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Catering behaviors in corporate digitization disclosures: Identification and analyst forecast accuracy loss

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ABSTRACT

This paper identifies the catering behaviors in corporate digitization disclosures (CDD) and examines their effects on analyst forecast accuracy. By creating a peer-relative catering behavior score, we measure the extent to which firms cater to investors and provide evidence that catering behaviors in CDD decrease the improvement effect of CDD on analyst forecast accuracy. We further find that catering behaviors reduce the improvement effect of CDD by decreasing information quality and information comparability. Finally, we document that the reduction effect of catering behaviors is more pronounced in firms with poor information environment and firms followed by fewer expert analysts. Overall, our findings are consistent with the argument that narrative disclosures can be used both to reduce information asymmetry and to cater to investor demand.

1. Introduction

This paper analyzes the catering behaviors in firms' narrative disclosures and the associated analysts' earnings forecasts. Financial analysts are an integral part of capital markets, evaluating the performance of firms that they follow and providing earnings forecasts and stock recommendations to investors (Lang and Lundholm, 1996). Despite some non-publicly disclosed private information (Chen et al., 2022), much of the information analysts use in their evaluations is provided through publicly available corporate disclosures (Byard and Shaw, 2003; Dhaliwal et al., 2012). The extent to which analysts provide valuable information to investors depends on the degree of the informativeness of corporate disclosures (Healy and Palepu, 2001). Although publicly listed firms are required to follow disclosure rules set by the China Securities Regulatory Commission (CSRC), firms have substantial discretion in the informativeness of disclosures (Lang and Lundholm, 1996). The discretion is more pronounced for firms' unaudited narrative disclosures, such as voluntary corporate social responsibility (CSR) disclosures (Dhaliwal et al., 2012; Muslu et al., 2019; Soliman and Ben-Amar, 2022), environmental, social, and governance (ESG) disclosures (Bernardi and Stark, 2018; Yu et al., 2020), and corporate digitization disclosures (CDD) in the Management's Discussion and Analysis (MD&A) section of annual reports. So far, the relation between analyst forecast accuracy and CDD, particularly the catering behaviors in narrative CDD, is ambiguous.

Our motives for CDD and catering behaviors in CDD are twofold. First, digital technologies contribute to the reduction in search and information costs, the emergence of new markets and platforms, and the improvement of efficiency and productivity, making the

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transition towards digital transformation inevitable (Nambisan et al., 2019; Verhoef et al., 2021; Huo and Wang, 2022). The COVID-19 pandemic has amplified the importance of digital technologies; countries and firms around the world are accelerating their digital transformation process (United Nations, 2022). China's firms are increasingly engaged in promoting digital transformation and disclosing information about their digital transformation process, i.e. CDD, in the MD&A section of annual reports. While providing information about firms' digitization activities to outside investors, CDD brings significant benefits to firms and investors, such as reducing the information asymmetry between firms and investors. The academic literature on the economic consequences of CDD has investigated the impact of CDD on stock liquidity (Wu et al., 2021), within-firm pay gaps (Li et al., 2022; Kong et al., 2023), stock price crash risk (Wu et al., 2022), ESG performance (Fang et al., 2023), stock price volatility (Liu et al., 2023), trade credit provision (Liu and Wang, 2023), and idiosyncratic risk (Huang et al., 2023), mainly regarding the effects of CDD on firm performance. So far, little attention has been paid to the information intermediates in capital markets, in particular, evidence of the impact of CDD on financial analysts is nascent.

Second, narratives in voluntary disclosure can be used to cater to investor demand in addition to reducing asymmetric information. For example, the studies of voluntary CSR reports show that many firms are engaged in greenwashing to appear to be environmentally friendly (Parguel et al., 2011; Yu et al., 2020). The CDD is similar to CSR reports in that there are few regulatory guidelines or auditing frameworks for the narratives in voluntary disclosures, giving managers latitudes to trade off the costs and benefits of misleading information (Lang and Lundholm, 2000; Li, 2010; Muslu et al., 2019; Yu et al., 2020). Consequently, opportunistic managers would cater to investors' interests and expectations by providing misleading information. Much of the empirical research on CDD focuses on the quantity of digitization narratives (e.g., Wu et al., 2022; Liu and Wang, 2023; Fang et al., 2023; Huang et al., 2023). Evidence of the catering behaviors in CDD and evidence of the effect of catering behaviors on analyst behaviors, particularly, analyst forecast accuracy, are sparse.

Our goal in this paper is to identify firms' catering behaviors in CDD and assess their effects on analyst forecast accuracy. To assess the content of CDD in MD&As, we rely on a dictionary-based approach (e.g., Wu et al., 2022; Liu and Wang, 2023; Fang et al., 2023; Liu et al., 2023). First, we build a thesaurus of digitization keywords (see Fang et al., 2023 for details) and add the thesaurus to the "Jieba" module. Then, we use Python to conduct text analysis and quantify the digitization keywords disclosed in MD&As as our CDD measure. After developing the CDD measure, we apply the model developed by Yu et al. (2020) to quantify the catering behaviors in CDD. Specifically, in the case of digitization disclosures, catering implies that firms provide a large number of digitization narratives but perform poorly in digitization aspects. To quantify a firm's catering behaviors in CDD, we create a peer-relative catering score by comparing a firm's digitization disclosure score with its digitization performance score. After developing CDD data and catering behaviors data, we further test whether and how catering behaviors affect analyst forecast accuracy.

Our results show that CDD can improve analyst forecast accuracy, but the catering behaviors in CDD significantly decrease the improvement effect of CDD on analyst forecast accuracy, providing evidence that narrative disclosures can be used both to reduce information asymmetry and to cater to investor demand. We also find that information quality and information comparability are the potential channels through which catering behaviors harm the improvement effect of CDD on analyst forecast accuracy. In addition, heterogeneity analysis shows that the reduction effect of catering behaviors is more pronounced in firms with poor information environment and firms followed by fewer expert analysts.

This paper contributes to four strands of literature. First, it provides additional evidence on the capital market consequences of CDD by focusing on analyst behaviors. Prior capital market research typically focuses on the impact of CDD on firm performance, such as firms' stock price crash risk, stock price volatility, stock liquidity, trade credit provision, and idiosyncratic risk (Wu et al., 2021; Wu et al., 2022; Liu et al., 2023; Liu and Wang, 2023; Huang et al., 2023). In contrast to previous research, we predict and test the association between CDD and analyst behaviors. Analysts are among the most important users of corporate disclosures (Lang and Lundholm, 1996; Hope, 2003); few, if any, studies have investigated CDD's effects on analyst forecast accuracy.

Second, it enriches the literature on narrative disclosures. Our paper is distinct from previous research on narrative disclosures in that (1) we use a peer-relative score to empirically measure a firm's catering behaviors in narrative disclosures; and (2) we testify the effects of catering behaviors, whereas past literature typically focuses on the quantity of disclosure narratives and their effects (e.g. Soliman and Ben-Amar, 2022; Fang et al., 2023; Zhang et al., 2023). Specifically, we construct the measure of catering behaviors in digitization narratives and examine their effects on analyst forecasts. To our knowledge, our paper is the first developing a catering score based on the content of digitization narratives.

Third, it extends the literature on catering theory. Prior studies of catering focus more on catering behaviors in social and professional interactions (Gilmore and Ferris, 1989; Wayne and Kacmar, 1991; Gino et al., 2020). Baker and Wurgler (2004a) formalize the catering view in managerial decisions and develop a catering theory of dividends. Similarly, Polk and Sapienza (2008) test a catering theory of firm investment and demonstrate that catering is a significant channel through which stock mispricing affects firms' investment decisions. We extend these studies by focusing on the catering behaviors in narrative disclosures. The voluntary nature of narratives coupled with the opportunistic incentives of managers have the potential to induce firms' catering behaviors (Muslu et al., 2019). In the case of digitization disclosures, catering implies that firms provide a large number of digitization narratives but perform poorly in digitization aspects.

