Influence of Reporting Tone on Organisational Performance: An Exploration of Agency and Behavioural Theory Across Chinese Firms

**Hammad Hassan Mirza[1], Muhammad Haroon Rasheed[1,2♣], Maria Sultana[3],
Ahsen Saghir[4], Jamshed Khalid[2] and Nordiana Mohd Nordin[5]**
[1]Malik Firoz Khan Noon Business School, University of Sargodha, Pakistan.
[2]College of Economics and Management,
Nanjing University of Aeronautics and Astronautics, China.
[3]Department of Management Sciences, Shifa Tamer-e-Millat University, Islamabad
[4]Department of Management Sciences, ABASYN University, Islamabad
[5]School of Information Science, College of Computing, Informatics and Mathematics,
UiTM Campus Selangor, Malaysia.

ABSTRACT

The exponential increase in technological capabilities has enabled financial researchers to incorporate massive textual data for economic analysis. The study expanded this avenue by aiming to identify the underlying dynamics of reporting by Chinese firms. The model linked behavioural and rationalist variables with organizational performance through the tone of the financial statements. The study utilized panel data from 13 years of the Chinese Research Data Services (CNRDS) platform. The final dataset comprised data from 5184 different firms. The generalized method of moments (GMM) method was applied to test for inferential propositions using EViews. The findings indicated a significant influence of agency costs, CEO overconfidence, and statement tone on organizational performance. An increase in agency costs and CEO overconfidence was negatively associated with organizational performance, whereas an increase in positive tone was positively associated with improved organizational performance. Furthermore, the tone of financial statements was found to mediate this relationship. The study is a pioneer in expanding the paradigm of textual analysis by incorporating the tone of financial statements. Practically, the study provides significant insights to all the stakeholders, considering traditional and behavioral factors.

Keywords: Textual Analysis, Agency Theory, Behavioral Factors, Organizational Performance, Chinese Stock Market

INTRODUCTION

The twenty-first century has ushered in an era of exponential growth in technological innovations. (Rasheed et al., 2023). Among these, the introduction of 5G and artificial intelligence (AI)-related technologies has created a ripple effect with multidimensional implications. Following this trend, the fields of management, accounting, and finance have also evolved significantly, with the first decade of the century marked by an increased acceptance of multidisciplinary research topics, including psychology, sociology, and neuroscience. The incorporation of technological innovations, such as fintech, blockchain, and artificial intelligence, marks the recent decade. (Khalid et al., 2025; Tan et al., 2024). These technological innovations are making global economies increasingly connected and integrated. On one hand, this has brought increased competition and challenges for businesses. On the other hand, technology benefits global enterprises by expanding markets, reducing costs, enhancing quality, retaining customers, and improving access to necessary data. (Dananjayan et al., 2023). Madni (2018) contended that integration among ever-evolving technological innovations and disciplines is mandatory to address challenges in the 21st century.

The merger of technological innovation and artificial intelligence across finance has enabled researchers to obtain significant data and apply machine learning models, revolutionizing financial literature. (Goldstein et al., 2021). AI models, such as ChatGPT, have equipped business stakeholders with new and dynamic capabilities to adapt and grow. AI is being applied across various fields, including marketing, finance, accounting, and academia, among others. (Wamba et al., 2023). Automated models and underlying algorithms are also evolving and continuously enhancing the researchers' abilities to incorporate vast amounts and avenues of data to identify their interlinkage with economic variables (Tudor & Vega, 2014). Numerous new AI-aided tools, including those for coding, debugging, machine learning, etc., are expanding the traditional boundaries of knowledge in the field (Jiao et al., 2023; Khalid et al., n.d.; Rasheed et al., 2024). Among numerous other implications, these advancements and tools have also led researchers to increased access to textual data, paving the way for a rise in textual analysis across a wide range of knowledge streams, including accounting and finance, and uncovering previously unexplored and intricate relationships.

Shiller (2017) contended that narrative plays a critical role in determining economic motivations and behavior, and textual outputs hold most of a human narrative (Loughran & McDonald, 2020). This has led to exponential growth in the application of textual analysis across accounting and finance, paving the way for testing new constructs and associations (Lee et al., 2018). The significance of converting data into useful information is nothing new for accounting, as it represents organizational information (Li, 2010). Hence, textual analysis is an extension of existing trends in business research, incorporating newly acquired capabilities related to textual data. Understanding textual information holds particular significance as it provides meaning to the numerical outcomes of an organization. The exact values of an organizational outcome for two different organizations can have significantly different meanings. Furthermore, textual analysis can also reveal the intentions of organizational management and the overall behavior of the organization. Behavioral financial models suggest that managers are innately irrational and biased, like every other human being (Rasheed et al., 2022; Shiller, 2006). Hence, textual disclosure from a company can also aid in assessing the underlying behavioral biases that lead to suboptimal firm performance (Li, 2010). This necessitates a quantitative inquiry of the antecedents and predictors of an organization's textual output. Various comprehensive reviews of the existing literature have highlighted that research on the topic is scarce, with most existing studies focusing on readability and qualitative aspects of textual analysis (Bochkay et al., 2023; Li, 2010). Therefore, the quantitative model of the current study was unique in that it examined the antecedents and determinants of textual variables. The framework is the pioneer in providing and validating a comprehensive framework that leads to organizational performance.

The Asian Pacific region, led by China, is home to nearly 60% of the world's total population of 4.3 billion. Recently, the area has witnessed a rapid economic expansion in the post-pandemic period, contributing almost 70% of the worldwide GDP growth in 2023 (Biswas, 2024; Tan et al., 2024). Apart from being a key player and population center in the region. China also makes significant contributions to the region's global economy and technological innovations. Therefore, the study is focused on understanding the dynamics of firms registered in China. The reason for selecting China is not limited to its sizeable economy, but also to its pioneering role in innovation and the adoption of artificial intelligence (AI)- based technologies

across the country. The study's results expanded the existing understanding of conventional and behavioral finance models. Findings highlighted the significance and relevance of considering both paradigms better to understand their association with an organization's financial disclosure. The complex interplay between agency costs, behavioral factors, financial disclosure, and organizational performance highlights the need to develop a multifaceted understanding of the dynamics of a firm's future orientation.

