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Concealment and detection: The influence of management tone on analyst forecast revisions

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ABSTRACT

Non-financial information disclosures driven by managers' expropriation motivations obscure and misrepresent a company's actual performance, discouraging capital market efficiency. This study examines analysts' sensitivity to management tone in earnings forecast revisions using data from Chinese publicly listed firms (2007–2022). Key findings are as follows: (1) Analysts reduce forecast revisions when the management tone in annual reports is overly positive. This finding indicates that Chinese securities analysts can perceive expropriation motives in the non-financial information disclosed by companies; (2) Only star analysts effectively detect expropriation motives. (3) Companies engaged in financing and margin trading exhibit improved transparency, curbing managerial opportunism and reducing tone's impact on forecasts. (4) Institutional investors identify distorted information, partially substituting for analysts in detecting self-interest and diminishing tone's influence. This study provides insights into analysts' role in recognizing the expropriation of shareholder interests in changing capital markets.

1. Introduction

This study investigates whether the disclosure of non-financial information impacts the operations of listed companies and capital market stability, inspired by Bloomfield's (2008) hypothesis questioning if non-financial information acts merely as a "straw man." Suppose non-financial information consists only of generic annotations, standard text, disclaimers, and other trivial details. In that case, its disclosure may not affect the operations of listed companies, rendering it a mere "straw man." If non-financial information is merely a "straw man," its disclosure holds little importance. However, if it is not, its disclosure becomes crucial, warranting a deeper analysis of its impact on corporate operations. There is a lack of systematic evidence in the literature on this topic. This study applies corporate finance theory to examine how non-financial information disclosure via financial intermediaries impacts listed companies' operations and explores methods to strengthen corporate governance systems.

As an essential information liaison in the capital market, securities analysts can reduce information asymmetry in the capital market and thus identify the motivation of the tone of management dialogue and analysis text in the annual reports of listed companies in the Chinese A-share market. The key lies in whether they can recognize biased information in the market. Past studies have investigated the capital market's response to analysts' forecasting behavior. These studies support the idea that analysts are skilled information processors (Barber et al., 2001; Womack, 1996). Thus, the role of analysts in information production helps mitigate information asymmetry in the capital market. Recent studies challenge the effectiveness of analysts, suggesting conflicts of interest (Bouchaud et al., 2019; O'Brien et al., 2005) undermine the efficiency of their forecasting behavior. Evidently, the disclosure of non-financial information based on the intrusion of the controlling shareholder's interests distorts the company's actual performance information, which expands the information asymmetry issue of listed companies and will harm the efficiency of listed companies' business operations. Thus, we must answer the question: As an information intermediary, can analysts identify the distortion caused by disclosing non-financial information based on interest encroachment?

A real-world example is the case of Kangmei Pharmaceutical, a major

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Table 1
Definition of key variables.

Variable name	Variable symbol	Variable definition
Dependent variables		
Earnings Forecast Revision Magnitude	Rev	The difference between the analyst j's revised earnings forecast for company i in quarter Q($FEPS^{*}_{i,j,Q}$) and their earnings forecast for the same fiscal year in the previous quarter Q − 1($FEPS^{*}_{i,j,Q-1}$)
Earnings Forecast Revision Direction	Rev_Sign	If the analyst's revision is upward, it takes the value of +1; if the revision is downward, it takes the value of −1
Independent variables		
Management tone	Tone	(Tone_P-Tone_N) / (Tone_P + Tone_N)
Positive management tone	Tone_P	The proportion of positive management tone words in the management discussion and analysis section of the annual report of a listed company compared to the total number of positive and negative management tone words.
Negative management tone	Tone_N	The proportion of negative management tone words in the management discussion and analysis section of the annual report of a listed company compared to the total number of positive and negative management tone words.
Control variables		
Return on Equity	ROE	The net profit of a listed company divided by its net assets
Total Debt-to-Asset Ratio	Lev	The total liabilities of the listed company are divided by its total assets.
Firm Size	Size	Ln(1 + Total Assets of the listed company)
Book-to-Market Ratio	B/M	Book value of the listed company divided by its market value
Institutional Ownership Ratio	INST	Sum of the shares held by financial institutions in the listed company
Firm Age	Age	Ln (1 + Number of years the company has been listed)
Nature of the Firm	SOE	It takes a value of 1 if the listed company is state-owned; otherwise, it takes a value of 0
Discretionary Accruals	DA	Absolute value of the residuals obtained from regressing using the modified Jones (1991) model at the industry-year level
Real Earnings Management	REM	Real earnings management based on the model referenced by Roychowdhury (2006)
Stock Volatility	SIGMA	Standard deviation of the weekly stock returns of the company
Stock Return	RET	Mean of the weekly stock returns of the company
Stock Turnover	Turnover	Trading volume of listed company stocks / Total number of outstanding shares × 100 %
Illiquidity Indicator	Amihud	Non-liquidity indicator of the stock was obtained using the calculation method described in Amihud
Moderating variables		
Regional Dummy Variable	Area	If the listed company is in the eastern region of China, the value is 1; otherwise, it is 0
Analyst Coverage	Coverage	The natural logarithm of the number of analysts (or analyst teams) who have conducted tracking analysis on the listed company within one year

Note: This table presents the results of the descriptive statistics for all variables in our research sample.

Shanghai Stock Exchange-listed company. Between 2016 and 2018, Kangmei's financial reports used an overly optimistic tone to highlight growth and efficiency. However, in 2019, it was revealed that the company had engaged in financial manipulation, overstating cash holdings by over $4 billion. Initially, analysts responded cautiously to the optimistic tone but later downgraded earnings forecasts as inconsistencies, particularly in cash flows, became evident. This case demonstrates how analysts can detect management's expropriation motives, even when the tone of management's communication is overly positive.

In addition to the intuition provided by real-world examples, we must seek rigorous empirical evidence. Therefore, we select all A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2007 to 2022 as the research sample. We directly investigate analysts' ability to identify distorted information and further examine whether analysts can discern the motives behind non-financial information disclosures of listed companies by examining analysts' forecast revision behaviors and their sensitivity to management tone. The empirical results indicate the following: (1) Chinese securities analysts have the ability to identify non-financial information disclosed by listed companies based on expropriation motives. This study finds a significant negative relationship between the tone of management discussion and analysis (MD&A) texts in annual reports of A-share listed companies and the magnitude of analysts' earnings revisions. This suggests that external analysts can effectively detect expropriation motives in non-financial disclosures. (2) This study examines differences in the ability of star and non-star analysts to identify such motives by internal controllers in listed companies. The findings suggest that only star analysts can identify listed companies' expropriation motives behind non-financial information disclosures.

The contributions of this study are as follows. (1) Unlike previous studies, this study directly investigates analysts' ability to identify distorted information by analyzing the sensitivity of their earnings forecast revisions to the tone of MD&A texts in the annual reports of A-share listed companies in China. While prior research highlights analysts' supervisory role, it often overlooks their function in detecting distorted information. (2) The study supplements existing research by examining the differences in information identification abilities between the star and non-star analysts. The 2018 analyst voting scandal and the suspension of the New Fortune Analyst Selection event sparked public and academic debates about the true contribution of securities analysts to the healthy development of China's capital market. This study suggests that the selection mechanism for star analysts requires further regulation to better leverage their incentive effects. (3) The study augments the pathways through which non-financial information disclosure impacts the commercial operations of listed companies. Past research has primarily focused on the impact of non-financial information on the capital market from the perspectives of investors and media intermediaries. By integrating textual and financial data, this study provides valuable insights into how management tone impacts analysts' forecast revisions and the mechanisms through which differing market participants contribute to optimizing sustainable business operations.

The remainder of this paper is organized as follows. Section 1 presents the theoretical analysis of the non-financial information disclosure behavior of listed companies and the earnings forecast behavior of analysts. The research hypotheses are proposed accordingly. Section 2 encompasses the research design, including the data and research methodology. Section 3 puts forth the main empirical results and analysis. Section 4 investigates the impact of the nature of tone, whether the analyst is a star analyst and the proportion of institutional investor holdings on the relationship between analysts' earnings forecasts and the tone of management in annual reports. Section 5 concludes the study.

2. Theoretical analysis and research hypotheses

Information technology advancements have significantly boosted the volume and speed of information dissemination. Thus, developed capital markets are increasingly adopting artificial intelligence and other technologies to strengthen or replace human efforts in information analysis and create purely quantitative trade strategies. These innovations enable more precise information processing while improving

Table 2
Descriptive statistical analysis of main variables.

Variable	Observations	Mean	Standard Deviation	Minimum	Median	Maximum
Tone	42,988	0.456	0.134	−0.052	0.459	0.895
Tone_P	42,988	0.718	0.067	0.474	0.718	1.000
Tone_N	42,988	0.282	0.067	0.000	0.282	0.526
Rev	42,988	−0.168	0.630	−22.800	−0.100	24.400
Rev_Sign	42,988	−0.395	0.919	−1.000	−1.000	1.000
ROE	37,836	0.138	0.105	−0.502	0.126	0.721
SGR	42,985	0.195	0.314	−0.867	0.146	4.297
Size	42,985	23.311	1.148	19.481	23.210	27.499
B/M	37,446	0.606	0.264	0.092	0.599	1.227
INST	42,988	0.523	0.230	0.000	0.561	0.942
Coverage	42,988	2.962	0.686	0.693	3.091	4.205
Age	42,985	2.414	0.506	1.386	2.485	3.332
BIGR	42,988	36.220	15.397	4.080	35.170	75.090
DUAL	42,985	0.221	0.415	0.000	0.000	1.000
SOE	42,985	0.463	0.499	0.000	0.000	1.000
DA	42,695	0.010	0.082	−0.395	0.005	0.916
REM	42,573	−0.076	0.215	−3.475	−0.040	0.516

Note: This table summarizes descriptive statistics for 42,988 analyst–year observations. Tone_P represents positive tone words, and Tone_N represents negative tone words in the annual reports of A-share listed companies in China.

decision-making efficiency. At the same time, the evolution of information technology has transformed the motives and methods of corporate information disclosure, expanding the tools available to external stakeholders such as investors, financial analysts, and media intermediaries. These changes have reshaped how stakeholders acquire, interpret, and engage with market information. Existing literature has primarily explored the impact of non-financial information on capital markets through the perspectives of investors and media intermediaries. Non-financial information can alter investors' perspectives (Hope et al., 2016; Kravet & Muslu, 2013; Chen et al., 2024) and their market comprehension (Davis et al., 2015; Loughran & McDonald, 2011; Yu et al., 2018), which subsequently affects their decision-making and the performance of listed companies. This ultimately impacts capital market stability. Experimental studies, such as Tan et al. (2014), indicate that certain characteristics of non-financial information can produce "reliability" among investors, particularly small- and medium-sized ones. This, in turn, influences their judgments and the subsequent performance of listed companies. Media intermediaries can use easily understandable language to help the market interpret the original information companies release (Stice, 1991) and provide professional industry and trend analysis. This supplementary content can further influence investors' decisions (Blankespoor et al., 2018; Engelberg & Parsons, 2011; Paul & Sharma, 2023; Zhang, Aerts, et al., 2022; Zhang, Shrider, et al., 2022; Zhou et al., 2024), affecting capital market stability (Han et al., 2024; Zhou et al., 2024). Recent research has confirmed that trade volume and stock prices of listed companies are significantly influenced by corporate information disclosures, primarily by financial news releases. However, the role of media as information intermediaries in China's capital markets remains controversial (Ge et al., 2024; Zhang, Li, et al., 2024; Zhang, Peng, et al., 2024).

