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SOCIAL MEDIA, SUPPLY CHAIN CONCENTRATION AND ACCOUNTING INFORMATION TRANSPARENCY

Abstract:

Improving accounting information quality of companies in supply chain is crucial for capital market. We collect disclosed information in China's stock market to explore the relationship between supply chain concentration and accounting information transparency and apply text sentiment analysis based on SnowNLP to investigate the effect of the social media's governance role on the accounting information. The empirical results show that accounting information transparency improves as supply chain concentration increases, customer concentration has a greater effect, and greater media attention results in higher accounting information transparency. Positive and negative reports display different roles in the process. It is found that the media and supply chain's synergistic governance role to enhance accounting information transparency. Moreover, as a supply chain characteristic, bargaining power significantly moderates accounting information transparency. Enterprises with stronger supply chain bargaining power are more inclined to improve accounting information quality, which is more obvious in the enterprise–customer relationship.

Keywords:

Accounting information transparency; Supply chain concentration; Media governance; Text sentiment analysis

1. Introduction

Investors and regulators always expect high-quality accounting information which is a reflection of capital market efficiency (Healy and Palepu 2001). As far back as 1996, the U.S. Securities and Exchange Commission (SEC) first introduced the concept of ‘transparency’ in the core standards of the International Accounting Standards Committee (IASC) and regarded it as an important feature when judging the quality of accounting information. Most of the literature has regarded accounting information transparency as an indicator to evaluate the reliable and timely information disclosure of enterprises to society, helping information users evaluate the financial status, business performance and risks of enterprises.

Compared with the institutional construction of the developed capital markets, the protection of investors' rights and interests in Chinese capital market and the transparency of corporate accounting information is not perfect (Allen et al. 2005). As important participants in the capital market, investors have few channels through which to acquire information, and it is difficult to distinguish the authenticity of information. According to asymmetric information theory, the imperfect information disclosure of the capital market causes adverse selection problems. As investors fail to distinguish superior listed companies from bad ones, such ‘voting with their feet’ phenomenon seriously restricts the development of the capital market (Biddle et al. 2009). Therefore, helping investors obtain transparent accounting information is the key to the healthy development of the capital market (Wurger 2000, Beyer et al. 2010).

Due to the globalization of trade and crisis, the supply chain, as a very considerable role in promoting the world economy, has faced serious impacts and challenges in in the past few years. The important reason of the shortage of N95 masks is the fragmented nature and lack of transparency of supply chains (Velayutham et al. 2021). From the scramble of masks, the shortage of chips and even daily necessities, many enterprises around the world become more and more aware of the importance of optimizing the supply chain and tend to consolidate and strengthen relationships with suppliers and customers as a key to optimizing supply chain management and the way to deal with uncertainties, so that supply chain concentration is on

the rise. Under the circumstance of closer cooperation in the supply chain, enterprises demand high-quality accounting information to make decisions.

In addition to inter-firm relationship pressures that may influence the accounting disclosure behaviour of firms in the supply chain, the pressures from external concern may also make the management pay more attention to the quality of accounting information disclosure. Due to the increasing internet penetration, China has the largest number of online users in the world. Tencent Weibo is almost the largest microblogging services in China instead of Twitter and the information can be diffused more efficient in Tencent Weibo (Li et al. 2012). In an environment where everyone becomes the media, corporate crises are quickly exposed by news media, which promptly triggers large-scale dissemination and diffusion of online public opinions through social networking sites. The phenomenon not only has a seriously negative impact on the reputation and performance of the companies involved but also may implicate supply chain partners in the process of further diffusion, resulting in a vertical spillover effect. Media reports strengthen or break up the relationship among connected enterprises in the supply chain and improve the motivation of enterprises to pay attention to the quality of their accounting information. As an external force, the social media carries out the functions of supervision and information dissemination. It is becoming an important element of the accounting information environment (Debreceny 2015).