LITERATURE REVIEW

Textual analysis is a process of parsing textual outputs to identify and classify logical patterns. Textual analysis has expanded to encompass numerous dimensions and avenues in modern literature and research tools. Therefore, the analysis is not simply associated with what is being said but also with how it is said. Overall, textual analysis broadly focuses on the nature, quality, and quantity of the words utilized in the text, evaluating words, phrases, tones, and themes. Historically, textual analysis has existed in some form across various disciplines and has a long history in the natural sciences, dating back to the 14th century when the Dominican order began indexing common phrases (Loughran & McDonald, 2020). The notion of textual analysis as a relevant and robust research methodology is scientifically validated and widely accepted and utilized, particularly in the fields of psychology and mental health. Natural language processing (NLP), a form of textual analysis, is a well-established assessment tool within natural sciences, particularly neuroscience and psychology. This method is frequently employed to ascertain the presence of mental health disorders in individuals. The widespread reliance on natural language processing in this critical aspect of human existence underscores the reliability of its outcomes. Notably, the results it yields are reliable and valid concerning various facets of the human psyche, encompassing but not limited to identifying mood, values, emotions, and communication modalities (Norman et al., 2020; Zhang et al., 2022). Therefore, the current study aims to create and apply textual variables to uncover and address the ongoing debate of agency problems in modern organizations.

The avenue of textual analysis in accounting and finance can be traced back to the late 20th century with the pioneering work of Frazier et

al. (1984) but since then, the avenue remained dormant, and the inception of the 21st century also brought revival to the avenue of textual analysis across the domain of accounting and finance with the revitalizing work of Antweiler and Frank (2004), Das and Chen (2007) and Tetlock (2007). This delayed emergence can be attributed to the costs and researchers' lack of access to sufficient textual data. These technological advancements have also led to increased acceptance of contextualized and behavioral models, further validating models like textual analysis for economic prediction (Rasheed et al., 2023; Tan et al., 2024). Over the past decade, textual models have become increasingly efficient and effective in studying business environments. The increased access to accounting and financial information, alongside the inception and rise of social media, has expanded the scope of textual analysis to incorporate official communications by the stakeholders, including but not limited to organizational decisions, governmental policies, media reports, and social media reactions (Booker et al., 2023; Cao et al., 2021). The modern literature on textual analysis offers significant insights to stakeholders across various aspects of the business environment and holds the potential to improve business performance substantially.

Traditionally, the fields of accounting and finance relied on the rationality paradigm and considered human behavior to consist of systematic, uniform, and perfectly efficient choices (Fama, 1970; Markowitz, 1952). Hence, any deviation from this optimal track is considered intentional and self-oriented. This assumption becomes the driving force that creates agency problems in an organization. Traditional financial models focus on institutional factors, such as corporate governance, to mitigate such issues, thereby contesting the study of human factors (sentiments, tone, patterns) as irrelevant. Still, ample modern literature based on real-world evidence indicates otherwise. Notably, the evolution of behavioral financial models was pioneered through the prospect theory by Kahneman and Tversky (1979) marks the commencement and acceptance of humanistic models across accounting and finance literature, and hence, pioneered the wave of contextualized understanding of the business environment, including manager behavior. The current model incorporates these aspects to assess their impact on financial reporting tone and its link with organizational performance.

Tone of Accounting Disclosure and Firm Performance

Annual financial reports aim to present an accurate and fair view of an organization's performance to all stakeholders. Traditionally, researchers have focused only on the quantitative aspects of annual reports to evaluate financial decisions. Only recently, however, the textual portion, including the accounting narrative, has gained momentum across accounting and financial research. The qualitative textual part of financial reporting is widely utilized and vital in financial decisions (Clatworthy & Jones, 2003). Ideally, the textual part of the report should accurately reflect the organization's actual quantitative performance. An increase in positive tone should be associated with improved performance and vice versa. Still, given the unaudited nature of the textual portion of financial reports, it can lead to impression management and biased presentation. Literature suggests that the tone of annual reports can significantly predict a company's future performance, while accounting for board tendencies and biases (Kang et al., 2018). Similarly, it has been noted that both good- and bad-performing entities tend to place significant emphasis on only positive news in their annual reports (Clatworthy & Jones, 2003). Researchers are also interested in studying the degree of complexity in financial reporting and whether better readability of annual reports is associated with increased organizational performance and vice versa (Alduais, 2022). The textual study of annual reports is an established financial decision-making tool (Li, 2008; Sai et al., 2019). Hence, the tone of the financial statement has a significant influence on organizational performance and is explored in the current study.

H1: The tone of the financial statements is significantly associated with organizational performance.

Agency Costs, Disclosure, and Firm Performance

The rational or conventional view of accounting and finance originates from the pioneering work of Markowitz and Fama (Fama, 1970; Markowitz, 1952). The rational view of accounting and finance considers agency costs a significant component of organizational performance that has received constant attention in the accounting and finance literature. Agency costs arise from the divergence of interests between stakeholders and organizational management. In traditional theory, the agency problem

is believed and established to be associated with declining organizational performance (Eskandari & Kordestani, 2024; Indriastuti et al., 2021). The literature established a significant but contextual association between agency cost and organizational performance (Herrero, 2011). Meanwhile, studies explored the nexus between capital structure, agency cost, and organizational performance across Turkey and India. They reported a significant and negative influence of agency cost on organizational performance (Ahmed et al., 2023; Pandey & Sahu, 2019)agency theory has argued that debt can decrease agency issues between agent and principal and enhance the value of firms. This paper explores the moderating effect of agency cost on the association between capital structure and firm performance. A panel econometric method, namely a fixed-effect regression model, was used to evaluate the above description. This investigation uses secondary data collected from published annual reports of manufacturing firms listed on Tehran Stock Exchange (TSE. Hence, a consensus exists in the literature regarding the relationship between agency costs and organizational performance.

H2: Agency Cost is significantly associated with organizational performance

Similarly, the traditional rational view of accounting and finance posits that any deviance from rational and optimal manager behavior is intentional and has a self-serving orientation (Herrero, 2011). The lousy news hoarding theory, an extension of agency theory, elaborates that managers tend to withhold bad news for their own interests (Kothari et al., 2009) Hence, based on that inference, the current study extends the theory of lousy news hoarding to incorporate the textual part of financial statements. The study suggests that increased agency costs will also lead management to exhibit significant variation in the tone of an organization's annual reports, thereby concealing a proper view of their interests. An increased agency cost is expected to be associated with a higher-than-intrinsic presentation of the positive outcomes. Similarly, higher agency-oriented management will attempt to downplay adverse outcomes through the positive presentation of financial statements; hence, it is proposed.

