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# Forward-looking information disclosure tone, financing constraints and marketing expenditures

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## ABSTRACT

Forward-looking information is often seen as private messages that managers deliver to the public, and a positive tone usually implies a positive signal from them. We use a sample of Shanghai and Shenzhen A-shares from 2011 to 2020 to examine the relationships between forward-looking information tone and company marketing expenditures. Our findings show that: first, forward-looking information tones contain valuable content that investors can comprehend, and the more positive the tone, the greater the marketing expenditures a company has. Second, this positive relationship is strengthened for companies that are more financially constrained. Finally, optimistic forward-looking messages can increase marketing expenditures in a greater magnitude for companies operating in the areas subject to a higher degree of marketisation.

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## 1. Introduction

Marketing activities are one of the effective means for enterprises to enhance their core competitiveness. Advertising is a powerful way to achieve product differentiation, and the development of enterprises cannot be separated from advertising (Kaldor 1950; Tremblay and Polasky 2002). The profitability of enterprises comes most fundamentally from consumers' purchases, and marketing activities can bring consumers a positive sense of experience and recognition that increase their purchasing intention. Generally speaking, the investment in marketing activities is expected to boost future sales and improve business performance, thus facilitating sustainable development. Based on this argument, marketing activities are considered crucial to the long-term development of enterprises. As a result, seeking the optimal allocation of limited financial resources between marketing and other operating activities has attracted significant attention from both professionals and academics.

Recent studies have focused extensively on the impact of marketing investment on business performance and operating activities. For example, Morgan (2012) integrates the insights of structure-conduct-performance (SCP), resource-based view (RBV) and dynamic capabilities (DC) schools in strategic management and the empirical and theoretical literature of strategic

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marketing, and establishes a comprehensive conceptual framework based on theories that link marketing with business performance. Wijesooriya et al. (2021) find that more marketing spending by enterprises can weaken the negative effect of excessive debt on enterprise performance, thus yielding positive results, in a sample of 35 public limited companies in Sri Lanka. In addition, some studies have shown a positive relationship between R&D activities and advertising expenses (Amabile et al. 1996; Weerawardena 2003). On the other hand, attention has been drawn to examining the determinants of enterprises' marketing expenditure. Picard (2001) studies the impact of the economic recession on advertising spending and reveals that advertising spending fell by an average of 5% when the economy declined by 1%. Moreover, the nature of the economy, the degree of economic fluctuation and national economic policies may also affect advertising expenditure. Another study exploring the impact of technological change and economic conditions on advertising expenses has found that the introduction of new media can lead to structural breaks in the growth rates of advertising expenditure for the incumbent media. In a concise summary, there is abundant literature on the impact of increased marketing expenditures, but less attention has been given to its determinants.

Information is a vital strategic resource for modern enterprises; it can be broadly divided into two categories: hard information and soft information. The former generally exists in a quantitative form, such as financial statement data. The latter includes mostly text-based qualitative data (Mayew and Venkatachalam 2012), such as an enterprise's future development prospects and analysis (referred to as FLS hereafter). Digital information is simple, straightforward and explicit, while textual information requires in-depth interpretation by the audience. Therefore, different judgments could be reached based on investors' individual abilities and perspectives. However, recent advancements in Natural Language Processing (NLP) and text-mining technologies for unstructured data have led to modern studies discovering that text-based data disclosed by listed companies not only describe graphical data but may also unintentionally reveal content creators' unconscious linguistic features (e.g. Li 2010).

Forward-looking information is an integral part of a company's annual reports and is drafted based on the company's operating conditions and development prospects. According to the signal theory, optimistic forward-looking information disclosed at a management level can release favourable signals to the public, and investors' confidence in their development prospects is expected to be enhanced, resulting in fewer financing obstacles facing those companies. Moreover, it has been documented that expanding external funding would increase marketing expenditures (Mian, Sharma, and Gul 2018). Therefore, we ask: is forward-looking information a more informative measure to signal the market? Can investors interpret the tone of forward-looking information? In addition, can the favourable signals conveyed in forward-looking statements through positive tones alleviate financing constraints, thus increasing marketing expenditures?

We adopted a sample that includes all qualified Chinese A-share listed companies over 2011–2020 to examine the above questions, and then manually captured the future development and analysis sections in their annual reports, and quantified forward-looking information tones. In addition to providing novel evidence to the narrative disclosure and financing constraints literature, our research extends previous studies in several ways. First, this quantitative study develops an empirical approach that complements theoretical analysis. Second, we advance previous marketing studies that rely largely on financial data by adopting text-based analysis techniques. In addition, this study introduces the moderating impact of firm-level financing constraints into the narrative tone and marketing expenditure nexus, thus providing practical decision-making bases for both managers and investors.

The rest of the paper proceeds as follows: [Section 2](#) reviews relevant literature and formulates the research hypotheses. [Section 3](#) describes the data and empirical strategies. [Section 4](#) presents the key findings of the study, followed by additional empirical analysis in [Section 5](#). The last section concludes the study and discusses its policy implications.