Existing related research mainly discusses the media's as an intermediary role in facilitating the market's ability to efficiently transmit accounting information into stock capital markets (Drake et al. 2014). However, the media serves as an external monitor that curbs managers' opportunistic earnings management behaviors (Chen et al. 2021). Thus, it might affect the accounting information transparency. In addition, the diffusion of social media has expanded organisational transparency, generated new types of organisational forms, changed the way stakeholders gather information and trade (Saxton 2012). Suppliers and customers, whose concentration is a key environmental factor for companies, represent the most basic and important business relationships in companies' daily production and operations when companies make accounting information disclosure decisions. The accounting information

contained in the financial statements of an enterprise has come to represent comprehensive information—far beyond the information contained in traditional financial statements. The supply chain structure has a significant impact on corporate financial performance and other key indicators (Cai et al. 2022). Velayutham et al. (2021) maintain that a concentrated and optimized supply chain has a large demand of high quality information which would provide certainty to ensure adequate action in the short term, and appropriate preparation for the medium and long term.

Further research is needed to determine whether the media and the supply chain concentration of enterprises play a role in accounting information transparency of enterprises. In this study, we expand the research field to suppliers and customers in the front and back ends of the supply chain in the commodity market and focus on their change of accounting information quality. We examine whether the centralization of the supply chain and the social media separately and jointly changes the information environment of enterprises, thereby affecting the transparency of their accounting information. The research has a reference value for clarifying the quality and efficiency of supplied accounting information.

The remainder of this article is structured as follows. The second and third sections provide a review of the literature related to the topic, a theoretical analysis and research hypotheses. Section four provides the research design. Section five presents the empirical tests and results. Section six discusses further research. Section seven presents the robustness test. The eighth section concludes this paper and provides policy recommendations and prospects for future research trends.

2. Literature review

2.1. The media and accounting information transparency

The media are often regarded as ‘the fourth estate’, which is independent of legislation, the judiciary and administration (Felle 2015). As an external monitoring mechanism, the media has been extensively studied. The main paths for the media to perform corporate governance functions are effective monitoring and market pressure.

In the view of effective monitoring, the media plays an external governance role in increasing the quality of corporate accounting information. Dyck and Zingales(2004) argue that the media can effectively reduce private gains of control. The media forces managers to reduce their self-interested behavior by affecting their reputations among shareholders and employers. Good comments in social media establish good public images for managers so that they have to abide by social ethics (Dyck et al. 2008). At the same time, media reports increase the cost for managers to use the space and opportunities to dress up performance (Ding et al. 2020). For the media exposure of cases that have been investigated and punished also exerts a deterrent effect on other companies. Media attention increases the likelihood and the size of the punishment (Dyck et al. 2008). Media supervision can effectively encourage companies to correct their violations, improve corporate governance, and maintain shareholder wealth (Liu and Mcconnell 2013). Media disclosure not only affects the business objectives, decision-making mechanism and behavior orientation of enterprises as an effective means of social supervision but also the operation and accounting information quality (Saxton 2012). Auditors use the information exposed by the media and confirm the media's risk warnings by issuing nonstandard opinions. Media attention and audit opinions jointly improve the transparency of accounting information (Li and Yang 2015). The media is one of the stakeholders of a corporation’s existence. Its information collection, processing and dissemination functions help reduce the information collection cost of external small and medium investors and information risks (Bushee et al. 2010). In all, media supervision effectively activates the internal governance mechanism of enterprises, significantly reducing the information asymmetry.

In the view of market pressure, Yu et al (2011) find the investor reaction is the main motivation for earnings management. Social media attention puts enormous public pressure on corporate behaviors. In the Chinese stock market, the 'herd effect' of investors is more pronounced and they are more easily guided by public opinion. Since operating results cannot be changed in the short term, managers would take a series of measures to meet the expectations of the capital market to avoid being negatively evaluated for their own private interests under external

pressure. Thus, managers might engage in more earnings management bahaviors so that the transparency of accounting information reduces.

2.2. Supply chain concentration and accounting information transparency

Managers of companies along the value chain find accounting information useful to support decision-making, especially when they make significant, new or rarely taken decisions or the operational knowledge is distributed across different parts of the supply chain (Wouters and Verdaasdonk 2002). Suppliers need to understand the business, profitability and solvency of a company through the accounting information that it publicly discloses to decide whether to establish a business relationship, cooperate for a long time, and grant business credit, and how to supply and deliver through comparative analysis. By using the accounting information publicly disclosed by a company, customers can understand its business, performance and management quality to estimate its continuous supply capacity, product costs and price levels, product quality assurances and after-sales service. Then, it is easier to make decisions such as whether to maintain the existing purchase relationship or find alternative supply channels. Suppliers and customers have expectations for the transparency of the accounting information publicly disclosed by companies, and their core purpose is to select high-quality business partners through dynamic comparisons.

