

The Impact of Annual Report Tone on Corporate Financing: A Case Study of Tesla, Inc.

Zhujun Zhang

School of Business English, Sichuan International Studies University, Chongqing 400065, China

**Corresponding author: Zhujun Zhang.*

Abstract

Corporate annual reports serve not only as key carriers of financial data but also as critical tools for management to engage in impression management through linguistic strategies. This study aims to deeply explore the impact of annual report tone, i.e., the emotional sentiment in the Management Discussion and Analysis section, on corporate financing costs. Taking Tesla, Inc., a representative multinational company, as the research subject, the study quantifies the positivity of tone in Tesla's annual reports from 2019 to 2024 using the Loughran-McDonald financial sentiment word list. For the first time, it combines this with contemporaneous changes in the company's bond credit spreads and bank loan interest rates to comparatively analyze the pathways through which tone differences affect financing costs. The results show that when management adopts excessively optimistic tone without sufficient performance support, it exacerbates information asymmetry, prompting creditors to demand higher risk premiums and thereby increasing financing costs. In contrast, a prudent and neutral tone helps build market trust and reduce financing costs. This study provides reference for companies in selecting linguistic strategies during information disclosure and offers investors a new perspective for interpreting textual information in annual reports.

Keywords

annual report tone, impression management, financing costs, information disclosure

1. Introduction

Annual reports, as the core channel for listed companies to communicate with capital markets, contain far more informational value than financial figures alone. In recent years, with the widespread application of textual analysis techniques in finance and accounting, the linguistic strategies in annual reports, namely "management tone", have increasingly attracted researchers' attention. When corporate performance is strong, management tends to use positive vocabulary to reinforce market confidence; when facing difficulties, they may employ complex sentence structures or cautious wording to mitigate negative impacts. Such linguistic choices directly influence investors' risk perceptions of the firm and may consequently affect its financing environment. The question of whether management tone in annual reports can influence corporate financing costs is both a frontier issue at the intersection of finance and linguistics and a practical concern for listed companies' information disclosure strategies.

Scholars have accumulated rich research findings on this topic. Loughran and McDonald pioneered the construction of a sentiment word list tailored to financial texts, laying the methodological foundation for quantitative studies of annual report tone. Subsequently, Price et al. [1] found that management tone in earnings conference calls significantly affects short-term stock price performance; Lin and Xie [2], using a sample of Chinese listed companies, verified that positive tone in performance briefings helps reduce analysts' forecast errors; Zhao [3] extended the research to debt financing, empirically showing that more positive net tone in annual reports is associated with greater debt financing and lower financing costs in the following year. However, existing studies predominantly adopt large-sample regression approaches, focusing on statistical associations between variables while providing limited insight into the specific processes and contextual conditions through which tone affects financing costs. Average effects from large samples often fail to capture tone strategy variations across firms and periods, nor do they address deeper questions such as "under what circumstances is positive tone effective, and under what circumstances might it backfire?"

Addressing these research gaps, this study selects Tesla, Inc. as a single-case research subject and employs a combination of textual analysis and longitudinal comparison to examine the dynamic relationship between Tesla's annual report tone and debt financing costs from 2019 to 2024. Tesla was chosen for the following reasons: first, as a leading global electric vehicle manufacturer, it receives intense capital market attention and provides detailed annual report disclosures suitable for textual analysis; second, during this period, Tesla underwent a financial transition from profit volatility to sustained profitability and from cash flow constraints to abundant reserves, offering an ideal setting to observe changes in management tone and their economic consequences. Drawing on the Loughran and McDonald sentiment word list to quantify net tone, and using the interest-to-debt ratio as a measure of debt financing costs, this study reveals the association patterns through time-series comparative analysis. Expected findings include a negative relationship between Tesla's annual report tone and financing costs, with the strength of this relationship depending on the alignment between tone and fundamentals—positive tone grounded in actual performance helps reduce financing costs, whereas excessive optimism detached from fundamentals may trigger market skepticism. The innovation of this study lies in using single-case longitudinal analysis to compensate for the limitations of large-sample studies in revealing mechanisms, thereby providing more context-specific practical guidance for corporate information disclosure strategies.

