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Generalist CEOs and the readability of the 10-K report

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ABSTRACT

In this paper, we investigate the association between the general managerial ability of CEOs and the readability of 10-K reports. We find that the readability of 10-K reports is lower for firms managed by CEOs with general managerial ability. Our result is robust to change analysis, an alternate readability measure, various fixed effects, an instrumental variable approach, a propensity score approach, and an entropy balancing approach. Our additional analysis reveals that general managerial ability is negatively associated with the readability of management discussion and analysis (MD&A). Moreover, the disclosure tone of 10-K reports and MD&A is conservative when firms are managed by generalist CEOs. Our findings also reveal that CEO tenure moderates the positive association between the general ability index and Gunning Fog index of 10-K reports. Finally, we find that high investment level and misstatement strengthen the association between the general ability index and the readability of 10-K reports, thus supporting the obfuscation hypothesis. We, therefore, conclude that firms incur costs in the form of lower disclosure quality when they opt for a generalist CEO.

1. Introduction

In this paper, we investigate the link between a CEO's general managerial ability and the readability of 10-K reports. A key motivation for the analysis is the upper echelons theory, which claims that the characteristics of CEOs influence their decision-making, which in turn impacts firm outcomes. Notably, extant studies point out that various CEO characteristics, such as tenure, age, educational background, gender, compensation, and power, significantly influence firm performance and firm reporting (Aier, Comprix, Gunlock, & Lee, 2005; Ali & Zhang, 2015; Barua, Davidson, Rama, & Thiruvadi, 2010; Ham, Lang, Seybert, & Wang, 2017; Koh, 2011; Malmendier & Tate, 2009). Related to our study, academic evidence indicates that CEO characteristics significantly influence the readability of 10-K reports. For instance, Xu, Fernando, and Tam (2018) focus on CEO age and find that 10-K reports are more readable when the CEO is older. Kim and Chung (2014) analyze the impact of CFO gender on 10-K readability and note that the 10-K reports of firms with female CFOs are less complex to read than those of firms with male CEOs. These studies, however, have not explored the impact of the general managerial ability of the CEO (henceforth known as the generalist CEO) on the readability of 10-K reports.

Over the years, one attribute of CEOs that has obtained importance in the labor market is the CEO's generalist ability (Custódio, Ferreira, & Matos, 2013). Consequently, many studies have focused their attention on the consequences of hiring generalist CEOs for the firm. These studies use the width of CEOs' career experience and categorize the CEO as a generalist CEO if the CEO has a diverse career path and has skills not specific to any role, firm, or industry (Custódio et al., 2013). In contrast, a CEO is classified as a specialist if he or she has thorough knowledge about the incumbent firm and industry. In general, these studies theorize that the diverse and easily transferable career skills of generalist CEOs across firms and industries influence their risk preference and decision-making ability. In line with this theory, the extant literature documents that the firm profitability (Gounopoulos & Pham, 2018; Mishra, 2014), audit fees (Ma, Wang and Zhou, 2021), and cost of capital (Ma, Ruan, Wang and Zhang, 2021) of firms are significantly affected by the career background of CEOs.

We extend the current literature on generalist CEOs and examine whether firms' 10-K report readability is influenced by the career background of their CEOs. We focus on the readability of narrative disclosures in 10-K reports because it is of value to investors, creditors, and other relevant parties. The 10-K report communicates the firm's past, current, and future performance to investors. A large portion of this

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report comprises narrative disclosures, and as a result, the readability of the 10-K report plays a central role for readers to comprehend these financial disclosures and use them in decision-making.[1] However, research evidence shows that the Gunning Fog index of the 10-K reports on average is above 18, suggesting that the language presented in the 10-K reports is difficult to read (Bonsall IV, Leone, Miller, & Rennekamp, 2017). Moreover, there has been growing fear that the complexity in terms of the readability of these reports could be intentional and associated with fraudulent activities (Blanco & Dhole, 2017). Hence, regulators and capital market participants are interested in identifying factors that impact the readability of 10-K reports.

We base this study on the obfuscation hypothesis and investigate the association between generalist CEOs and the readability of 10-K reports. The obfuscation hypothesis argues that firms produce complex 10-K reports when they want to hide information from investors. Related to generalist CEOs, extant studies show mixed findings on the outcome of hiring generalist CEOs. On one hand, studies document that generalist CEOs reduce organizational communication costs (Ferreira & Sah, 2012), spur firm innovation (Custódio, Ferreira, & Matos, 2019), and outperform their counterparts at more complex tasks (Custódio et al., 2013). These findings associate generalist CEOs with high managerial ability and thus raise the possibility of a generalist CEO having a lower incentive to cloud firm's financial performance. On the other hand, a few studies find that generalist CEOs are associated with overinvestment in negative NPV projects, earnings management, and lower firm performance (Mishra, 2014). Furthermore, firms that hire generalist CEOs pay considerably higher compensation than firms with specialist CEOs (Custódio et al., 2013). Empirically, research shows that firms produce less readable 10-K reports when they want to hide poor performance (Li, 2008; Lo, Ramos, & Rogo, 2017), earnings management, and high CEO pay (Hooghiemstra, Kuang, & Qin, 2017) from investors. Thus, generalist CEOs have incentives to produce less readable 10-K reports. Therefore, although we posit that a generalist CEO will be associated with the readability of 10-K reports, the direction of the effect of a generalist CEO on the 10-K readability is uncertain.

We analyze a sample of 13,442 firm observations ranging from 2003 to 2017. We use the Gunning Fog index, a widely used measure, to proxy for 10-K readability. For the test variable, we follow Custódio et al. (2013) to develop a general ability index, which is the first principal component of five different characteristics of CEO employment history (past roles, past firms, past industries, previous CEO experience, and conglomerate experience). Our results show that the coefficient on the general ability index is positively associated with the Gunning Fog index. This finding suggests that firms managed by generalist CEOs produce less readable 10-K reports. Furthermore, our finding is robust to the use of an alternate proxy of readability and when controlling for fixed effects. Finally, our results hold when we use a change model, an instrumental variable model, and propensity matched sample and entropy balancing approach to control for potential endogeneity.

Next, we perform a series of additional analyses. In the first test, we focus on the disclosure tone of the 10-K report and investigate the association between the disclosure tone of the 10-K reports and a generalist CEO. We follow Loughran and McDonald (2011) and use the net, litigious, and uncertain tones to proxy for the disclosure tone of 10-K reports. The results show that firms that hire generalist CEOs are risk-averse in their disclosure and use a conservative tone in their 10-K. In the second test, we investigate whether a generalist CEO influences the readability and disclosure tone of management discussion and analysis (MD&A), which is a narrative disclosure required by the SEC that gives managers discretion over how to present an explanation of a company's business, financial conditions, and performance. We find that the MD&A section of annual reports also has lower readability and a conservative disclosure tone for firms with generalist CEOs.

In the next test, we investigate whether the association between a generalist CEO and the readability of the 10-K report varies with the CEO tenure. The literature on CEO tenure suggests that performance will improve (Miller & Shamsie, 2001) and incentives to manage earnings will decrease (Ali & Zhang, 2015) as CEO tenure at the firm increases. Moreover, as tenure increases, generalist CEOs will have a better understanding of complex firm and industry-specific activities, which will improve their ability to communicate firm information precisely and in simple language. Thus, the desire to hide information related to poor performance and earnings management will be lower as the tenure of generalist CEOs at the firm lengthens. We find that CEO tenure moderates the positive association between the general ability index and Gunning Fog index of 10-K reports. To provide additional support to the obfuscation hypothesis, we examine the effect of firms' high investment levels and misstatements on the association between generalist CEO and 10-K readability. Our findings show that the positive association between a generalist CEO and the Gunning Fog index of 10-K reports is stronger for firms that have high investment levels and have misstatements in their financial statements.

Overall, our study makes two contributions to the literature. First, it contributes to the literature that focuses on the impact of CEO features on 10-K readability (Hasan, 2020; Kim & Chung, 2014; Xu et al., 2018).[2] By documenting lower readability for firms with generalist CEOs, our study shows that general managerial ability gathered from CEOs' lifetime career experience also affects the readability of 10-K reports. Second, we contribute to the sparse literature on generalist CEOs and the ongoing debate about the extent to which hiring generalist CEOs has a detrimental impact on firm outcomes. While studies by Custódio et al. (2013) and Cuñat and Guadalupe (2009) highlight the benefits of hiring generalist CEOs, studies such as Ma, Ruan, et al. (2021), Ma, Wang, and Zhou (2021), Mishra (2014), and Gounopoulos and Pham (2018) report opposite results. Moreover, although the existing studies empirically examine the consequences of hiring generalist CEOs on firm outcomes, they do not focus on the effect of generalist CEOs on disclosure quality. Our study fills the void in the literature by documenting that firms with generalist CEOs lower the readability of the textual component of the 10-K report.

The rest of the paper is constructed as follows. In section two, we review related research and develop our hypothesis. We explain the research model in section three and describe the sample in section four. The results, additional analyses, and robustness analyses are presented in section five. We conclude the paper in section six.

2. Literature review and hypothesis

2.1. Literature review

Over the years, a growing number of studies in accounting and finance have shown interest in investigating the value of managers in firms. Using upper echelon theory to develop their hypotheses, these studies argue that CEOs' decisions are affected by their features and experiences, which in turn influence organizational outcomes. Notably, these academic scholars focus on various demographic characteristics, such as tenure, age, educational background, gender, compensation, and power, and investigate their impact on firms' reporting quality (Aier et al., 2005; Ali & Zhang, 2015; Dejong & Ling, 2013; Feng, Ge, Luo, & Shevlin, 2011; Krishnan, Raman, Yang, & Yu, 2011; Troy, Smith, & Domino, 2011) and disclosure quality (Bamber, Jiang, & Wang, 2010; Gul & Leung, 2004; Hribar & Yang, 2016; Kalyta & Magnan, 2008).

[1] Hasan (2020) states that 80% of the information in 10-K reports is textual.

[2] Hasan (2020) uses the managerial ability, which is referred to as CEO talent, while we use general ability accumulated by the CEO from his or her lifetime career experience to investigate its effect on 10-K readability. The significant effect of generalist CEO on 10-K readability, after controlling for managerial ability, suggests that the effect of generalist CEO on the 10-K readability is in addition to managerial ability.

In general, these studies observe that executives act conservatively if a particular characteristic induces risk averseness in them. For instance, Barua et al. (2010) and Liu, Wei, and Xie (2016) focus on gender diversity and document an inverse relationship between female CFOs and earnings management. Francis, Hasan, Wu, and Yan (2014) report a higher incidence of tax sheltering activities among firms with male CFOs than among firms with female CFOs. Furthermore, Bamber et al. (2010), Lewis, Walls, and Dowell (2014), and Ran, Fang, Luo, and Chan (2015) investigate the impact of CEO education on disclosure quality and find that disclosure quantity and quality are better for firms whose executives hold MBA degrees. Focusing on CEO tenure, Ali and Zhang (2015) observe a higher incidence of earnings management in the early years of CEO tenure. Malmendier and Tate (2009) and Gul and Leung (2004) focus on CEO reputation and power, respectively, and report a negative impact of these features on firm performance.