Last, it contributes to the literature on the link between corporate disclosures and analyst forecasts. Previous research provides evidence that financial reports are related to analyst forecast accuracy (Healy and Palepu, 2001 provide a review of this literature). However, little research investigates whether analysts incorporate nonfinancial information into their evaluations. Two recent studies (Schiemann and Tietmeyer, 2022; Ni et al., 2023) show that ESG disclosures and CSR narratives, respectively, are positively associated with analyst forecast accuracy. We show in this study that the narratives in digitization disclosures are related to analyst forecast accuracy, complementing the research that establishes the link between nonfinancial information and analyst forecast accuracy. In

addition, we extend their research by considering firms' catering behaviors in narrative disclosures.

The rest of the paper proceeds as follows. Section 2 reviews the related literature and develops our hypothesis. Section 3 shows our methodology. Section 4 presents the empirical results. Section 5 contains the additional analyses related to channel analysis and heterogeneity analysis. Section 6 concludes the paper.

2. Literature review and hypothesis development

2.1. Literature review

Our paper relates to several streams of literature: (1) literature on determinants of analyst forecast accuracy, (2) literature on capital market consequences of corporate digitization disclosures (CDD), and (3) literature on catering strategy.

2.1.1. Determinants of analyst forecast accuracy

Many studies investigate the determinants of analyst forecast accuracy. These studies focus on two areas. The first area, the corporate disclosure literature, focuses on the information role of publicly disclosed financial reports and voluntary disclosures. The second area, the financial analyst literature, focuses on analysts' incentives and expertize.

Literature on corporate disclosure has taken two forms, i.e. regulated financial reports and voluntary disclosures. Firms provide disclosures through regulated financial reports, such as financial statements, footnotes, and other audited reports. In addition, firms also make voluntary communication, such as CSR reports, ESG disclosures, management forecasts, and other disclosures. In the financial report literature, studies typically focus on the association between accounting standards and analyst forecasts (Tan et al., 2011; Demmer et al., 2019). The most significant conclusion is that high accounting standards are associated with improved information quality and improved information comparability, providing valuable information to financial analysts and leading to more accurate forecasts. Research on voluntary disclosures argues that, even in an efficient market, financial reports cannot fully reveal firms' inside private information so that managers have strong incentives to communicate their superior knowledge of firms' future performance to outsiders (see Healy and Palepu, 2001 for a review). More informative disclosures can reduce the cost of information acquisition for analysts and mitigate firms' opaqueness, which in turn improves analyst forecast accuracy (Lang and Lundholm, 1996; Dhaliwal et al., 2012; Ni et al., 2023). Waymire (1986) provides evidence that there is an improvement in analyst forecast accuracy after firms release management earnings forecasts. Perhaps closest to our study, Ni et al. (2023) document a positive relationship between peer CSR disclosures and analyst forecast accuracy, and Schiemann and Tietmeyer (2022) find that ESG disclosure decreases the uncertainty about firms' future performance and in turn increases analyst forecast accuracy.

The literature on financial analyst examines the effects of analysts' incentives and expertize on their forecasts. Research on analysts' incentives documents that analysts have two conflicting incentives when issuing earnings forecasts. On the one hand, analysts have an incentive to be optimistic because they are rewarded for issuing earnings forecasts and recommendations that generate trading volume for brokerage houses (Dechow et al., 2000) and that help target firms obtain more investment banking opportunities (Libby et al., 2008). On the other hand, analysts have an incentive to issue accurate forecasts because the accuracy of forecasts determines their reputations in the job market. Analysts with more accurate forecasts will be better rewarded and are more likely to be hired by prestigious brokerage houses (Tan et al., 2010). Studies of analyst expertize investigate the factors that affect analyst forecast accuracy, including brokerage houses, experience, industry expertize, and other knowledge and skills. Clement (1999) documents that analyst forecast accuracy is positively related to analysts' experience, and is negatively related to the number of followed firms and industries. Jacob et al. (1999) documents that analyst forecast accuracy is affected by analysts' aptitude, brokerage house, and experienced-based learning. Boni and Womack (2006) and Kadan et al. (2012) show that analysts with both within-industry expertize and across-industry expertize can make more accurate forecasts than non-specialist analysts.

Collectively, financial reports and voluntary disclosures can mitigate information asymmetry between firms and analysts, which in turn improves analysts', especially expert analysts', forecast accuracy. However, the information contained in narrative disclosures varies in amount and is not audited. The credibility of the narratives and their effects on analyst forecasts are, therefore, interesting empirical questions.

2.1.2. Capital market consequences of corporate digitization disclosures (CDD)

Studies related to CDD are limited. To date, the research on CDD relates primarily to corporate digitization. Before reviewing the studies of CDD capital market consequences, we need to distinguish between corporate digitization and corporate digitization disclosures (CDD). Corporate digitization is a process that involves changes in internal management, company culture, and business model (Verhoef et al., 2021). In this sense, it is difficult to measure firms' digitization level through financial indicators (Fang et al., 2023). Much of the evidence on the measurement of corporate digitization focuses on the frequency of the digitization-related words disclosed in the MD&As (e.g., Wu et al., 2022; Liu and Wang, 2023; Fang et al., 2023; Liu et al., 2023; Huang et al., 2023). However, one of the major limitations of these studies is that words are discretionary. It is difficult to verify the accuracy of narratives and use these narratives to measure the extent to which digital technologies are used to alter firms' business processes. As noted by Li (2010), few firms provide useful and accurate narratives in their MD&As. Using digitization-related words to measure corporate digitization more likely captures, in a relative sense, corporate digitization disclosures. Building on this notion, we can review the capital market consequences of CDD by focusing on the research that uses digitization-related words as the metric for corporate digitization.

There are three types of capital market consequences for firms that issue corporate digitization disclosures: improved stock liquidity, decreased stock price crash risk, and increased stock price volatility. Wu et al. (2021) argue that a high level of CDD reduces

information asymmetry among investors and boosts investors' confidence in stock price, and ultimately improves firms' stock liquidity. Wu et al. (2022) provide evidence that CDD can reduce stock price crash risk by strengthening internal control and improving information transparency between firms and outside investors. Liu et al. (2023) find that firms providing a large amount of CDD have higher stock volatility. The above evidence, which establishes the association between CDD and firm performance, indicates that analysts can infer useful information from CDD, such as those regarding digitization activities, and incorporate this information into their forecasting process.

2.1.3. Catering strategy

Research on impression management argues that one strategy people use to make a good impression is to cater to targets' interests and expectations (Gilmore and Ferris, 1989). Catering is an impression management approach that people intentionally use in their efforts to secure positive outcomes (Wayne and Kacmar, 1991). The motives for catering generally stem from two desires: portraying one's ideal self, or living up to external standards (Gino et al., 2020). The second desire is much more powerful when people are evaluated by others who will decide their outcomes. Baker and Wurgler (2004a) test a catering theory of dividends and document that firms' decision to pay dividends is driven by investor demand. In a subsequent paper, Baker and Wurgler (2004b) provide empirical evidence that the propensity to pay dividends is positively associated with catering incentives. In a similar vein, Polk and Sapienza (2008) test a catering theory of firm investment and find that catering is a significant channel through which stock mispricing affects firms' investment decisions. Collectively, the catering theory argues that investors' preferences for dividends change over time, and managers rationally cater to investor demand (Ed-Dafali et al., 2023).