H3: Agency Cost is significantly associated with the tone of the financial statements.

Board Overconfidence, Disclosure, and Firm

The behavioral aspect of accounting and finance literature considers and incorporates behavioral factors that are responsible for managerial errors and mistakes, as well as malicious managerial intentions arising from agency problems. The behavioral theory posits that the primary reason for deviation from rational and optimal behavior is attributed to behavioral and cognitive factors (Hussain et al., 2022; Khan et al., 2022; Rasheed et al., 2023). Among those behavioral factors, overconfidence is found to be one of the most significant and extensively studied aspects in behavioral literature (Rasheed et al., 2020). Overconfidence can be defined as an individual's tendency to overestimate their abilities and judgments. The existing literature explores this issue, concluding that there is a significant presence of overconfidence among individuals in the workplace (Meikle et al., 2016). Meanwhile, the studies mainly explored the existing literature on overconfidence among top management and concluded that CEO overconfidence significantly influences organizational outcomes, including financial performance (Brunzel, 2021). It has been identified that CEO overconfidence can substantially reduce and hinder organizational performance (Shipman & Mumford, 2011). In contrast, evidence also supports a significant, favorable influence of CEO overconfidence on organizational performance (Vitanova, 2021). Overconfidence among managers is a persistent phenomenon that influences many organizational outcomes. (Huffman et al., 2022). Hence, the current study believes CEO overconfidence is significantly associated with organizational performance.

H4: CEO overconfidence is significantly associated with organizational performance

Meanwhile, the CEO's overconfidence will also lead to significant variations in the representative tone of the annual financial statements. The Socionomic theory of finance states that financial systems are social systems influenced by individual beliefs (Nofsinger, 2005). These beliefs spread in the system through human interactions (Prechter, 1970). Similarly, an overconfident CEO will also spill bias throughout the organization and

its financial reports. The CEO's overconfidence-based inherent beliefs are expected to create suboptimal assessments and evaluations (Moore & Healy, 2008). This will result in downplaying risks that contradict the CEO's beliefs and amplifying news that aligns with the CEO's views. Hence, a significant association is also expected between CEO overconfidence and the tone of annual reports.

H5: CEO overconfidence is significantly associated with the tone of financial statements

Mediation of Annual Report Tone

The preceding discussions, based on existing literature, also establish the theoretical grounds for the step mediation process as outlined by Baron and Kenny. The theoretical inferences derived from prospect theory, socionomic theory, agency theory, and bad news hoarding theory enabled the model to associate the tone of the financial statements (Li, 2008; Sai et al., 2019) they have a higher Fog index and are longer with agency cost (Eskandari & Kordestani, 2024; Indriastuti et al., 2021), (Kothari et al., 2009), CEO overconfidence (Brunzel, 2021), and organizational performance (Moore & Healy, 2008). Hence, it fulfills the necessary linkages for a median path (Baron & Kenny, 1986). Therefore, the current investigation also explores the potential mediating effect of statement tone on the relationship between agency cost, overconfidence, and organizational performance. The study followed the interpretation of Preacher and Hayes (2004), as it allowed for the examination of both partial and complete mediation models. Providing a deeper understanding of the underlying dynamics.

Agency costs often catalyze opportunistic tendencies by the management. They affect how information is reported in the financial statements. The study held the view that agents may become more motivated to distort the tone of such disclosures by either making them excessively optimistic or understating any risks that may arise from them, to serve their interests in the event of higher agency costs. Stakeholders may, in turn, be misled by such manipulation, which can negatively impact an organization's performance. The mediation approach suggests that the tone of the financial reports plays an essential intermediary role in clarifying the mechanism by which agency costs affect company performance, through

varying perceptions of participants regarding the healthiness of the firm based on its financial performance.

H6: The Tone of financial statements mediates the relationship between agency cost and organizational performance.

CEO overconfidence is often characterized by a tendency to overestimate the firm's capabilities and prospects, which may manifest in overly optimistic tones in financial statements (Moore & Healy, 2008). This study held the view that overconfidence can lead to distorted disclosures, where positive information is emphasized while negative aspects are downplayed, creating a false sense of security among stakeholders. This, in turn, can influence organizational performance by fostering misguided decision-making, excessive risk-taking, and suboptimal resource allocation. The mediation hypothesis suggested that the tone of the financial statements acts as a channel through which CEO overconfidence affects organizational performance, explaining how overconfident CEOs may inadvertently harm their organizations by altering the communication of performance.

H7: The Tone of financial statements mediates the relationship between CEO overconfidence and organizational performance.

The current investigation is a pioneer in exploring these nexuses in the context of businesses operating in China. The findings are expected to expand the current understanding of dynamics while providing practical implications for all stakeholders. The framework of the study is presented in Figure 1.
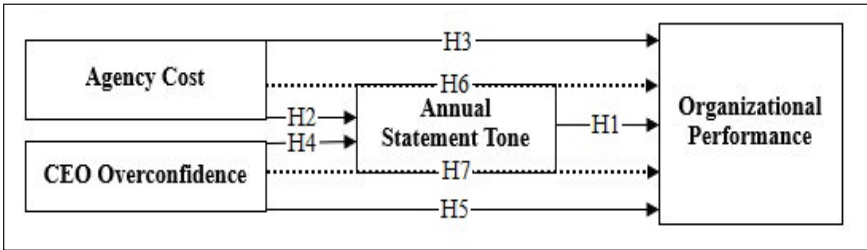

Figure 1: Theoretical Framework

SAMPLE SELECTION AND METHODOLOGY

The Asian Pacific region is home to almost 60% of the global population of 4.3 billion. From an economic perspective, the area boasts the largest GDP and a substantial investment landscape. (Adnan, 2023). Recently, the region has experienced rapid economic expansion during the post-pandemic period, contributing nearly 70% of the global GDP growth in 2023, primarily spearheaded by China (Biswas, 2024). This makes the Chinese economy an international focus point in financial literature, and hence, the current study focuses on Chinese businesses. The data for the study was derived from financial indicators available on the Chinese Research Data Services (CNRDS) Platform.