## 2. Theoretical background and hypotheses

### 2.1 Forward-looking information tone and marketing expenditures

Text information disclosed in an annual report can be greatly flexible. Managers can communicate forward-looking information with investors through qualitative disclosure (such as views on the future development of the industry and the company's business plan), guiding investors' investment decisions (Campbell et al. 2020; Muslu et al. 2015). Disclosure tone, as the expression of positive and negative emotions in text information (Price et al. 2012), can convey a management team's objective outlook on their enterprise's prospects and development strategies (Li 2010). In this case, forward-looking information, as the landing point of the Management Analysis and Discussion section of an annual report, reflects management's expectations and emotions about the future development of the enterprise. Specifically, forward-looking statements disclosed with a positive tone are predicted to be associated with better expectations about the company's future development and operating performance (Davis et al. 2015), and vice versa (i.e. less positive, or negative tones). According to the signalling theory, tone is the signal transmitted by management to investors (Hanley and Hoberg 2010). Similarly, forward-looking information tone is the signal delivered to investors by senior members of listed companies. External investors would make decisions based on the degree of positivity or negativity of the signals they receive. In this sense, insufficient historical information, forward-looking information disclosure provides investors with the information they need to make more informed decisions (Menicucci 2013).

It has been documented by Rogers et al. (2011) that investors can, to some extent, capture managers' hidden or implicit messages through textual tone analysis, and then respond accordingly. Management teams may attract investors' attention by sending positive information to the market, where investors would interpret the signals via tone analysis, and then (re)establish confidence that leads to potential investment transactions. This means that the company can raise more external funds. Hence, it is a necessary premise for companies to have sufficient capital to carry out marketing activities. Mian et al. (2018) have demonstrated that an enterprise's advertising budget is positively correlated with the size of external funds it receives during the year, implying that the more external funds an enterprise raises in the year, the more it spends on advertising expenditures. This suggests that forward-looking messages accompanied by positive tones can deliver positive signals to investors. Consequently, those companies would become less financially constrained as investors can gain confidence through the signals. This potential expansion of external financing would ultimately lead to an increase in marketing expenses. With these arguments in mind, we test the following hypothesis.

**Hypothesis 1:** Forward-looking message tone is positively correlated with marketing expenditures

### 2.2 Forward-looking tone, financing constraints and marketing expenditures

Companies face financing constraints, which means that they cannot raise external funds when faced with better investment opportunities (Xu et al. 2020). Financing constraints may delay or impede companies' investment (Whited and Wu 2006). Marketing activities, as a form of capital investment, build intangible assets of the company, especially brand assets, customer loyalty, and market perception (Srinivasan and Hanssens 2009). These activities are future-oriented, and their sustainability is sensitive to the support of external financing. Specifically, sufficient external funds can facilitate companies' investment in marketing activities. Conversely, firms facing more financing obstacles are less likely to obtain adequate funds for marketing activities.

Forward-looking information disclosed by listed companies to stakeholders contains valuable signals about the development strategies, business challenges, potential risks, and relevant countermeasures of those companies. Such information plays a vital role in the decision-making process of investors. Managers may actively release signals through tone information, improve the quality and transparency of accounting information, and help investors judge the liquidity and market value of an enterprise (Muslu et al. 2015). External investors make decisions based on the positive or negative signals they receive (Hanley and Hoberg 2010). A positive tone is conducive to enhancing investors' confidence in the future development of the enterprise, promoting potential investment and easing the financing constraints of the enterprise. In addition, Healy and Palepu (2001) show that managers can reduce information risk by increasing voluntary disclosure, thereby reducing the cost of capital. Similarly, managers can reduce information asymmetry, alleviate enterprise financing constraints, and increase the accessibility of enterprise resources through forward-looking information disclosure. Some studies have shown that forward-looking information disclosure can help investors better predict the future performance of the company (Schleicher, Hussainey, and Walker 2007) and reduce the company's external financing costs (Bujaki, Zeghal, and Bozec 1999). Given the above arguments, we conjecture that positive forward-looking information tone would alleviate financing constraints and increase marketing expenditures, and this effect is stronger for firms with a higher level of financing constraints, as in the below hypothesis:

**Hypothesis 2:** The positive relationship between forward-looking message tone and marketing expenditures is stronger for firms that are more financially constrained.

### **2.3 Forward-looking message tone, marketisation and marketing expenditures**

Since there are significant differences across provinces/regions in mainland China regarding natural resources, cultural identity, and economic development, enterprises operating under different external environments face vastly different or even unique challenges. Companies located in areas subject to different degrees of marketisation face different external environments, which are reflected in the following two aspects. First, due to competitive pressure, enterprise executives would be more willing to cater to and meet investors' needs by providing more sophisticated and accurate information in highly market-oriented regions. Second, stringent and effective supervision of laws and regulations, the board of directors, and third-party institutions can improve the quality of voluntary information disclosure (Healy and Palepu (2001)). The greater strength of local governments/authorities' external supervision and regulatory capacity in such regions implies that companies are likely to be compelled by the market and regulations to produce more explicit and valuable, and clearer information. This may, to some extent, impose more restrictions on narrative disclosures of forward-looking information under FLS. However, compared with companies in high market areas, companies in low market areas may disclose information more freely, since they face less competitive pressure and less regulatory intensity. The above reasons may lead to different preferences of disclosure tone in the two areas.