The role of analysts as intermediaries in capital markets has attracted attention due to their potential to reduce information asymmetry. Analysts can achieve this benefit by identifying and interpreting distorted information, improving market efficiency. However, while some research examines analysts' forecasting behavior, direct evidence of their ability to detect such distortions remains limited. Some studies suggest that analysts are skilled information processors by examining the market's response to analysts' forecasting behavior. Dhaliwal et al. (2012) found that companies that first disclose corporate social responsibility reports and perform well attract greater attention from institutional investors and analysts, improving analysts' forecast accuracy. Merkley (2014) found that non-financial information disclosure leads to more analyst coverage, more accurate earnings forecasts, and less forecast divergence. Through examining conference call transcripts, Allee and Deangelis (2015) discovered that analysts actively participate in these calls while questioning management's statements, enabling faster and more precise predictions. If the positive tone in management reports is highly dispersed, analysts tend to use more positive tone words in the Q&A session, leading to a more positive market response and vice versa (Fu et al., 2021). Furthermore, Boone and White (2015) indicate that a high proportion of institutional ownership can encourage management's information disclosure, increase analyst coverage, and enhance stock liquidity, mitigating information asymmetry.

Despite their superior information analysis and processing capabilities, analysts' behavior is influenced by company disclosures, affecting their attention to a company, forecast accuracy, and degree of opinion divergence (Call et al., 2021). However, factors like conflicts of interest, irrational biases, and other issues can undermine the objectivity and integrity of their assessments. For instance, analysts often display a systematic optimistic bias in their earnings forecasts, frequently issuing positive forecasts and stock ratings while downplaying negative information (Zhang, Aerts, et al., 2022; Zhang, Shrider, et al., 2022). A key factor influencing this bias is the conflict of interest analysts face, especially with companies with higher institutional investor holdings. Thus, analysts are less likely to issue negative ratings publicly (Bouchaud et al., 2019; O'Brien et al., 2005) and are more inclined to make positive earnings revisions (Mola & Guidolin, 2009).

Analysts' earnings forecast revisions are essential for capital markets, providing timely and accurate insights that can significantly affect stock prices, trade activities, and market liquidity (Frankel et al., 2006, 1995). Existing research highlights that a company's unexpected earnings significantly influence analysts' behavior. Theoretically, positive unexpected earnings should lead analysts to revise their forecasts upward, while negative earnings would result in downward revisions. However, when companies disclose information intending to expropriate benefits, it alters the firm's actual performance. This distortion misguides unexpected earnings figures and analysts' forecast behavior. Rational and professional analysts, if able to detect that a company is using overly positive language to conceal expropriation motives, should reduce the magnitude of their forecast revisions accordingly. In contrast, if analysts fail to identify these expropriation-driven disclosures, they may leave their forecasts unchanged or increase their revisions. Based on the above, this study proposes the following hypotheses:

Hypothesis H1a. Their earnings forecast revision magnitude will be negatively correlated with the managerial tone if analysts can detect that a company discloses more positive tone information based on the motivation of benefit expropriation.

Hypothesis H1b. Their earnings forecast revision magnitude will be uncorrelated or positively correlated with the managerial tone if

Table 3
Correlation analysis of key variables.

Variable Name	Tone	Rev	Rev_sign	ROE	LEV	SGR	Size	B/M	INST	Coverage	Age	*BIGR*	DUAL	SOE	DA	REM
Tone	1.00	−0.02*** [0.00]	−0.03*** [0.00]	0.16*** [0.00]	−0.09*** [0.00]	0.14*** [0.00]	−0.06*** [0.00]	−0.09*** [0.00]	−0.01 [0.17]	0.10*** [0.00]	−0.12*** [0.00]	0.01 [0.14]	−0.01*** [0.00]	0.03*** [0.00]	0.05*** [0.00]	−0.07*** [0.00]
Rev	−0.03*** [0.00]	1.00	0.80*** [0.00]	0.20*** [0.00]	−0.05*** [0.00]	0.22*** [0.00]	0.06*** [0.00]	−0.03*** [0.00]	0.05*** [0.00]	0.08*** [0.00]	0.08*** [0.00]	0.00 [0.36]	−0.01* [0.09]	0.03*** [0.00]	−0.01*** [0.00]	−0.06*** [0.00]
Rev_sign	−0.03*** [0.00]	0.49*** [0.00]	1.00	0.26*** [0.00]	−0.06*** [0.00]	0.24*** [0.00]	0.10*** [0.00]	−0.04*** [0.00]	0.07*** [0.00]	0.12*** [0.00]	0.05*** [0.00]	0.03*** [0.00]	−0.01 [0.26]	0.03*** [0.00]	0.00 [0.89]	−0.08*** [0.00]
ROE	0.15*** [0.00]	0.14*** [0.00]	0.25*** [0.00]	1.00	−0.40*** [0.00]	0.34*** [0.00]	0.32*** [0.00]	−0.36*** [0.00]	0.25*** [0.00]	0.43*** [0.00]	0.05*** [0.00]	0.10*** [0.00]	0.02*** [0.00]	−0.04*** [0.00]	0.08*** [0.00]	−0.39*** [0.00]
LEV	−0.08*** [0.00]	−0.05*** [0.00]	−0.07*** [0.00]	−0.32*** [0.00]	1.00	−0.04*** [0.00]	−0.13*** [0.00]	0.44*** [0.00]	−0.10*** [0.00]	−0.24*** [0.00]	0.07*** [0.00]	−0.03*** [0.00]	−0.04*** [0.00]	0.06*** [0.00]	−0.02*** [0.00]	0.31*** [0.00]
SGR	0.10*** [0.00]	0.14*** [0.00]	0.20*** [0.00]	0.29*** [0.00]	−0.07*** [0.00]	1.00	0.06*** [0.00]	−0.17*** [0.00]	−0.02*** [0.00]	0.15*** [0.00]	−0.16*** [0.00]	−0.05*** [0.00]	0.06*** [0.00]	−0.10*** [0.00]	0.04*** [0.00]	−0.13*** [0.00]
Size	−0.07*** [0.00]	0.03*** [0.00]	0.10*** [0.00]	0.32*** [0.00]	−0.10*** [0.00]	0.02*** [0.00]	1.00	−0.15*** [0.00]	0.47*** [0.00]	0.53*** [0.00]	0.23*** [0.00]	0.16*** [0.00]	−0.02*** [0.00]	0.09*** [0.00]	0.03*** [0.00]	−0.11*** [0.00]
B/M	−0.09*** [0.00]	−0.03*** [0.00]	−0.04*** [0.00]	−0.33*** [0.00]	0.26*** [0.00]	−0.10*** [0.00]	−0.14*** [0.00]	1.00	−0.05*** [0.00]	−0.21*** [0.00]	0.23*** [0.00]	0.11*** [0.00]	−0.12*** [0.00]	0.24*** [0.00]	−0.06*** [0.00]	0.33*** [0.00]
INST	−0.02*** [0.00]	0.03*** [0.00]	0.07*** [0.00]	0.23*** [0.00]	−0.05*** [0.00]	−0.03*** [0.00]	0.46*** [0.00]	−0.03*** [0.00]	1.00	0.29*** [0.00]	0.23*** [0.00]	0.45*** [0.00]	−0.16*** [0.00]	0.28*** [0.00]	−0.03*** [0.00]	−0.09*** [0.00]
Coverage	0.11*** [0.00]	0.03*** [0.00]	0.12*** [0.00]	0.40*** [0.00]	−0.17*** [0.00]	0.09*** [0.00]	0.51*** [0.00]	−0.20*** [0.00]	0.28*** [0.00]	1.00	0.05*** [0.00]	0.03*** [0.00]	0.01** [0.02]	0.01*** [0.00]	0.05*** [0.00]	−0.26*** [0.00]
Age	−0.10*** [0.00]	0.05*** [0.00]	0.05*** [0.00]	0.06*** [0.00]	0.05*** [0.00]	−0.12*** [0.00]	0.23*** [0.00]	0.24*** [0.00]	0.24*** [0.00]	0.03*** [0.00]	1.00	0.06*** [0.00]	−0.18*** [0.00]	0.36*** [0.00]	−0.05*** [0.00]	0.11*** [0.00]
BIGR	−0.00 [0.96]	−0.00 [0.39]	0.03*** [0.00]	0.10*** [0.00]	0.00 [0.56]	−0.03*** [0.00]	0.19*** [0.00]	0.13*** [0.00]	0.42*** [0.00]	0.04*** [0.00]	0.05*** [0.00]	1.00	−0.09*** [0.00]	0.32*** [0.00]	−0.02*** [0.00]	0.02*** [0.00]
DUAL	−0.02*** [0.00]	0.01 [0.23]	−0.01 [0.26]	0.02*** [0.00]	−0.04*** [0.00]	0.06*** [0.00]	−0.02*** [0.00]	−0.12*** [0.00]	−0.16*** [0.00]	0.01 [0.15]	−0.18*** [0.00]	−0.09*** [0.00]	1.00	−0.30*** [0.00]	0.03*** [0.00]	−0.07*** [0.00]
SOE	0.03*** [0.00]	0.01*** [0.00]	0.03*** [0.00]	−0.02*** [0.00]	0.08*** [0.00]	−0.09*** [0.00]	0.10*** [0.00]	0.25*** [0.00]	0.29*** [0.00]	0.02*** [0.00]	0.36*** [0.00]	0.32*** [0.00]	−0.30*** [0.00]	1.00	−0.03*** [0.00]	0.11*** [0.00]
DA	0.06*** [0.00]	−0.01*** [0.00]	0.01 [0.30]	0.11*** [0.00]	−0.03*** [0.00]	0.04*** [0.00]	0.02*** [0.00]	−0.04*** [0.00]	−0.02*** [0.00]	0.04*** [0.00]	−0.05*** [0.00]	−0.01*** [0.00]	0.02*** [0.00]	−0.02*** [0.00]	1.00	0.20*** [0.00]
REM	−0.08*** [0.00]	−0.04*** [0.00]	−0.07*** [0.00]	−0.35*** [0.00]	0.16*** [0.00]	−0.12*** [0.00]	−0.11*** [0.00]	0.32*** [0.00]	−0.08*** [0.00]	−0.22*** [0.00]	0.11*** [0.00]	0.01** [0.04]	−0.07*** [0.00]	0.12*** [0.00]	0.06*** [0.00]	1.00

[1]Note: This table presents the results of the correlation analysis for the main regression variables used in this study. REV represents the changes in analysts' earnings forecasts; REV_sign indicates whether the revision is positive or negative. The values in square brackets represent *p*-values. ***, **, and * indicate significance at 1 %, 5 %, and 10 %, respectively. The lower triangle of the table displays Pearson's correlation coefficients, while the upper triangle shows Spearman's correlation coefficients.

Table 4
Main regression analysis results.