Operationalization of Variables

Variables in the current study can be categorized into four distinct categories: dependent, independent, mediator, and control variables. The primary focus of the study was to uncover the dynamics of the proposed model, identifying the dependent, independent, and mediating variables of interest for the current study. Therefore, details of the proxies used for analysis are reported.

Organizational Performance: "referred to the ability of an organization to attain its goals and objectives." (Khan et al., 2023). The current study employed two well-established proxies of return on assets (ROA) and return on equity (ROE) for inferential analysis.

Tone of Financial Statement: "referred to the assessment of language to uncover sentiments conveyed in the reports." (Kang et al., 2018). For the current model, the study gauged the tone of financial statements through the relative measurement of utilization of positive and negative words in the financial statements. (Zhou et al., 2018).

Agency Cost: "referred to the costs arising from agent-principal association." (Ahmed et al., 2023). The current study employed two proxies that encompassed both operating and capital aspects. (Ang et al., 2000).

Overconfidence Bias: "referred to the tendency to overestimate own abilities" (Rasheed et al., 2020). The current study assessed managers' overconfidence by examining their tendencies to invest and leverage the firm. (Sumiyana et al., 2023).

All the study's variables were well-established measures in the existing literature, and their statistical representation is presented in Table 1. The study considered two proxies for each variable under consideration. These proxies enabled the model to establish its reliability and validity through robustness checks.

Table 1: Operationalization of Variables

Variable	Measurement		Reference
OP	$ROA = \dfrac{Total\ Income}{Total\ Assets}$	$ROE = \dfrac{Total\ Income}{Total\ Equity}$	(Khan et al., 2022)
FST	$T1 = \dfrac{(+ve) - (-ve)Words}{Total\ Words}$	$T2 = \dfrac{(+ve) - (-ve)Words}{(+ve) + (-ve)Words}$	(Zhou et al., 2018)
AC	$AC1 = \dfrac{Operating\ Expense}{Annual\ Sales}$	$AC2 = \dfrac{Annual\ Sales}{Total\ Assets}$	(Ang et al., 2000)where the manager is the firm's sole shareholder. We utilize a sample of 1,708 small corporations from the FRB/NSSBF database and find that agency costs (i)
OC	$OC1 = \dfrac{Capital\ Expense}{Total\ Assets(-1)}$	$OC2 = \dfrac{Total\ Debt}{Total\ Assets}$	(Sumiyana et al., 2023)
FS	"Log of Total Assets"		(Khan et al., 2022)
FA	"Age of the Firm in Years"		(Khan et al., 2022)

Statistical Approach

An appropriate panel regression model is the cornerstone for establishing and validating the effect of independent variables on firm performance. Given the panel nature of the dataset, the heteroskedasticity of the data raises concerns about the reliability and validity of the model. Therefore, the generalized method of moments (GMM) is considered and utilized by a wide array of researchers in finance. This model is widely used in previous financial literature, including studies of Khan et al. (2022), Khan et al. (2023), Mulyadi and Anwar (2015), Richardson et al. (2015). Therefore, the current study also used that model. The general form of the panel data model is as below:

$$Y_{it} = \alpha_{IT} + \beta_1 X_{it} + \beta_n X_{it} + \varepsilon_{it} \qquad \dots(1)$$

Where *Yit* represented the outcome variable, i denoted the cross-section, *t* represented the time series, and α was the constant term. The β represented coefficients associated with independent variables. X denoted the independent variables in the estimated model, and ε was the standard error of these estimates.

The investigation aimed to understand the influence of agency cost (AC), CEO overconfidence (OC), and the tone of financial statements (TFC) on organizational performance (OP) and their interrelationship. The investigation further delved into the mediating role of financial statement tone (TFC). At the same time, the study also considered the impact of firm size (FS) and age (FA) as control variables. Therefore, the study utilized the systematic mediation process of Baron and Kenny (1986) for hypothesis testing and followed the interpretation of Preacher and Hayes (2004)2004 This allowed for the incorporation of partial and complete mediation impact. The four-step panel regression models used to establish and check these hypotheses are represented in the equations below:

$$OP_{it} = \alpha_0 + \beta_1 TFC_{it} + \beta_2 FA_{it} + \beta_3 FS_{it} + \varepsilon_{it} \qquad \dots(2)$$

$$OP_{it} = \alpha_0 + \beta_1 AC_{it} + \beta_2 OC_{it} + \beta_3 FA_{it} + \beta_4 FS_{it} + \varepsilon_{it} \qquad \dots(3)$$

$$TFC_{it} = \alpha_0 + \beta_1 AC_{it} + \beta_2 OC_{it} + \beta_3 FA_{it} + \beta_4 FS_{it} + \varepsilon_{it} \qquad \dots(4)$$

$$OP_{it} = \alpha_0 + \beta_1 TFC_{it} + \beta_2 AC_{it} + \beta_3 OC_{it} + \beta_4 FA_{it} + \beta_5 FS_{it} + \varepsilon_{it} \dots(5)$$

RESULTS AND DISCUSSION

The initial data set comprised 38,650 observations from 5,184 companies and 13 years, from 2010 to 2022. Descriptive statistics of the variables are reported in Table 1 below. The data was then tested for the presence of outliers and missing values. The entire series with missing values was removed, while outliers identified based on the interquartile range were trimmed using the trim function of EViews. The resulting dataset was then analyzed and tested further.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
OP	03.02298	07.4129	-35.350	20.46000
TFC	-00.00018	00.0097	-00.084	00.09284
AC	01.38782	61.1710	-35.247	11770.42
OC	00.23763	00.4285	-00.238	029.5784
FA	10.70647	07.5953	00.000	032.0000
FS	09.67599	00.6563	05.678	013.5978

Table 3 below represents the linkage between variables through correlation analysis. The analysis aimed to explore the association between the study variables. The degree of these associations established the expected linkage and paved the way for inferential statistics. The reported association indicated a weak linkage between the independent variables and the dependent variables, but the association between the mediating variable and the dependent variable was significantly higher and moderate, while its association with the independent variables was weak.