Modigliani and Miller (1959) point out that companies can usually raise exogenous capital at the same cost as endogenous capital in a complete capital market, thus, they will not face financing constraints. Because the market system in highly market-oriented areas is more complete, enterprises located in areas with a high degree of marketisation tend to face smaller financing constraints and are more likely to raise external finance. In addition, Zhang et al. (2021) show that deepening marketisation has greatly improved the efficiency of capital allocation in eastern, central, and western China. Three main reasons contribute to this improvement: first, regions with higher marketisation are subject to more mature financial markets and more efficient information sharing and transmission mechanisms compared to regions with a lower degree of marketisation. Second,

regions with a higher degree of marketisation tend to have sound financial and legal systems, less administrative intervention, and funds are allocated more by the market, thereby easing the financing constraints of enterprises. Third, regions with a higher degree of marketisation are likely to be more economically developed, with larger investors, thus enhancing the feasibility of external financing for enterprises operating there.

The above analysis suggests that enterprises have a greater probability of obtaining external funds in regions with a high degree of marketisation, are more efficient in transmitting forward-looking information tone, and are therefore more likely to increase marketing expenditures. Our last hypothesis is proposed as follows.

**Hypothesis 3:** The positive relationship between forward-looking message tone and marketing expenditures is more significant in regions with a higher degree of marketisation.

### 3. Data, variables and model specification

#### 3.1 Data

This study adopts secondary data to empirically examine the proposed hypotheses. We obtained and manually constructed relevant data, including forward-looking statement tone, marketing expenditure, equity concentration, R&D expenditures, enterprise growth, and enterprise size for all companies listed in Shanghai and Shenzhen A-shares from 2011–2020. All data are originally sourced from the China Stock Market Accounting Research database (CSMAR), except for the forward-looking statement tone, which is calculated by Python. In addition, year and industry fixed effects are added to control for potentially unobservable time effects and industry heterogeneities. Furthermore, we exclude the following companies as they do not meet our screening criteria: (1) ST, \*ST and PT<sup>1</sup> sample companies; (2) companies in the financial industry due to different regulatory systems and reporting standards; (3) companies with substantially unreliable or missing data. (4) companies whose annual reports are unfindable or unusable. Our final balanced panel data sample comprises 1,123 listed companies in China A-shares with 11,230 observations.

##### 3.1.1 Measure of marketing expenditure

The dependent variable in this study is marketing expenditure (MarketEx). We follow Pepall et al. (2014) and adopt the ratio of marketing expenses to operating revenue as a proxy for marketing expenditure, as follows.

$$\text{MarketEx}_{it} = \frac{\text{SellingsEx}_{it}}{\text{OperatingInc}_{it}} \quad (1)$$

##### 3.1.2 Measures of forward-looking statement tone

The forward-looking information presented in annual reports is primarily located in the outlook section of management discussion and analysis (MD&A). The tone indicators of forward-looking information are constructed as follows: (1) The annual reports of China A shares from 2011 to 2020 are collected from Juchao Information Network<sup>2</sup>; (2) artificial selection and extraction of forward-looking information from the FLS sections; (3) We use the Python computer programming language to clean the text, delete all numbers and various symbols, and delete the stop words with little information based on the HIT<sup>3</sup> list of stop words; (4) Count the frequency of positive and negative words according to the financial sentiment dictionary<sup>4</sup>; (5) Calculate the total number of words in each company's FLS chapter; (6) generate the information tone indicators. The most widely used text tone

measures in the existing literature are the following two kinds: the first one (Tone1) uses the ratio of the difference between positive and negative words to the total number of words in the text as a proxy for text tone (Davis et al. 2015), calculated as (number of positive words – number of negative words)/total number of words; the second one (Tone2) is the ratio of the difference between positive and negative words divided by the sum of the two (Price et al. 2012). We employ the first approach (i.e. prospective information tone) in the baseline regression, and the second approach (i.e. text tone) in the robustness check sections.

$$\text{Tone1}_{it} = \frac{\text{Pos}_{it} - \text{Neg}_{it}}{\text{TotalW}_{it}} \quad (2)$$

$$\text{Tone2}_{it} = \frac{\text{Pos}_{it} - \text{Neg}_{it}}{\text{Pos}_{it} + \text{Neg}_{it}} \quad (3)$$

### 3.1.3 Measures of financial constraints

The level of financing constraint of a company refers to the degree of difficulty in obtaining external funds (e.g. debt and equity financing). In our study, we make use of two widely used measures of financing constraints in the recent literature: the SA index (Hadlock and Pierce 2010) and the WW index (Whited and Wu 2006). The former one is an indicator of firm-level information opaqueness solely captured by firm age (A) and size (S) calculated as in Eq. (4). A lower (higher) value of the index represents that a firm is more (less) informationally opaque, thus more (less) financially constrained (Wang, Han, and Huang 2020). Notably, the SA index offers several advantages over other financial constraint indicators, such as the KZ index (Kaplan and Zingales 1997), due to its ease of calculation, relative stability, and lack of endogenous attributes (Chen, Zhong, and Lee 2020). Furthermore, we incorporate the WW index, as calculated in Eq. 5, into our robustness check models. In this context, a higher WW index value signifies greater financing obstacles faced by the sample firms. The WW index reflects the shadow price of external funds (Farre-Mensa and Ljungqvist 2016). Livdan et al. (2009) argue that WW index effectively represents credit constraints.