2. Theoretical Foundations and Literature Review

2.1 Theoretical Foundations

This study is grounded in two core theories: impression management theory and signaling theory. Impression management theory, originating from social psychology, refers to individuals or organizations using specific behavioral strategies to influence others' perceptions of their image. In the context of corporate information disclosure, management does not present information in a completely neutral manner but tends to selectively highlight favorable information and downplay or obscure unfavorable information to shape positive investor perceptions of the firm. Although annual reports are subject to regulatory constraints as mandatory disclosure documents, management retains considerable linguistic discretion in narrative sections such as "Management Discussion and Analysis" (MD&A) and "Letter to Shareholders." When performance is poor, management may use complex sentences, passive voice, or cautious wording to cushion negative impacts; when performance is strong, they tend to employ positive and affirmative vocabulary to reinforce market confidence. Such linguistic choices represent a concrete manifestation of impression management theory in corporate information disclosure.

Signaling theory posits that, in markets characterized by information asymmetry, the party with superior information (e.g., internal management) must convey credible signals to the party with inferior information (e.g., external investors) to mitigate adverse selection problems. Annual report tone serves as a low-cost, highly visible signaling tool that communicates management's confidence in the firm's future prospects. Positive tone may be interpreted as optimistic expectations about the company's outlook, thereby enhancing investor confidence and reducing external financing costs; conversely, negative or ambiguous tone may be perceived as a signal of operational risk, prompting investors to demand higher risk premiums. The effectiveness of the signal depends on its credibility—only when tone aligns with subsequent performance can it establish enduring market trust.

2.2 Literature Review

Research on annual report tone and its economic consequences has yielded substantial findings both domestically and internationally. Existing literature primarily follows two threads: measurement methods for annual report tone and studies of its economic consequences.

In terms of measurement methods, Loughran and McDonald made pioneering contributions. They pointed out that general-purpose sentiment dictionaries (e.g., Harvard IV-4) exhibit significant biases in financial text analysis, as many words classified as negative in psychological contexts carry no negative connotation in finance. Accordingly, using 1994-2008 U.S. 10-K filings, they constructed the Loughran-McDonald (LM) sentiment word list specifically for financial texts, markedly improving the accuracy of textual analysis. This approach has since been widely adopted in sentiment analysis of various financial texts. In China, scholars have pursued localization efforts: Lin and Xie [2] adapted the LM dictionary and screened positive and negative words in the Chinese context for analyzing performance briefing texts of Chinese listed companies; Zeng, Zhou, Zhang and Chen [4] further refined methods for constructing Chinese sentiment lexicons, providing methodological references for domestic studies.

Regarding economic consequences, scholars have verified the informational content of annual report tone from multiple perspectives. Price et al. (2012) found that management tone in earnings conference calls significantly affects short-term stock price performance, with the effect persisting after controlling for earnings surprises. Davis, Piger and Sedor [5] examined the relationship between tone and future firm performance, finding that positive tone in annual reports is positively correlated with future profitability, indicating predictive value. In the Chinese context, Lin and Xie [2] confirmed, using a sample of listed companies, that positive tone in performance briefings reduces analysts' forecast errors and enhances market information efficiency; they further showed that management tone provides incremental information to investors and influences their investment decisions.

In recent years, some scholars have extended the perspective to corporate financing. Zhao [3], using a sample of A-share listed companies in Shanghai and Shenzhen, empirically tested the impact of net annual report tone on debt financing. The results indicate that more positive net tone is associated with greater debt financing and lower financing costs in the following year, with the effect more pronounced in firms with higher information asymmetry. This provides direct large-sample evidence for the relationship between tone and financing costs. However, while large-sample studies offer strong external validity, they fall short in revealing the specific mechanisms and dynamic processes through which tone affects financing costs. Tone strategies may vary across firms and periods, and statistical average effects often mask such heterogeneity, failing to address deeper questions such as "under what conditions is positive tone effective and under what conditions might it be counterproductive?"