Supply chain concentration reflects the closeness of the relationship between enterprises and their partners. Supply chain collaboration focuses on joint planning, coordination, and process integration between suppliers, customers, and other partners in a supply chain. Its competitive benefits include cost reductions and increased return on assets, and increased reliability and responsiveness to market needs (McLaren et al. 2002). Enterprises have more motivation and willingness to maintain such close, cooperative partnerships when the supply chain concentration is higher. Therefore, enterprises strive to maintain these relationships to decrease their operating risks and costs. High supply chain concentration indicates that both parties of a transaction have made considerable specialized investments in each other (Hobbs 1996). Based on positive expectations of the company's current operating status and development

prospects formed by information surveys, large suppliers and customers are willing to form and maintain such proprietary transaction relationships. Therefore, companies have the motivation to improve their accounting information transparency. Li et al. (2018) demonstrate that the most important factor of information disclosure about major customers is proprietary costs in the US. However, some evidences have argued that the higher supply chain concentration might cause worse accounting information quality of a company. Customers and suppliers exist because of the relationship between upstream and downstream, and they are important stakeholders to each other. For suppliers, a small change in major customers may affect the stability of the supply chain, thereby increasing business risks (Titman 1984). The relationship between suppliers and customers is similar to a kind of strategic alliance whose maintenance generally requires special relationship investments from main customers. Once the main customers decide to terminate the strategic alliance relationship, then these investments lose their value, and customers cannot recover investment costs and receive the expected investment returns. Furthermore, with regard to long-term contracts, firms in poor financial conditions are more likely to default (Raman and Shahrur 2008). Therefore, if the company’s development prospects are not optimistic, customers and suppliers cannot decide whether to invest in special relationships. Similarly, major customers are reluctant to sign long-term contracts and establish strategic alliances if the accounting information disclosed by suppliers shows great uncertainty about their future development. Therefore, companies may selectively disclose accounting information and dress up performance to show their strong development potential to prevent major customers and suppliers from cancelling long-term cooperative relationships. Such behaviors might affect the quality and transparency of accounting information.

3. Theoretical analysis and hypotheses

As an important part of the external governance mechanism, the media play a significant role in reducing information asymmetry and improving information transparency and helps stakeholders reduce the cost of obtaining information. In addition, the media’s supervisory pressure forces managers and shareholders to reduce their acts of agency. The media plays a

supervisory role in revealing corporate accounting fraud (Miller 2006). With the continuous advancement of Internet technology, traditional media lose part of their monopoly on news creation and dissemination. Instead, independent bloggers grow and gradually acquire credibility from the public (Meraz 2009). The multidimensional, network and rapidity characteristics of modern social media helps the stakeholders to dig deep into the fraud facts. On the other hand, positive comments from user-generated social media exert a major influence on superior brand image of an enterprise (Bruhn et al. 2012). Therefore, when positive and negative reports are not distinguished, firms reported more frequently by the media have a lower degree of information asymmetry. It is easier for information users to obtain sufficient information and the managers are more cautious and honest to regard and improve accounting information transparency. Therefore, hypothesis 1a is proposed:

H1a: Under the circumstance that other conditions remain unchanged, the accounting information transparency of a company increases when there are more media reports on it due to the governance effect of the media.

Negative media coverage increases the volatility of stocks because investors have cognitive biases, and bad news has a significant negative impact on stock prices (Chan 2003). Negative media coverage increases financial market pressure on companies (Vega 2006). (Fang and Peress 2009) pointed out that media attention affects stock returns. Negative media coverage can increase stock price volatility, reduce stock yields and place intense market pressure on managers. Investors' behavior in Chinese stock market has a herd effect. The media would leads to investor sentiment fluctuation, and significantly affects investors' trading decisions (Yang, et al., 2017). Social media is a novel tool enabling the collection of data about investors' sentiment and public mood at the level of a society, which cause capital market volatility (Bukovina, 2016). Negative media coverage creates public opinion pressure on company management, forcing it to respond to market concerns. Therefore, when faced with market pressure, managers adopt earnings management behaviors to meet the capital market's expectations of their own private interests. Such behaviors reduce the transparency of corporate accounting information. However, with an increase in the overall number of media reports and

the degree of company exposure, managers' relevant behaviors are restricted. In contrast, many positive reports in the media deepens the positive cognitive of accountants and creditors of the company and an imperceptible consensus on "good news" in the media opinion environment is reached. The assimilation effect and the willing to maintain good reputation would decrease manipulative behaviors and increase accounting information transparency. Thus, hypothesis 1b is proposed:

H1b: The accounting information transparency of a company becomes higher when there are more positive media reports on it under the circumstance that other conditions remain unchanged. In contrast, the accounting information transparency of a company becomes lower when there are more negative media reports on it.

