.000	0.200	2.167
Geographic dispersion	25,693	6.293	6.316	0.000	2.000	4.000	9.000	29.000
Managerial ability	23,949	-0.003	0.110	-0.196	-0.067	-0.023	0.032	0.444
General ability index	13,962	0.074	0.906	-0.861	-0.570	-0.352	0.494	3.191
Equity Compensation	29,810	0.094	0.217	0.000	0.000	0.000	0.000	0.827
Board independence	16,116	0.657	0.475	0.000	0.000	1.000	1.000	1.000
Panel D: Additional control variables								
Earnings volatility	42,025	0.059	0.065	0.004	0.018	0.036	0.076	0.315
Competition	44,799	0.091	0.062	0.036	0.055	0.076	0.106	0.331
Delaware incorporation	44,799	0.632	0.482	0.000	0.000	1.000	1.000	1.000
Non missing items	44,799	5.877	0.120	5.609	5.790	5.916	5.969	6.052
Special items	44,177	-0.014	0.059	-0.263	-0.012	0.000	0.000	0.069
Female CEO	44,799	0.013	0.115	0.000	0.000	0.000	0.000	1.000
CEO-Chair duality	16,116	0.599	0.490	0.000	0.000	1.000	1.000	1.000
Religiousity	44,793	0.439	0.062	0.332	0.414	0.418	0.440	0.641
Population density	44,799	11.684	4.238	3.343	6.230	13.708	14.799	17.433
Income per capita	44,777	0.393	0.078	0.230	0.339	0.407	0.439	0.571

The table provides summary statistics for variables in the study. All variables are fully defined in Appendix A. Source: Authors' own work.

Table 3

Univariate analysis: Readability of Form 10-K reports in High versus Low social trust regions

Variables	Low Trust (1)	High Trust (2)	Diff (3)	Std Error (4)	t-statistic (5)	p-value (6)
Panel A: Mean of Social Trust						
Fog index	19.660	19.303	0.355***	0.015	24.550	0.000
Flesch-Kincaid index	17.091	16.903	0.188***	0.014	13.450	0.000
Bog index	83.566	80.275	3.292***	0.095	34.650	0.000
10-K File size	12.722	12.441	0.280***	0.005	53.200	0.000
Panel B: Median of Social Trust						
Fog index	19.602	19.404	0.199***	0.015	13.750	0.000
Flesch-Kincaid index	17.045	16.971	0.073***	0.014	5.300	0.000
Bog index	83.433	80.744	2.690***	0.096	28.050	0.000
10-K File size	12.707	12.491	0.216***	0.005	40.850	0.000
Panel C: Terciles of Social Trust (T1, T3)						
Fog index	19.602	19.058	0.545***	0.019	27.700	0.000
Flesch-Kincaid index	17.045	16.707	0.339***	0.019	17.700	0.000
Bog index	83.433	79.712	3.722***	0.126	29.600	0.000
10-K File size	12.707	12.340	0.367***	0.007	51.500	0.000
Panel D: Quintiles of Social Trust (Q1, Q5)						
Fog index	19.427	18.948	0.479***	0.024	20.000	0.000
Flesch-Kincaid index	16.917	16.638	0.279***	0.024	11.900	0.000
Bog index	82.559	79.424	3.135***	0.147	21.300	0.000
10-K File size	12.646	12.307	0.340***	0.009	39.100	0.000

The table presents results from univariate difference of means tests comparing the readability of 10K reports for firms in low versus high social trust regions. ***, ** and * denote statistical significance at the 1, 5, and 10% levels, respectively. All variables are fully defined in Appendix A. Source: Authors' own work.

Table 4
Social trust and financial statements' obfuscation

Variables	Fog index	Fog index	Fog index	Flesch-Kincaid Index	Bog Index	10-K file size
	(1)	(2)	(3)	(4)	(5)	(6)
Social trust	-0.903***	-3.483***	-1.541***	-1.343***	-7.177**	-0.592***
	(0.159)	(0.417)	(0.383)	(0.367)	(3.107)	(0.122)
Loss dummy			0.120***	0.115***	0.806***	0.080***
			(0.024)	(0.024)	(0.172)	(0.008)
Tobin's Q			-0.014	-0.007	-0.078	0.014***
			(0.010)	(0.010)	(0.089)	(0.004)
Leverage			0.743***	0.762***	2.103***	0.185***
			(0.085)	(0.084)	(0.676)	(0.028)
Sales growth			0.238***	0.184***	0.859***	0.091***
			(0.039)	(0.040)	(0.273)	(0.013)
Firm size			0.164***	0.199***	0.624***	0.134***
			(0.009)	(0.008)	(0.074)	(0.003)
Firm age			-0.239***	-0.162***	-1.599***	-0.166***
			(0.027)	(0.027)	(0.217)	(0.009)
Free cash flow			-0.633***	-0.538***	-6.225***	-0.413***
			(0.103)	(0.099)	(0.856)	(0.035)
Tangible assets			-0.683***	-0.690***	-2.065***	-0.173***
			(0.099)	(0.095)	(0.774)	(0.032)
Capital expenditure			-0.263	-0.728***	-7.245***	-0.194**
			(0.256)	(0.254)	(1.860)	(0.088)
Net working capital			-0.226***	-0.266***	0.460	-0.184***
			(0.067)	(0.065)	(0.580)	(0.024)
Big 4 auditor			0.088***	0.050*	0.823***	0.037***
			(0.028)	(0.027)	(0.214)	(0.009)
Z score			-0.002	-0.005**	0.013	-0.007***
			(0.003)	(0.003)	(0.027)	(0.001)
Financial constraints			0.015*	0.014*	0.108*	0.008***
			(0.008)	(0.007)	(0.055)	(0.002)
Discretionary accruals			-0.422***	-0.308***	-4.702***	-0.247***
			(0.104)	(0.102)	(0.836)	(0.034)
Constant	19.677***	20.179***	17.356***	13.963***	75.767***	10.603***
	(0.033)	(0.082)	(0.201)	(0.191)	(1.661)	(0.068)
Observations	44,799	44,799	44,799	44,799	25,014	44,799
R-squared	0.001	0.179	0.244	0.189	0.408	0.449
Industry FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes

This table presents regression results exploring the relationship between social trust and measures of the obfuscation of 10-K reports. All variables are fully defined in Appendix A. Standard errors of coefficient estimates, clustered at the firm-level, are presented in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 5
The role of stakeholder orientation

Variables	Mediation effects		Moderation effects	
Variables	Orientation (1)	Fog index (2)	Fog index (3)	Fog index (4)
Social trust	0.705***	-1.647***	3.435***	2.527***
	(0.124)	(0.314)	(0.248)	(0.186)
Stakeholder orientation		-0.068***		0.467***
		(0.019)		(0.078)
High stakeholder orientation			0.204***	
			(0.069)	
Social trust # High stakeholder orientation			-1.590***	
			(0.360)	
Social trust # Stakeholder orientation				-1.830***
				(0.381)
Loss Dummy	0.015	0.101***	0.124***	0.119***
	(0.013)	(0.034)	(0.036)	(0.036)
Tobin's Q	0.037***	-0.049***	-0.020*	-0.028***
	(0.004)	(0.010)	(0.011)	(0.011)
Leverage	-0.090***	0.451***	0.881***	0.882***
	(0.030)	(0.077)	(0.081)	(0.081)
Sales growth	-0.144***	0.257***	0.135**	0.173***
	(0.024)	(0.060)	(0.061)	(0.062)
Firm size	0.137***	0.092***	0.131***	0.107***
	(0.003)	(0.008)	(0.009)	(0.009)
Firm age	0.036***	-0.173***	-0.282***	-0.284***
	(0.010)	(0.026)	(0.027)	(0.027)
Free cash flow	0.304***	-0.861***	-0.997***	-1.053***
	(0.067)	(0.169)	(0.179)	(0.179)
Tangible assets	-0.154***	-0.642***	-1.065***	-1.040***
	(0.033)	(0.083)	(0.088)	(0.088)
Capital expenditure	0.921***	-0.258	-0.725**	-0.849***
	(0.119)	(0.302)	(0.320)	(0.319)
Net working capital	0.094***	-0.230***	-0.145*	-0.156**
	(0.028)	(0.070)	(0.075)	(0.075)
Audit quality	0.082***	-0.021	-0.027	-0.044
	(0.012)	(0.031)	(0.033)	(0.033)
Z score	-0.007***	-0.004	-0.008**	-0.006**
	(0.001)	(0.003)	(0.003)	(0.003)
Financial constraint	-0.024***	0.040***	0.029***	0.033***
	(0.003)	(0.008)	(0.008)	(0.008)
Discretionary accruals	-0.130*	-0.708***	-0.628***	-0.607***
	(0.069)	(0.174)	(0.186)	(0.186)
Constant	-3.543***	17.461***	16.954***	17.685***
	(0.100)	(0.262)	(0.239)	(0.245)
Observations	18,747	18,747	18,747	18,747
R-squared	0.307	0.225	0.111	0.112
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

This table presents regression results exploring how the relationship between social trust and the obfuscation of 10-K reports is mediated and moderated by stakeholder orientation. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. ***, ** and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 6

The role of geographic dispersion

Variables	High focus	Low focus	All	
	(1)	(2)	(3)	(4)
Social trust	-1.222***	0.437***	0.467***	-1.973***
	(0.302)	(0.125)	(0.125)	(0.337)
High focus			0.145**	
			(0.069)	
Social trust # High focus			-2.065***	
			(0.320)	
Focus				0.086**
				(0.037)
Social trust # Focus				-0.930***
				(0.182)
Loss Dummy	0.220***	0.159***	0.171***	0.176***
	(0.060)	(0.023)	(0.021)	(0.030)
Tobin's Q	0.051***	0.024***	0.027***	0.020**
	(0.017)	(0.006)	(0.006)	(0.009)
Leverage	0.920***	0.759***	0.787***	0.836***
	(0.155)	(0.059)	(0.055)	(0.078)
Sales growth	0.193*	0.107***	0.114***	0.159***
	(0.109)	(0.040)	(0.038)	(0.055)
Firm size	0.247***	0.243***	0.244***	0.218***
	(0.014)	(0.005)	(0.005)	(0.007)
Firm age	-0.370***	-0.221***	-0.258***	-0.326***
	(0.041)	(0.019)	(0.017)	(0.022)
Free cash flow	-0.650***	-0.753***	-0.802***	-0.950***
	(0.222)	(0.087)	(0.082)	(0.123)
Tangible assets	-1.175***	-0.840***	-0.890***	-0.929***
	(0.160)	(0.061)	(0.057)	(0.080)
Capital expenditure	-0.991**	-1.087***	-1.147***	-1.520***
	(0.480)	(0.203)	(0.189)	(0.262)
Net working capital	-0.418***	-0.105**	-0.154***	-0.313***
	(0.115)	(0.044)	(0.042)	(0.061)
Audit quality	-0.031	-0.097***	-0.085***	-0.044*
	(0.043)	(0.019)	(0.018)	(0.024)
Z score	-0.011**	-0.012***	-0.011***	-0.005*
	(0.005)	(0.002)	(0.002)	(0.003)
Financial constraint	-0.002	-0.021***	-0.018***	-0.018***
	(0.014)	(0.005)	(0.005)	(0.006)
Discretionary accruals	-0.178	-0.471***	-0.435***	-0.611***
	(0.242)	(0.100)	(0.093)	(0.135)
Constant	15.664***	14.655***	14.801***	15.606***
	(0.348)	(0.149)	(0.138)	(0.196)
Observations	7,207	37,592	44,799	25,693
R-squared	0.146	0.133	0.143	0.129
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