$$\text{SA}_{it} = -0.737 * \text{Size}_{it} + 0.043 * \text{Size}_{it}^2 - 0.04 * \text{Age}_{it} \quad (4)$$

$$\begin{aligned} \text{WW}_{it} = & -0.091 * \text{Cf}_{it} - 0.062 * \text{Divpos}_{it} + 0.021 * \text{Tltd}_{it} - 0.044 * \text{Lnta}_{it} + 0.102 * \text{Lgrowth}_{it} \\ & - 0.035 * \text{Growth}_{it} \end{aligned} \quad (5)$$

In Equation (4), Size is the natural logarithm of total assets and Age is calculated in actual years of creation; in Equation (5), Cf is the ratio of cash flow to total assets; Divpos represents the dividend dummy variable; Lnta is the natural logarithm of total assets; Ltdr is the long-term debt ratio; Lgrowth is the industry-level sales revenue growth rate; and Growth represents the firm-level growth rate of sales revenue. The definitions of variables are presented in Appendix A, followed by a correlation matrix (Appendix B).

### Summary statistics

We applied winsorisation at the 1% and 99% levels to all continuous variables to address potential outliers. Table 1 provides descriptive statistics for the main variables in this study. The mean value of the dependent variable marketing expenditures (0.0724) is greater than its median (0.0430), suggesting that a portion of observations has a significantly higher level of marketing expenditures (i.e. left-skewed distribution). Regarding the key independent variable (Tone1), the statistics reveal that the forward-looking information tone of sample companies is generally more positive than

**Table 1.** Summary statistics.

Variable	Obs.	Mean	Std. Dev.	Min.	Max	Median
MarketEx	11,230	0.0724	0.0828	0.0000	0.4276	0.0430
Tone1	11,230	0.2018	0.0502	0.0853	0.3399	0.1995
Herf	11,230	0.1118	0.1127	0.0001	0.5123	0.0773
RDEx	11,230	0.0095	0.0222	0.0000	0.1182	0.0000
Size	11,230	22.3963	1.2385	20.2052	26.1592	22.2247
Growth	11,230	0.1518	0.3446	-0.4954	2.0511	0.0999
Roe	11,230	0.0643	0.0962	-0.4444	0.2999	0.0641
SA	11,230	-3.7819	0.2389	-4.3580	-3.2051	-3.7911
WW	11,230	-0.9525	0.2768	-1.2180	0.0000	-1.0200

negative. Furthermore, substantial disparities are observed in the equity concentration and R&D expenses variables.

### 3.2 Model specification

We employ the following baseline model (Eq. 6) to examine if the positivity of forward-looking message tone affects marketing expenditures after controlling for firm and industry-level heterogeneities.

$$\text{MarketEx}_{it} = \alpha_0 + \beta_0 \text{Tone1}_{it} + \beta_1 \text{Herf}_{it} + \beta_2 \text{RDEx}_{it} + \beta_3 \text{Size} + \beta_4 \text{Growth} + \beta_5 \text{Roe} + \text{Year} + \text{Ind} + \varepsilon_{it} \quad (6)$$

MarketEx is the amount of marketing expenditures scaled by operating income for a firm *i* in year *t*; Tone1 is the proxy of the positivity of forward-looking information tone, and a higher value indicates a more positive tone. Herf measures the equity concentration of a company. Major shareholders could ease financial restrictions by strengthening supervision, thereby affecting marketing expenditure, which in turn reduces the likelihood of cutting marketing budget due to performance pressure (Almeida, Campello, and Weisbach 2004). Since R&D activities also affect the size of marketing expenditures (Hirschey 1982), we include R&D expenditures scaled by operating income (RDEx) in the model. Moreover, Size is the natural logarithm of the enterprise's total assets. Growth is the growth rate of the enterprise's operating income. Roe refers to the return on equity ratio, which is used to measure the profitability of listed companies. Finally, Year and Ind denote year and industry fixed effects, respectively.  $\varepsilon$  is the disturbance term. The coefficient of variable Tone1 ( $\beta_0$ ) is our primary point of interest, which is expected to be positive according to Hypothesis H1.

## 4. Empirical findings

### 4.1 Baseline results

We present our baseline results in Table 2. Model 1 includes only the variable of focus (Tone1), Model 2 adds five control variables, and on top of that, Model 3 allows for industry- and time-fixed effects. The gradual addition of elements to the models aims to assess the stability of our estimated key parameters (Huang et al. 2022). Our estimation output consistently reveals positive and statistically significant coefficients for Tone1 across all models. This finding supports the hypothesis in H1, indicating that the positivity of forward-looking message tone correlates positively with marketing expenditure. Such a finding supports the conjecture that the positive tone of private information implies a positive signal from managers to the public, which in turn boosts investors' confidence and alleviates the enterprise's financing constraints. This favourable signalling effect



**Table 2.** Baseline results.

<i>Explanatory variables</i>	Dependent variable: MarketEx		
	(1)	(2)	(3)
Tone1	0.0897*** (0.015)	0.1192*** (0.015)	0.0961*** (0.015)
Herf		-0.0103 (0.007)	-0.0088 (0.006)
RDEx		0.4789*** (0.041)	0.3663*** (0.053)
Size		-0.0133*** (0.001)	-0.0088*** (0.001)
Growth		-0.0109*** (0.002)	-0.0131*** (0.002)
Roe		0.0672*** (0.009)	0.0729*** (0.009)
Constant	0.0471*** (0.005)	0.3411*** (0.012)	0.2325*** (0.013)
Ind	Yes	No	Yes
Year	Yes	No	Yes
Observations	11,230	11,230	11,230
R-squared	0.103	0.060	0.127

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

fosters potential investment opportunities, facilitates external financing expansion, and ultimately leads to increased marketing expenditure.