The essence of catering theory is that managers always give investors what they currently want (Baker and Wurgler, 2004a; Baker and Wurgler, 2004b; Polk and Sapienza, 2008; Ed-Dafali et al., 2023). In this sense, firms would use a catering strategy in their narrative disclosures due to the voluntary nature of narrative disclosures and the opportunistic incentives of managers (Muslu et al., 2019). Managers always cater to investors by disclosing information that they believe is commensurate with investors' preferences and expectations rather than their own (Merkl-Davies and Brennan, 2007). For example, the CSR literature suggests that managers opportunistically disclose CSR information to cater to investors, with the intent of presenting a socially responsible impression (Hemingway and Maclagan, 2004; Loughran and McDonald, 2016). In addition, the research on ESG shows that firms are likely to greenwash their ESG disclosures (Lyon and Maxwell, 2011; Bowen and Aragon-Correa, 2014). Greenwashing, e.g. revealing large quantities of environmental data or selectively disclosing positive environmental information, is a catering strategy that managers often use to manage stakeholders' impressions (Yu et al., 2020).

The CDD is similar to CSR narratives and ESG disclosures in that there are no specific guidelines or auditing frameworks for the narratives in these disclosures. To date, however, evidence of catering behaviors in digitization narratives is limited. The only such work to our knowledge is that of Zhang et al. (2023), who examine whether firms use a "more words but less investment" strategy and provide evidence that rookie CEOs are more likely to use catering strategies in digitization narratives. Methodologically, we differ from Zhang et al. (2023) by creating a catering behavior score, which can measure the extent to which firms cater to investors. In addition, we test the capital market consequences of catering behaviors.

2.1.4. Summary

Most existing research suggests a positive relation between corporate disclosure and firms' information environment, but the informativeness of voluntary disclosure is not always clear. Although several studies find the narratives in voluntary disclosure deficient and use the tone, readability, and ratings as proxies for disclosure quality, relatively few papers consider how firms' catering behaviors affect analyst forecasts. Accordingly, our goal in this paper is to develop a catering behavior score and examine whether catering behaviors affect analyst forecast accuracy.

2.2. Hypothesis development

It is not difficult to forecast that, with agency problems, managers would use a catering strategy in CDD. The existing challenges on CDD are manifold: unaudited CDD, substantial boilerplate disclaimers, immaterial detail, no specific governance rules, and no regulatory guidelines to ensure the credibility of reported CDD (Li, 2010; Muslu et al., 2019; Yu et al., 2020). These impediments give firms latitudes to trade off the benefits and costs of CDD. A large amount of CDD has many positive outcomes, including a good impression of high-quality development, decreased cost of capital, increased availability of financing, improved stock liquidity, and lower stock price crash risks (Wu et al., 2021; Wu et al., 2022; Tian et al., 2022; Zhang et al., 2023). Therefore, we believe that firms have opportunistic motivations and are likely to obscure their digitization performance by disclosing a large amount of digitization information, which is so-called catering behavior in CDD.

We assume that catering behaviors in CDD would inhibit the improvement effect of CDD on analyst forecast accuracy. CDD can decrease the cost of information acquisition for analysts and reduce the information asymmetry between firms and analysts (Wu et al., 2021; Wu et al., 2022; Tian et al., 2022; Fang et al., 2023). As a result, for firms with a rich disclosure environment and low information asymmetry, analysts can make a better forecast (Hope, 2003; Dhaliwal et al., 2012; Muslu et al., 2019; Ni et al., 2023). However, the catering behaviors in CDD will inhibit the improvement effect of CDD on analyst forecast accuracy via the following two routes.

First, catering behaviors could reduce the information quality of corporate disclosures per se. To cater to investors' interests and expectations, managers may manipulate information or selectively disclose digitization information. As a result, the information would be less authentic and less informative. Meanwhile, a great many studies provide evidence that high-quality corporate disclosure is associated with more accurate analyst forecasts. In a cross-sectional study, Lang and Lundholm (1996) find that informative

disclosures are positively associated with analyst forecast accuracy, and negatively associated with analyst forecast dispersion and volatility. In an international study, Hope (2003) provides evidence that firms with high-level disclosures have more accurate analyst forecasts. Byard and Shaw (2003) distinguish between firms' public disclosures and analysts' private communications with management and provide evidence that higher-quality public disclosures can improve analyst forecast accuracy, while analysts' private information has no impact on the precision of analysts' forecasts. In a similar vein, Lehavy et al. (2011) document that higher-quality disclosures are associated with lower dispersion among analysts, lower uncertainty in forecasts, and higher forecast accuracy. In this sense, we propose that catering behaviors will lower the quality of firms' disclosures, and ultimately decrease the precision of analyst forecasts.

Second, catering behaviors could decrease information comparability across firms. Along with the decreasing of corporate disclosure quality, the information comparability across firms decreases (Tan et al., 2011; Demmer et al., 2019; Caban-Garcia et al., 2020). Meanwhile, a large number of studies provide evidence that information comparability is positively associated with analyst forecast accuracy. For example, De Franco et al. (2011) first develop a measure of financial statement comparability and examine the benefits of comparability to analysts. Their empirical evidence shows that improved comparability lowers the costs of information acquisition for analysts, and hence increases analyst forecast accuracy and decreases the dispersion in forecasts. Horton et al. (2013) find that the adoption of IFRS significantly improves the comparability across firms, and the improvement in comparability contributes to an increase in analyst forecast accuracy. In a cross-country study, Caban-Garcia et al. (2020) find that the improved comparability of disaggregated earnings can help analysts better assess firms' future cash flows and make more accurate forecasts. Hence, we argue that catering behaviors will decrease the information comparability across firms and further harm analyst forecast accuracy.

Based on the above analysis, we obtain our null hypothesis as follows.

Hypothesis. *The catering behaviors in CDD are negatively associated with the improvement effect of CDD on analyst forecast accuracy.*

3. Methodology

3.1. Sample selection and data sources

The sample includes all Chinese A-share listed firms from 2010 to 2021. We exclude firms with special treatment (ST) and particular transfer (PT) because these firms have serious financial problems and long-term abnormal data. We obtain firm data from two sources: the Wind database and the China Stock Market and Accounting Research (CSMAR) database. More specifically, we collect firms' annual reports from the Wind database and collect analysts' forecasts data and firms' financial data from the CSMAR database. All continuous variables are winsorized at their 1st and the 99th percentile. Our final unbalanced panel sample consists of 15,029 firm-year observations, including 4871 firms and covering twelve years from 2010 to 2021.

3.2. Measuring catering behaviors in CDD

In the case of narrative disclosures, catering implies that firms provide a large number of digitization narratives but perform poorly in digitization aspects. To align with this definition, our empirical measure distinguishes between corporate digitization disclosures (CDD) and corporate digitization performance (CDP). Our proxy for CDD is the number of digitization keywords that are disclosed in the MD&As of annual reports. Concerning prior studies (e.g., Li et al., 2022; Wu et al., 2022; Fang et al., 2023; Liu et al., 2023; Liu and Wang, 2023), we construct CDD scores using the following steps. First, we build a thesaurus of digitization keywords (see Fang et al., 2023 for details). Second, we add the thesaurus to the "Jieba" module and use Python to conduct text analysis on the MD&As. Third, we quantify the digitization keywords revealed in the MD&As as our CDD score, i.e. $CDD = log\,(1+$*the number of digitization keywords*$)$. Our proxy for CDP is prepared by the CSMAR. CSMAR assesses a firm's digitization performance from several digitization aspects, including digitization standards setting, patents, theses, qualifications, and national awards.

After developing both CDD data and CDP data, we follow Yu et al. (2020) and estimate a firm's peer-relative catering score using Eq. (1).

$$\mathrm{Cater}_{it} = \frac{\mathrm{CDD}_{ikt} - \overline{\mathrm{CDD}}}{\sigma_{\mathrm{CDD}}} - \frac{\mathrm{CDP}_{ikt} - \overline{\mathrm{CDP}}}{\sigma_{\mathrm{CDP}}} \tag{1}$$

where *i*, *k,* and *t* denote firm, industry, and year, respectively. *CDD* and *CDP* present a firm's digitization disclosure score and digitization performance score, respectively. We normalize both the digitization disclosure score and digitization performance score to the same scale by subtracting the mean and dividing by the standard deviation. The first piece is a normalized measure presenting firm *i*'s disclosure score in industry *k* and year *t*. The second piece is a normalized measure capturing firm *i*'s performance score in industry *k* and year *t*. A positive *Cater* indicates that a firm has a higher relative score than its peers in its digitization disclosure than in its digitization performance, suggesting that the firm is catering.