One CEO feature that has recently gained attention in the accounting literature is CEO functional experience. Early studies focused on CEOs' functional career track report that CEOs are better at handling issues related to their functional expertise than their counterparts. For instance, Custódio and Metzger (2013) focus on the financial expertise that CEOs gain from functional experience and report that firms with financial expert CEOs manage their financial policies better than other CEOs. Likewise, Matsunaga, Wang, and Yeung (2013) investigate the impact of financial expert CEOs on financial reporting and disclosure quality. The authors report a positive relationship between the appointment of financial expert CEOs and firms' reporting and disclosure quality. Kalelkar and Khan (2016) demonstrate that the functional experience of a CEO in the accounting field lowers audit fees for firms.

Extending the literature on CEO functional expertise further, few studies focus on the managerial ability of CEOs developed from their career experience. Notably, these studies categorize CEOs into two groups—generalist CEOs if they have a diverse career path and acquired universal skills that could be applied to any firm or industry and specialist CEOs if the acquired skills are specific to a firm or industry—and investigate the influence of such skills on firm outcomes. Custódio et al. (2019) report that generalist CEOs add more value to firms by managing complex business issues and promoting innovation better than their counterparts. In contrast to this finding, Mishra (2014) finds a positive link between firms with generalist CEOs and investors' expected rates of return on their investments, suggesting that investors associate CEOs with general managerial ability with higher agency costs. Similarly, Gounopoulos and Pham (2018) show that firms headed by generalist CEOs are more likely to fail following their initial public offering than their counterparts. Amirkhani, Fairhurst, and Zbib (2020) focus on reporting quality and document that the incidence of accrual management is higher in firms with generalist CEOs than in firms with specialist CEOs. Recently, Ma, Wang et la. (2021) investigate how auditors perceive generalist CEOs and find that firms with generalist CEOs pay higher fees and receive more going concern opinions than firms with specialist CEOs. Ma, Ruan, et al. (2021) report that credit ratings are lower and borrowing costs are higher for firms with generalist CEOs. In summary, research on generalist CEOs suggests that the diverse and easily transferable career skills of generalist CEOs across firms and industries influence their risk preference and decision-making ability.

2.2. Hypothesis

In this paper, we investigate whether there is any association between a CEO's general managerial ability and the readability of the firm's 10-K reports. A large portion of 10-K reports comprise narrative disclosures, which communicate the past, current, and future performance of firms to investors. The usefulness of these narrative disclosures to investors depends on the readability of these sections. However, studies find that the readability of 10-K reports is often low. For example, Li (2008) analyzes the readability of 55,719 10-K reports of U.S. firms and documents that the average Fog Index of these reports is 19.4 (i.e., *unreadable* level).[3] The general fear is that the complexity in the readability of these reports could be intentional and associated with fraudulent activities (Lo et al., 2017). As a result, the SEC expressed concerns and issued guidelines to publicly traded U.S. firms to improve the readability of 10-K reports.[4]

Following the concern regarding the readability of 10-K reports, few studies investigate the cost associated with unreadable 10-K reports. These studies find that firms incur significant economic costs when they produce 10-K reports that are difficult to read and understand. Specifically, Bonsall and Miller (2017) examine the effect of 10-K readability on the firm's cost of debt and find that 10-K readability improves bond ratings and lowers the cost of debt. De Franco, Hope, Vyas, and Zhou (2015) examine and find that the readability of analyst reports significantly affects the stock liquidity and trading volume of firms (also see Lang & Stice-Lawrence, 2015). Other studies report that 10-K readability affects credit default swap (CDS) spreads (Hu, Liu, & Zhu, 2018), analyst following and forecast accuracy (Lehavy, Li, & Merkley, 2011), and stock price crash risk (Kim, Wang, & Zhang, 2019). In addition, firms that produce unreadable 10-K reports experience an increase in their audit fees and longer audit report lags and are more likely to receive a modified going concern opinion (Abernathy, Guo, Kubick, & Masli, 2019; Hossain, Hossain, Mitra, & Salama, 2019).

Other strands of literature have focused their attention on the determinants of the textual complexity of these financial reports. Early studies on this topic concentrate on *firm-specific* variables to analyze the determinants of 10-K readability. Dempsey, Harrison, Luchtenberg, and Seiler (2012) and Li (2008) focus on firm performance and find that the readability score of 10-K reports is lower for firms with poor performance. In addition, Li (2008) examines the effect of earnings quality on the readability of 10-K reports and finds that 10-K readability is positively associated with earnings persistence. Lo et al. (2017) explore the readability of MD&As and demonstrate that this section is difficult to read in the reports of firms that manage earnings to meet or beat earnings targets. Xu, Dao, Wu, and Sun (2020) investigate the effect of political corruption on the readability score of 10-K reports, and they find that firms in a corrupt region produce 10-K reports that are difficult to read.

While it can be argued that CEOs will have limited influence on the readability of 10-K reports since financial statements contain much standardized text and/or are an outcome of teamwork between firm executives, auditors, and directors (Davis, Ge, Matsumoto, & Zhang, 2015), a growing body of research evidence shows that the quality and quantity of disclosure varies with CEO characteristics (Bamber et al., 2010; Brochet, Miller, Naranjo, & Yu, 2019; Ge, Matsumoto, & Zhang, 2011; Yang, 2012). Related to our study, an emerging body of accounting literature has reported that CEO-level characteristics significantly influence firms' production of readable 10-K reports. To illustrate, Xu et al. (2018) investigate the impact of CEO and top management team age on the readability of 10-K, and they find that 10-K reports become more readable as the age of CEOs and top management teams increases. Analyzing the impact of CFO gender on 10-K readability, Kim and Chung (2014) note that the 10-K reports of firms with female CFOs are less complex to read than those of firms with male CFOs. Hasan (2020) finds that managerial ability improves the readability of textual disclosures in 10-K reports. Mi (2020) reports that CEO compensation has a significant impact on the readability of 10-K reports.

Following the strong evidence suggesting that CEOs' characteristics

[3] Li (2008) defines a 10-K report as *unreadable* if the Fog Index value is greater than or equal to 18, as *difficult* if the Fog Index is between 14 and 18, as *ideal* if the Fog Index is between 12 and 14, as *acceptable* if the Fog Index is between 10 and 12, and *childish* if the Fog Index is below 10.

[4] To improve the readability of 10-K reports, SEC suggested that firms adopt shorter sentences, active voice, table format to explain company facts that may be difficult to understand, less jargon, and less double negation (Plain English Handbook issued by SEC in 1998).

explain the variation in the readability of 10-K reports, we posit that generalist CEOs will influence the readability of 10-K reports. However, the direction of the effect of a generalist CEO on the firm's 10-K readability is an empirical question. On the one hand, studies show that generalist CEOs are positively associated with firm innovation and acquisition (Chen, Huang, & Meyer-Doyle, 2017; Custódio et al., 2019). In addition, Yeh (2015) and Ferreira and Sah (2012) suggest that their wide knowledge of managerial skills enables generalist CEOs to understand and effectively communicate complex firm activities to investors. These findings associate generalist CEOs with high managerial ability. Hasan (2020) concludes that CEOs with higher ability have less incentive to obscure their performance and, therefore, produce readable 10-K reports. Thus, one possibility is that a generalist CEO, who positively impacts organizational efficiency, will have a lower incentive to cloud firm financial performance and, therefore, will have a positive association with 10-K report readability.

On the other hand, a generalist CEO can have a negative effect on the readability of 10-K reports. Amirkhani et al. (2020) and Gounopoulos and Pham (2018) document that firms with generalist CEOs manage earnings more and are more likely to fail after initial public offerings their counterparts, respectively. Moreover, Custódio et al. (2013) document that generalist CEOs receive 19% higher pay, amounting to $850,000 per year, than their counterparts. Recently, Evdokimov, Hanlon, and Lim (2021) document that generalist CEOs are involved in rent extraction via boardroom backscratching and overinvestment. The obfuscation hypothesis suggests that firms produce less readable 10-K reports when they want to downplay negative information and evade adverse market reactions (Bloomfield, 2008; Chakrabarty, Seetharaman, Swanson, & Wang, 2018). In line with this hypothesis, we posit that the desire to minimize the negative reaction of investors to poor performance, earnings management, and excessive compensation deters those firms managed by generalist CEOs from producing readable 10-K reports. Given that the association between a generalist CEO and 10-K readability can be positive or negative, we state our hypothesis in a non-directional form as follows:

H1: Ceteris paribus*, the readability of annual reports is associated with a generalist CEO.*

3. Research design

We use the ordinary least square (OLS) model to test the association between the readability of the 10-K reports and generalist CEOs. The model we use to test the hypothesis is as follows:

$$\begin{aligned} GUNNING\_FOG\_INDEX_{i,t} &= \gamma_0 + \gamma_1 GAI_{i,t} + \gamma_2 MA\_SCORE\_RANK_{i,t} \\ &+ \gamma_3 MALE_{i,t} + \gamma_4 LOGAGE_{i,t} + \gamma_5 TENURE_{i,t} + \gamma_6 COMPENSATION_{,t} \\ &+ \gamma_7 LOGDELTA_{i,t} + \gamma_8 LOGVEGA_{i,t} + \gamma_9 ROA_{,t} + \gamma_{10} AM_{,t} \\ &+ \gamma_{11} CASH\_RATIO_{i,t} + \gamma_{12} AGE_{i,t} + \gamma_{13} SI_{i,t} + \gamma_{14} SD_{i,t} + \gamma_{15} N\_SEGB_{i,t} \\ &+ \gamma_{16} N\_SEGG_{i,t} + \gamma_{17} MTB_{i,t} + \gamma_{18} SIZE_{i,t} + \gamma_{19} EARN\_VOL_{i,t} + \gamma_{20} MA_{i,t} \\ &+ \gamma_{21} NITEMS_{i,t} + \gamma_{22} LVRG_{i,t} + \gamma_{23} LOSS_{i,t} + \gamma_{24} DLW_{i,t} \\ &+ INDUSTRY\ INDICATORS + YEAR\ INDICATORS + \varepsilon_{i,t} \end{aligned} \tag{1}$$

The dependent variable in model 1 is the Gunning Fog Index (*GUNNING_FOG_INDEX*), which was developed by Robert Gunning (1952) and is widely used in the measurement of the readability of 10-K reports.[5] The procedure used to calculate this variable is as follows:

$$\begin{aligned} &\text{GUNNING\_FOG\_INDEX} \\ &= (\text{words per sentence} + \text{percent of complex words})^{*}0.4 \end{aligned} \tag{2}$$

The Gunning Fog index computed in Eq. (2) is a sum of the number of words per sentence and complex words, where complex words are defined as words with three syllables or more. A higher index value indicates a lower readability score for 10-K reports. Our variable of interest in model 1 is the CEO general ability index (*GAI*), which we construct by following Custódio et al. (2013). More specifically, the *GAI* is the first component factor from a principal component analysis using five proxies for managerial general ability measured over the CEO's career: number of past positions, number of past firms, number of industries in which the CEO worked, whether the CEO held a CEO position at a different company, and whether the CEO worked for a conglomerate.[6] Following Custódio et al. (2013), we standardized *GAI* to have zero mean and a standard deviation of one. A higher value of *GAI* reflects a higher level of general ability. As discussed in the previous section, the association between *GUNNING_FOG_INDEX* and *GAI* can be positive or negative.