Variable Name	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*
	(1)	(2)	(3)	(4)	(5)	(6)
Tone	−0.0677**	−0.0740**	−0.1111***	−0.0662**	−0.1109***	−0.0739**
	(−2.25)	(−2.45)	(−4.23)	(−2.24)	(−3.96)	(−2.49)
ROE		0.7915***	0.8009***	0.8263***	0.7848***	0.8401***
		(13.90)	(14.34)	(14.76)	(13.83)	(15.06)
LEV		−0.0077	−0.0220***	−0.0100	−0.0175***	−0.0099
		(−1.28)	(−3.67)	(−1.64)	(−2.99)	(−1.64)
SGR		0.1857***	0.2183***	0.1807***	0.2173***	0.1802***
		(14.62)	(17.10)	(14.05)	(17.15)	(13.96)
Size		−0.0313***	−0.0139***	−0.0295***	−0.0183***	−0.0282***
		(−6.26)	(−2.89)	(−5.83)	(−3.89)	(−5.62)
B/M		0.0239	0.0574***	0.0264	0.0402***	0.0294*
		(1.57)	(3.52)	(1.47)	(2.91)	(1.65)
INST		0.0443***	0.0325**	0.0390**	0.0285*	0.0334**
		(2.70)	(2.02)	(2.37)	(1.76)	(2.03)
Coverage		−0.0036	−0.0160***	−0.0035	−0.0097**	−0.0024
		(−0.68)	(−3.29)	(−0.69)	(−2.00)	(−0.48)
Age		0.0527***	0.0700***	0.0513***	0.0681***	0.0516***
		(6.79)	(8.84)	(6.41)	(8.71)	(6.39)
BIGR		−0.0008***	−0.0012***	−0.0010***	−0.0009***	−0.0010***
		(−3.53)	(−4.92)	(−4.29)	(−3.96)	(−4.16)
DUAL		0.0004	0.0103	0.0032	0.0055	0.0028
		(0.05)	(1.43)	(0.44)	(0.76)	(0.39)
SOE		0.0430***	0.0146*	0.0362***	0.0274***	0.0370***
		(5.32)	(1.85)	(4.42)	(3.50)	(4.51)
DA		−0.2163***	−0.1813***	−0.2185***	−0.1906***	−0.2142***
		(−4.09)	(−3.39)	(−4.09)	(−3.60)	(−4.02)
REM		0.0282	0.0317	0.0280	0.0325	0.0262
		(1.30)	(1.41)	(1.25)	(1.49)	(1.18)
Constant	−0.0073	0.3120***	0.1463	0.4974***	−0.0165	0.4188***
	(−0.11)	(2.79)	(1.32)	(4.15)	(−0.14)	(3.08)
Industry FE	controlled	controlled	uncontrolled	uncontrolled	controlled	controlled
Year FE	controlled	controlled	controlled	uncontrolled	controlled	controlled
Observations	controlled	uncontrolled	uncontrolled	controlled	uncontrolled	controlled
R-squared	42,985	35,777	35,777	35,777	35,771	35,771
Constant	0.060	0.151	0.139	0.154	0.147	0.164

[1]Note: This table presents the results of the analysts' earnings forecast revisions in response to the tone of the annual report's management discussion and analysis. The values in parentheses indicate *t*-test values; ***,**, and* indicate significance at 1 %, 5 %, and 10 %, respectively.

analysts cannot detect the tone information disclosed by the listed company based on the motivation of benefit expropriation.

3. Empirical design

3.1. Data sources and description

This study selected A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2007 to 2022 as the research sample. Financial and real estate industry companies were first excluded from examining the impact of the management tone in annual reports on analysts' earnings forecast revisions (readability analysis is provided in the Appendix). Standard procedures were applied to the remaining sample companies, removing ST and PT companies and companies with missing data. This resulted in a final sample of 2080 companies, corresponding to 42,988 analyst–year observations. In the empirical analysis, we controlled for fixed effects of year, industry, and brokerage firm to account for the impact of individual brokerage characteristics and industry differences on analysts' earnings forecast revisions. To reduce the influence of extreme observations on the regression results, all continuous variables were winsorized at 1 % and 99 %.

The primary data for this study were obtained from the annual reports available on the Shanghai Stock Exchange and Shenzhen Stock Exchange websites. Python web scraping was used to download the annual reports of all A-share listed companies from the Giant Tide Information Network (Cninfo) for the sample period. The process for handling the annual report text data involved the following steps. First, Python was used to batch-convert PDF annual reports into Word documents. Then, Word documents were converted into TXT files for further text processing. Python's Jieba library was employed for word segmentation and frequency calculation. Financial data, analysts' earnings forecast data, and the "New Fortune" Best Analysts list were sourced from the China Stock Market & Accounting Research database; institutional ownership data came from the Choice database.

3.2. Model specification and variable definition

3.2.1. Model

This study investigates whether analysts can detect non-financial information disclosures driven by managerial self-interest through their earnings forecast revisions. If analysts identify a positively biased tone in the information disclosed due to self-interested behavior by the company, they will reduce the magnitude of their positive earnings forecast revisions. The baseline model is specified as follows (Eq. 4.1):

$$REV_{i,j,n} = \alpha + \beta\, Tone_{i,n-1} + \gamma X_{i,j,n} + Year + Industry + Borker + \varepsilon_{i,j,n}, \tag{4.1}$$

where $REV_{i,j,n}$ indicates the earnings forecast revision made by analyst *j* for company *i* in year *n*. $Tone_{i,n-1}$ indicates the tone of the management's language in the annual report of company *i* for year $n-1$. If analysts can identify a more positive tone in the management's disclosures, the coefficient β should be negative. $X_{i,j,n}$ represents the control variables. *Year* refers to the year fixed effects, controlling for time-specific characteristics of a company. *Industry* refers to industry fixed effects, controlling for the impact of the industry in which a company operates on the analysts' earnings forecast revisions. *Broker* depicts broker fixed effects, controlling for the influence of the relationship between the broker and

Table 5
Results of replacing the dependent variable.

Variable Name	*Rev_sign*	*Rev_sign*	*Rev_sign*	*Rev_sign*	*Rev_sign*	*Rev_sign*
	(1)	(2)	(3)	(4)	(5)	(6)
Tone	−0.1473***	−0.1488***	−0.1300***	−0.1361***	−0.1256***	−0.1261***
	(−4.10)	(−3.84)	(−3.51)	(−3.75)	(−3.14)	(−3.16)
ROE	2.3617***	2.3840***	2.3818***	2.3745***	2.4094***	2.4026***
	(34.75)	(34.16)	(34.38)	(34.73)	(33.96)	(33.79)
LEV	−0.0022	0.0143**	−0.0062	−0.0013	0.0110	0.0100
	(−0.32)	(2.10)	(−0.89)	(−0.19)	(1.59)	(1.43)
SGR	0.3994***	0.3173***	0.3986***	0.3900***	0.3150***	0.3103***
	(22.61)	(17.61)	(22.35)	(22.06)	(17.33)	(17.08)
Size	0.0168***	−0.0003	0.0193***	0.0181***	−0.0015	0.0021
	(3.03)	(−0.06)	(3.35)	(3.21)	(−0.23)	(0.32)
B/M	0.1327***	0.1419***	0.1516***	0.1333***	0.1479***	0.1482***
	(6.24)	(6.31)	(6.66)	(6.21)	(6.10)	(6.08)
INST	−0.0048	0.0357	−0.0013	−0.0106	0.0355	0.0292
	(−0.19)	(1.37)	(−0.05)	(−0.41)	(1.35)	(1.11)
Coverage	0.0241***	0.0505***	0.0214**	0.0259***	0.0530***	0.0535***
	(2.86)	(5.72)	(2.48)	(3.03)	(5.84)	(5.87)
Age	0.0743***	0.0622***	0.0726***	0.0713***	0.0579***	0.0567***
	(6.72)	(5.56)	(6.45)	(6.43)	(5.08)	(4.97)
BIGR	−0.0009***	−0.0009**	−0.0013***	−0.0009**	−0.0013***	−0.0013***
	(−2.63)	(−2.52)	(−3.70)	(−2.40)	(−3.66)	(−3.63)
DUAL	0.0065	0.0066	0.0061	0.0046	0.0056	0.0051
	(0.54)	(0.55)	(0.50)	(0.38)	(0.46)	(0.42)
SOE	0.0711***	0.0830***	0.0613***	0.0735***	0.0767***	0.0756***
	(6.36)	(7.17)	(5.32)	(6.52)	(6.45)	(6.34)
DA	−0.2929***	−0.3002***	−0.2848***	−0.2933***	−0.2996***	−0.2933***
	(−5.02)	(−5.17)	(−4.85)	(−5.00)	(−5.13)	(−5.01)
REM	0.1105***	0.1030***	0.1018***	0.1052***	0.0973***	0.0919***
	(4.56)	(4.28)	(4.16)	(4.33)	(4.00)	(3.77)
Constant	−1.4407***	−1.2504***	−1.3777***	−1.8780***	−1.0991***	−1.4986***
	(−12.18)	(−8.25)	(−10.60)	(−10.58)	(−6.77)	(−6.89)
Industry FE	uncontrolled	controlled	uncontrolled	uncontrolled	controlled	controlled
Year FE	uncontrolled	uncontrolled	controlled	uncontrolled	controlled	controlled
Brokerage FE	uncontrolled	uncontrolled	uncontrolled	controlled	uncontrolled	controlled
Observations	35,777	35,777	35,777	35,771	35,777	35,771
R-squared	0.090	0.114	0.093	0.097	0.116	0.122

[1]Note: This table presents the robustness checks by changing the dependent variable from the analysts' earnings forecast revision magnitude (REV) to the direction of the analysts' earnings forecast revision (Rev_sign). The values in parentheses indicate *t*-test values; ***, **, and * indicate significance at 1 %, 5 %, and 10 %, respectively.

company on the analysts' earnings forecast revisions. $\varepsilon_{i,j,n}$ represents the regression residuals.

3.2.2. Variable definitions

(1) Earnings Forecast Revision Magnitude

This study measured the magnitude of analysts' earnings forecast revisions by examining the changes in their forecasts. The initial magnitude of an analyst's earnings forecast revision was calculated as the difference between analyst *j*'s forecast for company *i* for the same fiscal year in quarter $Q(FEPS_{i,j,Q})$ and the forecast for the same fiscal year made in the previous quarter $Q-1(FEPS_{i,j,Q-1})$. This study adjusted the analysts' forecast data to account for potential changes in the share capital of the forecasted companies (stock dividends, additional share issuance, etc.) between the two quarters when the analysts' reports were released. A share capital adjustment factor $\lambda_{i,Q}$ was constructed using the share capital in the first quarter of the sample period as the benchmark.

$$\lambda_{i,Q} = \frac{N_{i,Q}}{N_{i,1}}, \tag{4.2}$$

where $N_{i,1}$ indicates the number of shares of stock *i* at the end of the first quarter of the sample period. $N_{i,Q}$ indicates the number of shares of stock *i* at the beginning of quarter *Q*. The adjusted earnings per share forecast by the analyst is given as follows:

$$FEPS^{*}_{i,j,Q} = \lambda_{i,Q} * FEPS_{i,j,Q}. \tag{4.3}$$

Next, we calculated the magnitude of the analyst's forecast revision. Here, the revision magnitude was calculated as the difference between analyst *j*'s adjusted earnings forecast for company *i* in quarter *Q* $(FEPS^{*}_{i,j,Q})$ and the adjusted earnings forecast for the same fiscal year made in the previous quarter $Q-1\left(FEPS^{*}_{i,j,Q-1}\right)$.

$$REV'_{i,j,Q} = FEPS^{*}_{i,j,Q} - FEPS^{*}_{i,j,Q-1}. \tag{4.4}$$

Second, this study standardized the revisions using the book value per share (Bps) to make the magnitude of analysts' earnings forecast revisions more comparable across different stocks. The earnings forecast revision magnitude was divided by the book value per share of company *j* at the end of quarter *Q* $(Bps_{i,jQ})$, resulting in the adjusted analyst earnings forecast revision magnitude as follows:

$$REV_{i,j,Q} = \frac{FEPS^{*}_{i,j,Q} - FEPS^{*}_{i,j,Q-1}}{Bps_{i,j,Q}}. \tag{4.5}$$

(2) Management tone

Drawing on Brockman et al. (2017), we constructed a measure of management tone (TONE) for earnings presentations of listed companies as follows. We obtained the number of positive and negative tone words from the annual report text of each listed company using the Python Jieba segmentation method. Management tone was calculated based on the following formula:

Table 6
Instrumental variable analysis regression results (industry mean).