3.3. Measuring analyst forecast accuracy

Following Lang and Lundholm (1996), we define analyst forecast accuracy as follows.

$$\text{Accuracy}_{it} = -\frac{|\text{median\_FEPS}_{it} - \text{EPS}_{it}|}{\text{Price}_{t-1}} \times 100 \quad (2)$$

where *t* and *i* denote year and firm, respectively. *EPS*, *FEPS*, *median_FEPS,* and *Price* are a firm's actual earnings per share (EPS), analysts' forecasted EPS for the current year, the median value of FEPS, and stock price, respectively. To ensure firms' digitization disclosures are available to analysts before they issue earnings forecasts, we drop the forecasts that are issued before the release of firms' annual reports. The numerator, $|median\_FEPS_{it} - EPS_{it}|$, is the absolute value of analyst forecast error. To facilitate comparisons across firms, we divide the measure by stock price. Since we use the negative of the absolute value of analyst forecast error, the higher the *Accuracy*, the more accurate the analyst forecast.

3.4. Empirical model

We conduct two regressions to test our hypothesis. We first employ regression (3) to examine the average effect of CDD on analyst forecast accuracy. If CDD does affect analyst forecast accuracy, we further apply regression (4) to access whether catering behaviors in CDD inhibit the forecast improvement effect of CDD.

$$Accuracy_{it} = \alpha_0 + \alpha_1 CDD_{it-1} + \sum\nolimits_m \alpha_m Control_{it} + \lambda_i + \nu_t + \varepsilon_{it} \quad (3)$$

$$Accuracy_{it} = \beta_0 + \beta_1 CDD_{it-1} + \beta_2 Cater_{it-1} + \beta_3 CDD_{it-1} \times Cater_{it-1} + \sum\nolimits_m \beta_m \text{Control}_{it} + \lambda_i + \nu_t + \varepsilon_{it} \quad (4)$$

where *t* and *i* denote year and firm, respectively. The dependent variable *Accuracy* is analyst forecast accuracy, the explanatory variable *CDD* is the corporate digitization disclosure score and *Cater* represents the magnitude of firms' catering behaviors in CDD. We lag both *CDD* and *Cater* by one year to mitigate potential reverse causality. *Control* is a set of control variables. λ_i, and ν_t represent firm-fixed, and year-fixed effects, respectively. ε_{it} is the error term. β_3 is the coefficient of interest. If catering behaviors decrease the improvement effect of CDD on analyst forecast accuracy, β_3 will be significantly negative.

Following prior literature (Lang and Lundholm, 1996; Schiemann and Tietmeyer, 2022; Ni et al., 2023), we control for several firm-specific characteristics that may affect analyst forecast accuracy. (1) Firm size (*Size*), which is measured as the logarithm of total assets. (2) Firm age (*Age*), which is calculated as the logarithm of the number of years since listing. (3) Firm leverage (*Lev*), which is defined as the ratio of total debt to total assets. (4) Returns on equity (*Roe*), which is equal to the net profit over net assets. (5) Volatility of the returns on equity (*Roe_sd*), which is measured as the standard deviation of Roe for the previous three years. (6) Firm transparency (*Transparency*), which is defined as institutional investors' shareholding proportions. (7) Analyst following (*Follow*), which equals the logarithm of the number of analysts following the firm.

3.5. Descriptive statistics

Table 1 presents the descriptive statistics of our sample. The mean value and median value of *CDD* are 1.1151 and 0.6931, respectively. The mean value of *CDD* is larger than its median, indicating that *CDD* follows the right-skewness distribution and demonstrating differences between firms in digitization disclosures. The median value and standard deviation of *Cater* are 0.0406 and 1.3505, respectively, implying that firms do use a catering strategy in their digitization narratives. *Accuracy* experiences greater volatility than *CDD* and *Cater*, with a standard deviation value of 1.4821.

Table 1
Descriptive statistics.

Variable	Mean	Median	SD	Min	Max
CDD	1.1151	0.6931	1.2841	0.0000	5.6904
Cater	-0.0175	0.0406	1.3505	-12.0420	12.6246
Accuracy	-1.7969	-1.3894	1.4821	-30.8521	-0.0105
Size	22.2128	21.9743	1.4320	18.9740	27.5621
Age	2.0179	2.1972	0.9423	0.0000	3.4340
Lev	0.4293	0.4177	0.2184	0.0274	1.2686
Roe	0.0619	0.0719	0.1309	-1.2250	0.3639
Roe_sd	0.0585	0.0246	0.1194	0.0001	1.5642
Transparency	0.3758	0.3816	0.2408	0.0001	0.9051
Follow	3.0322	2.5695	3.9571	1.0000	5.1668

This table presents the descriptive statistics of all variables in our study. The sample includes 15,029 firm-year observations for 4871 firms and for the period 2010-2021.

4. Empirical results

4.1. Main regression results

Table 2 presents our main regression results. We control for firm-fixed effects and year-fixed effects in all columns. Columns 1 and 3 report the average effect of CDD on analyst forecast accuracy by estimating Eq. (3). We find that CDD is positively associated with analyst forecast accuracy in columns 1 and 3, indicating that CDD can significantly improve analyst forecast accuracy. Although not addressed by our study, theoretical and empirical evidence denotes that such results may be related to a better information environment for firms disclosing more information (Lang and Lundholm, 1996; Healy and Palepu, 2001; Dhaliwal et al., 2012; Muslu et al., 2019). Taking column 3 as an example, we can quantify the impact of CDD on analyst forecast accuracy. Considering that we take the logarithm of digitization disclosures, the average effect of CDD on analyst forecast accuracy is that a 1% increase in CDD leads to a 0.0380 improvement in analyst forecast accuracy, which is about 2.11% (0.0380/1.7969) of the sample mean value of analyst forecast accuracy.

Columns 2 and 4 show the interaction effect between CDD and catering behaviors on analyst forecast accuracy by estimating Eq. (4). The coefficient on the interaction term enters negatively and significantly in both columns, suggesting that the catering behaviors in CDD significantly decrease the improvement effect of CDD on analyst forecast accuracy. That said, our hypothesis is verified.

Overall, findings in Table 2 indicate that corporate digitization disclosures (CDD) is positively associated with analyst forecast accuracy. This result for digitization disclosures is consistent with recent evidence from Schiemann and Tietmeyer (2022), who demonstrate that ESG disclosure is positively associated with analyst forecast accuracy, and with Muslu et al. (2019), who develop a disclosure score for CSR narratives and provide evidence that CSR narratives can improve analyst forecast accuracy. In addition, we find that the association between CDD and analyst forecast accuracy is tempered by catering behaviors. This finding extends the research on narrative disclosures by showing that catering behaviors play a significant role in affecting analyst forecast accuracy.

4.2. Robustness tests

So far, our results show that CDD can improve the accuracy of analyst forecasts and the catering behaviors are negatively associated with the improvement effect of CDD on analyst forecast accuracy. However, these findings may be affected by potential endogeneity, sampling methods, the measures of analyst forecast accuracy, and the measures of CDD and catering behaviors. Thus, we further conduct a battery of sensitivity checks to ensure the validity of our main results.

Table 2
Main regression results.