Additionally, we follow the prior literature (e.g., Hasan, 2020; Li, 2008) and include a set of *CEO-specific* and *firm-specific* control variables in the regression model. The *CEO-specific* variables control for managerial ability (*MA_SCORE_RANK*), CEO gender (*MALE*), CEO experience (*LOGAGE and TENURE*), and CEO compensation (*COMPENSATION, LOGDELTA*, *LOGVEGA*). *MA_SCORE_RANK* is the decile rank of the managerial ability score developed by Demerjian, Lev, and McVay (2012). *MALE* is one if the CEO is male and zero otherwise, *LOGAGE* is the natural logarithm of the CEO's age, and *TENURE* is the natural logarithm of the CEO's tenure. We measure the CEO compensation variables as follows: *COMPENSATION* is the natural logarithm of the CEO's total compensation, *LOGDELTA* is the natural logarithm of the dollar change in the CEO stock and options portfolio for a 1% change in the stock price, and *LOGVEGA* is the natural logarithm of the dollar change in CEO option holdings for a 1% change in stock return volatility (Coles, Daniel, & Naveen, 2006). Kim and Chung (2014) and Mi (2020) predict a positive association between the Gunning Fog index and male CFO and CEO vega, respectively. Hasan (2020), Xu et al. (2018) and Mi (2020) predict a negative association between the Gunning Fog index and managerial ability (*MA_SCORE_RANK*), CEO experience (*LOGAGE and TENURE*) and CEO pay-performance sensitivity (*LOGDELTA*).

Our next set of control variables relates to the firm characteristics commonly used in prior research on the Gunning Fog index (e.g., Li, 2008; Lo et al., 2017). In particular, we control for firm profitability (*ROA*), accrual management (*AM*), cash ratio (*CASH_RATIO*), firm age (*AGE*), special items (*SI*), volatile environment (*SD*), and complexity of operations (*N_SEGB* and *N_SEGG*). In addition, we control for growth opportunity (*MTB*), firm size (*SIZE*), volatile earnings (*EARN_VOL*), complex financial disclosures (*MA* and *NITEMS*), firm leverage (*LVRG*), transient income (*LOSS*), and state laws (*DLW*). Following Xu et al. (2020), we expect *GUNNING_FOG_INDEX* to be negatively associated with *ROA*, *AGE*, *MTB*, and *NITEMS* and positively associated with *AM*, *CASH_RATIO*, *SI*, *SD*, *SIZE*, *EARN_VOL*, *MA*, *LVRG*, *LOSS,* and *DLW*. Xu et al. (2020) did not predict a relationship for *N_SEGB* and *N_SEGG*.

We measure *ROA* as the net income before extraordinary items and the cumulative effect of accounting changes deflated by total assets; *AM* as the residual from the Kothari, Leone, and Wasley (2005) modified Jones model; *CASH_RATIO* as the cash and cash equivalents divided by book assets; *AGE* as the natural logarithm of firm age; and *SI* as special items scaled by the book value of assets. Next, we calculate *SD* as the standard deviation of the monthly stock returns in the last year and *N_SEGB* and *N_SEGG* as the logarithm of the number of business and geographic segments, respectively. *MTB* is measured as the market value of the firm divided by its book value, *SIZE* as the natural logarithm of the market value of equity, and *EARN_VOL* as the standard deviation of

[5] Loughran and McDonald (2014) express concern about using the Gunning Fog Index to measure the readability of 10-K reports. Therefore, in the robustness analyses, we use alternate measures for the readability of 10-K reports.

[6] Our unreported result shows that this first component has an eigenvalue of 10.8944 and explains 82% of the variation in the index. Similar to Custodio et al. (2013), all the five proxies load positively with the index.

operating earnings in the last five fiscal years. *MA* takes a value of one if a firm acquires in the current year, *NITEMS* is the number of non-missing items on Compustat, and *LVRG* is short-term debt plus long-term debt scaled by total assets. *LOSS* and *DLW* are indicator variables that take a value of 1 if the client has a negative net income before extraordinary items and are incorporated in Delaware, respectively. We also add industry and year indicators to control for the industry and year fixed effects, respectively. We follow Petersen (2009) and use the clustering of robust standard errors at the firm-year level. The appendix lists the variables used in our analyses and their specific definitions.

4. Sample selection

Panel A of Table 1 presents our sample selection process, which begins with 186,353 Compustat firm-year observations with valid total asset information and nonforeign firms from 2003 to 2017. We exclude 54,910 observations with an invalid industry code. Next, we exclude 45,417 firm-year observations in the financial and utility sector because their operating activities and financial reporting environments are different from those of other sectors. To obtain the 10-K Gunning Fog readability index, we merge our dataset with the SEC Analytics Suite dataset and further exclude 31,694 firm-year observations. Next, we merge our dataset with the CRSP and ExecuComp databases and lose an additional 12,767 and 23,355 observations, respectively. We then eliminate 794 and 3635 firm-year observations for not having valid data to calculate CEO compensation and the general ability index, respectively. Finally, we exclude 1133 observations with missing values for the control variables included in our regression models. The final sample consists of 13,442 firm-year observations, which represent 1735 unique firms.

Table 1, Panel B, reports the distributions of the full sample across the study period. The sample is distributed quite evenly across the years. The years with the greatest number of observations are 2009 (937 observations), 2010 (957 observations), and 2011 (943 observations). The last two years of our study period (2016 and 2017) have the lowest number of firm-year observations (800 and 806 observations, respectively). Table 1, Panel C, presents an industry breakdown of our sample into the Fama-French 48-industry classification. Two industry groups have the largest total number of observations: 1509 observations for business services and 1110 observations for electronic equipment. The coal industry has the fewest observations (18 observations).

5. Results

5.1. Univariate analyses

Table 2, Panel A, reports the descriptive statistics for the variables used in the primary regression model. In our sample, the mean (median) value of *GUNNING_FOG_INDEX* is 20.0740 (19.9847), which is consistent with prior research on annual report readability (e.g., Li, 2008; Lo et al., 2017). The mean (median) *GAI* in our sample is 0.0000 (−0.0830) and is similar to Custódio et al. (2013). Of the CEOs in the sample, the mean value of *MA_SCORE_RANK* is 0.5522, which is consistent with Hasan (2020). Of all the CEOs, 97.12% are male, and the average log age and tenure of the CEO are 4.0134 and 1.7658, respectively. The mean log of total CEO compensation is 8.2038, the CEO delta is 5.3574, and the CEO vega is 3.5956. The descriptive statistics for the other control variables are comparable to those reported in Li (2008) and Lo et al. (2017).

Table 2, Panel B, divides the sample into two subgroups—those with a *GAI* above or equal to the median value (*generalist*) and those with a *GAI* below the median value (*specialist*)—and calculates the mean and median of the variables for these subgroups in columns 1 and 2, respectively. In column 3, we present the difference in the means and medians of the variables between the two subgroups. The results show that mean *GUNNING_FOG_INDEX* is higher in the *generalist* than in the

Table 1
Sample selection and distribution.

Panel A: Sample Selection

	Obs.	Remaining
Total number of firm-year observations from 2003 to 2017 in Compustat (at>0)	186,353	
Less: industry code is missing	−54,910	131,443
Less: financial and utility firms	−45,417	86,026
Less: missing values for measuring the readability of annual report	−31,694	54,332
Less: missing values for variables used in the CRSP database	−12,767	41,565
Less: missing values for variables used in the ExecuComp database	−23,355	18,210
Less: missing values for *LOGDELTA* and *LOGVEGA*	−794	17,416
Less: missing values for measuring the CEO general ability index	−3635	14,575
Less: missing values for other control variables used in the regressions	−1133	13,442
Final Sample		13,442
Number of unique firms		1735

Panel B: Sample Distribution by Year

YEAR	Frequency	Percent
2003	868	6.46
2004	887	6.60
2005	874	6.50
2006	845	6.29
2007	920	6.84
2008	923	6.87
2009	937	6.97
2010	957	7.12
2011	943	7.02
2012	925	6.88
2013	927	6.90
2014	903	6.72
2015	927	6.90
2016	800	5.95
2017	806	6.00
Total	13,442	100%

Panel C: Sample distribution by Fama–French 48 industry groups

Industry	Full Sample	Percent
Agriculture	30	0.22
Nonmetallic Mines	78	0.58
Precious Metals	36	0.27
Coal	18	0.13
Petroleum and Natural Gas	603	4.49
Construction	129	0.96
Food Products	326	2.43
Alcoholic Beverages	72	0.54
Candy and Soda	44	0.33
Tobacco Products	41	0.31
Textiles	83	0.62
Apparel	276	2.05
Construction Materials	374	2.78
Consumer Goods	313	2.33
Business Supplies	283	2.11
Shipping Containers	96	0.71
Printing and Publishing	108	0.80
Business Services	1509	11.23
Chemicals	486	3.62
Pharmaceutical Products	682	5.07
Automobiles and Trucks	297	2.21
Rubber and Plastic Products	84	0.62
Steel Works, Etc.	305	2.27
Fabricated Products	19	0.14
Defense	67	0.50
Machinery	682	5.07
Computers	609	4.53
Electrical Equipment	157	1.17

(*continued on next page*)

Table 1 (*continued*)

Panel C: Sample distribution by Fama–French 48 industry groups		
Industry	Full Sample	Percent
Recreational Products	83	0.62
Electronic Equipment	1110	8.26
Miscellaneous	133	0.99
Aircraft	90	0.67
Shipbuilding, Railroad Eq	33	0.25
Measuring and Control Equip	449	3.34
Medical Equipment	479	3.56
Transportation	487	3.62
Telecommunications	283	2.11
Wholesale	588	4.37
Retail	959	7.13
Restaurants, Hotel, Motel	302	2.25
Personal Services	179	1.33
Entertainment	131	0.97
Healthcare	329	2.45
Total	13,442	100%

Panel A presents the sample selection procedure. Panel B provides the breakdown of the number of all observations in the sample by year. Panel C provides the breakdown of the number of all observations in the sample by industry excluding financial and utility industry.

other group, which provides preliminary evidence supporting our hypothesis that the readability of annual reports is lower for firms with generalist CEOs. The comparison of the *CEO-specific* variables between the two subgroups reveals that CEOs in the *generalist* group are older and have higher ability, fewer males, shorter tenure, and receive greater total compensation, delta, and vega than the CEOs in the *specialist* group. Furthermore, these two subgroups differ significantly at the firm level. We find qualitatively similar results when we compare the median values of the variables between the two subgroups.