This table presents regression results exploring how the relationship between social trust and the obfuscation of 10-K reports is moderated by firms' geographic dispersion. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. ***, ** and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 7
The effect of managerial attributes and the governance environment

Variables	Managerial attributes		Governance environment	
	(1)	(2)	(3)	(4)
Social trust	-1.390***	-1.824***	-1.102**	-2.882***
	(0.299)	(0.344)	(0.435)	(0.586)
Managerial ability	0.083			
	(0.275)			
Social trust # Managerial ability	-3.239**			
	(1.363)			
General ability index		0.164***		
		(0.051)		
Social trust # General ability index		-0.693***		
		(0.266)		
Board independence			0.170**	
			(0.073)	
Social trust # Board independence			-0.784**	
			(0.358)	
Board Co-option				-0.132
				(0.154)
Social trust # Board Co-option				1.380*
				(0.754)
Loss Dummy	0.127***	0.109***	0.075*	0.154**
	(0.031)	(0.037)	(0.041)	(0.063)
Tobin's Q	-0.011	-0.070***	-0.040***	-0.039*
	(0.011)	(0.012)	(0.014)	(0.021)
Leverage	0.824***	0.600***	0.643***	0.801***
	(0.075)	(0.088)	(0.095)	(0.138)
Sales growth	0.318***	0.245***	0.287***	0.281**
	(0.055)	(0.069)	(0.074)	(0.113)
Firm size	0.146***	0.097***	0.067***	0.057***
	(0.007)	(0.009)	(0.010)	(0.014)
Firm age	-0.201***	-0.288***	-0.180***	-0.148***
	(0.022)	(0.027)	(0.034)	(0.046)
Free cash flow	-0.585***	-0.826***	-0.988***	-0.943***
	(0.137)	(0.159)	(0.236)	(0.364)
Tangible assets	-0.761***	-0.563***	-0.829***	-0.656***
	(0.078)	(0.092)	(0.102)	(0.145)
Capital expenditure	-0.357	-0.384	-0.613	-1.264**
	(0.260)	(0.314)	(0.379)	(0.551)
Net working capital	-0.395***	-0.524***	-0.489***	-0.655***
	(0.064)	(0.078)	(0.087)	(0.133)
Audit quality	0.082***	0.141***	-0.091**	-0.084
	(0.023)	(0.031)	(0.037)	(0.054)
Z score	-0.000	0.012***	-0.002	0.000
	(0.003)	(0.003)	(0.004)	(0.006)
Financial constraint	0.013*	0.006	0.060***	0.030**
	(0.007)	(0.008)	(0.010)	(0.014)
Discretionary accruals	-0.391***	-0.818***	-0.536**	-0.443
	(0.142)	(0.177)	(0.225)	(0.348)
Constant	15.981***	18.117***	15.381***	18.053***
	(0.207)	(0.423)	(1.377)	(0.438)
Observations	23,949	13,962	16,116	8,744
R-squared	0.208	0.233	0.210	0.203
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

This table presents regression results exploring how managerial attributes and the governance environment moderate the relationship between social trust and the obfuscation of 10-K reports. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. ***, ** and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 8
Addressing endogeneity through entropy balancing

	Treatment group			Control group		
	Mean	Variance	Skewness	Mean	Variance	Skewness
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Variable distributions before entropy balancing						
Loss Dummy	0.257	0.191	1.111	0.275	0.199	1.010
Tobin's Q	1.851	2.032	5.063	1.856	1.662	4.141
Leverage	0.159	0.027	0.981	0.155	0.028	1.042
Sales growth	0.077	0.037	0.711	0.078	0.036	0.617
Firm size	19.550	4.216	0.227	20.020	3.908	0.110
Firm age	3.113	0.216	-0.831	3.132	0.172	-0.864
Free cash flow	0.021	0.013	-1.385	0.032	0.012	-1.448
Tangible assets	0.271	0.046	1.092	0.247	0.050	1.230
Capital expenditure	0.054	0.003	2.687	0.048	0.003	3.039
Net working capital	0.273	0.050	0.197	0.267	0.050	0.324
Audit quality	0.647	0.229	-0.613	0.775	0.174	-1.318
Z score	4.811	30.860	3.394	4.403	25.960	3.000
Financial constraint	0.414	2.107	-6.355	0.374	2.138	-6.820
Discretionary accruals	-0.011	0.008	-0.200	-0.021	0.008	-0.577
Panel B: Variable distributions after entropy balancing						
Loss Dummy	0.257	0.191	1.111	0.257	0.191	1.110
Tobin's Q	1.851	2.032	5.063	1.851	1.946	4.578
Leverage	0.159	0.027	0.981	0.159	0.030	1.046
Sales growth	0.077	0.037	0.711	0.077	0.038	0.614
Firm size	19.550	4.216	0.227	19.550	3.838	0.189
Firm age	3.113	0.216	-0.831	3.113	0.175	-0.832
Free cash flow	0.021	0.013	-1.385	0.021	0.014	-1.550
Tangible assets	0.271	0.046	1.092	0.271	0.057	1.062
Capital expenditure	0.054	0.003	2.687	0.054	0.004	2.846
Net working capital	0.273	0.050	0.197	0.273	0.055	0.302
Audit quality	0.647	0.229	-0.613	0.647	0.229	-0.613
Z score	4.811	30.860	3.394	4.811	38.240	3.167
Financial constraint	0.414	2.107	-6.355	0.414	2.264	-6.185
Discretionary accruals	-0.011	0.008	-0.200	-0.011	0.008	-0.191