	(1)	(2)	(3)	(4)
CDD	0.0356 * *	0.0302 *	0.0380 * **	0.0272 *
	(2.45)	(1.85)	(2.70)	(1.70)
Cater		-0.0233 * **		-0.0167 * *
		(−2.92)		(−1.99)
CDD×Cater		-6.3390 * **		-5.1213 * *
		(−2.88)		(−2.24)
Size			0.3801 * **	0.3845 * **
			(10.46)	(9.69)
Age			-0.6249 * **	-0.7438 * **
			(−9.17)	(−9.52)
Lev			-0.8874 * **	-0.9240 * **
			(−6.72)	(−6.39)
Roe			1.0871 * **	0.9689 * **
			(7.47)	(6.35)
Roe_sd			-0.0148	-0.0168
			(−0.78)	(−0.83)
Transparency			0.0077 * **	0.0079 * **
			(3.23)	(3.11)
Follow			0.4442 * **	0.3326 * *
			(2.70)	(2.29)
Constant	-1.9440 * **	-1.9765 * **	-9.2970 * **	-9.1135 * **
	(−114.55)	(−95.99)	(−10.97)	(−9.75)
Firm & Year	YES	YES	YES	YES
Observations	15,029	15,029	13,250	13,250
R-squared	0.7271	0.7406	0.7469	0.7579

This table presents estimates of the effects of corporate digitization disclosures (CDD) and catering behaviors on analyst forecast accuracy. In the first and third columns, we estimate the impact of CDD on analyst forecast accuracy. In the second and fourth columns, we test whether catering behaviors affect the association between CDD and analyst forecast accuracy. There are no control variables in the first two columns. In the last two columns, we control for firm size, age, leverage, roe, volatility of roe, transparency, and analyst following. All regressions control for firm-fixed effects and year-fixed effects. *t* statistics are reported in parentheses, with standard errors clustered by firm. * ** , * *, * indicate significance at 1%, 5%, and 10%, respectively.

4.2.1. Endogeneity

Potential endogeneity arising from omitted variables is the major limitation of the research on voluntary disclosures and their capital market consequences. (Healy and Palepu, 2001). To mitigate the concerns over omitted variables, we add control variables that are omitted in previous analyses because their data requirements may induce sample attrition.

Prior research argues that corporate governance is associated with both voluntary disclosures and capital market performance (Healy and Palepu, 2001; Soliman and Ben-Amar, 2022). Following Yi (2023), we consider eight corporate governance related variables and use principal component analysis (PCA) to evaluate corporate governance. These variables include size of the board of directors, size of the supervisory board, size of the independent directors, CEO duality, management shareholding, executive shareholding, board of directors' shareholding, and shareholding concentration. Columns 1 and 2 of Table 3 show the results after adding corporate governance to our main regressions. The inclusion of corporate governance (*Governance*), however, does not alter the results for CDD or the interaction term.

Another stream of literature documents that financial performance is associated with both increased corporate disclosures and improved analyst forecasts (Lang and Lundholm, 1996; Healy et al., 1999). We have controlled for return on equity (*Roe*) and the volatility of return on equity (*Roe_sd*) in all previous analyses. To further verify the robustness of our results, we rerun our main regressions using multiple measures for firm performance including return on assets (*Roa*) and its volatility (*Roa_sd*), and Tobin's q (*TQ*) and its volatility (*TQ_sd*). The last four columns in Table 3 continue to show significantly positive coefficients for CDD and significantly negative coefficients for the interaction term.

4.2.2. Different sampling methods

We also use different sampling methods to test the robustness of our results. First, we are concerned that the Chinese stock market crash could affect analyst forecast accuracy. Following Ni et al. (2023), we drop the observations in year 2015 to remove any possible effect of the Chinese stock market crash. As shown in columns 1 and 2 of Table 4, the coefficient on CDD remains significantly positive and the coefficient on the interaction term is still significantly negative. Second, we exclude the firms in financial sectors because the structure of their financial statements is different from that of other sectors (Fang et al., 2023). We obtain the same conclusions in columns 3 and 4 of Table 4. Third, we drop the observations with zero corporate digitization performance scores to mitigate the concerns that CSMAR may rate firms with zero scores due to their failure to uncover firms' digitization performance rather than actual digitization performance per se. The results in columns 5 and 6 do not alter our main results.

Overall, the Table 4 results corroborate our main regression results, providing support for the argument that catering behaviors are negatively associated with the improvement effect of CDD on analyst forecast accuracy.

Table 3
Regression analysis to address endogeneity concerns.

	(1)	(2)	(3)	(4)	(5)	(6)
	Controlling for corporate governance		Controlling for firm performance (*Roa*)		Controlling for firm performance (*TQ*)	
CDD	0.0226 * *	0.0133 *	0.0206 * *	0.0157 *	0.0170 * *	0.0114
	(2.02)	(1.78)	(2.32)	(1.93)	(2.10)	(1.38)
Cater		-0.0116		-0.0151 *		-0.0118
		(−1.31)		(−1.72)		(−1.36)
CDD×Cater		-6.0245 * *		-6.5363 * **		-5.5313 * *
		(−2.49)		(−2.78)		(−2.38)
Governance	0.0643 * **	0.0609 * **				
	(3.34)	(3.47)				
Roa			1.2182 * *	1.1827 * *		
			(2.07)	(1.98)		
Roa_sd			-0.0253 * **	-0.0255 * **		
			(−5.14)	(−5.32)		
TQ					0.0831 * **	0.0812 * **
					(10.42)	(10.13)
TQ_sd					-0.0035 *	-0.0035 * *
					(−1.96)	(−2.00)
Constant	-8.6346 * **	-8.7071 * **	-7.8641 * **	-7.9932 * **	-9.9500 * **	-10.0308 * **
	(−8.87)	(−8.72)	(−8.41)	(−8.37)	(−10.37)	(−10.24)
Controls	YES	YES	YES	YES	YES	YES
Firm & Year	YES	YES	YES	YES	YES	YES
Observations	11,394	11,394	13,250	13,250	13,250	13,250
R-squared	0.7514	0.7556	0.7524	0.7576	0.7542	0.7593

This table shows estimates of the effects of CDD and catering behaviors on analyst forecast accuracy after including additional controls and using different measures of firm performance. Columns 1 and 2 report the regression results after adding corporate governance (*Governance*) to our main regressions. The calculation of *Governance* is based on the principal component analysis (PCA) and eight corporate governance related variables: size of the board of directors, size of the supervisory board, size of the independent directors, CEO duality, management shareholding, executive shareholding, board of directors' shareholding, and shareholding concentration. Columns 3 and 4 show the regression results using return on assets (*Roa*) and its volatility (*Roa_sd*) as alternative proxies for firm performance. Columns 5 and 6 present results using Tobin's q (*TQ*) and its volatility (*TQ_sd*) as alternative proxies for firm performance. All regressions control for firm-fixed effects and year-fixed effects. *t* statistics are reported in parentheses, with standard errors clustered by firm. * ** , * *, * indicate significance at 1%, 5%, and 10%, respectively.

Table 4
Regression analysis using different sampling methods.

	(1)	(2)	(3)	(4)	(5)	(6)
	Excluding the effects of Chinese stock market crash		Excluding the firms in financial sectors		Excluding the firms with zero digitization performance scores	
CDD	0.0440 * **	0.0341 *	0.0401 * **	0.0291 *	0.0201 * *	0.0122 * *
	(2.81)	(1.89)	(2.87)	(1.82)	(2.39)	(2.01)
Cater		-0.0211 * *		-0.0157 *		-0.0153 * *
		(−2.32)		(−1.89)		(−2.09)
CDD×Cater		-4.9863 * *		-5.2734 * *		-5.5271 * *
		(−2.10)		(−2.29)		(−2.04)
Constant	-9.2437 * **	-9.0645 * **	-17.9654 * **	-17.1302 * **	-9.296 * **	-9.3071 * **
	(−10.04)	(−8.90)	(−10.43)	(−9.33)	(−6.33)	(−6.20)
Controls	YES	YES	YES	YES	YES	YES
Firm &Year	YES	YES	YES	YES	YES	YES
Observations	13,226	11,600	12,345	11,973	9890	8891
R-squared	0.7502	0.7633	0.7472	0.7581	0.7799	0.7815

This table reports the impact of CDD and catering behaviors on analyst forecast accuracy using different sampling methods. Columns 1 and 2 show regression results excluding the observations in year 2015 to exclude the effects of Chinese stock market crash. Columns 3 and 4 show regression results excluding the firms in financial sectors. Columns 5 and 6 report results excluding the firms with zero digitization performance scores. Control variables include firm size, age, leverage, roe, volatility of roe, transparency, and analyst following. All regressions control for firm-fixed effects and year-fixed effects. *t* statistics are reported in parentheses, with standard errors clustered by firm. * ** , * *, * indicate significance at 1%, 5%, and 10%, respectively.