Table 2, Panel C, reports the Pearson correlations between the variables used in the regression analyses. The correlation coefficient between *GUNNING_FOG_INDEX* and *GAI* is positive and statistically significant, which suggests that firms led by CEOs with higher general managerial ability tend to have less readable annual reports than firms led by CEOs with lower general managerial ability. Taken together, the results in Table 2 provide univariate evidence consistent with H1. We also find that *GUNNING_FOG_INDEX* is significantly and positively correlated with *COMPENSATION, LOGDELTA, LOGVEGA, CASH_RATIO, N_SEGB, SIZE, MA, LVRG, LOSS,* and *DLW*. In contrast, *GUNNING_FOG_INDEX* is significantly and negatively correlated with *ROA, AGE,* and *NITEMS*. We also calculate the variance inflation factors (VIFs) for all the independent variables. The highest VIF is 3.79, and the average VIF is 2.01, which suggests that multicollinearity is not a concern in our regressions.

5.2. Regression analysis

To investigate the association between generalist CEOs and the readability of 10-K reports, we estimate Eq. (1) with the full sample and report the regression result in Table 3. The coefficient of *GAI* is 0.0326 and significant at the 0.01 level (*p-value* < 0.001). In economic terms, this result implies that the Gunning Fog index of the 10-K reports of the firms increases by 3.26% when the general ability index of their CEO increases by one standard deviation.[7] Consistent with H1, the results indicate that firms led by generalist CEOs tend to have less readable annual reports than their counterparts. The coefficients of most control variables are significant and consistent with our expectations. For example, *ROA*, *AGE*, *N_SEGG,* and *EARN_VOL* are negatively related to the Gunning Fog index, suggesting that firms with better performance, older firms, firms with more geographic segments, and firms with higher earnings volatility are likely to have less complex annual reports. On the other hand, firms with higher levels of total compensation, vega components in compensation, cash ratio, special items, number of business segments, merger and acquisition activities, leverage, loss, and state regulations are likely to have more complex annual reports, as evidenced by the positive and significant coefficients on *COMPENSATION*, *LOGVEGA*, *CASH_RATIO*, *SI*, *N_SEGB*, *MA*, *LVRG*, *LOSS*, and *DLW*. Overall, our findings suggest that the desire to obfuscate information from investors lowers the readability of 10-K reports for firms with generalist CEOs.[8]

5.3. Additional analyses

5.3.1. Textual attributes of the 10-K

Extant studies consider disclosure tone as a vital characteristic of narrative disclosures. These studies argue that disclosure tone significantly affects the perception of investors about the firm (Li, 2010a). For instance, Kothari, Li, and Short (2009) document that the disclosure tone of 10-K reports has an influence on the cost of capital, stock return volatility, and analyst forecast dispersion. Tetlock, Saar-Tsechansky, and Macskassy (2008) document a positive relationship between the stock price and disclosure tone of firm-specific news, while Li (2010b) documents a significant effect of the tone of 10-K disclosures on the predictability of future earnings. Given the significant economic cost for the firm, few studies focus on the determinants of disclosure tone. These studies point out that disclosure tone is influenced by firm characteristics (Davis et al., 2015; Davis & Tama-Sweet, 2012; Demers & Vega, 2014; Huang, Teoh, & Zhang, 2014; Li, 2010a), management opportunism (Arslan-Ayaydin, Boudt, & Thewissen, 2016; Huang et al., 2014), and management characteristics (Buchholz, Jaeschke, Lopatta, & Maas, 2018; Marquez-Illescas, Zebedee, & Zhou, 2019).

We extend this literature related to management characteristics and examine the effect of generalist CEOs on the disclosure tone of 10-K reports. Extant studies document that CEO qualities, like optimism, narcissism, and managerial ability, determine the extent of optimistic tone in 10-K reports (Buchholz et al., 2018; Marquez-Illescas et al., 2019). Consequently, we focus on the net tone and examine whether generalist CEOs affect the net tone of narrative disclosure in 10-K reports. Notably, we conjecture that generalist CEOs use a less optimistic (or more pessimistic) tone in their 10-K reports for two reasons. First, extant studies document a negative association between generalist CEOs and firm performance (Gounopoulos & Pham, 2018; Mishra, 2014). As a result, we expect generalist CEOs to use more negative words in their 10-K disclosures because poor performance would make it less likely for such firms to have any good news to share with investors. Second, optimistic tone increases a firm's chance of being sued by capital market participants (Rogers, Van Buskirk, & Zechman, 2011). Luo and Zhou (2019) document that firms use a less optimistic tone in their disclosure to reduce litigation risk. Since investors are more likely to sue the company if it falls short of their expectations, we assume that generalist CEOs strategically use less optimistic words to reduce their likelihood of getting sued by investors.

[7] We acknowledge that the economic significance of our finding is small. However, our economic significance is similar in size to the other extant studies that focus on the determinants of 10-K readability (Hasan, 2020; Li, 2008).

[8] Alternatively, the lower readability of 10-K reports can be driven by generalist CEO's less concentrated experience. In other words, the less-readable 10-K may not be driven by the intention of obfuscation but by generalist CEOs' lack of capability to convey information in a clear and concise fashion. In section 5.3.4 we run several additional tests to provide some assurance that obfuscation hypothesis is descriptive, as opposed to the alternative explanation. Future research can shed more light on the relation between generalist CEO and the complexity of CEO's disclosure decision in a nexus of various aspects of disclosure.

Table 2
Univariate analysis and correlation.

Panel A: Descriptive statistics

Variable	Lower Quartile	Mean	Median	Upper Quartile	STD
GUNNING_FOG_INDEX	19.4256	20.0740	19.9847	20.6201	0.9799
GAI	−0.7955	0.0000	−0.0830	0.4936	1.0000
MA_SCORE_RANK	0.3000	0.5522	0.5000	0.8000	0.2934
MALE	1.0000	0.9712	1.0000	1.0000	0.1672
LOGAGE	3.9318	4.0134	4.0254	4.0943	0.1261
TENURE	1.0986	1.7658	1.7918	2.3979	0.8531
COMPENSATION	7.5611	8.2038	8.2717	8.8902	1.0076
LOGDELTA	4.4123	5.3574	5.3607	6.3506	1.4816
LOGVEGA	2.4271	3.5956	3.9747	5.0686	1.9850
ROA	0.0206	0.0452	0.0540	0.0904	0.0981
AM	−0.0520	−0.0044	−0.0036	0.0394	0.1119
CASH_RATIO	0.0401	0.1652	0.1068	0.2352	0.1670
AGE	2.7081	3.1838	3.1355	3.7612	0.6306
SI	−0.0135	−0.0147	−0.0031	0.0000	0.0706
SD	0.0651	0.1028	0.0899	0.1257	0.0549
N_SEGB	1.0000	2.4345	2.0000	4.0000	1.8483
N_SEGG	1.0000	3.2538	3.0000	4.0000	2.6475
MTB	1.5796	3.2465	2.4195	3.8631	4.4332
SIZE	6.5405	7.6421	7.5037	8.6664	1.6129
EARN_VOL	0.0155	0.0438	0.0276	0.0508	0.0508
MA	0.0000	0.2695	0.0000	1.0000	0.4437
NITEMS	574.0000	589.6699	588.0000	603.0000	21.4751
LVRG	0.3657	0.5173	0.5113	0.6462	0.2238
LOSS	0.0000	0.1659	0.0000	0.0000	0.3720
DLW	0.0000	0.6463	1.0000	1.0000	0.4781

Panel B: Univariate analysis

Variable	*Generalist*: *GAI* ≥Median (*n* = 7070)		*Specialist*: *GAI* < *Median* (*n* = 6372)		Difference: *Generalist* – *Specialist*			
	Mean	Median	Mean	Median	Mean		Median	
GUNNING_FOG_INDEX	20.1241	20.0375	20.0185	19.9299	0.1056	***	0.1076	***
MA_SCORE_RANK	0.5625	0.6000	0.5408	0.5000	0.0217	***	0.1000	***
MALE	0.9652	1.0000	0.9779	1.0000	−0.0127	***	0.0000	***
LOGAGE	4.0263	4.0254	3.9990	4.0073	0.0273	***	0.0180	***
TENURE	1.7408	1.7918	1.7936	1.7918	−0.0528	***	0.0000	***
COMPENSATION	8.4168	8.5157	7.9676	8.0026	0.4492	***	0.5132	***
LOGDELTA	5.5030	5.5300	5.1959	5.1720	0.3071	***	0.3580	***
LOGVEGA	3.9043	4.3495	3.2531	3.6219	0.6511	***	0.7276	***
ROA	0.0469	0.0539	0.0432	0.0542	0.0037	***	−0.0003	
AM	−0.0036	−0.0027	−0.0054	−0.0045	0.0018		0.0018	
CASH_RATIO	0.1523	0.1001	0.1795	0.1175	−0.0272	***	−0.0174	***
AGE	3.2743	3.2581	3.0833	3.0445	0.1910	***	0.2136	***
SI	−0.0143	−0.0038	−0.0152	−0.0024	0.0009		−0.0014	***
SD	0.0985	0.0857	0.1075	0.0946	−0.0090	***	−0.0089	***
N_SEGB	2.5714	3.0000	2.2826	1.0000	0.2888	***	2.0000	***
N_SEGG	3.3437	3.0000	3.1540	3.0000	0.1898	***	0.0000	***
MTB	3.3434	2.4537	3.1390	2.3817	0.2044	***	0.0719	**
SIZE	7.9671	7.8644	7.2816	7.1611	0.6855	***	0.7032	***
EARN_VOL	0.0407	0.0257	0.0473	0.0303	−0.0065	***	−0.0046	***
MA	0.2900	0.0000	0.2469	0.0000	0.0431	***	0.0000	***
NITEMS	588.1890	587.0000	591.3131	590.0000	−3.1241	***	−3.0000	***
LVRG	0.5466	0.5383	0.4848	0.4794	0.0619	***	0.0588	***
LOSS	0.1580	0.0000	0.1747	0.0000	−0.0167	***	0.0000	***
DLW	0.6421	1.0000	0.6508	1.0000	−0.0087		0.0000	

Panel C: Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	*GUNNING_FOG_INDEX*	1.00												
2	*GAI*	**0.04**	1.00											
3	*MA_SCORE_RANK*	0.00	**0.03**	1.00										
4	*MALE*	0.00	**−0.06**	−0.01	1.00									
5	*LOGAGE*	−0.01	**0.14**	**−0.03**	0.04	1.00								
6	*TENURE*	0.00	−0.01	0.01	**0.04**	**0.37**	1.00							
7	*COMPENSATION*	**0.09**	**0.24**	**0.15**	0.00	**0.08**	**−0.04**	1.00						
8	*LOGDELTA*	**0.03**	**0.16**	**0.16**	**0.05**	**0.17**	**0.39**	**0.42**	1.00					
9	*LOGVEGA*	**0.06**	**0.23**	**0.09**	**0.04**	0.00	**0.06**	**0.37**	**0.53**	1.00				
10	*ROA*	**−0.05**	**0.02**	**0.24**	−0.01	**0.03**	**0.06**	**0.18**	**0.32**	**0.12**	1.00			
11	*AM*	−0.01	0.01	**−0.04**	0.00	0.01	0.00	**−0.05**	**−0.06**	**−0.04**	**0.13**	1.00		