Panel C: Social trust and readability after entropy balancing

Variables	Fog Index	Flesch-Kincaid Index	Bog Index	10-K file size
	(1)	(2)	(3)	(4)
Social trust	-1.420***	-1.278***	-6.631***	-0.553***
	(0.202)	(0.198)	(1.281)	(0.066)
Loss Dummy	0.124***	0.122***	0.804***	0.082***
	(0.021)	(0.021)	(0.132)	(0.007)
Tobin's Q	-0.008	0.000	-0.066	0.015***
	(0.006)	(0.006)	(0.045)	(0.003)
Leverage	0.751***	0.779***	2.249***	0.186***
	(0.055)	(0.054)	(0.325)	(0.018)
Sales growth	0.225***	0.175***	0.891***	0.086***
	(0.038)	(0.038)	(0.248)	(0.013)
Firm size	0.177***	0.205***	0.659***	0.138***
	(0.005)	(0.005)	(0.030)	(0.002)
Firm age	-0.240***	-0.167***	-1.615***	-0.169***
	(0.016)	(0.016)	(0.094)	(0.005)
Free cash flow	-0.613***	-0.521***	-6.078***	-0.424***
	(0.076)	(0.074)	(0.561)	(0.026)
Tangible assets	-0.699***	-0.717***	-2.342***	-0.185***
	(0.056)	(0.056)	(0.338)	(0.019)
Capital expenditure	-0.212	-0.664***	-6.913***	-0.188***
	(0.181)	(0.183)	(1.079)	(0.061)
Net working capital	-0.197***	-0.248***	0.409	-0.201***
	(0.041)	(0.040)	(0.276)	(0.014)
Audit quality	0.071***	0.041**	0.782***	0.034***
	(0.017)	(0.017)	(0.102)	(0.006)
Z score	-0.003	-0.005***	0.016	-0.006***
	(0.002)	(0.001)	(0.012)	(0.001)
Financial constraint	0.016***	0.013***	0.122***	0.008***
	(0.005)	(0.005)	(0.031)	(0.002)
Discretionary accruals	-0.396***	-0.289***	-4.741***	-0.248***
	(0.089)	(0.087)	(0.634)	(0.031)
Constant	15.722***	12.818***	62.288***	10.140***
	(0.162)	(0.157)	(0.887)	(0.052)
Observations	44,799	44,799	25,014	44,799
R-squared	0.243	0.188	0.407	0.443
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

This table presents regression results exploring the relationship between social trust and the obfuscation of 10-K reports after entropy balancing. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 9

Social trust and financial statements' obfuscation: Two-stage least squares

Variables	Social trust	Fog index	Flesch-Kincaid Index	Bog Index	10-K file size
	(1)	(2)	(3)	(4)	(5)
Religiosity in 1958	0.036***				
	(0.000)				
% of women in legislature	0.001***				
	(0.000)				
Social trust (instrumented)		-3.151**	-2.786**	-20.345***	-0.338
		(0.011)	(0.023)	(0.004)	(0.389)
Loss dummy		0.111***	0.106***	0.768***	0.080***
		(0.000)	(0.000)	(0.000)	(0.000)
Tobin's Q		-0.016***	-0.009	-0.080*	0.015***
		(0.005)	(0.122)	(0.067)	(0.000)
Leverage		0.731***	0.743***	1.807***	0.191***
		(0.000)	(0.000)	(0.000)	(0.000)
Sales growth		0.234***	0.179***	0.789***	0.089***
		(0.000)	(0.000)	(0.001)	(0.000)
Firm size		0.162***	0.197***	0.595***	0.135***
		(0.000)	(0.000)	(0.000)	(0.000)
Firm age		-0.235***	-0.162***	-1.574***	-0.167***
		(0.000)	(0.000)	(0.000)	(0.000)
Free cash flow		-0.650***	-0.561***	-6.149***	-0.412***
		(0.000)	(0.000)	(0.000)	(0.000)
Tangible assets		-0.646***	-0.654***	-1.774***	-0.180***
		(0.000)	(0.000)	(0.000)	(0.000)
Capital expenditure		-0.358**	-0.829***	-7.646***	-0.184***
		(0.048)	(0.000)	(0.000)	(0.002)
Net working capital		-0.232***	-0.277***	0.238	-0.188***
		(0.000)	(0.000)	(0.366)	(0.000)
Big 4 auditor		0.074***	0.034**	0.762***	0.036***
		(0.000)	(0.042)	(0.000)	(0.000)
Z score		-0.002	-0.005***	0.019	-0.007***
		(0.309)	(0.002)	(0.131)	(0.000)
Financial constraints		0.015***	0.015***	0.114***	0.008***
		(0.001)	(0.002)	(0.000)	(0.000)
Discretionary accruals		-0.422***	-0.309***	-4.453***	-0.253***
		(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.172***	16.567***	13.448***	67.418***	10.124***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	43,945	43,945	43,945	24,515	43,945
R-squared	0.788	0.242	0.187	0.409	0.450
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