In analysing other variables, we note that the coefficient on R&D expenditure is significant at 1% level, implying that enterprises engaging in more product innovation spend more on marketing activities. Next, the negative coefficient of size is statistically significant at the 1% level. This suggests that larger enterprises tend to allocate lower resources to marketing activities. Furthermore, the coefficient results for equity concentration indicate a negative association with marketing expenditure, and this relationship is statistically significant. The coefficient of Roe is statistically significant at the 1% level, implying that a higher level of profitability in a listed company corresponds to increased marketing expenditure. Last, we observe that the variable ‘Growth’ is statistically significant at the 1% level.

## 4.2 Endogeneity concerns and robustness tests

### 4.2.1 Endogeneity concerns

Regarding the endogeneity problem, we have used various methods to solve it as follows:

- (1) lagging the explanatory variables by one period. The main independent variable Tone1 is one-year lagged in Table 3 to address the concerns of contemporaneous reverse causality, and all other specifications remain unchanged from the baseline models. All results are consistent with the baseline findings.
- (2) Propensity score matching techniques (PSM). The propensity score matching (PSM) technique involves finding a control group that closely resembles the treatment group based on their propensity score values in paired analysis. This approach effectively reduces sample selection bias and removes confounding biases from observable factors, such as control variables, affecting the examined variables (Sun and Wang 2014). Therefore, we employ the PSM method to mitigate the estimation bias that could arise from regressing forward-looking disclosure tones on marketing expenditures, thus effectively addressing endogeneity concerns. Specifically, the whole sample is first divided into two groups according to the

**Table 3.** Alternative models – one-year lagged tone 1.

<i>Explanatory variables</i>	Dependent variable: MarketEx		
	(1)	(2)	(3)
L_Tone1	0.0890*** (0.016)	0.1182*** (0.016)	0.0948*** (0.015)
Herf		-0.0097 (0.007)	-0.0063 (0.007)
RDEx		0.4570*** (0.041)	0.3725*** (0.054)
Size		-0.0137*** (0.001)	-0.0088*** (0.001)
Growth		-0.0098*** (0.002)	-0.0128*** (0.002)
Roe		0.0702*** (0.010)	0.0730*** (0.010)
Constant	0.0527*** (0.006)	0.3513*** (0.013)	0.2396*** (0.014)
Ind	Yes	No	Yes
Year	Yes	No	Yes
Observations	10,107	10,107	10,107
R-squared	0.101	0.061	0.126

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

**Table 4.** PSM results.

<i>Explanatory variables</i>	Dependent variable: MarketEx		
	(1)	(2)	(3)
Tone1	0.0866*** (0.017)	0.1155*** (0.017)	0.0934*** (0.017)
Herf		-0.0037 (0.008)	-0.0039 (0.008)
RDEx		0.4806*** (0.048)	0.3651*** (0.062)
Size		-0.0139*** (0.001)	-0.0091*** (0.001)
Growth		-0.0110*** (0.003)	-0.0126*** (0.002)
Roe		0.0844*** (0.011)	0.0878*** (0.011)
Constant	0.0476*** (0.006)	0.3514*** (0.014)	0.2392*** (0.015)
Ind	YES	NO	YES
Year	YES	NO	YES
Observations	8,685	8,685	8,685
R-squared	0.105	0.062	0.130

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

median of the prospective information text tone. Next, we adopt a one-to-one inexact nearest matching technique with no replacement to find the corresponding control group samples.<sup>5</sup> Finally, we conduct a regression analysis on the matched sample and present the results in Table 4. The output remains meaningfully unchanged.

- (3) System GMM. In our study, there might exist reverse causality: an increase in marketing expenditures could lead to an enhancement in firm fundamentals, consequently influencing the forward-looking disclosure tone. Therefore, we include a one-period lag of the explanatory variables in the model and adopt a dynamic panel model using the systematic GMM

**Table 5.** Regression results of the systematic GMM method.

<i>Explanatory variables</i>	Dependent variable: MarketEx	
	(1)	(2)
L_MarketEx	0.5970*** (0.1235)	0.7216*** (0.1255)
Tone1	0.0484 (0.0476)	0.0776* (0.0471)
Herf		0.0026 (0.0053)
RDEx		0.0750 (0.1351)
Size		0.0062** (0.0028)
Growth		-0.0165*** (0.0026)
Roe		-0.0288*** (0.0062)
Ind	Yes	Yes
Year	Yes	Yes
Observations	8,984	8,984
AR(1)	0.0001	0.0000
AR(2)	0.4802	0.3173
Hansen	0.1725	0.2518

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level.  
Robust standard errors are reported in parentheses.

approach to address the concern of endogeneity. According to column 2 of [Table 5](#), Tone1 remains significantly positive and L\_MarketEx is also significant. The model satisfies the AR tests and Hansen test.