Variable Name	*Tone*	*Tone*	*Rev*	*Rev*
	(1)	(2)	(3)	(4)
Tone_hy	0.9470***	0.9359***		
	(42.649)	(42.033)		
Tone			−0.3959***	−0.3687***
			(−3.499)	(−3.222)
ROE	−0.0216**	−0.0211**	0.8202***	0.8348***
	(−2.447)	(−2.394)	(18.068)	(18.432)
LEV	−0.0122***	−0.0121***	−0.0144***	−0.0137**
	(−11.931)	(−11.731)	(−2.634)	(−2.525)
SGR	0.0047**	0.0048**	0.1828***	0.1821***
	(2.186)	(2.238)	(17.032)	(16.999)
Size	0.0072***	0.0072***	−0.0273***	−0.0262***
	(8.742)	(8.789)	(−6.439)	(−6.167)
B/M	−0.0383***	−0.0384***	0.0112	0.0158
	(−12.260)	(−12.242)	(0.666)	(0.935)
INST	−0.0309***	−0.0311***	0.0299*	0.0252
	(−9.154)	(−9.200)	(1.694)	(1.430)
Coverage	0.0159***	0.0163***	0.0019	0.0025
	(13.548)	(13.787)	(0.296)	(0.392)
Age	−0.0026*	−0.0021	0.0497***	0.0503***
	(−1.791)	(−1.485)	(6.512)	(6.610)
BIGR	0.0001***	0.0001***	−0.0010***	−0.0009***
	(2.773)	(2.608)	(−4.095)	(−3.979)
DUAL	0.0003	−0.0002	0.0029	0.0024
	(0.216)	(−0.128)	(0.359)	(0.295)
SOE	−0.0008	−0.0006	0.0362***	0.0371***
	(−0.513)	(−0.392)	(4.581)	(4.702)
DA	0.0430***	0.0440***	−0.2037***	−0.2007***
	(5.876)	(5.973)	(−5.387)	(−5.319)
REM	0.0012	0.0013	0.0292*	0.0273*
	(0.440)	(0.452)	(1.835)	(1.719)
Constant	−0.1081***	−0.1053***	0.6265***	0.6048***
	(−3.970)	(−3.139)	(5.209)	(3.931)
Industry FE	controlled	controlled	controlled	controlled
Year FE	controlled	controlled	controlled	controlled
Brokerage FE	uncontrolled	controlled	uncontrolled	controlled
Observations	35,777	35,771	35,777	35,771
R-squared	0.3068	0.3095	0.0490	0.0575
Anderson-canon statistic	–	–	1990.928***	1940.001***
Cragg–Donald statistic	–	–	2105.597***	2043.220***

[1]Note: This table presents the results of the instrumental variable regression, which employs the average management tone of other listed companies in the same industry (Tone_hy) as an instrumental variable. The values in parentheses are *t*-test values; ***, **, and* indicate significance at 1 %, 5 %, and 10 %, respectively.

Table 7
Instrumental variable analysis regression results (endogenous variable lag term).

Variable Name	*Tone*	*Tone*	*Rev*	*Rev*
	(1)	(2)	(3)	(4)
LTone	0.4184***	0.4174***		
	(63.877)	(63.658)		
Tone			−0.1649**	−0.1747**
			(−2.388)	(−2.532)
ROE	−0.0098	−0.0106	0.7788***	0.7914***
	(−1.102)	(−1.191)	(15.688)	(15.981)
LEV	−0.0114***	−0.0113***	−0.0149**	−0.0150**
	(−9.708)	(−9.626)	(−2.451)	(−2.474)
SGR	0.0107***	0.0107***	0.1938***	0.1936***
	(4.797)	(4.826)	(16.305)	(16.335)
Size	0.0026***	0.0026***	−0.0295***	−0.0281***
	(3.158)	(3.135)	(−6.487)	(−6.184)
B/M	−0.0300***	−0.0304***	0.0266	0.0294*
	(−9.674)	(−9.756)	(1.503)	(1.660)
INST	−0.0218***	−0.0220***	0.0398**	0.0330*
	(−6.399)	(−6.465)	(2.107)	(1.752)
Coverage	0.0126***	0.0129***	0.0089	0.0104
	(10.494)	(10.662)	(1.247)	(1.458)
Age	0.0014	0.0018	0.0489***	0.0493***
	(0.941)	(1.181)	(5.927)	(5.985)
BIGR	0.0001	0.0001	−0.0009***	−0.0009***
	(1.295)	(1.138)	(−3.656)	(−3.578)
DUAL	−0.0024	−0.0029*	0.0120	0.0110
	(−1.639)	(−1.954)	(1.370)	(1.263)
SOE	0.0017	0.0017	0.0328***	0.0339***
	(1.150)	(1.112)	(3.821)	(3.949)
DA	0.0069	0.0071	−0.2711***	−0.2677***
	(0.905)	(0.923)	(−6.634)	(−6.573)
REM	−0.0052*	−0.0054**	0.0213	0.0195
	(−1.879)	(−1.967)	(1.255)	(1.151)
Constant	0.2988***	0.3044***	0.5546***	0.5659***
	(13.781)	(11.763)	(5.418)	(4.038)
Industry FE	controlled	controlled	controlled	controlled
Year FE	controlled	controlled	controlled	controlled
Brokerage FE	uncontrolled	controlled	uncontrolled	controlled
Observations	32,171	32,165	32,171	32,165
R-squared	0.3969	0.3996	0.0506	0.0596
Anderson-canon statistic	–	–	5602.453***	5582.845***
Cragg–Donald statistic	–	–	6774.552***	6726.593***

[1]Note: This table presents the robustness check by using lagged values of the explanatory variable as instrumental variables. The values in parentheses indicate *t*-test values; ***, **, and * indicate significance at 1 %, 5 %, and 10 %, respectively.

$$Tone = \frac{(Tone_P - Tone_N)}{(Tone_P + Tone_N)} \tag{4.6}$$

where *Tone_P* indicates the proportion of positive tone words in the MD&A section of a listed company's annual report. This was calculated as the number of positive words divided by the total number of positive and negative words. *Tone_N* indicates the proportion of negative tone words in the MD&A section, calculated as the number of negative words divided by the total number of positive and negative words.

Tone analysis used in this study offers several advantages over alternative textual metrics such as readability or sentiment analysis. Tone analysis is effective in identifying expropriation motives in non-financial disclosures within the context of Chinese A-share listed companies, given the cultural and regulatory factors at play. Unlike readability or sentiment analysis, tone analysis directly captures management's strategic use of language to emphasize or obscure certain information. Managers often rely on subtle linguistic cues to convey non-financial risks or promote a positive outlook in China's regulatory environment, where strict financial reporting standards are enforced. This makes tone analysis an effective tool for detecting opportunistic motives. Moreover, the tendency of Chinese managers to use positive language to boost investor confidence underscores the value of tone analysis in revealing managerial intent. By quantifying the level of optimism or pessimism in corporate disclosures, tone analysis offers a more precise and contextually relevant method for assessing managerial behavior.

(3) Selection of Control Variables

Based on the model specifications, this section summarizes the main explanatory variables, dependent variables, and moderating variables. Referring to past studies, additional control variables include stock size (Size), analyst coverage (Coverage), book-to-market ratio (B/M), return on equity (ROE), year dummy variables (Year), industry dummy variables (Industry), and brokerage dummy variables (Table 1).

4. Empirical results and analysis

4.1. Descriptive statistics

Table 2 presents the descriptive statistics for the main variables. The study sample comprises 42,988 analyst–year observations. Table 2 shows that the mean (median) management tone in annual reports was

Table 8
Analysis results based on intonation properties.

Variable Name	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*
	(1)	(2)	(3)	(4)	(5)	(6)
Tone_N	−0.1618**	−0.1899***	−0.1811***			
	(−2.46)	(−2.95)	(−2.80)			
Tone_P				0.1618**	0.1899***	0.1811***
				(2.46)	(2.95)	(2.80)
ROE	0.7967***	0.8307***	0.8446***	0.7967***	0.8307***	0.8446***
	(13.98)	(14.83)	(15.13)	(13.98)	(14.83)	(15.13)
LEV	−0.0048	−0.0075	−0.0074	−0.0048	−0.0075	−0.0074
	(−0.79)	(−1.21)	(−1.21)	(−0.79)	(−1.21)	(−1.21)
SGR	0.1816***	0.1764***	0.1760***	0.1816***	0.1764***	0.1760***
	(14.26)	(13.66)	(13.57)	(14.26)	(13.66)	(13.57)
Size	−0.0327***	−0.0309***	−0.0296***	−0.0327***	−0.0309***	−0.0296***
	(−6.58)	(−6.12)	(−5.91)	(−6.58)	(−6.12)	(−5.91)
B/M	0.0318**	0.0347*	0.0377**	0.0318**	0.0347*	0.0377**
	(2.07)	(1.92)	(2.11)	(2.07)	(1.92)	(2.11)
INST	0.0471***	0.0425***	0.0370**	0.0471***	0.0425***	0.0370**
	(2.88)	(2.58)	(2.25)	(2.88)	(2.58)	(2.25)
Coverage	−0.0054	−0.0056	−0.0046	−0.0054	−0.0056	−0.0046
	(−1.02)	(−1.10)	(−0.92)	(−1.02)	(−1.10)	(−0.92)
Age	0.0531***	0.0519***	0.0522***	0.0531***	0.0519***	0.0522***
	(6.85)	(6.49)	(6.46)	(6.85)	(6.49)	(6.46)
BIGR	−0.0008***	−0.0010***	−0.0010***	−0.0008***	−0.0010***	−0.0010***
	(−3.35)	(−4.32)	(−4.19)	(−3.35)	(−4.32)	(−4.19)
DUAL	0.0000	0.0033	0.0031	0.0000	0.0033	0.0031
	(0.00)	(0.46)	(0.42)	(0.00)	(0.46)	(0.42)
SOE	0.0442***	0.0362***	0.0370***	0.0442***	0.0362***	0.0370***
	(5.47)	(4.43)	(4.51)	(5.47)	(4.43)	(4.51)
DA	−0.2206***	−0.2222***	−0.2184***	−0.2206***	−0.2222***	−0.2184***
	(−4.17)	(−4.15)	(−4.09)	(−4.17)	(−4.15)	(−4.09)
REM	0.0306	0.0297	0.0278	0.0306	0.0297	0.0278
	(1.41)	(1.33)	(1.26)	(1.41)	(1.33)	(1.26)
Constant	0.3319***	0.5284***	0.4463***	0.1701	0.3385***	0.2652*
	(3.11)	(4.49)	(3.32)	(1.34)	(2.59)	(1.82)
Industry FE	uncontrolled	controlled	controlled	uncontrolled	controlled	controlled
Year FE	controlled	controlled	controlled	controlled	controlled	controlled
Brokerage FE	uncontrolled	uncontrolled	controlled	uncontrolled	uncontrolled	controlled
Observations	35,777	35,777	35,771	35,777	35,777	35,771
R-squared	0.151	0.154	0.164	0.151	0.154	0.164

[1]Note: This table presents the regression results of separating the management tone into positive tone (Tone_P) and negative tone (Tone_N). The values in parentheses are t-test values; ***, **, and *indicate significance at 1 %, 5 %, and 10 %, respectively.