4.2.3. Alternative measures of CDD and catering behaviors in CDD

We reexamine our regression analysis using alternative proxies for CDD and catering behaviors. In our main regressions, we measure CDD as the logarithm of the number of digitization keywords in the MD&A, which is widely used in prior literature (e.g., Wu et al., 2021; Wu et al., 2022; Tian et al., 2022; Liu et al., 2023; Huang et al., 2023). In this section, we follow Fang et al. (2023) and use the ratio of the number of digitization keywords to the number of total words in the MD&As, *CDDpercent*, to proxy for CDD. Accordingly, we replace *CDD* with *CDDpercent* in Eq. (1) and re-estimate a firm's peer-relative catering score. Columns 1 and 2 of Table 5 report the regression results. These results are in line with the results in Table 2, supporting the argument that catering behaviors in CDD would decrease the improvement effect of CDD on analyst forecast accuracy.

4.2.4. An alternative measure of analyst forecast accuracy

We also consider an alternative measure of analyst forecast accuracy. In Eq. (2), we first calculate the median value of analysts' FEPS (*median_FEPS*) and then use $|median\_FEPS_{it} - EPS_{it}|$ as a proxy for analyst forecast error. In this section, we follow Dhaliwal et al. (2012) and use the mean value of the absolute errors for all analyst forecasts. Similar to Eq. (2), we divide the measure by stock price to facilitate comparisons across firms and use the negative form. More specifically, we use Eq. (5) to re-estimate forecast accuracy:

Table 5
Alternative measures of CDD, catering behaviors in CDD, and analyst forecast accuracy.

	(1)	(2)	(3)	(4)
	Alternative measures of CDD and catering behaviors in CDD		An alternative measure of analyst forecast accuracy	
CDD	8.3461 * **	5.9376 * *	0.0560 * *	0.0771 *
	(2.82)	(2.46)	(2.00)	(1.88)
Cater		-0.0108		-0.0356
		(−1.35)		(−1.43)
CDD×Cater		-6.0109 * *		-4.5938 * *
		(−2.27)		(−2.27)
Constant	-9.3762 * **	-9.2027 * **	-1.4313	-1.8752
	(−11.05)	(−9.83)	(−0.50)	(−0.55)
Controls	YES	YES	YES	YES
Firm &Year	YES	YES	YES	YES
Observations	14,893	13,250	14,881	13,241
R-squared	0.7467	0.7578	0.1939	0.2279

This table shows estimates of the impact of CDD and catering behaviors on analyst forecast accuracy using alternative measures of CDD, catering behaviors, and analyst forecast accuracy. Columns 1 and 2 show regression results using a different measure of CDD, measured as use the ratio of the number of digitization keywords to the number of total words in the MD&As, and a different measure of catering behaviors, based on the new CDD measure and Eq. 1, respectively. Columns 3 and 4 show the regression results using a different measure of analyst forecast accuracy, measured as the mean value of the absolute errors for all analyst forecasts. Control variables include firm size, age, leverage, roe, volatility of roe, transparency, and analyst following. All regressions control for firm-fixed effects and year-fixed effects. *t* statistics are reported in parentheses, with standard errors clustered by firm. * ** , * *, * indicate significance at 1%, 5%, and 10%, respectively.

$$Accuracy\_new_{it} = -\frac{1}{N}\sum_{j=1}^{N}\frac{\left|FEPS_{itj} - EPS_{it}\right|}{Price_{it}} \times 100 \quad (5)$$

where *i*, *t*, and *j* denote firm, year, and forecast, respectively. *N* is the total number of forecasts issued for the firm. *EPS*, *FEPS*, and *Price* are the firm's actual EPS, analysts' forecasted EPS for the current year, and stock price, respectively.

Columns 3 and 4 of Table 5 report the regression results using an alternative measure of analyst forecast accuracy. These results corroborate the results reported in Table 2, providing consistent evidence that catering behaviors in CDD would decrease the improvement effect of CDD on analyst forecast accuracy.

5. Additional analysis

5.1. Channel analysis

Having found that catering behaviors in CDD decrease the improvement effect of CDD on analyst forecast accuracy, we next explore two potential channels underlying these findings, i.e. information quality and information comparability. To cater to others' interests and expectations, managers may manipulate information or selectively disclose digitization information, leading to a reduction in the information quality of corporate disclosures per se. In addition, along with the decrease of disclosure quality, the information comparability across firms would decrease.

To provide an assessment of the information quality channel, we use the corporate disclosure quality ratings from the SCRC, *InfoQua*, as our proxy for a firm's information quality. To examine whether information comparability can serve as a channel through which catering behaviors affect analyst forecast accuracy, we use the measure developed by De Franco et al. (2011) to calculate accounting comparability for all firms in the same industry, *InfoCompInd*. Columns 1 and 2 of Table 6 report regression results of channel analysis, where the dependent variables are *InfoQua* and *InfoCompInd*, respectively. The results show that the coefficient on the interaction term enters significantly and negatively in both columns, suggesting that the catering behaviors substantially reduce the information quality of disclosures per se and the information comparability across firms. The consensus among financial economists is that high-quality and comparable information is associated with better analyst forecasts (Healy and Palepu, 2001). Therefore, the catering behaviors in CDD would harm the improvement effect of CDD on analyst forecast accuracy by reducing information quality and information comparability.

5.2. Heterogeneity analysis

To the extent that analyst forecast accuracy is affected by firms' information environment and analysts' ability, we further conduct two cross-sectional tests.

5.2.1. Firm information environment

Many studies document that if firms' inside information is not fully revealed through regulated financial information, voluntary disclosures would play an important role in reducing information asymmetry between firms and analysts and improving analyst

Table 6
Channel analysis results.

	(1)	(2)
	InfoQua	*InfoCompInd*
CDD	0.0042	0.0326 * **
	(1.38)	(3.02)
Cater	-0.0087 * *	-0.0001
	(−2.15)	(−1.02)
CDD×Cater	-1.4969 * **	-0.8823 * **
	(−3.05)	(−2.98)
Constant	0.8517 * *	-1.3799
	(2.44)	(−1.23)
Controls	YES	YES
Firm & Year	YES	YES
Observations	17,988	11,738
R-squared	0.4846	0.6916

This table presents regression results of the channel analysis. Column 1 shows estimates of the impact of CDD on information quality, measured as the ratings of firms' disclosure quality. Column 2 reports estimates of the impact of CDD on information comparability, calculated by the model of De Franco et al. (2011). Control variables include firm size, age, leverage, roe, volatility of roe, transparency, and analyst following. All regressions control for firm-fixed effects and year-fixed effects. *t* statistics are reported in parentheses, with standard errors clustered by firm. * ** , * * indicate significance at 1% and 5%, respectively.

forecast accuracy (Healy and Palepu, 2001; Li, 2010). Hence, we predict that the improvement effect of CDD on analyst forecast accuracy and the reduction effect of catering behaviors on the improvement effect of CDD will be more pronounced in opaque firms. In Panel A of Table 7, we run regressions on subsamples stratified by the median value of firms' information environment. We follow Morck et al. (2000) and quantify a firm's information environment by its stock price synchronicity. A higher value of stock price synchronicity indicates poorer information environment. The regression results in Panel A of Table 7, consistent with our prediction, show that the coefficient on the interaction term is significantly negative in firms with a poor information environment, while is not significant in the rich information environment subsample. This finding is consistent with that of Dhaliwal et al. (2012) and Ni et al. (2023), who demonstrate that nonfinancial information plays a greater role in firms with a higher level of financial opaqueness.