This table presents regression results exploring the relationship between social trust and the obfuscation of 10-K reports after entropy balancing. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 10

Additional analyses: Effect of Sarbanes-Oxley Act and SEC Plain English Mandate

| | Sarbanes Oxley (SOX) Act | | SEC Plain English Mandate | |
	Pre-SOX	Post-SOX	Pre-SPEM	Post-SPEM
Variables	(1)	(2)	(3)	(4)
Social trust	-1.881***	-1.332***	-1.011	-1.593***
	(0.562)	(0.198)	(0.796)	(0.195)
Loss Dummy	0.114**	0.120***	0.102	0.119***
	(0.048)	(0.021)	(0.077)	(0.020)
Tobin's Q	-0.018	-0.018***	0.037	-0.020***
	(0.014)	(0.006)	(0.025)	(0.006)
Leverage	1.034***	0.586***	1.445***	0.626***
	(0.137)	(0.054)	(0.213)	(0.052)
Sales growth	0.207**	0.226***	0.191	0.232***
	(0.081)	(0.038)	(0.126)	(0.037)
Firm size	0.194***	0.150***	0.197***	0.156***
	(0.010)	(0.005)	(0.016)	(0.005)
Firm age	-0.234***	-0.239***	-0.276***	-0.225***
	(0.035)	(0.016)	(0.049)	(0.016)
Free cash flow	-0.584***	-0.611***	-0.605**	-0.611***
	(0.182)	(0.077)	(0.308)	(0.075)
Tangible assets	-0.971***	-0.573***	-1.120***	-0.624***
	(0.139)	(0.055)	(0.216)	(0.055)
Capital expenditure	-0.226	-0.196	-0.207	-0.202
	(0.393)	(0.183)	(0.591)	(0.180)
Net working capital	-0.332***	-0.177***	0.006	-0.263***
	(0.099)	(0.040)	(0.166)	(0.039)
Audit quality	0.010	0.174***	-0.044	0.134***
	(0.034)	(0.018)	(0.048)	(0.017)
Z score	-0.005	-0.001	-0.022***	-0.000
	(0.004)	(0.002)	(0.007)	(0.002)
Financial constraint	0.062***	0.007	0.062**	0.011**
	(0.017)	(0.005)	(0.026)	(0.005)
Discretionary accruals	-0.026	-0.597***	0.005	-0.509***
	(0.206)	(0.088)	(0.330)	(0.087)
Constant	15.819***	16.032***	15.455***	16.226***
	(0.336)	(0.142)	(0.479)	(0.155)
Observations	12,693	32,106	6,235	38,564
R-squared	0.081	0.249	0.088	0.257
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

This table presents regression results exploring how the Sarbanes-Oxley (SOX) Act of 2002 and the SEC Plain English Mandate (SPEM) of 1998 impact the relationship between social trust and the obfuscation of 10-K reports. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Table 11 Robustness tests
Panel A: Social capital as an alternative measure of social trust

Dependent variable	Fog index	Flesch-Kincaid Index	Bog Index	10-K file size
Variables	(1)	(2)	(3)	(4)
Social capital	-0.083***	-0.080***	-0.749***	-0.033***
	(0.009)	(0.009)	(0.054)	(0.003)
Loss Dummy	0.114***	0.110***	0.750***	0.078***
	(0.020)	(0.020)	(0.127)	(0.006)
Tobin's Q	-0.016**	-0.007	-0.120***	0.014***
	(0.006)	(0.006)	(0.043)	(0.002)
Leverage	0.753***	0.757***	2.091***	0.195***
	(0.051)	(0.050)	(0.309)	(0.016)
Sales growth	0.236***	0.182***	0.762***	0.090***
	(0.037)	(0.037)	(0.235)	(0.012)
Firm size	0.166***	0.201***	0.619***	0.134***
	(0.005)	(0.004)	(0.027)	(0.001)
Firm age	-0.248***	-0.176***	-1.614***	-0.164***
	(0.016)	(0.016)	(0.090)	(0.005)
Free cash flow	-0.639***	-0.550***	-5.868***	-0.420***
	(0.084)	(0.084)	(0.533)	(0.027)
Tangible assets	-0.696***	-0.698***	-2.202***	-0.177***
	(0.053)	(0.052)	(0.319)	(0.017)
Capital expenditure	-0.235	-0.722***	-6.859***	-0.198***
	(0.178)	(0.176)	(1.066)	(0.056)
Net working capital	-0.245***	-0.289***	-0.031	-0.197***
	(0.042)	(0.042)	(0.265)	(0.013)
Audit quality	0.082***	0.042**	0.764***	0.038***
	(0.017)	(0.016)	(0.098)	(0.005)
Z score	-0.002	-0.005***	0.023*	-0.007***
	(0.002)	(0.002)	(0.012)	(0.001)
Financial constraint	0.015***	0.014***	0.120***	0.008***
	(0.005)	(0.005)	(0.029)	(0.002)
Discretionary accruals	-0.425***	-0.321***	-4.101***	-0.257***
	(0.092)	(0.091)	(0.578)	(0.029)
Constant	15.690***	12.678***	62.230***	10.062***
	(0.143)	(0.142)	(0.848)	(0.046)
Observations	44,134	44,134	24,591	44,134
R-squared	0.245	0.190	0.417	0.450
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

This table presents regression results exploring the relationship between social trust and the readability or obfuscation of 10-K reports using alternative readability measures. Dependent variables are "Fog", "Flesch", "Bog" and "File size". All variables are fully defined in Appendix A. Robust standard errors are shown in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively. Source: Authors' own work.