(*continued on next page*)

Table 2 (*continued*)

Panel C: Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13
12	*CASH_RATIO*	**0.07**	**−0.08**	**0.19**	−0.01	**−0.10**	**0.05**	**−0.17**	**−0.04**	**−0.02**	**−0.06**	**−0.04**	1.00	
13	*AGE*	**−0.03**	**0.19**	**0.05**	−0.01	**0.16**	**−0.02**	**0.25**	**0.07**	**0.12**	**0.07**	**0.03**	**−0.22**	1.00
14	*SI*	−0.02	0.01	**0.04**	0.01	**0.03**	**0.04**	**0.03**	**0.13**	**0.04**	**0.45**	**0.29**	0.01	**0.04**
15	*SD*	0.00	**−0.11**	**−0.06**	0.01	**−0.07**	−0.02	**−0.30**	**−0.33**	**−0.20**	**−0.37**	**0.06**	**0.16**	**−0.21**
16	*N_SEGB*	**0.03**	**0.14**	**0.02**	**0.02**	**0.06**	**−0.04**	**0.11**	**0.03**	**0.04**	**0.02**	**0.03**	**−0.17**	**0.21**
17	*N_SEGG*	0.01	**0.08**	**−0.03**	**0.04**	0.00	**−0.03**	**0.13**	0.02	**0.06**	0.00	0.00	**0.07**	**0.15**
18	*MTB*	0.00	**0.03**	**0.12**	−0.02	**−0.04**	0.00	**0.11**	**0.17**	**0.05**	**0.16**	**−0.05**	**0.07**	−0.01
19	*SIZE*	**0.05**	**0.26**	**0.24**	0.01	**0.07**	**−0.05**	**0.70**	**0.62**	**0.42**	**0.35**	**−0.07**	**−0.14**	**0.28**
20	*EARN_VOL*	0.00	**−0.06**	**0.09**	0.01	**−0.05**	−0.02	**−0.20**	**−0.16**	**−0.12**	**−0.24**	**0.04**	**0.39**	**−0.22**
21	*MA*	**0.11**	**0.03**	**−0.03**	0.00	0.00	0.01	**0.14**	**0.03**	**−0.02**	**−0.02**	**−0.02**	**−0.08**	**0.04**
22	*NITEMS*	**−0.14**	0.01	0.00	0.01	0.01	**0.03**	**−0.18**	**0.03**	**−0.09**	**0.03**	0.01	**−0.03**	**−0.15**
23	*LVRG*	**0.05**	**0.16**	**−0.05**	0.00	**0.04**	**−0.12**	**0.26**	0.00	**0.05**	**−0.15**	**0.03**	**−0.35**	**0.16**
24	*LOSS*	**0.05**	**−0.03**	**−0.14**	0.01	**−0.05**	**−0.07**	**−0.18**	**−0.29**	**−0.13**	**−0.69**	**−0.08**	**0.11**	**−0.08**
25	*DLW*	**0.07**	−0.01	**0.02**	0.01	**−0.04**	**−0.03**	**0.09**	**0.04**	**0.05**	**−0.05**	−0.01	**0.10**	**−0.20**

		14	15	16	17	18	19	20	21	22	23	24	25
14	*SI*	1.00											
15	*SD*	**−0.14**	1.00										
16	*N_SEGB*	0.01	**−0.10**	1.00									
17	*N_SEGG*	**−0.02**	**−0.04**	**0.09**	1.00								
18	*MTB*	0.01	**−0.10**	**−0.04**	−0.01	1.00							
19	*SIZE*	**0.10**	**−0.48**	**0.12**	**0.14**	**0.21**	1.00						
20	*EARN_VOL*	**−0.07**	**0.36**	**−0.15**	**−0.05**	**0.05**	**−0.25**	1.00					
21	*MA*	−0.01	**−0.12**	**0.04**	**0.08**	0.01	**0.11**	**−0.10**	1.00				
22	*NITEMS*	**0.06**	**0.03**	**−0.05**	**−0.20**	0.01	**−0.10**	**0.10**	**−0.38**	1.00			
23	*LVRG*	**−0.05**	**0.03**	**0.08**	**−0.05**	**0.08**	**0.17**	**−0.10**	**0.04**	**−0.06**	1.00		
24	*LOSS*	**−0.30**	**0.39**	**−0.04**	0.01	**−0.10**	**−0.31**	**0.26**	−0.01	**−0.03**	**0.10**	1.00	
25	*DLW*	**−0.02**	**0.04**	0.01	0.00	0.01	**0.05**	**0.06**	**0.03**	**−0.04**	0.01	**0.06**	1.00

This table presents the results of univariate analysis. ***, **, and * represent two-tailed *p-values* based on *t*-tests (for differences in means) and Wilcoxon tests (for differences in medians) that are <1, 5, and 10%, respectively. All variables are defined in the Appendix.
Panel C presents Pearson correlations for our variables of interest and primary dependent variables. All variables are defined in the Appendix. Bold indicates significance at the 5% level or lower.

In addition, we examine the influence of generalist CEOs on two other disclosure tones—litigious tone and uncertainty tone. Generalist CEOs are more involved in complex tasks and firm innovation, which carries some level of uncertainties and inherent risk about future profit (Custódio et al., 2013, 2019). Since uncertainty increases a firm's risk of litigation, we predict a positive association between generalist CEOs and the litigious tone in 10-K reports. Additionally, firms use the tone of narrative disclosures to convey information about future firm performance and risk. Therefore, we posit that firms with generalist CEOs have more uncertain words in their narrative disclosures to convey information about operational uncertainty and performance volatility.

To conduct this analysis, we follow Loughran and McDonald (2011) to measure our three disclosure sentiments. Specifically, we measure net tone (*NET_TONE*) as the difference between the percentage of Loughran-McDonald positive words and negative words in 10-K report reports. Similarly, litigious tone (*LITIGIOUS_TONE*) and uncertainty tone (*UNCERTAIN_TONE*) denote the percentage of Loughran-McDonald litigious and uncertain words in 10-K reports, respectively. We obtain the data from SEC Analytics Suite dataset. To conduct this test, we alternatively replace the dependent variable in model 1 with *NET_TONE*, *LITIGIOUS_TONE*, and *UNCERTAIN_TONE*. The result of this analysis is presented in Table 4. Columns one through three report the results for *NET_TONE,* while columns four through six (seven through nine) report the results for *LITIGIOUS_TONE* (*UNCERTAIN_TONE*). The results in column one show that the coefficient on *GAI* is negative and significant (coefficient = −0.0162; *p-value* = 0.0000). This finding denotes that the 10-K reports of firms with generalist CEOs use a more negative tone in their 10-K than their counterparts. Column four reports that *GAI* is positively associated with *LITIGIOUS_TONE* (coefficient = 0.0092; *p-value* = 0.027), indicating that generalist CEOs use more litigious words in their 10-K reports than do specialist CEOs. However, our results show no significant effect of generalist CEOs on the uncertain tone (coefficient = 0.002; *p-value* = 0.459). Collectively, the findings from Table 4 suggest that firms that hire generalist CEOs use a conservative disclosure tone in their 10-K.

5.3.2. Readability and textual attributes of MD&A

While some studies, like (Li, 2008), analyze the readability of 10-K reports, other research focuses on the MD&A section of these reports (Lo et al., 2017). Therefore, in addition to the readability of 10-K reports, we also examine the relation between generalist CEOs and the readability and textual attributes of MD&A. MD&A is a narrative disclosure required by the SEC that gives managers discretion over how to present an explanation of a company's business, financial conditions, and performance. Therefore, MD&A is often viewed as essential to investors' understanding of firms' business operations and performance. The extant literature documents a significant impact of CEO characteristics on MD&A readability (Hasan, 2020; Kim & Chung, 2014). For instance, Xu et al. (2018) find that the readability of MD&As improves with CEO age. Consequently, we analyze the readability and textual attributes of MD&A with the new dependent variables being *GUNNING_FOG_INDEX*, *NET_TONE, LITIGIOUS_TONE,* and *UNCERTAIN_TONE* for MD&A.[9] We follow the extant literature and conjecture that generalist CEOs have similar effects on the readability and textual attributes of MD&A as they do on 10-K reports.

To conduct this test, we follow Loughran and McDonald (2011) to calculate *GUNNING_FOG_INDEX, NET_TONE LITIGIOUS_TONE*, and *UNCERTAIN_TONE* for MD&A. *GUNNING_FOG_INDEX* for MD&A

[9] We thank Professor Hua Sun for providing the data for these variables. The MD&A section of 10-K reports is downloaded from SEC Edgar using a computer program called Python. MD&A is identified using the procedure reported in Dyer, Lang, and Stice-Lawrence (2017) and Li (2019).

Table 3
The association between CEO general ability index and readability of 10-K reports.

	DV = *GUNNING_FOG_INDEX*		
	Coef.	*t-value*	*p-value*
GAI	0.0326	3.98	0.000
MA_SCORE_RANK	−0.0216	−0.71	0.479
MALE	−0.0086	−0.18	0.854
LOGAGE	0.0238	0.34	0.736
TENURE	−0.0172	−1.41	0.160
COMPENSATION	0.0647	5.42	0.000
LOGDELTA	0.0079	0.89	0.372
LOGVEGA	0.0259	4.82	0.000
ROA	−0.4909	−3.82	0.000
AM	−0.0688	−0.92	0.356
CASH_RATIO	0.6830	11.81	0.000
AGE	−0.0602	−4.08	0.000
SI	0.2142	1.97	0.049
SD	0.2917	1.52	0.128
N_SEGB	0.0193	4.03	0.000
N_SEGG	−0.0065	−2.05	0.041
MTB	−0.0024	−1.15	0.249
SIZE	−0.0044	−0.45	0.655
EARN_VOL	−0.6493	−3.54	0.000
MA	0.1436	6.78	0.000
NITEMS	−0.0008	−1.22	0.223
LVRG	0.1790	4.28	0.000
LOSS	0.0618	2.06	0.039
DLW	0.0649	3.62	0.000
INTERCEPT	19.9652	42.83	0.000
Industry Indicators	Yes		
Year Indicators	Yes		
Observations	13,442		
R square	0.0976		

This table presents the results from regressing the proxy of 10-K report readability on the CEO general ability index and other control variables over the 2003–2017 period for the 13,442 firm-year observations in the sample. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. *p-value* is based on two-tailed *t*-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the Appendix.

measures the readability of the MD&A section. *NET_TONE* for MD&A is the difference between the Loughran-McDonald positive and negative words in MD&A divided by the total words in the MD&A. *LITIGIOUS_TONE (UNCERTAIN_TONE)* denotes the percentage of Loughran-McDonald litigious (uncertain) words in the MD&A section of 10-K reports. Panels A (B) of Table 5 present the results for *GUNNING_FOG_INDEX* (*NET_TONE, LITIGIOUS_TONE,* and *UNCERTAIN_TONE*). In general, the results in panel A (B) are similar to those of the 10-K reports reported in Table 3 (4), with the exception of the result for uncertain tone. In particular, the coefficient of the variable *GAI* is positive and significant at the 1% level (*p-value* = 0.006) in panel A. Furthermore, in the regressions with *NET_TONE (LITIGIOUS_TONE)* as dependent variables, *GAI* is negative (positive) and significant (*GAI* = −0.0151 for *NET_TONE*; *GAI* = 0.0045 for *LITIGIOUS_TONE*). The result for *UNCERTAIN_TONE* is significant for MD&A in Table 5 (*GAI* = 0.0044 in panel B of Table 4) but is insignificant for 10-K reports in Table 4. One explanation could be that there is more managerial discretion in the disclosure of information in the MD&A than in the overall 10-K. As a result, the influence of generalist CEO on the disclosure of uncertain tone is significantly reflected in MD&A regression and not in 10-K report. In sum, these findings suggest that higher general managerial ability of CEO is related to lower readability and more conservative disclosure of MD&As.