0.456 (0.459), with a minimum value of −0.052 and a maximum value of 0.895. The number of positive tone words in the annual reports of A-share listed companies in China was significantly higher than that of negative tone words, indicating a net positive tone. The mean and median of earnings forecast revisions (REV) were − 0.168 and − 0.100, respectively. This finding suggests that most analysts tend to make negative earnings forecast revisions, with a relatively high degree of negative revisions. The direction of earnings forecast revisions (Rev_Sign) indicates that over 50 % of analysts make downward adjustments to their earnings forecasts. The average institutional holding as a percentage of total shares was 52.3 %. Additional sample results related to company characteristics are presented in Table 2.

4.2. Analysis of variable correlations

Table 3 presents correlation analysis results for the main regression variables. Tone in annual reports of A-share listed companies had a significant negative correlation with analyst earnings forecast revisions (REV) and their direction (Rev_Sign). Pearson's correlation coefficients between Tone and REV and Rev_Sign were − 0.03 and − 0.03, respectively; Spearman's correlation coefficients were − 0.02 and − 0.03, significant at 1 %. This indicates that analysts can identify when companies disclose more positive tone information due to opportunistic motives. This leads to a negative correlation between the extent of earnings forecast revisions and management tone. These findings offer preliminary support for H1a. However, confirming whether management tone influences analysts' earnings forecast revisions requires further validation through rigorous multivariate regression analyses. Table 4.3 indicates that other control variables used in the study significantly impact the dependent variable, analyst earnings forecast revisions. Notably, the Pearson and Spearman correlation coefficients for these variables are consistent in sign, magnitude, and significance, indicating the stability of the relationships. For example, the Pearson and Spearman correlation coefficients between discretionary accruals (DA) and analyst earnings forecast revisions were 0.05 and 0.06, respectively, both significant at 1 %. Pearson's and Spearman's correlation coefficients between ROE and analyst earnings forecast revisions were 0.15 and 0.16, respectively, significant at 1 %. Pearson's and Spearman's coefficients between leverage (Lev) and management tone were − 0.09 and − 0.08, respectively, significant at 1 %.

4.3. Main empirical results and analysis

Securities analysts act as information intermediaries in the market. A core aspect of this study is determining whether they can identify the tone of information in the management's disclosures driven by expropriation motives. Table 4 presents the results of the analysts' earnings forecast revisions in response to the tone of the annual report's MD&A section. Columns (1) to (6) present different control variables. Column (6) of Table 4 shows that the coefficient for the primary explanatory variable, management tone (Tone), was approximately −0.07, significant at 1 %. The economic implication is that the more positive the tone in an annual report's MD&A section, the more analysts reduce their earnings forecast revisions. Specifically, analysts decrease their per-

Table 9
Heterogeneity analysis results (based on whether the analyst is a star analyst).

Variable Name	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*
	Star = 0			*Star = 1*		
	(1)	(2)	(3)	(4)	(5)	(6)
Tone	−0.0211	−0.0433	−0.0307	−0.1256**	−0.1562***	−0.1222**
	(−0.62)	(−1.30)	(−0.90)	(−2.44)	(−3.25)	(−2.36)
ROE	0.9020***	0.9092***	0.9147***	1.0068***	1.0177***	1.0026***
	(13.01)	(13.04)	(13.27)	(10.14)	(10.11)	(10.01)
LEV	−0.0012	−0.0017*	−0.0013	0.0012*	0.0006	0.0012**
	(−1.33)	(−1.83)	(−1.42)	(1.89)	(1.21)	(2.13)
SGR	0.0276***	0.0350***	0.0279***	0.0082**	0.0095**	0.0082**
	(2.96)	(3.22)	(2.95)	(2.07)	(2.04)	(2.06)
Size	−0.0344***	−0.0248***	−0.0329***	−0.0133*	−0.0003	−0.0125*
	(−5.43)	(−4.24)	(−5.18)	(−1.78)	(−0.04)	(−1.68)
B/M	0.0281	0.0367**	0.0340	0.0270	0.0347	0.0216
	(1.18)	(2.06)	(1.44)	(1.03)	(1.59)	(0.81)
INST	0.0163	−0.0044	0.0106	−0.0394	−0.0385	−0.0390
	(0.84)	(−0.23)	(0.56)	(−1.42)	(−1.37)	(−1.38)
Coverage	−0.0062	−0.0113*	−0.0052	0.0173*	0.0063	0.0179*
	(−1.03)	(−1.90)	(−0.89)	(1.83)	(0.69)	(1.86)
Age	0.0365***	0.0516***	0.0374***	0.0556***	0.0733***	0.0531***
	(3.73)	(5.37)	(3.76)	(4.67)	(6.41)	(4.48)
BIGR	0.0266	0.0374	0.0298	0.0413	0.0608**	0.0442
	(1.23)	(1.60)	(1.35)	(1.52)	(2.17)	(1.62)
DUAL	0.0107	0.0125	0.0105	−0.0137	−0.0043	−0.0119
	(1.25)	(1.45)	(1.23)	(−1.08)	(−0.33)	(−0.93)
SOE	0.0342***	0.0295***	0.0350***	0.0331**	0.0149	0.0334**
	(3.15)	(2.91)	(3.21)	(2.56)	(1.12)	(2.57)
DA	−0.1423**	−0.1161**	−0.1321**	−0.2693***	−0.2747***	−0.2671***
	(−2.56)	(−2.11)	(−2.39)	(−3.48)	(−3.48)	(−3.40)
REM	−0.0186	−0.0170	−0.0197	0.0643*	0.0819**	0.0638*
	(−0.60)	(−0.57)	(−0.64)	(1.88)	(2.49)	(1.85)
Constant	0.5899***	0.1363	0.5051***	−0.0360	−0.4818***	0.0107
	(4.11)	(0.98)	(3.18)	(−0.16)	(−3.65)	(0.04)
Industry FE	uncontrolled	controlled	controlled	uncontrolled	controlled	controlled
Year FE	uncontrolled	controlled	controlled	uncontrolled	controlled	controlled
Brokerage FE	controlled	uncontrolled	controlled	controlled	uncontrolled	controlled
Observations	25,647	25,641	25,641	10,130	10,130	10,130
R-squared	0.147	0.139	0.160	0.159	0.141	0.165

[1]Note: This table compares the regression results between star and non-star analysts. The values in parentheses are t-test values; ***, **, and * indicate significance at 1 %, 5 %, and 10 %, respectively.

share earnings forecast revision by about 0.07 for each unit increase in management tone.

This result sheds light on analysts' critical role in filtering information in financial markets. A more optimistic tone in management disclosures may not always signal favorable future firm performance, mainly when expropriation motives are present. This result provides valuable insights for stakeholders in financial markets, such as investors and corporate decision-makers. With the increasing complexity of financial reports, developing tone analysis tools can assist analysts by providing additional insight, helping them more rapidly and accurately discover discrepancies between the optimistic tone of management disclosures and underlying financial realities. It implies that analysts tend to adopt a more cautious stance in their earnings forecasts rather than being swayed by overly positive tones in management disclosures. This illustrates that analysts contribute to market efficiency by identifying and interpreting subtle cues in management disclosures that may suggest future risks, thereby helping investors make more informed decisions. Furthermore, with the increasing complexity of financial reports, developing tone analysis tools can assist analysts by providing additional insight, helping them more rapidly and accurately perceive discrepancies between the optimistic tone of management disclosures and fundamental financial realities.

Regarding other control variables, the company leverage (LEV) coefficient was negative, suggesting that higher leverage levels lead to lower positive earnings forecast revisions by analysts. In contrast, the ROE coefficient is positive, showing that higher ROE leads to higher positive earnings forecast revisions. The negative coefficient for company size (Size) suggests that larger companies result in lower positive earnings forecast revisions. The sales growth rate (SGR) coefficient was significantly positive at the 1 % confidence level, indicating that analysts make higher positive earnings forecast revisions when companies are in a high-growth phase. The positive coefficient for state ownership (SOE) implies that analysts make higher positive earnings forecast revisions for state-owned enterprises than non-state-owned companies. The significantly negative coefficient for DA at the 1 % confidence level indicates that higher discretionary accruals in earnings information lead analysts to reduce their earnings forecast revisions. This suggests that analysts can discern DA when revising their forecasts. Additionally, the higher the institutional ownership, the more positive the earnings forecast revisions by analysts, implying that conflicts of interest arising from institutional ownership influence analysts' forecasting behavior.

4.4. Robustness checks

4.4.1. Replacing the dependent variable

We conducted robustness checks by changing the dependent variable from the analysts' earnings forecast revision magnitude (*REV*) to the direction of the analysts' earnings forecast revision (*Rev_sign*). *Rev_sign* takes the value of +1 for upward revisions and − 1 for downward revisions. We employed linear regression for *Rev_sign* to enable us to capture the directional impact while exploring linear relationships between the predictors and the revision direction. The direction of the revision provides unique insight into the analysts' expectations of firm

Table 10
Heterogeneity analysis results (based on whether it is a margin trading target).

Variable Name	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*
	List = 0			*List = 1*		
	(1)	(2)	(3)	(4)	(5)	(6)
Tone	−0.0837**	−0.0733**	−0.0915***	−0.0023	−0.0623	−0.0133
	(−2.53)	(−2.28)	(−2.77)	(−0.04)	(−1.10)	(−0.23)
ROE	0.5931***	0.5487***	0.6105***	1.2080***	1.2052***	1.2069***
	(8.04)	(7.78)	(8.32)	(14.52)	(13.58)	(14.41)
LEV	−0.0045	−0.0077	−0.0048	−0.0501**	−0.0484***	−0.0555***
	(−0.79)	(−1.36)	(−0.85)	(−2.32)	(−2.58)	(−2.82)
SGR	0.1627***	0.2232***	0.1637***	0.2241***	0.2254***	0.2112***
	(10.13)	(14.15)	(10.10)	(10.83)	(11.59)	(11.07)
Size	−0.0476***	−0.0479***	−0.0457***	−0.0071	−0.0095	−0.0051
	(−7.07)	(−7.68)	(−6.78)	(−0.88)	(−1.19)	(−0.66)
B/M	−0.0333	−0.0744***	−0.0331	0.0774***	0.1741***	0.0854***
	(−1.53)	(−4.05)	(−1.51)	(2.66)	(8.67)	(3.03)
INST	0.0911***	0.0576***	0.0854***	−0.0974***	−0.0577*	−0.1045***
	(4.67)	(3.11)	(4.34)	(−3.06)	(−1.82)	(−3.32)
Coverage	0.0077	−0.0129**	0.0079	−0.0195**	0.0104	−0.0161**
	(1.12)	(−1.98)	(1.17)	(−2.53)	(1.39)	(−2.07)
Age	0.0728***	0.0738***	0.0720***	0.0336***	0.0436***	0.0373***
	(6.48)	(6.59)	(6.45)	(2.96)	(4.14)	(3.25)
BIGR	−0.0008***	−0.0005*	−0.0008***	−0.0009**	−0.0007*	−0.0009**
	(−2.79)	(−1.82)	(−2.60)	(−2.22)	(−1.79)	(−2.25)
DUAL	−0.0017	−0.0022	−0.0038	0.0098	0.0048	0.0102
	(−0.18)	(−0.24)	(−0.42)	(0.84)	(0.42)	(0.89)
SOE	0.0336***	0.0327***	0.0349***	0.0423***	0.0476***	0.0414***
	(3.20)	(3.38)	(3.33)	(3.25)	(3.83)	(3.13)
DA	−0.2024***	−0.1772***	−0.1893***	−0.2820***	−0.1434**	−0.2813***
	(−3.05)	(−2.72)	(−2.87)	(−3.94)	(−1.98)	(−3.78)
REM	−0.0062	0.0129	−0.0037	0.1008***	0.0628***	0.0893***
	(−0.21)	(0.43)	(−0.12)	(4.13)	(2.71)	(3.77)
Constant	0.7647***	0.6819***	0.7284***	0.1339	−0.3181	0.0274
	(5.53)	(5.27)	(5.07)	(0.60)	(−1.50)	(0.12)
Industry FE	uncontrolled	controlled	controlled	uncontrolled	controlled	controlled
Year FE	uncontrolled	controlled	controlled	uncontrolled	controlled	controlled
Brokerage FE	controlled	uncontrolled	controlled	controlled	uncontrolled	controlled
Observations	21,175	21,171	21,171	14,602	14,600	14,600
R-squared	0.158	0.151	0.171	0.166	0.167	0.184

[1]Note: This table presents the regression results based on whether the company is a margin trading target. The values in parentheses indicate t-test values; ***, **, and* indicate significance at 1 %, 5 %, and 10 %, respectively.

performance, which may not be fully captured by focusing solely on the magnitude of changes. We ensure that the findings are robust to different aspects of analyst behavior by including both magnitude and direction as dependent variables.