Panel B: Dominant subsample and additional controls

Dependent variable	Excl. Delaware	Additional Controls		
		Firm	Governance	State
Variables	(1)	(2)	(3)	(4)
Social trust	-0.523*	-0.761***	-1.105**	-1.146**
	(0.281)	(0.268)	(0.459)	(0.447)
Loss dummy	0.102***	0.109***	0.073*	0.078*
	(0.035)	(0.021)	(0.044)	(0.046)
Tobin's Q	-0.026**	-0.022***	-0.034**	-0.034**
	(0.011)	(0.007)	(0.015)	(0.014)
Leverage	0.632***	0.731***	0.641***	0.646***
	(0.089)	(0.053)	(0.098)	(0.102)
Sales growth	0.156**	0.246***	0.327***	0.341***
	(0.064)	(0.039)	(0.077)	(0.082)
Firm size	0.163***	0.158***	0.063***	0.060***
	(0.007)	(0.005)	(0.010)	(0.010)
Firm age	-0.180***	-0.225***	-0.162***	-0.157***
	(0.028)	(0.017)	(0.035)	(0.036)
Free cash flow	-0.422***	-0.578***	-1.128***	-1.131***
	(0.144)	(0.090)	(0.252)	(0.239)
Tangible assets	-0.870***	-0.656***	-0.782***	-0.751***
	(0.087)	(0.055)	(0.106)	(0.112)
Capital expenditure	0.163	-0.218	-0.799**	-0.761*
	(0.288)	(0.186)	(0.395)	(0.396)
Net working capital	-0.340***	-0.239***	-0.491***	-0.463***
	(0.070)	(0.044)	(0.090)	(0.086)
Big 4 auditor	0.117***	0.075***	-0.092**	-0.094**
	(0.026)	(0.017)	(0.038)	(0.041)
Z score	-0.003	-0.001	-0.002	-0.001
	(0.003)	(0.002)	(0.004)	(0.003)
Financial constraints	0.030***	0.016***	0.056***	0.054***
	(0.008)	(0.005)	(0.011)	(0.011)
Discretionary accruals	-0.337**	-0.405***	-0.689***	-0.697***
	(0.151)	(0.104)	(0.259)	(0.249)
Earnings volatility		0.342***	0.282	0.298
		(0.124)	(0.300)	(0.275)
Concentration		-0.244	-0.280	-0.072
		(0.205)	(0.356)	(0.368)
Delaware incorporation		0.093***	0.074**	0.116***
		(0.017)	(0.029)	(0.034)
Non-missing items		0.947***	1.085***	1.047***
		(0.170)	(0.306)	(0.328)
Special items		0.142	0.287	0.294
		(0.133)	(0.288)	(0.265)
Female CEO			0.161***	0.152***
			(0.058)	(0.057)
Board independence			0.002	0.231**
			(0.023)	(0.095)
CEO–Chair duality			0.030	0.024
			(0.024)	(0.023)
Religiosity				-0.218
				(0.247)
Population density				0.054***
				(0.012)
Income per capita				0.788**
				(0.331)
Constant	16.324***	10.596***	9.173***	12.323***
	(0.250)	(0.939)	(2.209)	(1.927)
Observations	16,492	41,432	15,352	15,342
R-squared	0.223	0.246	0.215	0.215
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: This table presents regression results for the Fog index under different robustness specifications. Columns (1)–(3) replicate prior robustness checks (Excl. Delaware and additional controls), while column (4) is the extended model with regional religiosity, population density, and income per capita. Robust standard errors are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10% levels. Source: Authors' own work.

| Variables	Definition
Panel A: Dependent and independent variables	
Fog Index	The Gunning Fog Readability index of parsed 10-K reports is estimated in Python 3.11.0 from the number of words (Words), sentences (Sentence), and complex words (Complex Words) in the report following ([Bonsall IV et al.](#), 2017; [Li](#), 2008). The model for estimating this is as follows: $$Fog\ index = 0.4 * (\frac{Words}{Sentences} + 100 * \frac{Complex\ Words}{Words})$$
Flesch-Kincaid Index	The Flesch-Kincaid Readability Index of parsed 10-K reports are estimated in Python 3.11.0 from the total number of words (Words), sentences (Sentences), and syllabi (Syllabus) in the report as follows: $$Flesch - Kincaid\ index = 0.39\frac{Words}{Sentences} + 11.8\frac{Syllabus}{Words} - 15.59$$
Bog Index	The Bog index ([Bonsall IV et al.](#), 2017) is generated using StyleWriter, The Plain English Editor. The data is freely available from the authors ([Bonsall IV et al.](#), 2017). StyleWriter generates the index based on the following model: $$Bog\ index = Sentence\ Bog + Word\ Bog - Pep$$ Where, *Sentence bog* captures obfuscation due to long sentences, *Word Bog* captures obfuscation through the use of difficult and problem words, and *Pep* captures the use of names and interesting words that enhance the clarity of texts.
10-K file size	Natural log of the net file size of Form 10-K reports.
Social Trust	Estimated from survey data, publicly accessible on the National Opinion Research Center webpage. It captures regional social trust levels based on the average responses to the question: *"Generally speaking, would you say that most people can be trusted, or that you need to be very careful in dealing with people?"*.
Social Capital	The first principal component from a list of variables that capture the presence and number of religious organizations, civic and social associations, bowling centers, business associations, labor organizations, physical fitness facilities, political organizations, public golf courses, and sports clubs, as well as voter turnout and census response rates, in each county ([Hasan et al.](#), 2017).
Panel B: Firm-level control variables	
Loss dummy	Takes a value of one when a firm reports a loss and a value of zero, otherwise.
Tobin's Q	Market value of equity plus the book value (BV) of debt, scaled by the BV of total assets.
Leverage	The ratio of a firm's long-term debt to its total assets.
Sales growth	Change in sales as a ratio of previous sales.
Firm size	The natural log of total assets.
Firm age	Natural log of the number of years since listing.
Free cash flow	Free cash flow (estimated as cash flow from operations minus capital expenditures) as a proportion of assets.
Tangible assets	A firm's fixed assets (including property, plant & equipment) as a proportion of its assets.
Capital expenditure	Total capital expenditure as a fraction of total assets.
Net working capital	Total working capital (the difference between current assets and current liabilities) as a fraction of total assets.
Audit quality	An identifier for firms audited by Big 4 audit firms.
Z score	Altman Z-score measure of the risk of financial distress.
Financial constraints	The Kaplan-Zingales measure of financial constraints or KZ index ([Kaplan and Zingales](#), 1997).
Discretionary accruals	Derived from the modified-Jones model ([Dechow et al.](#), 1995; [Tunyi et al.](#), 2024).