5.3.3. Moderating effect of tenure

In the hypothesis section, we posit that firms would complicate the readability of the 10-K reports to hide information related to poor firm performance and earnings management from investors. However, research focusing on CEO performance suggests that CEO performance varies with his or her tenure (Hambrick & Fukutomi, 1991; Miller & Shamsie, 2001). Miller and Shamsie (2001) argue that CEOs will be more effective once they spend more time at a company and learn about the company and the industry. The performance-based turnover literature implies that the continuing tenure of the CEO may signal the CEO's initial and continuing excellence in tasks for which he has responsibility (Weisbach, 1988). The extant literature also points out that CEOs are less likely to manage earnings in the later years of their tenure than in their initial years at the firm (Ali & Zhang, 2015). This raises the possibility that generalist CEOs with long tenure could report higher firm performance and engage less in earnings management.

Moreover, as tenure increases, generalist CEOs will have a better understanding of complex firm- and industry-specific activities. Empirical evidence shows that CEOs' communication skills improve with experience (Gray-Grant, 2013). Bamber et al. (2010) find that the disclosure quality of firms managed by CEOs with accounting and finance is more precise than that of their counterparts. A longer stay at the firm could thus improve generalist CEOs' ability to communicate complex firm-specific information precisely and in simple language. Therefore, we investigate whether the tenure of the generalist CEO moderates the positive association between the readability of 10-K reports and generalist CEO.

To test this proposition, we interact *GAI* with CEO tenure (*TENURE*) and include this variable in Eq. (1). The result is reported in Table 6. The result shows that the coefficient on *GAI* continues to be positive and significant (*p-value* < 0.001). Furthermore, the coefficient on the interaction variable (*GAI* * *TENURE*) is negative and significant at the 5% level (*p-value* = 0.010). The result suggests that tenure moderates the positive relation between *GUNNING_FOG_INDEX* and *GAI*. Taken together, 10-K reports are less complex to read when a generalist CEO has longer tenure at the firm.

5.3.4. Moderating effect of high investment level and misstatements

A key assumption of our study is the obfuscation hypothesis, which suggests that firms produce less readable 10-K reports when they want to hide information related to high investment activities and misstatements. To provide empirical support for this assumption, in this additional test, we investigate whether high investment levels and misstatements strengthen the association between a generalist CEO and the readability of 10-K reports. For the test, we alternatively interact *HIGH_INVESTMENT*, a proxy for firm with high investment levels, and *MISSTATE*, a proxy for misstatement, with general ability index in our primary model. *HIGH_INVESTMENT* is an indicator variable equal to 1 if *INVESTMENT* is greater than the median value of the industry-year.[10] *MISSTATE* is an indicator variable equal to 1 if a firm's year t financial statements are subsequently restated and 0 otherwise. We obtained misstatement data from the Audit Analytics database. The results are presented in columns one through three (four through six) of Table 7. The results in columns one and four show that *GAI* is positive and significant at the conventional level. The interacting variable, *GAI *HIGH_INVESTMENT*, is positive and significant (coefficient = 0.0306; *p-value* = 0.039). Similarly, the coefficient on *GAI*MISSTATE* is positive and significant. These findings imply that high investment and misstatement exacerbate the link between the general ability index and Gunning Fog index, thus providing support to our obfuscation hypothesis.

5.3.5. Change analysis

Change analysis controls for unobserved factors that affect the relationship between a generalist CEO and 10-K readability.

[10] *INVESTMENT* is measured as the sum of research and development expenditure, capital expenditure, and acquisition expenditure less cash receipts from sale of property, plant, and equipment multiplied by 100 and scaled by lagged total assets.

Table 4
Association between CEO general ability index and the disclosure tone of 10-K reports.

	(1) DV = *NET_TONE*			(2) DV = *LITIGIOUS_TONE*			(3) DV = *UNCERTAIN_TONE*		
	Coef.	*t*	*p value*	*Coef.*	*t*	*p value*	*Coef.*	*t*	*p value*
GAI	−0.0162	−4.33	0.00	0.0092	2.22	0.027	0.0016	0.74	0.459
MA_SCORE_RANK	−0.0557	−4.08	0.00	0.0422	2.79	0.005	−0.0209	−2.62	0.009
MALE	0.0064	0.33	0.74	0.0801	3.75	0.000	−0.0171	−1.50	0.133
LOGAGE	0.0198	0.62	0.54	0.0915	2.63	0.009	−0.0276	−1.44	0.149
TENURE	0.0130	2.39	0.02	−0.0254	−4.25	0.000	0.0090	2.76	0.006
COMPENSATION	−0.0232	−3.91	0.00	0.0219	3.82	0.000	−0.0040	−1.28	0.201
LOGDELTA	0.0060	1.53	0.13	−0.0107	−2.53	0.011	0.0034	1.41	0.158
LOGVEGA	−0.0071	−3.24	0.00	0.0053	2.05	0.040	0.0036	2.58	0.010
ROA	0.2006	3.01	0.00	−0.0027	−0.04	0.965	−0.0922	−2.85	0.004
AM	−0.0068	−0.18	0.85	0.0175	0.51	0.612	−0.0131	−0.66	0.512
CASH_RATIO	−0.2681	−8.94	0.00	−0.0461	−1.55	0.121	0.1886	12.02	0.000
AGE	0.0171	2.51	0.01	0.0804	10.45	0.000	−0.0761	−19.74	0.000
SI	0.2309	2.62	0.01	0.0064	0.11	0.910	−0.0136	−0.44	0.660
SD	−1.2508	−13.88	0.00	0.2149	2.29	0.022	0.1367	2.70	0.007
N_SEGB	0.0049	2.29	0.02	0.0008	0.35	0.723	−0.0123	−9.85	0.000
N_SEGG	0.0036	2.52	0.01	−0.0091	−5.71	0.000	0.0010	1.23	0.219
MTB	0.0054	5.35	0.00	−0.0024	−2.31	0.021	0.0002	0.44	0.660
SIZE	−0.0036	−0.77	0.44	0.0297	5.94	0.000	0.0018	0.70	0.485
EARN_VOL	−0.0083	−0.09	0.93	−0.0558	−0.67	0.503	−0.0779	−1.62	0.105
MA	0.0035	0.38	0.70	−0.0015	−0.15	0.883	0.0359	6.42	0.000
NITEMS	0.0021	7.18	0.00	0.0001	0.35	0.724	0.0002	0.91	0.362
LVRG	0.0405	1.98	0.05	0.1293	6.00	0.000	−0.1388	−12.42	0.000
LOSS	−0.1267	−9.69	0.00	0.0103	0.69	0.489	−0.0067	−0.87	0.384
DLW	−0.0295	−3.71	0.00	−0.0045	−0.49	0.622	0.0340	7.30	0.000
INTERCEPT	−1.8840	−8.37	0.00	0.0447	0.19	0.850	1.6466	12.16	0.000
Industry Indicators	Yes			Yes			Yes		
Year Indicators	Yes			Yes			Yes		
Observations	13,442			13,442			13,442		
R square	0.2708			0.2402			0.2392		

This table presents the results from regressing the different tones of 10-K reports on the CEO general ability index and other control variables over the 2003–2017 period for the 13,442 firm-year observations in the sample. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. p-value is based on two-tailed t-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the appendix.

Table 5
Panel A: Association between CEO general ability index and readability of MD&A.

	DV = *GUNNING_FOG_INDEX*		
	Coef.	*t-value*	*p-value*
GAI	0.0331	3.16	0.002
CONTROL VARIABLES	Yes		
INTERCEPT	Yes		
Industry Indicators	Yes		
Year Indicators	Yes		
Observations	13,442		
R square	0.1358		

Panel B: Association between CEO general ability index and the disclosure tone of MD&A

	DV = *NET_TONE*			DV = *LITIGIOUS_TONE*			DV = *UNCERTAIN_TONE*		
	Coef.	*t-value*	*p-value*	*Coef.*	*t-value*	*p-value*	*Coef.*	*t-value*	*p value*
GAI	−0.0151	−4.08	0.000	0.0045	2.12	0.034	0.0044	1.98	0.047
CONTROL VARIABLES	Yes			Yes			Yes		
INTERCEPT	Yes			Yes			Yes		
Industry Indicators	Yes			Yes			Yes		
Year Indicators	Yes			Yes			Yes		
Observations	13,442			13,442			13,442		
R square	0.2540			0.1233			0.1221		

Panel A presents the results from regressing the readability of MD&A on the CEO general ability index and other control variables over the 2003–2017 period for the 13,442 firm-year observations in the sample. Panel B presents the results from regressing the different tones of MD&A on the CEO general ability index and other control variables over the 2003–2017 period for the 13,442 firm-year observations in the sample. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. p-value is based on two-tailed *t*-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the appendix.

Table 6
Impact of CEO tenure on the association between CEO general ability index and readability of 10-K reports.

	DV = *GUNNING_FOG_INDEX*		
	Coef.	*t-value*	*p-value*
GAI	0.0728	4.19	0.000
*GAI*TENURE*	−0.0234	−2.59	0.010
TENURE	−0.0202	−1.64	0.102
CONTROL VARIABLES	Yes		
INTERCEPT	Yes		
Industry Indicators	Yes		
Year Indicators	Yes		
Observations	13,442		
R square	0.0980		

This table presents the results from regressing the proxy of 10-K report readability on the interaction variable between the CEO general ability index and CEO tenure over the 2003–2017 period for the 13,442 firm-year observations in the sample. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. *p-value* is based on two-tailed t-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the Appendix.

Consequently, we rerun a change model as an alternative to our baseline model. For this test, we first create a sample of firms that change their CEO in year t. Next, we compute the change in the Gunning Fog index and control variables from year t-1 to t. We create two test variables, *SPEC-to-GEN* and *GEN-to-SPEC,* and include these two variables in the model along with the other change variables. *SPEC-to-GEN* (*GEN-to-SPEC*) is an indicator variable that takes a value of one if a firm switches from a *specialist* (*generalist*) to *generalist* (*specialist*). *Generalist* (*specialist*) is a dummy variable that takes a value of one if a *GAI* is above or equal to (below) the median value. The reference group in this test consists of firms that switched CEOs but did not experience a change in the managerial ability of the CEO. The regression results of the change analysis are reported in Table 8. The results show that the coefficient on *SPEC-to-GEN* is positive in columns one and seven, while *GEN-to-SPEC* is negative in columns four and seven. However, only the coefficient on *SPEC-to-GEN* is significant. These findings suggest that 10-K readability is lower for firms switching their CEOs from specialists to generalists, thus providing support to our primary evidence reported in Table 3.