Table 3: Correlation Analysis

Variables	OP	TFC	AC	OC	FA	FS
OP	1					
TFC	0.2455	1				
AC	-0.0187	0.0009	1			
OC	-0.1178	0.0775	0.0058	1		
FA	-0.1508	-0.3861	-0.0055	-0.1676	1	
FS	0.0393	-0.0474	-0.0075	-0.0928	0.2848	1

As discussed earlier, the panel nature of the data made it suitable for the generalized method of moments (GMM) regression model. The panel data is inherently prone to heteroskedasticity errors in the terms. This makes the results of the pooled regression model unreliable and biased. The GMM method addressed this issue by using overidentification. Still, to affirm this issue, a statistical test based on the likelihood ratio was performed using EViews, and the results are presented in Table 4 below. The test was based on the null hypothesis that the error terms of the model are homoscedastic. At the same time, the results confirmed that significant heteroskedasticity

existed in the data across both the cross-section and periods. This provided grounds for performing a GMM-based inferential model for hypothesis testing and making inferences.

Table 4: Heteroskedasticity Test

	Cross-Section		Period	
	Value	Probability	Value	Probability
Likelihood ratio	6891.935	0.000	2573.071	0.000

Table 5 reports the results of hypothesis testing using the GMM model through EViews. The study followed Baron and Kenny's steps model. (Baron & Kenny, 1986). To establish mediation. The first reported step established the link between the mediator and the dependent variable, while the second step linked the independent variables with the dependent variable. Furthermore, the third step established the linkage between the independent and mediator variables. Lastly, these direct associations enabled the model to test for the mediation effect by incorporating the mediator and independent variables in the regression model. The study considered lag variables of basic accounting, as well as independent and control variables, as regression instruments for the GMM. The resulting J-statistics and their corresponding probabilities of validating the instruments are also reported for each model. The J-statistics' null hypothesis represented that the instruments used in the model were valid and produced reliable results for inference.

Table 5: Inferential Statistics

Variables	Coefficient	Standard Error	t-statistics	Probability
Step 1				
OP (-1)	-000.105	00.009	-11.315	0.000
TFC	180.980	11.574	15.640	0.000
FA	-000.509	00.027	-19.170	0.000
FS	008.145	00.367	22.200	0.000
	J-statistic	12.235	Prob(J-statistic)	0.778
Step 2				
OP (-1)	-000.102	00.009	-11.374	0.000
AC	-009.676	00.905	-10.695	0.000
OC	-029.034	02.589	-11.215	0.000
FA	000.878	00.201	04.368	0.000
FS	-032.685	03.714	-08.800	0.000
	J-statistic	11.123	Prob(J-statistic)	0.731

Step 3				
TFC (-1)	000.405	00.013	30.770	0.000
AC	000.001	00.000	-03.210	0.001
OC	-000.338	00.162	-02.090	0.037
FA	000.000	00.000	05.244	0.000
FS	-000.012	00.000	-35.966	0.000
	J-statistic	07.111	Prob(J-statistic)	0.875
Step 4				
OP (-1)	-000.011	00.002	-06.162	0.000
TFC	074.106	39.426	01.880	0.060
AC	000.061	00.131	00.466	0.641
OC	-028.092	03.846	-07.304	0.000
FA	000.978	00.271	03.614	0.000
FS	-035.729	05.666	-06.305	0.000
	J-statistic	09.713	Prob(J-statistic)	00.794

The results in step 1 established that the tone of the financial statement was significantly and positively associated with organizational performance. An increase in positive tone was primarily associated with increased organizational performance and vice versa. In step 2, the association between independent variables, specifically agency cost and CEO overconfidence, was examined about organizational performance. The findings established the negative and significant influence of these variables on organizational performance. The CEO's overconfidence was found to have a significantly higher impact on organizational performance. The findings underscored the significance and relevance of behavioral factors in comparison to the traditional view. The findings of the current model affirmed and extended the literature in the context of Chinese organizations. Next, step 3 studied the direct association of agency cost, CEO overconfidence, and the tone of annual reports. Here, the findings also indicated the presence of a significant association with mediating variables of financial statement tones, but with opposing directions. The findings of agency cost revealed that an increase in agency cost was significantly associated with the tone of the financial statements. Hence, it validated that managers tended to conceal the declining performance by improving the textual tone.

Lastly, a test of mediation was conducted in step 4. The findings revealed that the relationship between agency costs and organizational performance was entirely mediated through the tone of the financial statement. In contrast, it partially mediated the relationship between CEO

overconfidence and organizational performance. Overall, the findings suggested that suboptimal and irrational manager behavior was primarily attributable to behavioral factors, such as CEO overconfidence. Still, traditional factors, such as agency costs, also had a significant but less influence on organizational performance. The interplay of traditional and behavioral factors was not straightforward and is influenced by other contextual factors, with behavioral factors having a higher degree of complexity and requiring further exploration.

Table 6- Robustness Test

Variables	Coefficient	Standard Error	t-statistics	Probability
Orthogonal Deviations				
OP (-1)	-000.012	00.001	-018.075	0.000
TFC	756.678	65.427	011.565	0.000
AC	000.003	00.000	008.831	0.000
OC	-016.873	01.627	-010.369	0.000
FA	000.298	00.066	004.513	0.000
FS	-004.506	00.468	-009.639	0.000
	J-statistic	13.261	Prob(J-statistic)	0.474
ROE				
OP (-1)	-000.016	00.001	-018.613	0.000
TFC	015.608	01.468	010.630	0.000
AC	-008.156	05.168	001.578	0.115
OC	-122.255	01.212	-100.888	0.000
FA	000.766	00.159	004.827	0.000
FS	-012.563	02.924	-004.296	0.000
	J-statistic	02.397	Prob(J-statistic)	0.978
Arellano-Bond Serial Correlation Test				
Test order	m-Statistic	rho	SE (rho)	Probability
AR (1)	-1.759	-54842.093	25626.347	0.078
AR (2)	0.627	01145.575	18241.121	0.530

To establish the findings, robustness tests were performed using the GMM model, based on orthogonal deviations of the original model, with return on equity (ROE) as the dependent variable, while considering a second set of proxies for independent variables. Overall, the test validated the original model's findings, which are presented in Table 6. Lastly, the findings of the Arellano-Bond serial correlation test are also presented. The findings indicated that no significant serial association existed between the model's first and second-degree error terms, and the results are reliable.