5.2.2. Expert analyst coverage

Considering expert analysts are better at accessing and processing information (Stickel, 1992; Xu et al., 2013; Ni et al., 2023), they can be better equipped to identify firms' catering behaviors, and therefore, they should be able to downgrade their forecast on this. Building on this notion, we predict that firms with fewer expert analysts will have less accurate analyst forecasts. To validate this prediction, we partition the sample by the median value of expert analyst followings the firm and run subsample regressions. Following Xu et al. (2013), we define expert analysts as those star analysts selected by *The New Fortune*. Panel B of Table 7 reports the subsample regression results. We find that the negative association between the interaction term and analyst forecast accuracy is stronger in firms that are followed by fewer expert analysts, supporting our prediction. This conclusion is also in line with that of Xu et al. (2013) and Ni et al. (2023), who show that star analysts can issue more accurate forecasts.

Panel B: Expert analyst defined as star analyst.

	(1)	(2)	(3)	(4)
	More	More	Less	less
CDD	0.0421 * *	0.0881 *	0.0154 *	0.0428
	(2.26)	(1.81)	(1.77)	(1.47)
Cater		-0.0286 *		-0.0777 *
		(−1.89)		(−1.88)
CDD×Cater		-3.7498 * *		-4.5691 * **
		(−2.18)		(−3.13)
Constant	-1.4313	-1.8752	-9.3762 * **	-9.2027 * **
	(−0.50)	(−0.55)	(−11.05)	(−9.83)
Controls	YES	YES	YES	YES
Firm &Year	YES	YES	YES	YES
Observations	7673	6865	6324	5397
R-squared	0.4136	0.4304	0.3222	0.3318

This table shows estimates of the heterogeneity analysis of the effects of CDD and catering behaviors on analyst forecast accuracy. Panel A partitions the sample by the median value of firm information environment, measured as firms' stock price synchronicity. High synchronicity indicates a poor information environment and low synchronicity means a rich information environment. Panel B partitions the sample by the median value of expert analyst followings the firm, measured as the number of star analysts. Control variables include firm size, age, leverage, roe, volatility of roe, transparency, and analyst following. All regressions control for firm-fixed effects and year-fixed effects. *t* statistics are reported in parentheses, with standard errors clustered by firm. * ** , * *, * indicate significance at 1%, 5%, and 10%, respectively.

6. Conclusion

Given the challenges of narrative disclosures and the discretion managers have when they disclose digitization information, we identify the catering behaviors in corporate digitization disclosures (CDD) and investigate their effects on analyst forecast accuracy. By creating a peer-relative catering behavior score, we provide evidence that catering behaviors in CDD significantly decrease the improvement effect of CDD on analyst forecast accuracy. Our inference is robust to potential endogeneity, different sampling methods, alternative measures of CDD and catering behaviors, and a different analyst forecast accuracy measure, providing consistent evidence that catering behaviors would harm the improvement effect of CDD on analyst forecast accuracy. We further explore the channels through which catering behaviors harm analyst forecast accuracy and find that catering behaviors reduce both information quality of corporate disclosure per se and information comparability across firms. In addition, we find that the reduction effect of catering behaviors is stronger in firms with poor information environment and firms followed by fewer expert analysts. The overall evidence is consistent with the notion that high-quality corporate disclosure plays a greater role in reducing information asymmetry (Hope, 2003), and with the catering theory that firms always cater to investor demand (Baker and Wurgler, 2004a; Polk and Sapienza, 2008).

Our analysis of China's listed firms shows that the discretion in narrative disclosures impairs analyst forecasts as well as information quality and information comparability. Restricting the discretion is crucial to the success of future reforms aiming to make narrative disclosures more effective. Of course, we offer a caveat that the findings of any individual country are unique to the conditions of that particular country.

Nevertheless, we believe that the evidence from China is valuable to countries accelerating digital transformation process, particularly those with weak information-revealing systems. They can learn from the experience of China's listed firms that catering behaviors in digitization narratives would have negative impacts on analyst forecasts as well as information quality and information

Table 7
Heterogeneity analysis results.

	Panel A: Firm information environment measured by stock price synchronicity.			
	(1)	(2)	(3)	(4)
	Rich	Rich	Poor	Poor
CDD	0.0336 *	0.0209	0.0469 * *	0.0310 *
	(1.76)	(0.90)	(2.26)	(1.74)
Cater		-0.0117		-0.0077
		(−1.08)		(−0.55)
CDD×Cater		-4.0161		-3.4015 * *
		(−1.46)		(−2.15)
Constant	-10.6435 * **	-10.2380 * **	-8.9075 * **	-8.9361 * **
	(−9.05)	(−7.99)	(−8.03)	(−7.19)
Controls	YES	YES	YES	YES
Firm &Year	YES	YES	YES	YES
Observations	7291	6440	6726	5878
R-squared	0.8101	0.8190	0.7861	0.7994

comparability. Further, in international settings, we believe that the evidence from digitization narratives is also beneficial to other narrative disclosures, such as voluntary CSR report and ESG disclosure, since there are few regulatory guidelines or auditing frameworks for them. Collectively, our findings provide several implications for market participants and regulators. First, investors and analysts should screen the narratives in voluntary disclosures. We find that firms use a catering strategy in disclosing information. Second, managers should normalize disclosure procedures and improve information quality. We provide evidence that the misrepresented information can be identified by expert analysts. Third, regulators should standardize information-revealing systems to make disclosures more effective. Our results show that catering behaviors impair analyst forecasts as well as information quality and information comparability, harming the efficiency of capital markets.

CRediT authorship contribution statement

Yang Shenghao: Methodology, Software, Visualization, Writing – review & editing. **Ma Lili:** Methodology, Software, Supervision, Visualization. **Zhou Bole:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

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References

Baker, M., Wurgler, J., 2004a. A catering theory of dividends. J. Financ. 59 (3), 1125–1165.
Baker, M., Wurgler, J., 2004b. Appearing and disappearing dividends: the link to catering incentives. J. Financ. Econ. 73 (2), 271–288.
Bernardi, C., Stark, A.W., 2018. Environmental, social and governance disclosure, integrated reporting, and the accuracy of analyst forecasts. Br. Account. Rev. 50 (1), 16–31.
Boni, L., Womack, K., 2006. Analysts, industries, and price momentum. J. Financ. Quant. Anal. 41 (1), 85–109.
Bowen, F., Aragon-Correa, J.A., 2014. Greenwashing in corporate environmentalism research and practice: the importance of what we say and do. Organ. Environ. 27 (2), 107–112.
Byard, D., Shaw, K.W., 2003. Corporate disclosure quality and properties of analysts' information environment. J. Account., Audit. Financ. 18 (3), 355–378.
Caban-Garcia, M.T., Choi, H., Kim, M., 2020. The effects of operating cash flow disclosure on earnings comparability, analysts' forecasts, and firms' investment decisions during the Pre-IFRS era. Br. Account. Rev. 52 (4), 100883.
Chen, K., Guo, W., Jiang, L., Xiong, X., Yang, M., 2022. Does time-space compression affect analyst forecast performance? Res. Int. Bus. Financ. 62, 101719.
Clement, M., 1999. Analyst forecast accuracy: do ability, resources, and portfolio complexity matter? J. Account. Econ. 27 (3), 285–303.
De Franco, G., Kothari, S.P., Verdi, R.S., 2011. The benefits of financial statement comparability. J. Account. Res. 49 (4), 895–931.
Dechow, P., Hutton, A., Sloan, R., 2000. The relation between analysts' forecasts of long-term earnings growth and stock price performance following equity offerings. Contemp. Account. Res. 17 (1), 1–32.
Demmer, M., Pronobis, P., Yohn, T.L., 2019. Mandatory IFRS adoption and analyst forecast accuracy: the role of financial statement-based forecasts and analyst characteristics. Rev. Account. Stud. 24 (3), 1022–1065.