The regression results in Columns (1)–(6) of Table 5 exhibit different industry, year, and brokerage fixed effects. The key explanatory variable coefficient, management tone (Tone), was negative and significant at 1 %. The economic implication is that a more positive tone in the MD&A section of Chinese A-share companies' annual reports leads analysts to reduce their earnings forecast revisions. The robustness check results in this subsection indicate that analysts demonstrate a certain level of discernment regarding management tone information disclosed with expropriation motives when making earnings forecast revisions.

4.4.2. Instrumental variables

This subsection employs the average management tone of other listed companies in the same industry (*Tone_hy*) as an instrumental variable to address potential endogeneity issues, e.g., reciprocal causation between independent and dependent variables and the omission of key variables. *Tone_hy* was assumed to be uncorrelated with the error term in the primary regression model. Thus, the average tone of other firms in the industry was influenced by factors that did not affect the dependent variable. Moreover, *Tone_hy* was related to the management tone of a given firm, ensuring that it captures industry-wide trends. This implication is critical because it allows *Tone_hy* to serve as a valid instrument that effectively predicts the management tone of firms.

A two-stage least squares (2SLS) regression is conducted, with the results presented in Table 6. In the first-stage regression results shown in Columns (1) and (2) of Table 6, the coefficient for the instrumental variable—the average management tone of other listed companies in the same industry(*Tone_hy*), was positive and significant at the 1 % confidence level. This suggests that a more positive management tone in the annual reports of industry peers is linked to a more positive tone in the company's own annual report. The finding also suggests that the instrumental variable, *Tone_hy*, correlates well with the endogenous variable. Columns (3) and (4) show that the second-stage regression results indicate that the impact of the MD&A section's tone on analysts' earnings forecast revisions remained significantly negative at 1 % after using the instrumental variable to control for endogeneity. This implies that the more positive the tone in the MD&A section of the annual reports of Chinese A-share market-listed companies, the more analysts reduce their earnings forecast revisions.

Table 6 shows the Anderson-canon LM statistic rejected the null hypothesis of under-identification of the instrumental variable at 1 %; the Cragg–Donald Wald F statistic rejected the null hypothesis of weak correlation between the instrumental variable and the management tone (*Tone*) at 1 %. This implies a strong correlation between the selected instrumental and endogenous variables. The instrumental variable did not directly affect the management tone in the company's annual report, fulfilling the exogeneity condition. The research conclusions held after addressing endogeneity issues based on the instrumental variable approach.

This study used the average management tone of other listed companies in the same industry for the current year as an instrumental

Table 11
Results of the moderating effect analysis.

Variable Name	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*
	(1)	(2)	(3)	(4)	(5)	(6)
Tone	−0.2045***	−0.2047***	−0.2047***	−0.1986***	−0.2103***	−0.2176***
	(−3.38)	(−3.44)	(−3.41)	(−3.26)	(−3.58)	(−3.69)
INST	−0.1185**	−0.1211**	−0.1239**	−0.1217**	−0.1387**	−0.1433***
	(−2.15)	(−2.24)	(−2.25)	(−2.20)	(−2.57)	(−2.65)
*Tone**INST	0.2184**	0.2810***	0.2235**	0.2250**	0.2986***	0.2993***
	(2.00)	(2.59)	(2.04)	(2.06)	(2.73)	(2.74)
ROE	0.9185***	0.9060***	0.9586***	0.9390***	0.9331***	0.9435***
	(15.71)	(15.45)	(16.79)	(16.21)	(16.25)	(16.50)
LEV	−0.0013*	−0.0006	−0.0013*	−0.0012	−0.0007	−0.0007
	(−1.68)	(−0.87)	(−1.68)	(−1.63)	(−0.94)	(−0.98)
SGR	0.0191***	0.0152***	0.0188***	0.0187***	0.0148***	0.0149***
	(3.17)	(2.95)	(3.17)	(3.13)	(2.96)	(2.93)
Size	−0.0162***	−0.0311***	−0.0122***	−0.0172***	−0.0288***	−0.0274***
	(−3.52)	(−6.36)	(−2.58)	(−3.73)	(−5.75)	(−5.50)
B/M	0.0358**	0.0313**	0.0504***	0.0381***	0.0295	0.0326*
	(2.50)	(2.01)	(2.96)	(2.68)	(1.58)	(1.75)
INST	−0.0094*	0.0009	−0.0125**	−0.0069	0.0013	0.0023
	(−1.86)	(0.17)	(−2.52)	(−1.39)	(0.25)	(0.45)
Coverage	0.0609***	0.0439***	0.0608***	0.0589***	0.0425***	0.0428***
	(8.31)	(5.93)	(7.95)	(7.85)	(5.51)	(5.50)
Age	0.0481***	0.0346**	0.0485***	0.0487***	0.0324*	0.0357**
	(2.62)	(1.96)	(2.69)	(2.62)	(1.87)	(2.04)
BIGR	0.0100	0.0030	0.0120*	0.0076	0.0053	0.0048
	(1.40)	(0.42)	(1.68)	(1.07)	(0.74)	(0.68)
DUAL	0.0184**	0.0408***	0.0113	0.0246***	0.0337***	0.0349***
	(2.23)	(4.77)	(1.34)	(2.99)	(3.90)	(4.02)
SOE	−0.1535***	−0.1763***	−0.1488***	−0.1575***	−0.1783***	−0.1743***
	(−3.28)	(−3.79)	(−3.15)	(−3.37)	(−3.80)	(−3.73)
DA	0.0144	0.0075	0.0134	0.0133	0.0082	0.0066
	(0.56)	(0.30)	(0.51)	(0.52)	(0.32)	(0.25)
REM	0.0212	0.3554***	0.1139	−0.0022	0.5122***	0.4285***
	(0.21)	(3.24)	(1.06)	(−0.02)	(4.33)	(3.18)
Constant	−0.2045***	−0.2047***	−0.2047***	−0.1986***	−0.2103***	−0.2176***
	(−3.38)	(−3.44)	(−3.41)	(−3.26)	(−3.58)	(−3.69)
Industry FE	controlled	controlled	uncontrolled	uncontrolled	controlled	controlled
Year FE	controlled	uncontrolled	controlled	uncontrolled	controlled	controlled
Brokerage FE	controlled	uncontrolled	uncontrolled	controlled	uncontrolled	controlled
Observations	35,777	35,777	35,777	35,771	35,777	35,771
R-squared	0.125	0.244	0.228	0.237	0.248	0.258

[1]Note: This table reports how institutional ownership can replace analysts in monitoring management's expropriation of company interests through tone disclosures. The values in parentheses are t-test values; ***, **, and * indicate significance at 1 %, 5 %, and 10 %, respectively.

variable to address endogeneity. We employed the lagged values of the explanatory variable as an instrumental variable to further ensure the robustness of the findings (Table 7). The first-stage regression results in Columns (1) and (2) indicate that the lagged explanatory variable coefficient (LTone) was positive and statistically significant at 1 %. This finding implies that a more positive management tone in the previous period was associated with a more positive management tone in the current year's annual report. It demonstrates that the lagged explanatory variable (LTone) served as a valid instrument correlated with the endogenous variable. Columns (3) and (4) present the second-stage regression results. These results show that, after addressing endogeneity issues using the instrumental variable, the effect of the MD&A section's tone on analysts' earnings forecast revisions remains significantly negative at 1 %. This implies that when the tone in the MD&A section of annual reports of Chinese A-share listed companies is more positive, analysts will reduce their earnings forecast revisions accordingly.

Additionally, Table 7 shows that the Anderson canonical correlation LM statistic rejected the null hypothesis of under-identification of the instrumental variable at 1 %; the Cragg–Donald Wald F statistic rejected the null hypothesis of weak correlation between the instrumental variable and management tone (Tone) at 1 %. This indicates a strong correlation between the lagged explanatory variable (LTone) and the endogenous variable. Furthermore, the lagged explanatory variable (LTone) did not directly influence the management tone in the company's annual report, satisfying the exogeneity condition. Overall, the research conclusions remained valid after addressing endogeneity issues using this instrumental variable approach.

5. Additional analysis

5.1. Analysis based on the nature of intonation

The preceding sections showed that a more positive tone in the MD&A section of annual reports was associated with reduced analysts' earnings forecast revisions in the Chinese A-share market. Management tone is often categorized into positive (Tone_P) and negative (Tone_N) tones. This subsection examines how these tones individually affect analysts' earnings forecast revisions through regression analysis (Table 8). The regression results from Columns (1) to (3) of Table 8 indicate that the management's positive tone (Tone_P) coefficient was negative and significant. This indicates that a more negative management tone leads analysts to reduce their positive earnings forecast revisions. In contrast, the coefficient for the management's positive tone (Tone_P) was significantly positive, suggesting that a more positive management tone prompts analysts to increase their positive earnings forecast revisions.

Table 12
Moderating effect analysis results.