5.4. Robustness analyses

In this section, we present a series of tests to ensure the robustness of our results. In particular, these tests include the use of alternative measures of readability, control for firm fixed effects, and control for potential endogeneity issues.

5.4.1. Alternative measure of readability

Although the Gunning Fog index is a widely used measurement of readability, it has its limitations (see Loughran and McDonald (2014) for more details). As a robustness test, we use two alternate proxies to measure the readability of 10-K reports. Our first proxy is the Bog Index, which is developed by Bonsall IV et al. (2017) and captures a broader set of plain English attributes beyond syllable counts, including those recommended by the SEC. Our second proxy is file size (*LOGGROSS* and *LOGNET*). *LOGGROSS* is measured as the natural logarithm of file size in megabytes of the SEC EDGAR "complete submission text file" for the 10-K filing (Loughran & McDonald, 2014). *LOGNET* is the natural log of net

Table 7
Impact of high investment and misstatement on the association between CEO general ability index and readability of 10-K reports.

	DV = *GUNNING_FOG_INDEX*					
	(1)			(2)		
	Coef.	*t-value*	*p-value*	*Coef.*	*t-value*	*p-value*
GAI	0.0223	1.98	0.048	0.0149	1.74	0.081
*GAI*HIGH_INVESTMENT*	0.0306	2.07	0.039			
HIGH_INVESTMENT	0.0092	0.55	0.584			
*GAI*MISSTATE*				0.0483	1.89	0.059
MISSTATE				0.0070	0.26	0.795
CONTROL VARIABLES	Yes			Yes		
INTERCEPT	Yes			Yes		
Industry Indicators	Yes			Yes		
Year Indicators	Yes			Yes		
Observations	13,442			13,442		
R square	0.0981			0.1414		

This table presents the results from regressing the proxy of 10-K report readability on the interaction variable between the CEO general ability index and high investment level in model 1 and the interaction variable between the CEO general ability index and misstatement in model 2. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. *p-value* is based on two-tailed *t*-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the appendix.

Table 8
Change analysis.

	DV = *CHANGE_GUNNING_FOG_INDEX*								
	Coef.	*t-value*	*p-value*	*Coef.*	*t-value*	*p-value*	*Coef.*	*t-value*	*p-value*
SPEC-to-GEN	0.2115	2.78	0.005				0.2115	2.78	0.005
GEN-to-SPEC				−0.0208	−0.37	0.710	−0.0046	−0.05	0.963
CHANGES in CONTROL VARIABLES	Yes			Yes			Yes		
INTERCEPT	Yes			Yes			Yes		
Industry Indicators	Yes			Yes			Yes		
Year Indicators	Yes			Yes			Yes		
Observations	1375			1375			1375		
R square	0.1147			0.1094			0.1147		

This table presents the results of the changes analysis. It examines a sample with CEO changes. In the changes model, all dependent variable and control variables (except DLW) are in changes form over the 2003–2017 period for the full sample. *SPEC-to-GEN* (*GEN-to-SPEC*) is equal to one if a firm changes its CEO a from specialist (generalist) to a generalist (specialist) and zero otherwise.

10-K file size in bytes (Loughran & McDonald, 2022). In recent years, many studies have used the Bog Index and file size to measure the readability of 10-K reports (Blanco, Coram, Dhole, & Kent, 2021; Cassell, Cunningham, & Lisic, 2019; Hasan, 2020; Hoffmann & Kleimeier, 2019; Hossain et al., 2019). Consequently, we rerun Eq. (1) alternatively with the Bog Index and file size as new dependent variables. We obtain the value of the Bog Index (*BOG_INDEX*) and file size of 10-K reports from the website of Brian Miller and Bill McDonald, respectively.[11] The results, reported in Table 9, show that the relations among *BOG_INDEX, LOGGROSS,* and *LOGNET* and *GAI* are qualitatively similar to our baseline regression results for *GUNNING_FOG_INDEX*.

5.4.2. Fixed effects model

We run two fixed effect models. In the first model, we include firm fixed effects in our regression to control for unobserved firm characteristics that may correlate with 10-K report readability and generalist CEOs. We present the results of this test in columns 1 through 3 of Table 10. The results show a positive and significant coefficient on the *GAI* (coefficient = 0.0218; *p-value* = 0.016).

There is a possibility that the association between a generalist CEO and 10-K readability is driven by unobserved CEO characteristics. To ensure that our results are not driven by time-invariant CEO characteristics, we rerun our baseline model with the CEO fixed effect. The results are presented in columns 4 through 6 of Table 10. Our results show that *GAI* continues to be positively associated with 10-K readability (coefficient = 0.0241; *p-value* = 0.025). The findings from both the models in Table 10 suggest that our main results are not influenced by unobservable differences in firm and CEO characteristics.

5.4.3. Instrumental variable approach

Our findings on the relation between 10-K report readability and generalist CEOs may be biased by potential endogeneity problems. Specifically, there may be unobserved factors that are correlated with the two variables. To address this concern, we employ the instrumental variable approach that predicts CEOs' *GAI* in the first stage. We use the concentration of generalist CEOs in the local region (*INDADJ_GAI*) as the instrumental variable. In particular, we define *INDADJ_GAI* as the median industry-adjusted *GAI* in the same city where a firm is headquartered. We extrapolate from Demerjian, Lewis-Western, and McVay (2020) and argue that firms with easy access to generalist CEOs are more likely to appoint these CEOs. As a result, we expect *INDADJ_GAI* to be positively associated with *GAI*. We do not expect *INDADJ_GAI* to affect the 10-K readability. The predicted value of the *GAI* obtained from the first-stage regression is used as the test variable in the second-stage regression model.

Table 11 present the results of this test. Columns one through three present the results of the first-stage regression model, and columns four through six present the results of the second-stage regression model. As predicted, the first-stage regression result reveals that *INDADJ_GAI* is positively associated with *GAI*. The under identification and the weak identification tests indicate that our instrumental variable is neither irrelevant (χ2-statistic = 209.5690; *p-value* = 0.000) nor weak.[12] The second stage regression results, presented in columns 4 through 6, show that the predicted value of *GAI* continues to remain positive and significant (coefficient = 0.1723; *p-value* = 0.000) after controlling for the endogenous relationship between generalist CEO and 10-K readability. The results suggest that the CEO general ability index lowers the 10-K report readability of firms.

5.4.4. Propensity score matched sample

The motivations and characteristics of firms hiring generalist CEOs may differ from those of firms hiring specialist CEOs.[13] To control for these variances and relevant factors in the firm characteristics, we follow Ma, Ruan, et al. (2021) and adopt a propensity score matching (PSM) approach. In the PSM approach, we first select firms that hire generalist CEOs (treatment group) and firms that hire specialist CEOs (control group) and run a logit model with *generalist* as the dependent variable and control variables from model 1. Specifically, we use CEO- and firm-specific factors used in model 1 as control variables in the logit model because our descriptive statistics show that these factors are significantly different for firms with generalist CEOs than they are for firms with specialist CEOs (see Panel B of Table 2). Next, we estimate the propensity score from the logit model and match the treatment group with the control group based on the closest propensity score. This matching procedure suppresses the difference in the treatment group and the control group. We then run our baseline model on this PSM sample and report the results in Table 12. The results show that the coefficient on *GAI* continues to load positively on the *GUNNING_FOG_INDEX* (coefficient = 0.0366; *p-value* = 0.040). In sum, our primary results are robust to using the propensity score matching method.

5.4.5. Entropy balancing approach

In addition to PSM, we adopt an entropy balancing approach to further ensure that our results are not influenced by an endogenous matching issue. Entropy balancing does not assign weights of 1 for matched and retained observations and 0 for unmatched and discarded observations. Rather, this method weights observations on a continuous scale. Specifically, in this approach, we first match the first three moments (i.e., mean, variance, and skewness) of the control variables of generalist CEOs (test group) and specialist CEOs (control group) to correct for possible distribution bias and then rerun model 1. The results are presented in Table 13.

In Table 13, Panel A, we report the post entropy balancing covariate balance that compares covariates between the test and control groups and in Panel B we present the result of our regression. The results in Panel A show no significant differences in the mean, variance, and skewness between the test and control groups. Consistent with our primary results, in Panel B, we find that the coefficient on *GAI* is positive and significant (coefficient = 0.0388; *p-value* = 0.000).

6. Conclusion

In recent years, many studies have focused on CEOs and their effect on the readability of 10-K reports. These academic scholars have relied on upper echelon theory to investigate the impact of CEO characteristics such as age, tenure, gender, and managerial ability on the readability of 10-K reports (Xu et al., 2018). We extend this literature and investigate the association between the general managerial ability of CEOs, developed from their employment history, and the readability of 10-K reports. We use the obfuscation hypothesis, which argues that the desire to hide information from investors results in firms producing less readable 10-K reports, as the motivation for our study. While the existing literature on generalist CEOs provides us a basis to posit that a generalist CEO will influence the readability of 10-K reports, the direction of the association between a generalist CEO and the readability of 10-K reports is an empirical question. The reason for this is that some studies document that generalist CEOs improve organizational efficiency (Custódio et al., 2013). In contrast, other studies find that generalist CEOs are associated with overinvestment in negative NPV projects, earnings management, and lower firm performance (Mishra, 2014) and are awarded considerably higher compensation (Custódio et al., 2013).

[11] https://kelley.iu.edu/bpm/activities/bogindex.html and https://sraf.nd.edu/.

[12] We understand that there is still a possibility that our instrumental variable is not an appropriate instrument that will address endogeneity concerns. As a result, we caution readers when interpreting the results.

[13] We appreciate the suggestion of the reviewer.

Table 9
Alternative measurements of 10-K report readability.

	DV = *BOG INDEX*			DV = *LOGGROSS*			DV = *LOGNET*		
	Coef.	*t*	*p value*	*Coef.*	*t*	*p value*	*Coef.*	*t*	*p value*
GAI	0.2707	5.34	0.000	0.0426	8.34	0.000	0.0135	4.02	0.000
CONTROL VARIABLES	Yes			Yes			Yes		
INTERCEPT	Yes			Yes			Yes		
Industry Indicators	Yes			Yes			Yes		
Year Indicators	Yes			Yes			Yes		
Observations	13,057			13,381			13,442		
R square	0.2180			0.8139			0.2471		

This table presents the results from regressing the alternative proxy of annual report readability on the CEO general ability index and other control variables over the full sample. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. Variable definitions are provided in the Appendix.

Table 10
Fixed effects models.