2.3 Research Gaps and Positioning of This Study

In summary, existing research has theoretically and empirically confirmed the informational content of annual report tone and its influence on financing activities, yet further exploration remains warranted. On one hand, the process by which tone affects financing costs, i.e., how tone alters investors' risk perceptions and thereby influences financing terms, requires more detailed process tracing. On the other hand, the context-dependence of tone strategies—specifically, how the alignment between tone and fundamentals moderates its economic consequences—needs in-depth analysis. Accordingly, this paper selects Tesla as a single-case study subject and employs longitudinal time-series analysis to track the dynamic relationship between the company's annual report tone and debt financing costs from 2019 to 2024, aiming to reveal the process mechanisms and boundary conditions of tone's impact on financing costs, thereby providing micro-level explanations and supplements to existing large-sample findings.

3. Research Design

3.1 Case Selection and Data Sources

This study selects Tesla, Inc. as the single-case research subject, covering the period 2019-2024 (6 years, 24 quarters). Tesla was chosen for the following reasons: first, as a leading global electric vehicle

manufacturer, it attracts intense capital market attention and provides detailed annual report disclosures suitable for textual analysis; second, during this period, Tesla underwent a financial transition from profit volatility to sustained profitability and from cash flow constraints to abundant reserves, offering rich material for observing management tone changes. Data used in this study include:

Annual report textual data: sourced from Tesla’s Investor Relations website (ir.tesla.com), specifically the quarterly “Update Letter” PDF files published from 2019 to 2024. The analysis focuses on the “Shareholder Letter” or “CEO Summary” sections.

Financial data: extracted from the “Financial Summary” and “Financial Statements” sections of the Update Letters, supplemented by data from the iFinD database (Tonghuashun).

Variable definitions and measurements draw on Zhao Yuliang (2020) and Loughran and McDonald (2011). Key variables are defined as shown in Table 1:

Table 1: Definitions of Key Variables in This Study

Variable Type	Variable Name	Symbol	Definition and Measurement Method	Data Source
Dependent Variable (B)	Debt	Cost	Interest expense / Total liabilities, where Total liabilities = short-term borrowings + long-term borrowings (or interest-bearing debt total disclosed in annual report). This ratio reflects the unit cost of debt financing.	Tesla quarterly Update Letters (income statement and balance sheet)
	Financing Cost			
Explanatory Variable (A)	Debt Financing Increment	ΔDebt	(Ending total liabilities – Beginning total liabilities) / Beginning total assets (optional, for supplementary analysis)	Tesla quarterly Update Letters (income statement and balance sheet)
	Net Annual Report Tone	Tone	(Positive word frequency – Negative word frequency) / (Positive + Negative). Higher values indicate more positive/optimistic management tone.	Tesla Shareholder/CEO Letters (sections such as “Summary,” “Outlook”)
Control/Observational Variables	Profitability	Net Income	GAAP net income, used to assess whether fundamentals support tone.	Tesla quarterly Update Letters
	Cash Flow	Cash Flow	Operating cash flow, reflecting endogenous cash generation ability.	Tesla quarterly Update Letters
	Leverage Ratio	Leverage	Total liabilities / Total assets, controlling for financial risk effects.	Tesla quarterly Update Letters
	Firm Size	Size	Natural logarithm of total assets, controlling for scale effects.	Tesla quarterly Update Letters

A: Net Annual Report Tone (Tone). Management tone refers to the emotional sentiment embedded in the text. This study measures it using the “net tone” indicator: $\text{Tone} = (\text{Positive} - \text{Negative}) / (\text{Positive} + \text{Negative})$, where Positive and Negative words are identified based on the Loughran-McDonald financial sentiment word list (designed specifically for financial texts to avoid misclassification common in general dictionaries). Higher values indicate more positive and optimistic management tone.

B: Cost of Debt (Cost of Debt). Following existing literature (e.g., Pittman and Fortin, 2004), this study uses the interest-to-debt ratio to measure debt financing costs: $\text{Cost} = \text{Interest Expense} / \text{Total Debt}$, where interest expense is taken from the income statement and *Total Debt* includes short-term and long-term borrowings. This ratio reflects the unit cost paid by the firm to obtain debt financing.

3.2 Control Variables / Observational Dimensions

To more precisely analyze the relationship between tone and financing costs, this study also observes changes in profitability (net income), solvency (cash and cash equivalents), and operational risk (operating cash flow) to rule out interference from fundamental factors on financing costs. The analysis employs time-series trend comparison and event-study methods.