- (4) Instrumental variables (IV). We use a common approach to solving endogeneity problems-the instrumental variables approach (IV). Following Di et al. (2020), we select the forward-looking tone mean (Tone\_mean) of listed companies within the

**Table 6.** Regression results for instrumental variables.

VARIABLES	(1)	VARIABLES	(2)
	First stage Tone1		Second stage MarketEx
Tone1_mean	0.98945*** (0.046)	Tone1 fitted value	0.24606*** (0.075)
RDEx	-0.01816 (0.029)	RDEx	0.37092*** (0.046)
Size	0.00274*** (0.000)	Size	-0.00922*** (0.001)
Herf	0.00920** (0.004)	Herf	-0.01006 (0.007)
Growth	-0.00075 (0.001)	Growth	-0.01295*** (0.002)
Roe	0.04942*** (0.005)	Roe	0.06580*** (0.009)
Constant	-0.06880*** (0.014)	Constant	0.21286*** (0.018)
Ind	YES	Ind	YES
Year	YES	Year	YES
Observations	11,230	Observations	11,230
R-squared	0.069	R-squared	0.119

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

same year and province as an instrumental variable for Tone1. The choice is driven by the similarity observed in the tone of forward-looking information disclosed by listed companies operating in the same region during the same year, as they face a relatively similar policy environment and market environment. According to column 1 of Table 6, it can be seen that Tone\_mean is highly correlated with Tone1, and column 2 shows that Tone1 is still significantly positive at the 1% significance level. To conclude, after considering the endogeneity issue, the test results remain consistent with the previous conclusions.

#### 4.2.2 Further tests

First, we test in Table 7 the robustness of our baseline findings by using an alternative measure of tone positivity (i.e. Tone2, see Section 3.1.2). All other model specifications remain unchanged from the baseline models, and the results of coefficients provide the same conclusion as the baseline models.

**Table 7.** Alternative tone measure.

<i>Explanatory variables</i>	Dependent variable: MarketEx		
	(1)	(2)	(3)
Tone2	0.0466*** (0.006)	0.0542*** (0.006)	0.0429*** (0.006)
Herf		-0.0097 (0.007)	-0.0084 (0.006)
RDEx		0.4646*** (0.041)	0.3483*** (0.054)
Size		-0.0129*** (0.001)	-0.0085*** (0.001)
Growth		-0.0120*** (0.002)	-0.0139*** (0.002)
Roe		0.0656*** (0.009)	0.0719*** (0.009)
Constant	0.0294*** (0.006)	0.3149*** (0.013)	0.2131*** (0.014)
Ind	Yes	No	Yes
Year	Yes	No	Yes
Observations	11,230	11,230	11,230
R-squared	0.105	0.061	0.127

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

Second, considering the large proportion of manufacturing companies listed in China (66% in our sample), we examine if our baseline findings are driven by this specific group of sample firms. We divide the samples into manufacturing and non-manufacturing industries, and conclude that the variable Tone1 is a statistically significant determinant of marketing expenditure in both models (Table 8).

**Table 8.** Manufacturing industries vs. non-manufacturing industries.

<i>Explanatory variables</i>	Dependent variable: MarketEx	
	Manufacturing industries	non-manufacturing industries
Tone1	0.1527*** (0.020)	0.0509** (0.021)
Herf	-0.0118 (0.009)	-0.0082 (0.009)
RDEx	0.4126*** (0.075)	0.6569*** (0.078)
Size	-0.0104*** (0.001)	-0.0150*** (0.001)
Growth	-0.0149*** (0.003)	-0.0076** (0.003)
Roe	0.1101*** (0.013)	-0.0030 (0.014)
Constant	0.2611*** (0.018)	0.3764*** (0.020)
Year	Yes	Yes
Observations	7,479	3,751
R-squared	0.042	0.127

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

Moreover, Zhu (2021) has shown that managers might reduce marketing budgets in the short-term to alleviate performance pressure (Pres). Two of the most popular and widely discussed textual features: tone and readability (Reada). Similarly, readability as a text attribute can also exhibit linguistic characteristics that convey additional information and signals similar to tone, ultimately affecting marketing expenditure. In addition, the proportion of risky content (Risk<sup>6</sup>) also has a similar effect. We therefore add these additional variables<sup>7</sup> in Table 9 to further address omitted variable bias (names in the above parentheses). It is evident that even after incorporating these control variables, the positive and significant relationship between prospective message tone and marketing expenditures persists at the 1% significance level, aligning with the baseline findings.

**Table 9.** Regression results with additional control variables.

<i>Explanatory variables</i>	Dependent variable: MarketEx			
	(1)	(2)	(3)	(4)
Tone1	0.0923*** (0.015)	0.1114*** (0.016)	0.1040*** (0.017)	0.1202*** (0.018)
Pres	-0.0150*** (0.002)			-0.0150*** (0.002)
Reada		-0.1991*** (0.077)		-0.1950** (0.077)
Risk			0.0390 (0.040)	0.0634 (0.041)
Herf	-0.0080 (0.006)	-0.0085 (0.006)	-0.0087 (0.006)	-0.0075 (0.006)
RDEx	0.3493*** (0.053)	0.3607*** (0.053)	0.3696*** (0.054)	0.3493*** (0.053)
Size	-0.0080*** (0.001)	-0.0086*** (0.001)	-0.0088*** (0.001)	-0.0079*** (0.001)
Growth	-0.0138*** (0.002)	-0.0135*** (0.002)	-0.0129*** (0.002)	-0.0140*** (0.002)
Roe	0.0259** (0.011)	0.0733*** (0.009)	0.0731*** (0.009)	0.0266** (0.011)
Constant	0.2284*** (0.013)	0.2442*** (0.014)	0.2301*** (0.013)	0.2359*** (0.014)
Ind	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	11,230	11,230	11,230	11,230
R-squared	0.132	0.127	0.127	0.133