Core enterprises face crises caused by transactions by suppliers and customers being interrupted, which leads to increased business risks when the concentration of the supply chain is high (Hui et al. 2019). Existing research has explained the impact of the supply chain's relational transactions on corporate accounting information from two aspects: specific investments brought about by relational transactions and managers hiding bad news.

In an increasingly fierce competitive market environment, enterprises tend to choose certain key suppliers and customers as their main partners to establish strategic cooperative relations and avoid uncertainty. After a relationship network is established among upstream and downstream enterprises, engaging in transactions in the relationship network can greatly reduce the high external costs caused by continuous transactions in the external environment because related costs are shared in the network and efficient collaboration can be achieved. In the process of establishing mutual trust and strategic relationships, enterprises make mutual specific investments in suppliers and customers, such as material objects, technology, special locations and intangible investments, to ensure contract fulfillment by all parties as a commitment to cooperation. Due to the specificity and specialization of investments, once the strategic relationship breaks down, the value of assets decreases, and enterprises face higher sunk and transfer costs. At the same time, customers and suppliers continue to estimate the company's value and growth to make further references for cooperation decisions. The

accounting information used for such references is important and gives companies the motivation to carry out earnings management, which damages accounting information transparency.

Another point of view according to agency theory reveals that management has the incentive to hide or delay the publication of bad news (Kothari et al. 2009). When company managers hide bad news, such news accumulates to a certain level. At this point, managers cannot continue to hide the news or the hidden costs become too high, and the news is released at once, resulting in higher follow-up costs for the enterprise. Such an effect is more significant when an enterprise is more dependent on the existing supply chain. To avoid scandals about information opacity, companies are more inclined to maintain a high level of accounting information transparency to prevent incurring switching costs from seeking new suppliers and the loss of reputation from future customer churn. High supply chain concentration has a positive effect on improvements in the quality of corporate accounting information.

Based on the above two different views, we propose two opposite hypotheses, H2a and H2b:

H2a: The accounting information transparency of a company becomes higher when its supply chain is more concentrated under the circumstance that other conditions remain unchanged.

H2b: The accounting information transparency of a company becomes lower when its supply chain is more concentrated under the circumstance that other conditions remain unchanged.

A close relationship leads to customers and suppliers having the strong ability to obtain production, sales and even product information from nonpublic channels. On the other hand, resource integration can be completed in daily activities, including inventory management, supplier and customer management, and production management formed by relational transactions in the supply chain. Private information communication is becoming the main way for core node enterprises to transmit financial accounting information to major suppliers and major customers under the background of highly relational transactions. The bargaining power of an enterprise compared with its suppliers or customers is a direct reflection of the strength of

both sides in the transaction. Higher bargaining power leads to the formation of implicit contracts among enterprises, major suppliers and customers.

The stronger the bargaining power of enterprises is, the closer is their relationships with suppliers. Then, private information sharing becomes the main way for enterprises to transmit financial accounting information to suppliers in a centralized supply chain. The more channels that an enterprise establishes in private for information exchange and communication, the weaker the effect of improving accounting information transparency. In its relationships with customers, the greater bargaining power of an enterprise compared with its customers indicates that it has a good competitive advantage in the product market and has established a good reputation among its customers. Through the reputation mechanism, enterprises tend to maintain and improve their accumulated reputation status by continuously consolidating and expanding the existing competitiveness of product quality or logistics channels. Under this circumstance, high-quality accounting information can pass more information to new customers to create a larger market and better long-term development. Therefore, the motivation to reduce accounting information transparency through short-term earnings management behaviors is lower. Hypotheses H3a and H3b are proposed:

H3a: Enterprises are less inclined to improve accounting information quality when the bargaining power between enterprises and suppliers is stronger.

H3b: Enterprises are more inclined to improve accounting information quality when the bargaining power between enterprises and customers is stronger.