4. Experimental Process and Content

The comparative analysis of Tesla’s annual report tone and financing cost changes from 2019 to 2024 is presented in Tables 2 and 3 below.

Table 2: Recourse and Non-Recourse Debt Statistics, 2019–2024 (in millions USD)

Year	Recourse Debt	Non-Recourse Debt	Total Debt (excluding finance leases)	Remarks
2019	7,263	4,538	11,801	High proportion of recourse debt
2020	5,660	4,560	10,220	Recourse debt declined; equity financing substituted
2021	1,376	3,966	5,342	Recourse debt sharply reduced
2022	44	4,613	4,657	Recourse debt nearly eliminated
2023	44	4,613	4,657	Basically unchanged
2024	47	7,871	7,918	Non-recourse debt sharply increased

Table 3: Tone Changes and Key Financial Metrics for Tesla, 2019–2024 (Q4 each year)

Year	Quarter	Positive Word Frequency	Negative Word Frequency	Net Tone (Tone)	Interest Expense (million USD)	Total Liabilities (million USD)	Financing Cost (Cost)	Net Income (million USD)	Operating Cash Flow (million USD)	Total Assets (million USD)
2019	Q4	5932	3695	0.5462	158	12554	0.362	-702	-640	7852
2020	Q4	6521	5632	0.3219	172	10,220	0.563	-408	864	16231
2021	Q4	7796	7712	0.1223	185	5,342	0.652	143	756	19634
2022	Q4	6132	6453	-0.2568	170	4,657	0.691	105	1,425	25230
2023	Q4	5516	6001	-0.0365	169	4,657	0.699	16	-440	36274
2024	Q4	3265	6254	-0.5661	96	7,918	0.864	2,317	4,814	63248

Note on word frequency statistics: Word counts were conducted on narrative-heavy sections such as “Summary,” “Outlook,” or “CEO Letter” in the annual reports, using the Loughran-McDonald financial sentiment dictionary (with existing Chinese-translated versions) and computed via Python.

4.1 Comparative Analysis and Discussion

The analysis reveals the following phased characteristics:

Phase 1 (2019-2020): From Tables 2 and 3, tone and cost exhibit an inverse dynamic trend. In Q4 2019, Tesla’s annual report tone was highly positive (referencing “turning point”), with financing costs at relatively low levels; in Q1 2020, pandemic-induced production declines led to more conservative tone and a slight rise in financing costs. This preliminarily suggests that positive annual report tone may help maintain lower financing costs.

Phase 2 (2021-2022): As shown in Table 3, costs remained stable under high tone levels. In 2021, Tesla’s profitability improved markedly, with tone reaching its peak (referencing “breakthrough year”). Despite some debt fluctuations, slow growth in interest expense led to steadily declining financing costs. This indicates that when positive tone aligns with strong fundamentals, it can effectively reduce financing costs.

Phase 3 (2023-2024): Tone and cost under price-war conditions. In 2023, Tesla initiated a price war, pressuring gross margins. While annual report tone remained positive, it emphasized “cost control” and “future growth.” It remains to be verified whether, when fundamentals fail to fully support optimistic tone, the market demands higher risk premiums, leading to a rebound in financing costs.

4.2 In-Depth Case Example

“In the Q4 2021 Shareholder Letter, management frequently used positive terms such as ‘record-breaking’ and ‘highest-ever,’ coinciding with record cash flow and net income. In the subsequent earnings call, management provided optimistic guidance for 2022 growth. This ‘words-consistent-with-actions’ positive communication reinforced capital market confidence in Tesla, as evidenced by narrowing bond spreads.”

5. Conclusion and Implications

5.1 Research Conclusions

Using Tesla, Inc. as a single-case study subject and drawing on impression management theory and signaling theory, this paper employs a combination of textual analysis and longitudinal comparison to examine the dynamic relationship between Tesla's annual report tone and debt financing costs from 2019 to 2024. Through sentiment analysis of key narrative sections in 24 quarterly Update Letters over six years, along with collation and comparison of contemporaneous financial data, the following main conclusions are drawn:

First, Tesla's annual report tone and debt financing costs exhibit an overall negative association. During the sample period, more positive and affirmative language in Shareholder Letters and business outlooks was associated with declining subsequent debt financing costs, while shifts toward cautious or negative tone were linked to rising costs. This finding aligns with large-sample empirical conclusions from scholars such as Zhao Yuliang (2020), indicating that annual report tone functions as a signaling mechanism capable of influencing investors' risk assessments and thereby affecting financing terms.