Appendix A Variable definitions cont'd

| Variables	Definition
Panel C: Interaction variables	
Stakeholder orientation	Corporate social responsibility (CSR) index reflecting a firm's performance across five KLD database CSR dimensions including Community, Employment, Environment, Diversity and Human rights. The index is computed in line with Servaes and Tamayo (2013). Specifically, for each dimension, we first divide a firm's total number of CSR strengths (weaknesses) reported in KLD by the maximum possible number of strengths (weaknesses) to generate two indices that range from 0 to 1 (or 0 to 100%). We then compute stakeholder orientation as the difference between the strength index and the weakness index. This index lies between -1 and +1. Finally, we combine the stakeholder orientation scores across the five dimensions to generate a new score (stakeholder orientation) that ranges from -5 to +5.
Geographic dispersion	Natural log of the number of geographic segments reported in the segment reports.
Managerial ability	Captured using the Demerjian et al. (2012) measure of managerial ability available through the authors' repository.
General ability index	The first factor of the principal components analysis of five proxies of the breadth of a CEOs lifetime work experience including past number of (1) positions, (2) firms, and (3) industries in which a CEO worked; (4) whether the CEO held a CEO position at a different company; and (5) whether the CEO worked for a conglomerate (Custódio et al., 2013).
Board independence	The proportion of independent directors on the board.
Board co-option	The fraction of directors on the board appointed after the CEO assumed office.
Panel D: Additional control variables	
Earnings volatility	Standard deviation of a firm's operating profit to asset ratio over the last five years.
Competition	Proxied using the Herfindahl-Hirschman index (HHI) estimated from revenue-based market shares within 4-digit SIC code industries.
Delaware incorporation	An identifier for firms incorporated in the state of Delaware.
Non-missing items	Natural log of the number of non-missing items from a firm's Compustat data.
Special items	The ratio of the value of "special items" to total assets.
Female CEO	Takes a value of one if the firm has a female CEO.
CEO Chair duality	Indicator variable for firms where the same individual holds the Board Chair and CEO positions.
Religiousity	The ratio of total number of adherents in a state to the total population of the state.
Population density	The ratio of total population to total land surface area of each state. We divide the population density by 100,000 for tractability.
Income per capita	The natural log of personal income per capita for each state and each year.

Source: Authors' own work.

Appendix B Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) Fog index	1.00																	
(2) Flesch-Kincaid	0.96*	1.00																
(3) Bog index	0.38*	0.33*	1.00															
(4) 10-K file size	0.60*	0.62*	0.40*	1.00														
(5) Social trust	-0.04*	-0.01*	-0.12*	-0.17*	1.00													
(6) Loss Dummy	0.03*	0.00	0.13*	0.03*	-0.01*	1.00												
(7) Tobin's Q	0.00	-0.01	0.06*	0.00	-0.01	-0.10*	1.00											
(8) Leverage	0.15*	0.18*	0.02*	0.24*	0.01*	-0.01*	-0.19*	1.00										
(9) Sales growth	0.01	0.01	0.00	0.01*	-0.02*	-0.24*	0.24*	-0.01*	1.00									
(10) Firm size	0.28*	0.31*	0.13*	0.51*	-0.08*	-0.29*	0.00	0.36*	0.04*	1.00								
(11) Firm age	-0.02*	0.00	-0.12*	-0.01*	-0.02*	-0.19*	0.00	0.01	-0.05*	0.25*	1.00							
(12) Free cash flow	0.01	0.02*	-0.04*	0.01	-0.04*	-0.43*	0.14*	-0.04*	0.05*	0.24*	0.16*	1.00						
(13) Tangible assets	-0.05*	-0.05*	-0.21*	0.03*	0.04*	-0.03*	-0.14*	0.35*	-0.01	0.17*	0.04*	-0.12*	1.00					
(14) Capital expend.	-0.05*	-0.06*	-0.16*	-0.01	0.06*	-0.08*	0.03*	0.13*	0.14*	0.08*	-0.03*	-0.25*	0.62*	1.00				
(15) Net working cap.	-0.11*	-0.13*	0.07*	-0.24*	0.02*	0.01	0.15*	-0.39*	0.01*	-0.34*	-0.02*	0.00	-0.49*	-0.28*	1.00			
(16) Audit quality	0.12*	0.13*	0.10*	0.25*	-0.14*	-0.12*	0.06*	0.14*	0.03*	0.46*	0.05*	0.12*	0.03*	0.03*	-0.08*	1.00		
(17) Z score	-0.09*	-0.10*	-0.01	-0.16*	0.02*	-0.23*	0.58*	-0.35*	0.18*	-0.06*	0.04*	0.26*	-0.15*	-0.01	0.41*	0.02*	1.00	
(18) Financial constr.	0.05*	0.07*	0.04*	0.10*	-0.01	0.15*	-0.01	0.36*	0.07*	0.03*	-0.10*	-0.22*	0.09*	0.07*	-0.24*	0.03*	-0.20*	1.00
(19) Discretionary acr.	-0.05*	-0.03*	-0.09*	-0.07*	0.04*	-0.33*	-0.05*	0.05*	0.10*	0.04*	0.09*	-0.24*	0.13*	0.03*	0.04*	-0.03*	0.09*	-0.04*