DISCUSSION

The results statistically validated the conceptual links proposed by the framework. These findings aligned with the existing literature and underscore the importance of tone in financial statements for assessing organizational behavior and outcomes. Earlier authors on the impact of textual data on economic performance also support these findings (Alduais, 2022; Kang et al., 2018)convert it into numerical form to facilitate statistical analysis and then merge the results with data from the Chinese stock market to explain the impact on corporate performance and predict future earnings in the Chinese financial markets from 2008 to 2021. Findings Study findings indicate that firms with better financial reporting readability are more profitable, incur lower agency costs and have low earnings in the Chinese stock markets when readability is low (i.e. more complexity and length of annual reports. These observations underscored the importance of stakeholders surveying the textual tone of disclosed financial data to gain a better understanding of how the firm conducts and performs.

Subsequently, the association between agency cost and organizational performance was tested, and the results demonstrated that the influence of agency costs on the tone of financial statements and organizational performance was statistically significant, affirming the second and third hypotheses. The findings aligned with those of previous researchers, such as Ahmed et al. (2023), Eskandari and Kordestani (2024), Herrero (2011), Huffman et al. (2022), and Shipman and Mumford (2011). The findings highlighted the importance of traditional management practices and control methods in improving performance. In addition, the evidence suggested that a higher agency cost company might also distort the textual tone of financial disclosures, despite the presence of audit controls. This highlights the importance of reviewing financial statements related to agency issues to determine whether the economic consequences are realistic and accurately reflect the company's intrinsic valuation.

Regarding the behavioral element, the model considered the involvement of cognitive biases in organizational performance. The results for the CEO's overconfidence reported the same direction, in line with the theory of bad news hoarding. (Kothari et al., 2009). There was also a strong negative relation between CEO overconfidence and the tone of the financial

statements. The findings support the findings of Schumacher (2019)2019 and attribute that overconfidence can contribute to desensitization to both positive and negative organizational news, ultimately reducing the positivity of financial statements. The research also finds that overconfidence among CEOs affects the organization's behavior and risk-taking, leading to a decline in economic performance. Accordingly, the fourth hypothesis received complete support, shedding light on the complex system of overconfidence in determining financial disclosure and organizational outcomes. The need for managers to understate risks and profits within the firm could eventually diminish the value of the organization. Stakeholders must pay more attention to stakeholder overconfidence so that the organization's performance can be measured more reasonably and objectively.

The proposed mediation results also reinforced the study's contributions. The tone of organizational disclosures added up to the agency costs, and the effect of mediation on the agency costs was fully supported. On the other hand, the mediating role of the CEO's overconfidence on the performance of organizations gained partial support. These findings indicated that organizational performance and financial disclosures were primarily influenced by both traditional (agency-related) and behavior aspects. Nonetheless, the results also showed that their conventional management tools, including corporate governance apparatus, were more pertinent and practical in China, particularly in addressing corporate performance. This highlighted the integration of traditional controls with behavioral elements, particularly in the Chinese business context. Finally, an overall summary of the study hypothesis is also presented in Table 7.

Table 7: Hypothesis Results

No.	Hypothesis	Decision
H1	TFC---->OP	Supported
H2	AC---->OP	Supported
H3	AC---->TFC	Supported
H4	OC---->OP	Supported
H5	OC---->TFC	Supported
H6	AC---->TFC---->OP	Partial Mediation
H7	OC---->TFC---->OP	Full Mediation

CONCLUSION

The increased acceptance of cognitive and behavioral models in accounting and finance has brought the study of qualitative and contextualized models, such as technology-driven textual analysis, to the forefront of financial literature. Textual analysis is a qualitative inquiry in finance that focuses on parsing structure and linkage from textual outputs from individuals, corporations, policymakers, and practitioners. The lack of textual data and limitations in manual analysis earlier overlooked this aspect. With the recent rise of technology and artificial intelligence, the avenue has gained momentum and become an increasingly relevant and efficient methodology across accounting and finance literature—the current investigation aimed to follow a similar direction, with multiple objectives and contributions. The study contributes to the ongoing debate between rationalists and behavioralists by expanding into the textual tone of financial statements in China.

The study examined the impact of agency costs and CEO overconfidence on the textual tone of financial statements and financial performance. The findings concluded that these aspects had a considerable impact, which indicated their relevance to the overall economic environment. Furthermore, the conclusions elaborated that a positive financial statement tone is significantly associated with organizational performance in China. At the same time, the tone of a financial statement also mediated the relationship between agency cost and overconfidence with organizational performance. In other words, the findings established that primarily the positive tone of the financial statement indicated increased organizational performance. In contrast, increased agency costs and CEO overconfidence led to decreased firm performance.

The study was unique in identifying that, in the presence of overconfidence bias, the positive tone of the financial statement decreases; however, increased agency costs led to a greater presence of a positive tone in the financial statement. Hence, the study expands the existing literature, identifying that although CEO overconfidence is responsible for decreased positive tone and firm performance, agency costs are associated with increased positivity and reduced performance. Practically, these findings are of vital significance for all stakeholders and provide caution when

considering the tone of financial statements in light of changes in agency costs or CEO overconfidence, as this may impact their financial decisions.

The study allows future researchers to consider textual factors in quantitative accounting research models. Future studies can expand the generalizability of the current findings by extending the dataset to encompass varying economic realities. Furthermore, an industry-wide perspective is expected to produce unique and contextualized insights in future research. The current study is also limited in that it only considers a single dimension of organizational performance, natural language processing, agency problems, and behavioral factors. Future studies can expand the model's generalizability by considering other dimensions related to organizational outcomes, natural language processing, agency problems, and behavioral pitfalls.

REFERENCES

Adnan, A. T. M. (2023). Asian Perspective on Capital Market Performance Amid the COVID-19 Pandemic. *Asian Journal of Accounting Research, 8*(3), 210–235. Scopus. https://doi.org/10.1108/AJAR-10-2021-0223.

Ahmed, A. M., Nugraha, D. P., & Hágen, I. (2023). The Relationship between Capital Structure and Firm Performance: The Moderating Role of Agency Cost. *Risks, 11*(6), Article 6. https://doi.org/10.3390/risks11060102.

Alduai, F. (2022). Textual analysis of the annual report and corporate performance: Evidence from China. *Journal of Financial Reporting and Accounting, ahead-of-print*(ahead-of-print). https://doi.org/10.1108/JFRA-04-2022-0129.