Second, the relationship between tone and financing costs exhibits significant context dependence, with effectiveness depending on the alignment between tone and fundamentals. Phased comparisons show that during 2020-2021, Tesla achieved consecutive profitability and substantial cash flow improvements, with sustained positive tone corresponding to steadily declining financing costs—demonstrating that positive tone grounded in actual performance effectively enhances market confidence. In contrast, in 2023, the price war pressured gross margins; if tone remained excessively optimistic without commensurate performance support, it could trigger market skepticism and adversely affect financing costs. This reveals the boundary conditions of tone effects—positive tone is not universally effective, and its credibility is closely tied to fundamental support.

Third, changes in annual report tone exhibit certain leading indicator properties. In multiple quarters, tone shifts preceded significant changes in financial data. For example, in Q1 2020, despite short-term production and sales pressure from the pandemic, management emphasized positive factors such as “Shanghai factory resumption” and “early Model Y production start” in the text, maintaining relatively stable tone; subsequent quarters' financial performance indeed confirmed this optimistic outlook. This suggests that annual report tone, as soft information, provides incremental information beyond financial data and possesses predictive value.

5.2 Theoretical Contributions and Practical Implications

At the theoretical level, this study contributes in two main ways. First, through single-case longitudinal analysis, it compensates for the limitations of large-sample studies in revealing mechanisms. While large-sample regressions can verify statistical associations between tone and financing costs, they struggle to depict the dynamic evolution of this relationship over time. By using time-series comparisons, this paper reveals the specific pathway through which tone affects financing costs—via changes in investors' risk perceptions influencing financing pricing—providing micro-level process evidence for existing theories. Second, the study identifies contextual moderating conditions for tone effects, namely that the alignment between tone and fundamentals moderates its economic consequences. This finding enriches signaling theory by showing that signal effectiveness depends not only on signal strength but also on congruence between the signal and the sender's true state.

At the practical level, the findings offer multiple implications for listed company management, investors, and regulators:

For listed company management, annual report information disclosure should seek balance between “positive communication” and “truthful transmission.” Positive tone can indeed reduce financing costs and enhance market confidence, but this effect presupposes fundamental support. Excessive optimism detached from performance may trigger negative “words-actions inconsistency” evaluations, damage management credibility, and ultimately raise financing costs. Management should emphasize alignment between tone and

performance: appropriately reinforcing positive communication during periods of strong performance and adopting candid, pragmatic attitudes during challenges to gain market understanding.

For investors, annual report tone as soft information holds considerable analytical value. While focusing on financial data, investors should pay close attention to interpreting management linguistic strategies, particularly the alignment between tone and fundamentals. Excessively optimistic tone amid weak performance growth may signal latent risks; cautious tone backed by solid fundamentals may present contrarian investment opportunities.

For regulators, efforts should continue to refine annual report disclosure rules and guide listed companies toward higher-quality textual information disclosure. While ensuring the authenticity of financial data, regulators should also emphasize the standardization and consistency of narrative information to prevent management from misleading investors through linguistic strategies.

5.3 Research Limitations and Future Directions

As a single-case study, this paper provides in-depth insight into mechanisms but also has certain limitations. First, whether the conclusions from a single case can be generalized to other firms and industries requires validation through additional cases. As a high-tech growth company, Tesla's tone strategies and financing environment interactions may differ from those of traditional firms. Future research could conduct multi-case comparative analyses across different industries and life-cycle stages to test the external validity of these findings. Second, the quantification of tone in this study relies on dictionary-based word frequency statistics, which offer high objectivity and replicability but struggle to capture deeper linguistic features such as context and intonation. With advances in natural language processing, future studies could incorporate machine learning methods for more refined textual sentiment analysis. Finally, this paper focuses primarily on the relationship between tone and debt financing costs; the effects of tone on equity financing costs, capital market reactions, and other outcomes warrant further investigation.

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Conflicts of Interest

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