Variable Name	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*	*Rev*
	(1)	(2)	(3)	(4)	(5)	(6)
Tone	−0.1041***	−0.0520	−0.1035***	−0.0963***	−0.0500	−0.0585*
	(−3.46)	(−1.57)	(−3.57)	(−3.12)	(−1.55)	(−1.81)
Pledge	0.1373*	0.1816**	0.0980	0.1361*	0.1508*	0.1504*
	(1.67)	(2.26)	(1.16)	(1.66)	(1.82)	(1.81)
*Tone**Pledge	−0.3358**	−0.3729**	−0.2664*	−0.3326*	−0.3215*	−0.3206*
	(−1.98)	(−2.24)	(−1.83)	(−1.96)	(−1.89)	(−1.87)
ROE	0.7289***	0.7774***	0.7703***	0.7598***	0.8079***	0.8222***
	(12.49)	(13.51)	(13.54)	(13.17)	(14.27)	(14.59)
LEV	−0.0197***	−0.0076	−0.0217***	−0.0175***	−0.0097	−0.0096
	(−3.33)	(−1.26)	(−3.62)	(−2.98)	(−1.59)	(−1.59)
SGR	0.2235***	0.1862***	0.2200***	0.2186***	0.1817***	0.1811***
	(17.46)	(14.53)	(17.04)	(17.04)	(14.01)	(13.91)
Size	−0.0180***	−0.0324***	−0.0148***	−0.0190***	−0.0308***	−0.0294***
	(−3.79)	(−6.45)	(−3.02)	(−3.99)	(−6.00)	(−5.78)
B/M	0.0297**	0.0164	0.0464***	0.0310**	0.0170	0.0202
	(2.18)	(1.10)	(2.87)	(2.29)	(0.96)	(1.14)
INST	0.0048	0.0224	0.0012	0.0028	0.0127	0.0071
	(0.30)	(1.39)	(0.07)	(0.17)	(0.79)	(0.44)
Coverage	−0.0088*	−0.0012	−0.0120**	−0.0061	−0.0007	0.0005
	(−1.75)	(−0.23)	(−2.42)	(−1.23)	(−0.14)	(0.09)
Age	0.0765***	0.0569***	0.0773***	0.0744***	0.0560***	0.0562***
	(10.21)	(7.55)	(9.89)	(9.73)	(7.13)	(7.08)
BIGR	0.0387*	0.0186	0.0426**	0.0402*	0.0197	0.0241
	(1.89)	(0.94)	(2.12)	(1.96)	(1.01)	(1.23)
DUAL	0.0062	−0.0012	0.0087	0.0041	0.0014	0.0010
	(0.86)	(−0.16)	(1.20)	(0.58)	(0.19)	(0.14)
SOE	0.0167**	0.0406***	0.0091	0.0227***	0.0333***	0.0349***
	(2.00)	(4.71)	(1.06)	(2.71)	(3.82)	(3.99)
DA	−0.1842***	−0.2173***	−0.1775***	−0.1880***	−0.2185***	−0.2139***
	(−3.46)	(−4.09)	(−3.30)	(−3.54)	(−4.07)	(−4.00)
REM	0.0324	0.0270	0.0305	0.0314	0.0270	0.0254
	(1.47)	(1.23)	(1.34)	(1.43)	(1.20)	(1.14)
Constant	−0.0159	0.4918***	0.1113	−0.0452	0.6634***	0.5384***
	(−0.15)	(4.38)	(0.99)	(−0.38)	(5.56)	(4.10)
Industry FE	controlled controlled controlled	controlled	uncontrolled	uncontrolled	controlled	controlled
Year FE	controlled	uncontrolled	controlled	uncontrolled	controlled	controlled
Brokerage FE	controlled	uncontrolled	uncontrolled	controlled	uncontrolled	controlled
Observations	35,461	35,461	35,461	35,455	35,461	35,455
R-squared	0.035	0.050	0.038	0.047	0.054	0.064

[1]Note: This table examines the moderating effect of major shareholders' equity pledges on the relationship between analysts and management tone. The values in parentheses are t-test values; ***, **, and * indicate significance at 1 %, 5 %, and 10 %, respectively.

5.2. Heterogeneity analysis and moderation effect analysis

5.2.1. Star analysts vs. non-star analysts

Recent studies suggest that star analysts are essential in noticing corporate information distortion, primarily due to their capacity to reduce information asymmetry effectively. Cao et al. (2022) show how the analytical depth of star analysts allows them to overcome the challenges of asymmetric information in complex sectors. Zhang and Wang (2023) found that star analysts improve transparency in corporate innovation investments, reducing investment distortions. Hong and Kubik (2003) discovered that when an analyst uncovers more fundamental information, their chances of becoming a star analyst increase. This suggests that star analysts have superior information extraction abilities compared to other analysts (Guo et al., 2023; Zhang, Li, et al., 2024; Zhang, Peng, et al., 2024). These studies show that star analysts significantly enhance the market's understanding of a firm's financial condition by reducing information asymmetry.

This subsection examines whether there are differences between star analysts and non-star analysts in their ability to identify management tone disclosures driven by expropriation motives in the Chinese market. To explore this, the sample was divided into two groups based on whether the analyst (or team) was ranked among the top three in the "New Fortune" annual rankings in the previous or earlier years: the star analyst group and the non-star analyst group. Group-specific regressions are then conducted, controlling for year, industry, and brokerage fixed effects. The results are presented in Table 9.

Table 9 illustrates that the effect of the management tone in the MD&A section of annual reports on analysts' earnings forecast revisions was not significant for the non-star analyst group. In contrast, the impact was significantly negative for the star analyst group. This finding suggests that star analysts were better at discovering expropriation motives in management tone disclosures in annual reports than non-star analysts. In the Chinese A-share market, it is primarily the star analysts who can effectively identify the motives behind the management tone disclosures in the annual reports of companies.

5.2.2. Impact of margin trading and short selling

The introduction of margin trades and short-selling mechanisms is a noteworthy feature of financial markets. Research indicates that short sellers are informed traders with advanced information processing capabilities. When a company discloses non-financial information, as professional investors, short sellers typically have better interpretative abilities and can extract helpful information from ambiguous non-financial data, enhancing market transparency. Thus, this mechanism mitigates market volatility and can somewhat stabilize the securities market, which may reduce the magnitude of analysts' earnings forecast revisions. In markets where short selling is not allowed and investors possess heterogeneous information, Miller (1977) has suggested that

pessimistic traders become forced out of the market, leaving only optimistic traders holding stocks. Thus, stock prices fail to reflect negative information accurately and may become overvalued, leading to systemic bubbles. Moreover, Hong and Kubik (2003) argues that pessimistic sentiments are concealed without short selling. When prices eventually decline, the accumulated negative sentiment is suddenly released, hastening the decline in stock prices. Zhang, Li, et al. (2024) and Zhang, Peng, et al. (2024) utilized data on margin trading and short selling in China for the Chinese stock market. They found that introducing short selling can promptly integrate negative news into the market, strengthen company information transparency, and constrain managerial behavior, reducing earnings forecast biases. Furthermore, short-selling mechanisms, as external governance tools, can effectively compensate for deficiencies in internal corporate governance and strengthen internal control quality (He et al., 2024), curbing managerial expropriation. This analysis suggests that the influence of management tone in annual reports on analysts' earnings forecast revisions may be mitigated once a company becomes a margin trading and short-selling target.

To examine the above, this subsection analyzes whether the status of being a margin trading and short-selling target affects the impact of management tone on analysts' earnings forecast revisions. The sample was divided into two groups based on whether the stock was a margin trading and short-selling target in the previous period (t − 1), and a dummy variable (List) was defined, where List equals 1 if the stock is a target and 0 otherwise. Group-specific regression analysis was conducted accordingly (Table 10).

The regression results in Table 10 illustrate that for the non-margin trading and short-selling target group, the effect of management tone in the MD&A section of annual reports on analysts' earnings forecast revisions was significantly negative. In contrast, the impact of management tone on analysts' earnings forecast revisions was insignificant for the group that became margin trading and short-selling targets. This indicates that its transparency increases once a company becomes a margin trading and short-selling target; constraints on managerial opportunism are stronger, reducing the influence of management tone on analysts' earnings forecast revisions.

5.2.3. The moderating effect of institutional investors

A widely accepted view is that institutional investors can improve market information efficiency and contribute to the stability of stock markets, reducing the risk of stock price crashes (Li et al., 2023). Schnatterly et al. (2008) found that face-to-face communication between fund managers and listed companies enables fund managers to acquire more operational information, leading to more accurate predictions of a company's future performance. Institutional investor visits and research can significantly reduce the likelihood of company misreporting, profit manipulation, or stock price manipulation. This is because on-site visits and direct inquiries allow investors to obtain more accurate operational information, increasing the likelihood of exposing fraud and reducing the probability of misconduct (Bushee et al., 2011). By bringing more accurate and authentic information about listed companies to the market, institutional investors enhance the information content of stock prices through their trading activities (Chen et al., 2007).

In contrast, investors' on-site research acts as oversight, constraining listed companies and promoting governance. Institutional investors, through professional analysis, identify potential violations and enhance external supervision. On-site research standardizes operations and reduces earnings management. Cheng et al. (2016) found that institutional investors curb management behavior and lower earnings manipulation risks. Han et al. (2018) observed that companies with more institutional investor research are less likely to engage in earnings manipulation. The above analysis infers that institutional investors may, to some extent, replace analysts in monitoring management's expropriation of company interests through tone disclosures, thus mitigating the impact of management tone on analysts' earnings forecast revisions.

We established the following specific model to determine whether institutional ownership can replace analysts in monitoring management's expropriation of company interests through tone disclosures:

$$REV_{i,j,Q} = \alpha + \beta_1 Tone_{i,Q-1} + \beta_2 INST + \beta_3 Tone_{i,Q-1} {}^{*} INST + \gamma X_{i,j,Q} + Year + Industry + Borker + \varepsilon_{i,j,Q} \tag{4.7}$$

where $Tone_{i,Q-1}$x $INST$ represents the interaction term between the management tone in the company's annual report and the proportion of institutional ownership. If institutional investors can replace analysts in detecting management's expropriation of company interests through tone disclosures, the interaction term coefficient should be positive. The regression results for Model 4.7 are presented in Table 11.

Table 11 indicates that the interaction term coefficient (Tone x INST) was significantly positive. This implies that institutional investors can detect distorted information and, to some extent, can replace analysts in detecting management's expropriation of company interests through tone disclosures. Thus, institutional investors can help mitigate the impact of management tone on analysts' earnings forecast revisions.

5.2.4. Moderating effect of major shareholders' equity pledge

To assess whether analysts can effectively "identify" the market value management motives behind management tone disclosures, this study examines the moderating effect of major shareholders' equity pledges on the relationship between analysts and management tone. The results are presented in Table 12. The coefficient for the interaction term between management tone in the company's annual report and the proportion of major shareholders' equity pledges (Tone x Pledge) was negative at the 10 % significance level. This indicates that equity pledging by major shareholders negatively moderated the effect of management tone on analysts' earnings forecast revisions. Specifically, as the proportion of equity pledged by major shareholders increased, the tone of non-financial information disclosure by management became more positive. Thus, analysts tend to intensify their revisions to earnings forecasts when management in companies with significant equity pledges uses tone disclosures to expropriate company interests.

6. Summary

This study employed data from China's A-share listed companies in Shanghai and Shenzhen from 2007 to 2022 to explore the sensitivity of analysts' forecast revisions to management tone. It investigates analysts' ability to determine the motives behind non-financial information disclosures. The findings contribute to the theory of systemic optimization in sustainable business operations by highlighting the following conclusions.

(1) Impact of Positive Management Tone: analysts tend to reduce the magnitude of their earnings forecast revisions when the tone of the MD&A sections in annual reports is more positive. This behavior suggests that Chinese securities analysts can effectively screen non-financial information, identifying motives such as profit embezzlement. This ability helps optimize business operations by enhancing forecast accuracy.
(2) Differences between Star and Non-Star Analysts: the study shows that only star analysts can effectively detect profit embezzlement motives within non-financial disclosures. This emphasizes the significance of star analyst expertise in enhancing system efficiency, as these analysts improve the reliability of information assessment and business forecasting.
(3) Effect of Enhanced Corporate Transparency: when a listed company becomes a target for financing and margin trading, increased corporate transparency imposes stronger constraints on management's opportunistic behavior. This transparency reduces the influence of management tone on analysts' earnings forecast

revisions, leading to more reliable and stable business operations and promoting sustainable business practices.

(4) Role of Institutional Investors: institutional investors can identify distorted information, effectively substituting analysts in detecting management's exploitation of corporate interests through tone disclosures. This capability reduces the impact of management tone on analysts' earnings forecast revisions, contributing to systemic optimization by improving the accuracy of financial forecasts and promoting better corporate governance.