Ang, J. S., Cole, R. A., & Lin, J. W. (2000). Agency Costs and Ownership Structure. *The Journal of Finance, 55*(1), 81–106. https://doi.org/10.1111/0022-1082.00201.

Antweiler, W., & Frank, M. Z. (2004). Is All That Talk Just Noise? The Information Content of Internet Stock Message Boards. *The Journal*

*of Finance, 59(*3), 1259–1294. https://doi.org/10.1111/j.1540-6261.2004.00662.x.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173.

Biswas, R. (January 5, 2024). The APAC economic outlook for 2024 remains bright. IHS Markit. https://www.spglobal.com/marketintelligence/en/mi/research-analysis/apac-economic-outlook-for-2024-remains-bright-jan24.html.

Bochkay, K., Brown, S. V., Leone, A. J., & Tucker, J. W. (2023). Textual Analysis in Accounting: What's Next? *. *Contemporary Accounting Research, 40*(2), 765–805. Scopus. https://doi.org/10.1111/1911-3846.12825.

Booker, A., Curtis, A., & Richardson, V. J. (2023). Investor disagreement, disclosure processing costs, and trading volume evidence from social media. *The Accounting Review, 98*(1), 109–137.

Brunzel, J. (2021). Overconfidence and narcissism among the upper echelons: A systematic literature review. *Management Review Quarterly, 71*(3), 585–623. https://doi.org/10.1007/s11301-020-00194-6.

Cao, S. S., Fang, V. W., & Lei, L. G. (2021). Negative peer disclosure. *Journal of Financial Economics, 140*(3), 815–837.

Clatworthy, M., & Jones, M. J. (2003). Financial reporting of good news and bad news: Evidence from accounting narratives. *Accounting and Business Research, 33*(3), 171–185. https://doi.org/10.1080/00014788.2003.9729645.

Dananjayan, M. P., Gopakumar, S., & Narayanasamy, P. (2023). Money in the age of bits and bytes: Technology in reshaping finance. *Journal of Information Technology Teaching Cases*, 20438869231178845. https://doi.org/10.1177/20438869231178845.

Das, S. R., & Chen, M. Y. (2007). Yahoo! for Amazon: Sentiment Extraction from Small Talk on the Web. *Management Science, 53*(9), 1375–1388. https://doi.org/10.1287/mnsc.1070.0704.

Eskandari, R., & Kordestani, G. (2024). Agency Costs and the Relationship between Financial Distress Risk and the Stock Prices Crash Risk. *Financial Management Strategy, 12*(2), 87–112. https://doi.org/10.22051/jfm.2024.45464.2877.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383–417.

Frazier, K. B., Ingram, R. W., & Tennyson, B. M. (1984). A methodology for the analysis of narrative accounting disclosures. *Journal of Accounting Research*, 318–331.

Goldstein, I., Spatt, C. S., & Ye, M. (2021). Big Data in Finance. *The Review of Financial Studies, 34*(7), 3213–3225. https://doi.org/10.1093/rfs/hhab038.

Herrero, I. (2011). Agency Costs, Family Ties, and Firm Efficiency. *Journal of Management, 37*(3), 887–904. https://doi.org/10.1177/0149206310394866.

Huffman, D., Raymond, C., & Shvets, J. (2022). Persistent Overconfidence and Biased Memory: Evidence from Managers. *American Economic Review, 112*(10), 3141–3175. https://doi.org/10.1257/aer.20190668.

Hussain, M., Sadiq, S., Rasheed, M. H., & Amin, K. (2022). Exploring the Dynamics of Investors' Decision Making in Pakistan Stock Market: A Study of Herding Behavior. *Journal of Economic Impact, 4*(1), Article 1. https://doi.org/10.52223/jei4012220.

Indriastuti, M., Kartika, I., & Najihah, N. (2021). Financial Distress Prediction: The Ownership Structure and Management Agency Cost. *The Indonesian Journal of Accounting Research, 24*(2), Article 2. https://doi.org/10.33312/ijar.514.

Jiao, W., Wang, W., Huang, J., Wang, X., & Tu, Z. (2023). Is ChatGPT a good translator? A preliminary study. *arXiv Preprint arXiv:2301.08745, 1*(10). https://www.researchgate.net/profile/Wenxiang-Jiao/publication/367359399_Is_ChatGPT_A_Good_Translator_A_Preliminary_Study/links/63db294164fc86063807774b/Is-ChatGPT-A-Good-Translator-A-Preliminary-Study.pdf

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291.

Kang, T., Park, D.-H., & Han, I. (2018). Beyond the numbers: The effect of 10-K tone on firms' performance predictions using text analytics. *Telematics and Informatics, 35*(2), 370–381. https://doi.org/10.1016/j.tele.2017.12.014.

Khan, B., Rasheed, M. H., & Uddin, S. (2022). Firms' Performance in Pakistan: The Impact of Government Policies, Capital Structure, and Board Diversity. *NUML International Journal of Business & Management, 17*, 1–15. https://doi.org/10.52015/nijbm.v17i2.134.

Khan, N., Ahmed, W., Maqbool, Z., Sadiq, S., & Rasheed, M. H. (2023). Does Ownership Concentration Moderate In Csr And Firm Performance Relationship? An Evidence From Non-Financial Sector Listed Companies Of Pakistan. *Journal of Namibian Studies: History Politics Culture, 34*, 2940–2957.

Kothari, S. P., Shu, S., & Wysocki, P. D. (2009). Do managers withhold bad news? *Journal of Accounting Research, 47*(1), 241–276.

Lee, B., Park, J.-H., Kwon, L., Moon, Y.-H., Shin, Y., Kim, G., & Kim, H. (2018). About the relationship between business text patterns and financial performance in corporate data. *Journal of Open Innovation: Technology, Market, and Complexity, 4*(1), 1–18. https://doi.org/10.1186/s40852-018-0080-9.

Li, F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics, 45*(2), 221–247. https://doi.org/10.1016/j.jacceco.2008.02.003.

Li, F. (2010). Textual Analysis of Corporate Disclosures: A Survey of the Literature. *Journal of Accounting Literature, 26*(1), 143–165.

Loughran, T., & McDonald, B. (2020). Textual Analysis in Finance. *Annual Review of Financial Economics, 12*(Volume 12, 2020), 357–375. https://doi.org/10.1146/annurev-financial-012820-032249.