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

## 5. Additional analysis

### 5.1 The moderating effect of financing constraints

We include the interaction terms involving message tone and financing constraints indicators in Eq. 7 to test hypothesis H2, aiming to determine whether the stronger positive relationship observed in the baseline models holds true for firms that face higher financial constraints. Both financing constraints indicators proposed previously, i.e. SA and WW, are tested, and SA enters the models in its absolute form for the ease of interpretation.

$$\text{MarketEx}_{it} = \alpha_1 + \beta_6 \text{Tone1}_{it} + \beta_7 \text{FC}_{it} + \beta_8 \text{Tone} * \text{FC} + \beta_9 \text{Herf}_{it} + \beta_{10} \text{RDEx}_{it} + \beta_{11} \text{Size}_{it} + \beta_{12} \text{Growth}_{it} + \beta_{13} \text{Roe}_{it} + \text{Year} + \text{Ind} + \varepsilon_{it} \quad (7)$$

where FC is either the SA or WW index. The main parameter to be estimated is the interaction term (Tone\*FC), where a significant and positive coefficient indicates that the degree of financing constraints strengthens the positive effect of forward-looking tone positivity on marketing expenditures.

The regression output is presented in Table 10. As expected, the coefficient of variable Tone1 is significantly positive at the 1% level for both the SA and WW models, and the coefficients of the interaction terms of Tone1 and FC are both positive and statistically significant, showing supporting evidence to hypothesis H2.

**Table 10.** Moderating effects of financing constraints.

Explanatory variables	Dependent variable: MarketEx	
	(1)	(2)
Tone1	0.2038*** (0.069)	0.3835*** (0.133)
ToneFC	0.0762** (0.035)	0.1101* (0.066)
FC	-0.0157* (0.008)	-0.0123 (0.013)
Herf	-0.0088 (0.006)	-0.0091 (0.006)
RDEx	0.3477*** (0.054)	0.3672*** (0.053)
Size	-0.0079*** (0.001)	-0.0089*** (0.001)
Growth	-0.0123*** (0.002)	-0.0130*** (0.002)
Roe	0.0720*** (0.009)	0.0728*** (0.009)
Constant	0.2021*** (0.020)	0.1757*** (0.034)
Ind	Yes	Yes
Year	Yes	Yes
Observations	11,230	11,230
R-squared	0.128	0.127

\*\*\* \*\* and \* respectively represents significance at 1%, 5% and 10% level.  
Robust standard errors are reported in parentheses.

### 5.2 The degree of marketisation

The degree of regional/provincial level marketisation has a dual impact: it influences both the efficacy of forward-looking information disclosure and signalling, as well as the challenges enterprises face when attempting to secure external capital. With this in mind, we examine whether the degree of marketisation varies the effects of tone positivity on marketing expenditures identified in the baseline models. We use the market index (market) from Fan et al. (2011)<sup>8</sup> as a proxy for the degree of marketisation at a regional level.

**Table 11.** Regression results for regions with different degrees of marketisation.

VARIABLES	Different degree of marketisation: increasing from left to right			
	(1) MarketEx	(2) MarketEx	(3) MarketEx	(4) MarketEx
Tone1	-0.0168 (0.031)	0.0528** (0.027)	0.1417*** (0.028)	0.1924*** (0.033)
Herf	0.0024 (0.016)	-0.0257** (0.012)	0.0025 (0.011)	-0.0154 (0.012)
RDEx	0.7108*** (0.241)	0.2176** (0.093)	0.3020*** (0.116)	0.4817*** (0.089)
Size	-0.0131*** (0.001)	-0.0108*** (0.001)	-0.0063*** (0.001)	-0.0046*** (0.001)
Growth	-0.0106*** (0.004)	-0.0121*** (0.004)	-0.0140*** (0.004)	-0.0159*** (0.005)
Roe	0.1348*** (0.021)	0.0673*** (0.019)	0.0627*** (0.017)	0.0365* (0.019)
Constant	0.3314*** (0.025)	0.2844*** (0.026)	0.1616*** (0.026)	0.1846*** (0.037)
Ind	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	2,825	2,882	2,876	2,647
R-squared	0.145	0.181	0.127	0.119

\*\*\*, \*\* and \* respectively represents significance at 1%, 5% and 10% level. Robust standard errors are reported in parentheses.

In Table 11, the sample firms are regrouped into four according to the degree of marketisation. Moving from left to right, Column 1 has the lowest degree of marketisation, while Column 4 has the highest degree of marketisation. The coefficient of Tone1 is insignificant in Column 1 but positively significant in all other models. It is also found that the coefficient of Tone1 increases successively from left to right, suggesting that the higher the degree of marketisation, the greater the impact of forward-looking information tone on marketing expenditure, supporting hypothesis H3.