Based on the findings, we suggest that corporate boards should adopt a more proactive approach to ensuring transparency by establishing internal oversight mechanisms specifically focused on reviewing non-financial disclosures, especially the tone used in corporate communication. This can be achieved by forming committees that include independent directors or external auditors tasked with evaluating the consistency between the company's narrative and its financial data. Such oversight could help to ensure that the tone of management's communications reflects the company's actual financial position, reducing the likelihood of misleading statements. Moreover, boards should strengthen governance practices by implementing policies prioritizing transparency and accountability in corporate reporting. For example, boards could adopt guidelines that mandate a balanced presentation of opportunities and risks in management disclosures, preventing overly optimistic narratives. These measures would reduce the impact of management tone on analysts' earnings forecasts, leading to more accurate assessments of company performance and ultimately improving corporate transparency and credibility.

This study offers valuable insights into how management tone influences analysts' forecast revisions and the mechanisms through which market participants contribute to the systemic optimization of sustainable business operations by integrating textual and financial data.

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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

No

References

Allee, K. D., & Deangelis, M. D. (2015). The structure of voluntary disclosure narratives: Evidence from tone dispersion. *Journal of Accounting Research, 53*, 241–274. https://doi.org/10.1111/1475-679X.12072

Barber, B., Lehavy, R., & McNichols, M. (2001). Can investors profit from the prophets? Security analyst recommendations and stock returns. *The Journal of Finance, 56*(2), 531–563. https://doi.org/10.1111/0022-1082.00336

Blankespoor, E., Dehaan, E., & Zhu, C. (2018). Capital market effects of media synthesis and dissemination: Evidence from robo-journalism. *Review of Accounting Studies, 23*, 1–36. https://doi.org/10.1007/s11142-017-9422-2

Bloomfield, R. (2008). Discussion of "annual report readability, current earnings, and earnings persistence". *Journal of Accounting and Economics, 45*(2–3), 248–252. https://doi.org/10.1016/j.jacceco.2008.04.002

Boone, A. L., & White, J. T. (2015). The effect of institutional ownership on firm transparency and information production. *Journal of Financial Economics, 117*(3), 508–533. https://doi.org/10.1016/j.jfineco.2015.05.008

Bouchaud, J. P., Krueger, P., & Landier, A. (2019). Sticky expectations and the profitability anomaly. *The Journal of Finance, 74*(2), 639–674. https://doi.org/10.1111/jofi.12734

Brockman, P., Li, X., & Price, S. M. (2017). Conference call tone and stock returns: Evidence from the stock exchange of Hong Kong. *Asia-Pacific Journal of Financial Studies, 46*(5), 667–685. https://doi.org/10.1111/ajfs.12186

Bushee, B. J., Jung, M. J., & Miller, G. S. (2011). Conference presentations and the disclosure milieu. *Journal of Accounting Research, 49*(5), 1163–1192. https://doi.org/10.1111/j.1475-679x.2011.00426.x

Call, A. C., Hewitt, M., Watkins, J., & Yohn, T. L. (2021). Analysts' annual earnings forecasts and changes to the I/B/E/S database. *Review of Accounting Studies, 26*, 1–36. https://doi.org/10.1007/s11142-020-09560-x

Cao, J., Li, W., & Bilokha, A. (2022). Low-carbon city initiatives and analyst behaviour: A quasi-natural experiment. *Journal of Financial Stability, 62*, Article 101042. https://doi.org/10.1016/j.jfs.2022.101042

Chen, S., Liu, Q., & Yao, L. (2024). Do analysts' earnings forecasts exclude earnings management? Evidence from audit adjustments. *Asia-Pacific Journal of Accounting & Economics, 31*(6), 1008–1027. https://doi.org/10.1080/16081625.2023.2298924

Chen, X., Harford, J., & Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics, 86*(2), 279–305. https://doi.org/10.1016/j.jfineco.2006.09.005

Cheng, Q., Du, F., Wang, X., & Wang, Y. (2016). Seeing is believing: Analysts' corporate site visits. *Review of Accounting Studies, 21*, 1245–1286. https://doi.org/10.1007/s11142-016-9368-9

Davis, A. K., Ge, W., Matsumoto, D., & Zhang, J. L. (2015). The effect of manager-specific optimism on the tone of earnings conference calls. *Review of Accounting Studies, 20*, 639–673. https://doi.org/10.1007/s11142-014-9309-4

Dhaliwal, D. S., Radhakrishnan, S., Tsang, A., & Yang, Y. G. (2012). Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. *Accounting Review, 87*, 723–759. https://doi.org/10.2308/accr-10218

Engelberg, J. E., & Parsons, C. A. (2011). The causal impact of media in financial markets. *Journal of Finance, 66*(1), 67–97. https://doi.org/10.1111/j.1540-6261.2010.01626.x

Frankel, R., Kothari, S. P., & Weber, J. (2006). Determinants of the Informativeness of Analyst Research. *Journal of Accounting and Economics, 41*(1–2), 29–54.

Frankel, R., Mcnichols, M., & Wilson, G. P. (1995). Discretionary disclosure and external financing. *Accounting Review, 70*(1), 135–150. https://www.jstor.org/stable/248392.

Fu, X., Wu, X., & Zhang, Z. (2021). The information role of earnings conference call tone: Evidence from stock price crash risk. *Journal of Business Ethics, 173*, 643–660. https://doi.org/10.1007/s10551-019-04326-1

Ge, C., Cheng, H., Niu, Q., & Yang, M. (2024). The conjoint effects of corporate social responsibility performance and report tone on financial constraints: Evidence from China. *Pacific-Basin Finance Journal, 87*, Article 102506. https://doi.org/10.1016/j.pacfin.2024.102506

Guo, Y., Yang, S., Wang, Y., & Yi, Z. (2023). Star analysts' voting in emerging market: A perspective of analysts' optimistic bias. *Emerging Markets Finance and Trade, 59*(5), 1498–1518. https://doi.org/10.1080/1540496X.2022.2147783

Han, B., Kong, D., & Liu, S. (2018). Do analysts gain an informational advantage by visiting listed companies? *Contemporary Accounting Research, 35*(4), 1843–1867. https://doi.org/10.1111/1911-3846.12363

Han, H., Liu, C., & Li, J. (2024). Managerial overconfidence and stock price crash risk. *Finance Research Letters, 65*, Article 105518. https://doi.org/10.1016/j.frl.2024.105518

He, M., Bai, X., & Zhang, J. (2024). Does short selling reduce classification shifting? Exploration of market-oriented governance mechanism. *International Review of Financial Analysis, 93*, 10319. https://doi.org/10.1016/j.irfa.2024.103193

Hong, H., & Kubik, J. D. (2003). Analyzing the analysts: Career concerns and biased earnings forecasts. *The Journal of Finance, 58*(1), 313–351. https://doi.org/10.1111/1540-6261.00526

Hope, O. K., Hu, D., & Hai, L. (2016). The benefits of specific risk-factor disclosures. *Review of Accounting Studies, 21*, 1005–1045. https://doi.org/10.1007/s11142-016-9371-1

Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research, 29*(2), 193–228. https://doi.org/10.2307/2491047

Kravet, T., & Muslu, V. (2013). Textual risk disclosures and investors' risk perceptions. *Review of Accounting Studies, 18*, 1088–1122. https://doi.org/10.1007/s11142-013-9228-9

Li, J., Zhou, Z. Q., Zhang, Y., & Xiong, X. (2023). Information interaction among institutional investors and stock price crash risk based on multiplex networks. *International Review of Financial Analysis, 89*, 10278. https://doi.org/10.1016/j.irfa.2023.102780

Loughran, T., & McDonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *Journal of Finance, 66*(1), 35–65. https://doi.org/10.1111/j.1540-6261.2010.01625.x

Merkley, K. J. (2014). Narrative disclosure and earnings performance: Evidence from R&D disclosures. *Accounting Review, 89*(2), 725–757. https://doi.org/10.2308/accr-50649

Miller, E. M. (1977). Risk, Uncertainty, and Divergence of Opinion. *The Journal of Finance, 32*(4), 1151–1168. https://doi.org/10.2307/2326520

Mola, S., & Guidolin, M. (2009). Affiliated mutual funds and analyst optimism. *Journal of Financial Economics, 93*(1), 108–137. https://doi.org/10.1016/j.jfineco.2008.06.006

O'Brien, P. C., Mcnichols, M. F., & Lin, H. (2005). Analyst impartiality and investment banking relationships. *Journal of Accounting Research, 43*(4), 623–650. https://doi.org/10.1111/j.1475-679x.2005.00184.x

Paul, S., & Sharma, P. (2023). Does earnings management affect linguistic features of MD&a disclosures? *Finance Research Letters, 51*, Article 103352. https://doi.org/10.1016/j.frl.2022.103352

Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics, 42*(3), 335–370. https://doi.org/10.1016/j.jacceco.2006.01.002

Schnatterly, K., Shaw, K. W., & Jennings, W. W. (2008). Information advantages of large institutional owners. *Strategic Management Journal, 29*(2), 219–227. https://doi.org/10.1002/smj.654

Stice, E. K. (1991). The market reaction to 10-K and 10-Q filings and to subsequent *the wall street journal* earnings announcements. *Accounting Review, 66*(1), 42–55. https://www.jstor.org/stable/247704.

Tan, H. T., Wang, E. Y., & Zhou, B. O. (2014). When the use of positive language backfires: The joint effect of tone, readability, and investor sophistication on earnings judgments. *Journal of Accounting Research, 52*(1), 273–302. https://doi.org/10.1111/1475-679x.12039

Womack, K. L. (1996). Do brokerage analysts' recommendation have investment value? *The Journal of Finance, 51*(1), 137–167. https://doi.org/10.2307/2329305

Yu, Y., Chen, J., Tang, Y., & Xu, J. (2018). Analysts' strategic distortion during IPO waves. *International Review of Finance, 18*(3), 331–357. https://doi.org/10.1111/irfi.12149

Zhang, C., Shrider, D. G., Han, D., & Wu, Y. (2022). Accurate forecasts attract clients; biased forecasts keep them happy. *International Review of Financial Analysis, 81*, 10206. https://doi.org/10.1016/j.irfa.2022.102067

Zhang, P., & Wang, Y. (2023). The bright side of analyst coverage on corporate innovation: Evidence from China. *International Review of Financial Analysis, 89*, Article 102791. https://doi.org/10.1016/j.irfa.2023.102791

Zhang, S., Aerts, W., Zhang, D., & Chen, Z. (2022). Positive tone and initial coin offering. *Accounting and Finance, 62*(2), 2237–2266. https://doi.org/10.1111/acfi.12860

Zhang, S., Li, Y., Liang, R., & He, Y. (2024). Does management tone matter in information disclosure? Evidence from IPO online roadshows in the SSE STAR market. *International Review of Financial Analysis, 94*, Article 103307. https://doi.org/10.1016/j.irfa.2024.103307

Zhang, Y., Peng, H., Liu, T., & Xie, K. (2024). Corporate innovation and analysts' estimates of the cost of equity: Evidence from China. *International Review of Economics and Finance, 89*, 83–101. https://doi.org/10.1016/j.iref.2023.07.030

Zhou, W., Li, Y., Wang, D., Xueqin, D., & Ke, Y. (2024). Management's tone in MD&a disclosure and investment efficiency: Evidence from China. *Finance Research Letters, 59*, Article 104767. https://doi.org/10.1016/j.frl.2023.104767

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