Madni, A. M. (2018). Twenty-First-Century Imperatives. In A. M. Madni (Ed.), *Transdisciplinary Systems Engineering: Exploiting Convergence in a Hyper-Connected World* (pp. 1–9). Springer International Publishing. https://doi.org/10.1007/978-3-319-62184-5_1.

Markowitz, H. (1952). Portfolio selection. *The Journal of Finance, 7*(1), 77–91.

Meikle, N. L., Tenney, E. R., & Moore, D. A. (2016). Overconfidence at work: Does overconfidence survive the checks and balances of organizational life? *Research in Organizational Behavior, 36*, 121–134. https://doi.org/10.1016/j.riob.2016.11.005.

Moore, D. A., & Healy, P. J. (2008). The trouble with overconfidence. *Psychological Review, 115*(2), 502.

Mulyadi, M. S., & Anwar, Y. (2015). Corporate governance, earnings management and tax management. *Procedia-Social and Behavioral Sciences, 177*, 363–366.

Nofsinger, J. R. (2005). Social mood and financial economics. *The Journal of Behavioral Finance, 6*(3), 144–160.

Norman, K. P., Govindjee, A., Norman, S. R., Godoy, M., Cerrone, K. L., Kieschnick, D. W., & Kassler, W. (2020). Natural Language Processing Tools for Assessing Progress and Outcome of Two Veteran Populations: Cohort Study From a Novel Online Intervention for Posttraumatic Growth. *JMIR Formative Research, 4*(9), e17424. https://doi.org/10.2196/17424.

Pandey, K. D., & Sahu, T. N. (2019). Debt Financing, Agency Cost and Firm Performance: Evidence from India. *Vision, 23*(3), 267–274. https://doi.org/10.1177/0972262919859203.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717–731. https://doi.org/10.3758/BF03206553.

Prechter, R. R. (1970). *The Socionomic Theory of Finance*. PROBUS Publishing Company.

Rasheed, M. H., Ali, A., & Khan, N. A. (2023). Technological advancements and noise trading: A case of investors' sentiments at the Pakistan stock exchange. *Computers in Human Behavior Reports*, 100344. https://doi.org/10.1016/j.chbr.2023.100344.

Rasheed, M. H., Gul, F., Akhtar, M. W., & Tariq, S. (2020). DYNAMICS OF OVERCONFIDENCE AMONG STOCK MARKET INVESTORS IN PAKISTAN. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, 11*(4), 11A04T:1-11.

Rasheed, M. H., Khalid, J., Ali, A., Rasheed, M. S., & Ali, K. (2024). Human Resource Analytics in the Era of Artificial Intelligence: Leveraging Knowledge towards Organizational Success in Pakistan. *Journal of Chinese Human Resources Management, 15*(3), 3–20. https://doi.org/10.47297/wspchrmWSP2040-800501.20241503.

Rasheed, M. H., Zahid, T., & Sadiq, S. (2022). Exploring the nexus between Accounting Anomalies, Stock Returns, and Growth: A Study of KSE-100 Companies. *UW Journal of Management Sciences, 6*(1), 95–113.

Richardson, G., Lanis, R., & Taylor, G. (2015). Financial distress, outside directors and corporate tax aggressiveness spanning the global economic crisis: An empirical analysis. *Journal of Banking & Finance, 52*, 112–129.

Sai, P. K., Gupta, P., & Fernandes, S. F. (2019). Analysing Performance of Company through Annual reports using Text Analytics. *2019*

International Conference on Digitization (ICD), 21–31. https://doi.org/10.1109/ICD47981.2019.9105673.

Schumacher, C. (2019). Biased Interpretation of Performance Feedback: The Role of CEO Overconfidence. *Academy of Management Proceedings, 2019*(1), 14471. https://doi.org/10.5465/AMBPP.2019.14471abstract.

Shiller, R. J. (2006). Irrational exuberance revisited. *Other Publications, 2006*(1), 303–319.

Shiller, R. J. (2017). Narrative economics. *American Economic Review, 107*(4), 967–1004.

Shipman, A. S., & Mumford, M. D. (2011). When confidence is detrimental: Influence of overconfidence on leadership effectiveness. *The Leadership Quarterly, 22*(4), 649–665. https://doi.org/10.1016/j.leaqua.2011.05.006

Sumiyana, S., Na'im, A., Nugroho, A. H., & Kurniawan, F. (2023). Multiple measurements of CEOs' overconfidence and future earnings management: Evidence from Asia-Pacific developing countries. *Humanities and Social Sciences Communications, 10*(1), 1–11.

Tan, Q., Rasheed, M. H., & Rasheed, M. S. (2024). Post-COVID-19 technology adoption and noise trading: Elucidation of investors' sentiments across cultures. *China Accounting and Finance Review, 24*(4), 431–458. https://doi.org/10.1108/CAFR-08-2023-0106.

Tetlock, P. C. (2007). Giving Content to Investor Sentiment: The Role of Media in the Stock Market. *The Journal of Finance, 62*(3), 1139–1168. https://doi.org/10.1111/j.1540-6261.2007.01232.x.

Tudor, C. L., & Vega, C. (2014). A Review of Textual Analysis in Economics and Finance. *In Communication and Language Analysis in the Corporate World* (pp. 122–139). IGI Global. https://doi.org/10.4018/978-1-4666-4999-6.ch008.

Vitanova, I. (2021). Nurturing overconfidence: The relationship between leader power, overconfidence and firm performance. *The Leadership Quarterly, 32*(4), 101342. https://doi.org/10.1016/j.leaqua.2019.101342.

Wamba, S. F., Queiroz, M. M., Jabbour, C. J. C., & Shi, C. V. (2023). Are generative AI and ChatGPT game changers for 21st-century operations and supply chain excellence? *International Journal of Production Economics, 265*, 109015.

Zhang, T., Schoene, A. M., Ji, S., & Ananiadou, S. (2022). Natural language processing applied to mental illness detection: A narrative review. *Npj Digital Medicine, 5*(1), Article 1. https://doi.org/10.1038/s41746-022-00589-7.

Zhou, B., Zhang, C., & Zeng, Q. (2018). Does the rhetoric always hide bad intention: Annual report's tone and stock crash risk. *China Journal of Accounting Studies, 6*(2), 178–205. https://doi.org/10.1080/21697213.2018.1522038.