Dhaliwal, D.S., Radhakrishnan, S., Tsang, A., Yang, Y.G., 2012. Nonfinancial disclosure and analyst forecast accuracy: international evidence on corporate social responsibility disclosure. Account. Rev. 87 (3), 723–759.
Ed-Dafali, S., Patel, R., Iqbal, N., 2023. A bibliometric review of dividend policy literature. Res. Int. Bus. Financ. 65, 101987.
Fang, M., Nie, H., Shen, X., 2023. Can enterprise digitization improve ESG performance? Econ. Model. 118, 106101.
Gilmore, D.C., Ferris, G.R., 1989. The effects of applicant impression management tactics on interviewer judgments. J. Manag. 15 (4), 557–564.
Gino, F., Sezer, O., Huang, L., 2020. To be or not to be your authentic self? Catering to others' preferences hinders performance. Organ. Behav. Hum. Decis. Process. 158, 83–100.
Healy, P.M., Palepu, K.G., 2001. Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. J. Account. Econ. 31 (1-3), 405–440.
Healy, P.M., Hutton, A.P., Palepu, K.G., 1999. Stock performance and intermediation changes surrounding sustained increases in disclosure. Contemp. Account. Res. 16 (3), 485–520.
Hemingway, C.A., Maclagan, P.W., 2004. Managers' personal values as drivers of corporate social responsibility. J. Bus. Ethics 50 (1), 33–44.
Hope, O.K., 2003. Disclosure practices, enforcement of accounting standards, and analysts' forecast accuracy: an international study. J. Account. Res. 41 (2), 235–272.
Horton, J., Serafeim, G., Serafeim, I., 2013. Does mandatory IFRS adoption improve the information environment? Contemp. Account. Res. 30 (1), 388–423.
Huang, H., Wang, C., Wang, L., Yarovaya, L., 2023. Corporate digital transformation and idiosyncratic risk: based on corporate governance perspective. Emerg. Mark. Rev. 56, 101045.
Huo, P., Wang, L., 2022. Digital economy and business investment efficiency: inhibiting or facilitating? Res. Int. Bus. Financ. 63, 101797.
Jacob, J., Lys, T., Neale, M., 1999. Expertise in forecasting performance of security analysts. J. Account. Econ. 28 (1), 51–82.
Kadan, O., Madureira, L., Wang, R., Zach, T., 2012. Analysts' industry expertise. J. Account. Econ. 54 (2-3), 95–120.
Kong, G., Huang, J., Liu, S., 2023. Digital transformation and within-firm pay gap: evidence from China. Emerg. Mark. Financ. Trade 59 (6), 1748–1766.
Lang, M.H., Lundholm, R.J., 1996. Corporate disclosure policy and analyst behavior. Account. Rev. 71 (4), 467–492.
Lang, M.H., Lundholm, R.J., 2000. Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock? Contemporary accounting research 17 (4), 623–662.
Lehavy, R., Li, F., Merkley, K., 2011. The effect of annual report readability on analyst following and the properties of their earnings forecasts. Account. Rev. 86 (3), 1087–1115.
Li, F., 2010. The information content of forward-looking statements in corporate filings — a naïve Bayesian machine learning approach. J. Account. Res. 48 (5), 1049–1102.
Li, R., Rao, J., Wan, L., 2022. The digital economy, enterprise digital transformation, and enterprise innovation. Manag. Decis. 43 (7), 2875–2886.
Libby, R., Hunton, J.E., Tan, H.T., Seybert, N., 2008. Relationship incentives and the optimistic/pessimistic pattern in analysts' forecasts. J. Account. Res. 46 (1), 173–198.
Liu, G., Wang, S., 2023. Digital transformation and trade credit provision: evidence from China. Res. Int. Bus. Financ. 64, 101805.
Liu, S., Zhao, H., Kong, G., 2023. Enterprise digital transformation, breadth of ownership and stock price volatility. Int. Rev. Financ. Anal., 102713
Loughran, T., McDonald, B., 2016. Textual analysis in accounting and finance: a survey. J. Account. Res. 54 (4), 1187–1230.
Lyon, T.P., Maxwell, J.W., 2011. Greenwash: corporate environmental disclosure under threat of audit. J. Econ. Manag. Strategy 20 (1), 3–41.
Merkl-Davies, D.M., Brennan, N., 2007. Discretionary disclosure strategies in corporate narratives: Incremental information or impression management? J. Account. Lit. 26, 116–196.
Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? J. Financ. Econ. 58 (1-2), 215–260.
Muslu, V., Mutlu, S., Radhakrishnan, S., Tsang, A., 2019. Corporate social responsibility report narratives and analyst forecast accuracy. J. Bus. Ethics 154, 1119–1142.
Nambisan, S., Wright, M., Feldman, M., 2019. The digital transformation of innovation and entrepreneurship: progress, challenges and key themes. Res. Policy 48 (8), 103773.
Ni, J., Jin, S., Hu, Y., Zhang, L., 2023. Informative or distracting: CSR disclosure of peer firms and analyst forecast accuracy. Int. Rev. Financ. Anal. 87, 102575.
Parguel, B., Benoît-Moreau, F., Larceneux, F., 2011. How sustainability ratings might deter 'green- washing': a closer look at ethical corporate communication. J. Bus. Ethics 102, 15–28.
Polk, C., Sapienza, P., 2008. The stock market and corporate investment: a test of catering theory. Rev. Financ. Stud. 22 (1), 187–217.
Schiemann, F., Tietmeyer, R., 2022. ESG controversies, ESG disclosure and analyst forecast accuracy. Int. Rev. Financ. Anal. 84, 102373.
Soliman, M., Ben-Amar, W., 2022. Corporate social responsibility orientation and textual features of financial disclosures. Int. Rev. Financ. Anal. 84, 102400.
Stickel, S., 1992. Reputation and performance among security analysts. J. Financ. 47 (5), 1811–1836.
Tan, H., Wang, S., Welker, M., 2011. Analyst following and forecast accuracy after mandated IFRS adoptions. J. Account. Res. 49 (5), 1307–1357.
Tan, H.T., Libby, R., Hunton, J.E., 2010. When do analysts adjust for biases in management guidance? Effects of guidance track record and analysts' incentives. Contemp. Account. Res. 27 (1), 187–208.
Tian, G., Li, B., Cheng, Y., 2022. Does digital transformation matter for corporate risk-taking? Financ. Res. Lett. 49, 103107.
United Nations, 2022. E-government Survey 2022.
Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J.Q., Fabian, N., Haenlein, M., 2021. Digital transformation: a multidisciplinary reflection and research agenda. J. Bus. Res. 122, 889–901.
Waymire, G., 1986. Additional evidence on the accuracy of analyst forecasts before and after voluntary management earnings forecasts. Accounting Review 129–142.
Wayne, S.J., Kacmar, K.M., 1991. The effects of impression management on the performance appraisal process. Organ. Behav. Hum. Decis. Process. 48 (1), 70–88.
Wu, F., Hu, H., Li, H., Ren, X., 2021. Enterprise digital transformation and capital market performance: empirical evidence from stock liquidity. Manag. World 37, 130–144.
Wu, K., Fu, Y., Kong, D., 2022. Does the digital transformation of enterprises affect stock price crash risk? Financ. Res. Lett. 48, 102888.
Xu, N., Chan, K.C., Jiang, X., Yi, Z., 2013. Do star analysts know more firm-specific information? Evidence from China. J. Bank. Financ. 37 (1), 89–102.
Yi, E., 2023. Corporate governance, information disclosure and investment-Cash flow sensitivity. Financ. Res. Lett. 55, 103942.
Yu, E.P.Y., Van Luu, B., Chen, C.H., 2020. Greenwashing in environmental, social and governance disclosures. Res. Int. Bus. Financ. 52, 101192.
Zhang, W., Lu, C., Liang, S., 2023. More words but less investment: rookie CEOs and firms' digital transformations. China J. Account. Res., 100305