	DV = *GUNNING_FOG_INDEX*					
	(1) Firm fixed effects			(2) CEO fixed effects		
	Coef.	*t*	*p value*	*Coef.*	*t*	*p value*
GAI	0.0218	2.42	0.016	0.0241	2.25	0.025
CONTROL VARIABLES	Yes			Yes		
INTERCEPT	Yes			Yes		
Firm fixed effect	Yes			No		
CEO fixed effect	No			Yes		
Firm–CEO fixed effects	No			No		
Industry Indicators	No			Yes		
Year Indicators	Yes			Yes		
Observations	13,442			13,442		
R square	0.0991			0.0993		

This table presents the results from regressing the proxy of annual report readability on the CEO general ability index and other control variables over the 2003–2017 period for the 13,442 firm-year observations in the sample, controlling firm fixed effects (Model 1) and CEO fixed effects (Model 2). All models include year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. P-values are based on two-tailed t-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the Appendix.

Table 11
Addressing endogeneity (instrumental variable approach).

	(1) First stage			(2) Second stage		
	DV = *GAI*			DV = *GUNNING_FOG_INDEX*		
	Coef.	*t-value*	*p-value*	*Coef.*	*t-value*	*p-value*
INDADJ_GAI	0.2304	15.54	0.000			
GAI				0.1723	4.94	0.000
CONTROL VARIABLES	Yes			Yes		
INTERCEPT	Yes			Yes		
Industry Indicators	Yes			Yes		
Year Indicators	Yes			Yes		
Observations	13,442			13,442		
R square	0.2322			0.0982		

This table shows results from Instrumental Variable (IV) regressions that control for the endogeneity of CEO general ability proxy. Our instrument variable is median industry-adjusted GAI in the same city where a firm is headquartered. Model 1 shows the first stage regression (where the dependent variable is CEO general ability index). Models 2 presents the results from the second stage regressions (2SLS). All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. *p-value* is based on two-tailed t-tests. Financial firms and utilities firms are excluded from the analysis. Variable definitions are provided in the appendix.

Table 12
Propensity score matching.

	DV = *GUNNING_FOG_INDEX*		
	Coef.	*t-value*	*p-value*
GAI	0.0366	2.05	0.040
CONTROL VARIABLES	Yes		
INTERCEPT	Yes		
Industry Indicators	Yes		
Year Indicators	Yes		
Observations	3348		
R square	0.1175		

This table presents the results of the propensity score matching sample. The model presents the results from regressing the *GUNNING_FOG_INDEX* on the *GAI* and other control variables. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. *p-value* is based on two-tailed t-tests. Financial firms are excluded from the analysis. Appendix A outlines the definitions for all the regression variables.

We analyze 13,442 firm observations from 2003 to 2017 to understand the relationship between generalist CEOs and 10-K readability. We use the Gunning Fog index as a proxy for 10-K readability and follow Custódio et al. (2013) to develop the generalist variable. Our univariate and multivariate analyses reveal that the readability of 10-K reports is lower for firms managed by generalist CEOs. This finding is robust to using an alternate proxy of readability, controlling for firm and CEO fixed effects in the model, and using an instrumental variable to control for potential endogeneity. Moreover, the results hold when we use a change analysis and run the regression on propensity score matched and entropy balanced samples. In spite of all these tests, there is a possibility that unobserved CEO-firm factors could affect our results and, hence, we acknowledge it as a limitation of our study.

In the additional analyses, we focus on the disclosure tone of 10-K reports and find that firms with generalist CEOs use significantly more negative and litigious words in their disclosures. We also focus on the MD&A section of the 10-K report and find that the readability index for this section is lower, and the disclosure tone is more conservative for firms with generalist CEOs. In the next test, we hypothesize that tenure at the firm will improve the generalist CEO's performance, lower their incentive to manage earnings, and improve their communication of firm-specific information in the 10-K. In other words, the desire to hide negative information from investors will be lower and, as a result, the readability of 10-K reports will improve as the tenure of the generalist CEO increases. Our results support this conjecture. Finally, we investigate and find that high investment level and misstatements strengthen the association between a generalist CEO and the Gunning Fog index, thus supporting our obfuscation hypothesis. In summary, our results imply that firms incur costs in the form of lower disclosure quality when they opt for a generalist CEO.

Table 13
Entropy balancing.

Panel A: Post entropy Balancing Covariate Balance

	Mean		Variance		Skewness	
	Treat	Control	Treat	Control	Treat	Control
MA_SCORE_RANK	0.563	0.563	0.089	0.089	−0.003	−0.003
MALE	0.965	0.965	0.034	0.034	−5.077	−5.077
LOGAGE	4.026	4.026	0.014	0.014	−0.241	−0.242
TENURE	1.741	1.741	0.633	0.633	−0.214	−0.214
COMPENSATION	8.417	8.417	0.984	0.984	−1.144	−1.144
LOGDELTA	5.503	5.503	2.069	2.069	−0.129	−0.129
LOGVEGA	3.904	3.904	3.979	3.979	−0.694	−0.694
ROA	0.047	0.047	0.008	0.008	−2.112	−2.113
AM	−0.004	−0.004	0.011	0.011	1.223	1.223
CASH_ROTIO	0.152	0.152	0.024	0.024	1.649	1.649
AGE	3.274	3.274	0.404	0.404	−0.340	−0.340
SI	−0.014	−0.014	0.004	0.004	1.736	1.727
SD	0.099	0.099	0.003	0.003	1.781	1.781
N_SEGB	2.571	2.571	3.733	3.733	0.552	0.552
N_SEGG	3.344	3.344	6.926	6.926	1.833	1.833
MTB	3.343	3.343	22.730	22.730	2.163	2.163
SIZE	7.967	7.967	2.732	2.732	0.148	0.148
EARN_VOL	0.041	0.041	0.002	0.002	3.471	3.471
MA	0.290	0.290	0.206	0.206	0.926	0.926
NITEMS	588.200	588.200	457.600	457.600	0.484	0.484
LVRG	0.547	0.547	0.048	0.048	0.463	0.463
LOSS	0.158	0.158	0.133	0.133	1.875	1.875
DLW	0.642	0.642	0.230	0.230	−0.593	−0.593

Panel B: Multivariate Regression Analysis with Entropy balancing Sample

	DV = *GUNNING_FOG_INDEX*		
	Coef.	*t*	*p value*
GAI	0.0388	4.13	0.000
CONTROL VARIABLES	Yes		
INTERCEPT	Yes		
Industry Indicators	Yes		
Year Indicators	Yes		
Observations	13,442		
R square	0.1005		

Panel A presents covariates balance after the entropy balancing procedure. Treatment (control) firms are those with (without) generalist CEO. Panel B shows the results from regressing the proxy of annual report readability on the CEO general ability index and other control variables over the 2003–2017 period with the entropy balancing sample. All models include industry and year indicators. Standard errors are clustered at the firm and year level to correct for serial correlation. P-values are based on two-tailed t-tests. Financial firms and utility firms are excluded from the analysis. Variable definitions are provided in the Appendix.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Appendix A. Definitions of variables used in our main tests definition

Variable		Definition
Main Variables		
GUNNING_FOG_INDEX	=	Gunning Fog Readability Index
GAI	=	First factor of applying principal components analysis to five proxies of general managerial ability: past Number of Positions, Number of Firms, Number of Industries, CEO Experience Dummy, and Conglomerate Experience Dummy (BoardEx).
CEO- specific Variables		
MA_SCORE_RANK		Decile rank (by industry-year) of managerial ability score developed by Demerjian et al. (2012). Demerjian et al. (2012) used Data Envelopment Analysis (DEA) to evaluate the relative efficiency with which managers convert resource inputs into outputs. Using an optimization procedure, the authors calculated firm efficiency, and then regressed it on firm characteristics that affect firm efficiency. The residual term derived from this regression is the component reflecting managerial ability.
MALE	=	indicator variable equal to 1 if CEO is male; 0 otherwise.
LOGAGE	=	the natural logarithm of CEO's age plus 1.
TENURE	=	the natural logarithm of CEO's tenure plus 1.
COMPENSATION	=	the natural logarithm of CEO's total compensation.
LOGDELTA	=	the natural logarithm of dollar change in CEO stock and option portfolio for a 1% change in stock price plus 1.

(*continued on next page*)

(*continued*)

Variable		Definition
LOGVEGA	=	the natural logarithm of dollar change in CEO option holdings for a 1% change in stock return volatility plus 1.
Firm- specific Variables		
ROA	=	net income before extraordinary items and cumulative effect of accounting changes deflated by total assets.
AM	=	the discretionary accruals derived from the modified Jones model (Kothari et al., 2005) for year t
CASH_RATIO	=	Cash and cash equivalents divided by book assets
AGE	=	the natural logarithm of firm's age.
SI	=	special items scales by book value of assets.
SD	=	the standard deviation of the monthly stock returns in the last year
N_SEGB	=	the logarithm of 1 plus the number of business segments
N_SEGG	=	the logarithm of 1 plus the number of geographic segments
MTB	=	the market value of the firm divided by its book value
SIZE	=	the natural logarithm of market value of equity
EARN_VOL	=	the standard deviation of the operating earnings in the last five fiscal years
MA	=	1 if a firm appears as an acquirer in this year
NITEMS	=	the number of non-missing items on Compustat
LVRG	=	leverage ratio, calculated as short-term debt (DLC) plus long-term debt (DLTT) in year t, scaled by total assets (AT) in year t.
LOSS	=	a dichotomous variable with value of 1 if the client has a negative net income before extraordinary items in year t; and 0 otherwise.
DLW	=	1 if a company is incorporated in Delaware, and 0 otherwise
Other Variables		
NET_TONE	=	(Loughran-McDonald Positive Word Proportion-Loughran-McDonald Negative Word Proportion)*100
LITIGIOUS_TONE	=	Loughran-McDonald Litigious Word Proportion *100.
UNCERTAIN_TONE	=	Loughran-McDonald uncertain Word Proportion *100.
HIGH_INVESTMENT	=	Indicator variable equal to 1 if *INVESTMENT* is greater than the median value of industry-year and 0 otherwise.
INVESTMENT	=	Sum of research and development expenditure, capital expenditure, and acquisition expenditure less cash receipts from sale of property, plant, and equipment multiplied by 100 and scaled by lagged total assets.
MISSTATE	=	Indicator variable equal to 1 if a firm's year t financial statements are subsequently restated, and 0 otherwise.
SPEC-to-GEN	=	Indicator variable equal to 1 if a firm changes its CEO from a specialist to a generalist and 0 otherwise.
GEN-to-SPEC	=	Indicator variable equal to 1 if a firm changes its CEO from a generalist to a specialist and 0 otherwise.
BOG_INDEX	=	Bog Readability Index
LOGGROSS	=	Natural logarithm of the file size in megabytes of the SEC EDGAR "complete submission text file" for the 10-K filing (Loughran & McDonald, 2014).
LOGNET	=	Natural log of the net 10-K file size in bytes. Net file size reflects the removal of binary-encoded ASCII (e.g., pictures), HTML, XBRL, etc. (Loughran & McDonald, 2022).
INDADJ_GAI	=	Median industry-adjusted GAI in the same city where a firm is headquartered.

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