It is impossible to completely hide a company’s manipulation of its profits. Once such behavior is revealed, it is very likely to lead to adverse consequences such as reputation damage or punishment, acceleration of the departure of major customers, and massive turbulence in the core enterprises in the supply chain. The turbulence is even more harmful in a highly concentrated supply chain (Yang et al. 2019). Media follow-up can effectively alleviate the information asymmetry problem between listed companies and information users and reduce audit risks. Auditors can efficiently complete audit work according to standard audit procedures with reduced audit fees. Therefore, the function of the external governance mechanism is

greater, and the risk of earnings manipulation revealed by the media is also higher when there are more media reports about the company. The company reduces its profit manipulation behaviors, such as upward earnings management, and decreases the degree of ambiguity in its accounting information disclosures. It can be seen that when there are follow-up media reports, suppliers with a high degree of customer concentration have a greater incentive to reduce the degree of information asymmetry between both sides and selective information disclosure behaviors to prevent their cooperation from being terminated because of their exposed illegal behaviors, such as profit manipulation.

The combination of supply chain concentration and the media's tracking reports can produce a collaborative governance effect and improve the transparency of corporate accounting information. Hypothesis 4 is proposed accordingly:

H4: The synergistic governance effect of high media attention and high supply chain concentration can improve a company's accounting information transparency.

4. Variables and research design

4.1. Variable definition

4.1.1. Accounting information transparency

Accounting information transparency refers to the degree to which the accounting earnings of a company reflect real economic income information. The existing research on measuring the transparency of accounting information is divided into three main categories: relevant indices issued by authority organizations, self-established indicators and proxy indicators that reflect the level of disclosure. An influential method is adopted by Bhattacharya et al.(2003) who propose three indicators to measure surplus opacity. Except loss avoidance (the overall opacity of all listed companies in a country), we choose indicators, such as earnings aggressiveness (EA) and earnings smoothness (ES), which can reflect the company's disclosure level, as alternative indicators of information transparency.

A company's management is more likely to use accounting policy options to manipulate earnings and whitewash financial statements when earnings aggression increases. The formula for calculating earnings aggressiveness is:

$$EA_{i,t} = ACC_{i,t}/Asset_{i,t-1} \quad (1)$$

$$ACC_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STD_{i,t} - DEP_{i,t} + \Delta TP_{i,t} \quad (2)$$

In the formula, subscript i represents the company, and t represents the year. $EA_{i,t}$represents earnings aggressiveness. $Acc_{i,t}$ represents the accruals. $Asset_{it-1}$represents total assets at the end of year t-1. $\Delta CA_{i,t}$ represents the difference between current assets in year t and year t-1. $\Delta CL_{i,t}$ represents the difference between current liabilities in year t and year t-1. $\Delta Cash_{i,t}$ represents the difference between monetary funds in year t and year t-1. $\Delta STD_{i,t}$ represents the difference between long-term liabilities due within one year in year t and year t-1. $DEP_{i,t}$ represents the total amount of accumulated depreciation of fixed assets and amortization of intangible assets in year t. $\Delta TP_{i,t}$ represents the difference between taxes payable in year t and year t-1.

Earnings smoothness refers to the degree to which the earnings volatility of a company deviates from the normal level and reflects the relationship between reported earnings and real earnings. Francis (2004) noted that when earnings smoothness increases, management has more incentives to hide the real performance fluctuations of the company and convey the illusion of "stable" business conditions. Eventually, the opacity of accounting information becomes greater. Earnings smoothness is calculated using the following formula:

$$ES_{i,t} = \frac{SD(CFO_{i,t-3}/Asset_{i,t-4}, CFO_{i,t-2}/Asset_{i,t-3}, CFO_{i,t-1}/Asset_{i,t-2}, CFO_{i,t}/Asset_{i,t-1})}{SD(NI_{i,t-3}/Asset_{i,t-4}, NI_{i,t-2}/Asset_{i,t-3}, NI_{i,t-1}/Asset_{i,t-2}, NI_{i,t}/Asset_{i,t-1})} \quad (3)$$

In formula (3), $ES_{i,t}$ represents earnings smoothness. $SD(\bullet)$ represents the standard deviation of the indicators in parentheses. $CFO_{i,t-j}(j = 0,1,2,3)$ represents the net cash flow from the operating activities of the i-th listed company in year t-j. $NI_{i,t-j}$ represents the i-th listed

company's net profit in year t-j. $Asset_{i,t-k}(k = 1,2,3,4)$ represents the total assets of the i-th listed company at the end of year t-kth.