## 6. Contribution and implications

Marketing activities are a crucial element of corporate long-term sustainable growth. Therefore, the rational allocation of limited financial resources into marketing activities is one of the key strategic issues concerning managers of listed companies. Apart from the determinants reviewed in the previous literature, we have found that forward-looking information tone is a significant factor affecting the scale of marketing activities. Based on a sample of all eligible Chinese companies listed in Shanghai and Shenzhen A-shares from 2011 to 2020, this study examines the relationship between the narrative disclosure tone of forward-looking information and enterprise marketing behaviours (i.e. expenses). Our primary findings are that the amount of marketing expenses is positively affected by the optimism in forward-looking information in the current and immediate next financial year. Such a positive relationship is more pronounced for those listed companies that are relatively more financially constrained and for those operating in regions with a lower level of marketisation.

The policy and practical implications of this study are as follows. First, listed companies may adopt information disclosure as a tool to signal the public when they are less able to raise sufficient funds. Second, the marketisation process should be accelerated to narrow the gap across different regions. A sound and competent financial system and a well-developed market are the keys to effective information transmission and rational resource allocation. Third, the government may consider strengthening the regulation of information disclosure and the punishment of false statements, to prevent large companies from manipulating disclosed information for private motives and misleading investors.

## Notes

1. On April 22, 1998, the Shanghai and Shenzhen Stock Exchanges announced that according to the stock listing rules implemented in 1998, special treatment will be given to the trading of shares of listed companies with abnormal financial or other conditions. These stocks are special treatment stocks, referred to as ST stocks. \*ST refers to stocks for three consecutive years of losses and risk of delisting. 'PT' refers to stocks of Particular Transfer.
2. Source: <http://www.cninfo.com.cn>.
3. This is a widely used vocabulary dictionary developed by Harbin Institute of Technology in China.
4. This sentiment dictionary was developed by Yao et al. (2021). It starts with annual reports and social media sources, and constructs two categories of sentiment dictionaries with data mining and deep learning algorithms: formal language and informal language. This dictionary overcomes three limitations of many Chinese sentiment dictionaries. First, most of the Chinese sentiment dictionaries use words to describe emotions; such words have poor applicability to the financial scene. Second, many Chinese dictionaries are directly translated from the LM financial sentiment dictionary in English, where the contextual and cultural differences can hardly be fully captured. Third, most dictionaries are manually constructed thus are prone to human errors.
5. In addition, we also used two other matching methods: radius matching and kernel matching. The regression results obtained by these two methods are generally consistent with the conclusions of the baseline regression results.
6. Performance pressure (Pres) is a dummy variable that is coded as one if the company's current performance is below the median value of the ROA of total net assets in the previous year, zero otherwise. Text readability (Reada) is the ratio of the number of punctuation marks to the total number of words in the text. The greater the value, the stronger the readability. Finally, the proportion of risk information (Risk) is quantified by the ratio of risky words to total words (e.g. sudden, harm, uncertainty, elimination, hidden dangers).
7. The correlation matrix of the tone-relevant variables is presented in Appendix B. The results do not indicate concerns over multicollinearity.
8. The marketisation index refers to the level and degree of regional marketisation development. Marketisation index is composed of five elements, each of which reflects a specific aspect of marketisation. They are: 1. the relationship between government and market; 2. The development of a non-state-owned economy; 3. The development degree of the product market; 4. The development degree of the factor market; 5. Market intermediary organisation development and legal system environment. There are several sub indicators under each of the elements and the final index adopted in this study consists of a total of 23 basic indicators.

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## Appendix A: Definition of main variables

Variable Name	Abbreviation	Calculation
<i>Outcome variables</i>		
Marketing expenditure	MarketEX	The amount of marketing expenditure adjusted by the enterprise's operating income, see Equation (1) under <a href="#">Section 3</a>
<i>Main explanatory variables</i>		
Forward-looking message tone	Tone	The degree of positivity/negativity of FLS sections' narrative disclosure tones, see Equations (2) and (3) under <a href="#">Section 3</a>
Equity Concentration	Herf	The sum of the squared shareholdings of the top five outstanding shares of the enterprise
R&D Expenditure	RDEx	The amount of R&D expenditure scaled by operating income.
Enterprise Size	Size	The natural logarithm of an enterprise's year-end total assets
Enterprise Growth	Growth	The natural logarithm of the year-on-year growth rate of an enterprise's operating revenue
Return on Equity	Roe	Roe refers to the percentage of net income to average shareholders' equity and is used to measure the profitability of a listed company
Financing constraints 1	SA	The SA index as a proxy of financing constraints, see <a href="#">Section 3.1.3</a>
Financing constraints 2	WW	The WW index as an alternative proxy of financing constraints, see <a href="#">Section 3.1.3</a>
<i>Other controls</i>		
Year fixed effects	Year	N/A
Industry fixed effects	Ind	N/A

## Appendix B: Correlation matrix among tone variables

	MarketEx	Tone1	Pres	Reada	Risk
MarketEx	1.000***				
Tone1	0.064***	1.000***			
Pres	-0.123***	-0.072***	1.000***		
Reada	-0.022**	0.373***	0.014	1.000***	
Risk	-0.047***	-0.495***	0.094***	-0.066***	1.000***