Source: Authors' own work.
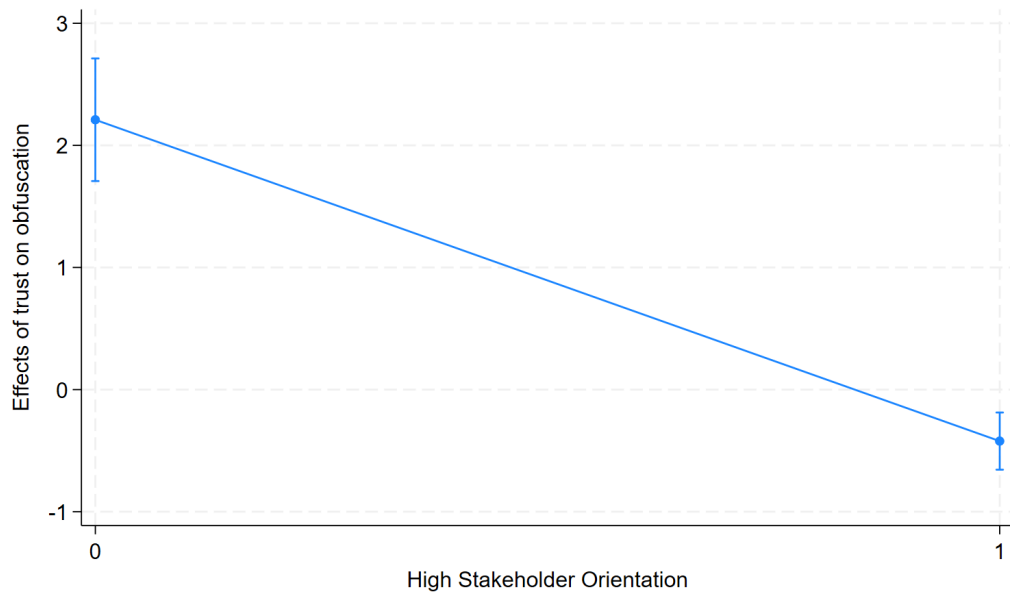
(a) Stakeholder Orientation
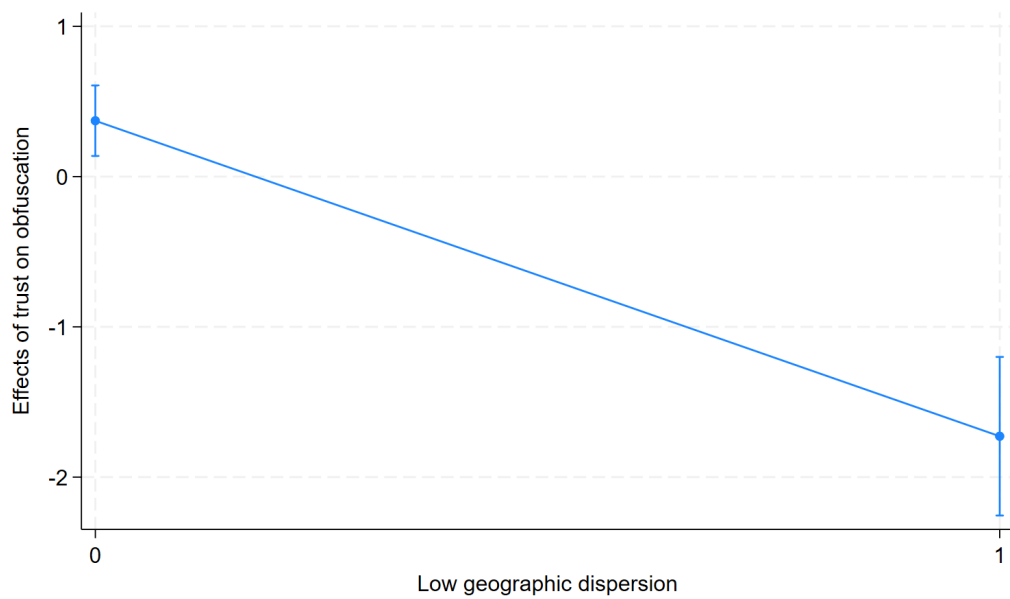
(b) Geographic Dispersion

Figure 1 Average marginal effects of social trust on obfuscation (with 95% CI)
Source: Authors' own work.