Accounting information transparency is calculated using the following formula:

$$Tran_{i,t} = \frac{Deciles(EA_{i,t}) + Deciles(ES_{i,t})}{2} \quad (4)$$

In formula (4), $Tran_{it}$ represents the accounting information transparency of the ith listed company in year t. $Deciles(EA_{i,t})$ and $Deciles(EA_{i,t})$ represent the deciles of the calculation of $EA_{i,t}$and$ES_{i,t}$. Larger values of earnings aggressiveness and earnings smoothness indicate lower accounting information transparency. The $EA_{i,t}$ and $ES_{i,t}$ deciles are sorted by convergence. The larger the value of $EA_{i,t}$and $ES_{i,t}$ is, the larger is their sequence. After the convergence process, the minimum value of $Tran_{i,t}$ is 1, and the maximum value of $Tran_{i,t}$ is 10. A larger value of $Tran_{i,t}$ represents lower accounting information transparency.

4.1.2. Supply chain concentration

Supply chain concentration includes the two dimensions of supplier and customer concentration. Suppliers and customers are important external stakeholders of the enterprise. As important demanders of enterprise accounting information, suppliers and customers have an impact on the quality of the accounting information supplied.

Referring to the study of Krishnan et al. (2018), we use the proportion of purchases from the largest supplier to purchases for the whole year, the ratio of the top five major suppliers' purchases to total annual purchases and the standard deviation of the proportion of purchases from each of the top five suppliers to total purchases to represent supplier concentration. We take the top five major customers' sales to annual total sales, the ratio of operating income from the largest customer to total operating income, and the standard deviation of the separate operating income ratio of top five customers to total income as customer concentration. Such subindicators separately represent the upstream and downstream supply chain concentrations. SCCI is a comprehensive indicator that measures the overall concentration upstream and

downstream of the supply chain and is beneficial to reasonably covering various levels of upstream and downstream supply chain concentrations of an enterprise.

4.1.3. Media attention

Blog posts on Weibo are selected as the proxy variable for media reports to measure views on the company and distinguish the number of related positive and negative comments on Weibo. The extensiveness and representativeness of Weibo bloggers can reflect the positive and negative attitudes of the public toward a company because they play the role of opinion leaders. Drawing on the method of Leitch and Sherif (2017), we write a web crawler program in the Python language and read and preliminarily organize the data by the Pandas module. When Python reads the name, abbreviation or stock name of the listed company in a Weibo post's text, it keeps the data and assigns the corresponding stock code to the Stkcd variable. Finally, combined with the machine learning algorithm and SnowNLP text mining, we carry out a text sentiment analysis of Weibo texts. According to the naive Bayes formula, Python calculates the probability of whether the text sentiment is positive according to its features. According to the rule of thumb of text mining methods, microblogs whose attitude value is above 0.6 are defined as positive reports. The logarithm of the number of reports plus 1 is used as the proxy variable for the media.

4.1.4. The bargaining power of supply chain center enterprises

In this research, we draw on the variable measurement methods of Van (2005) to measure the bargaining power of enterprises in the supply chain. The measurement of the bargaining power of enterprises in the supply chain uses the net commercial credit provided by listed companies to their suppliers or customers. Net commercial credit refers to the difference between the credit trade amount provided to the counterparty and the credit trade amount belonging to the enterprise in purchase and sale activities. As shown in Table 1, the current accounts balance in a company's annual report is used to calculate TCS (Net commercial credit provided to suppliers) and TCC (Net commercial credit provided to customers).

TCC and TCS represent the measure of the bargaining power between the core node enterprises of the industrial chain and their customers and suppliers, respectively. The larger the value is, the weaker is the bargaining power. Smaller values of TCC and TCS indicate that listed companies provide less net commercial credit to their suppliers or customers and have stronger bargaining power.

4.1.5. Control variables

Scholars have often considered corporate finance and corporate governance from the perspective of the past. The following control variables are selected by drawing on the existing research: separation rate of two rights (Separation), financial leverage (Leverage), operating scale (LnSize), profitability (ROA), state-owned enterprise (State), cash flow (FCF), total asset turnover rate (TATO), growth ability (Growth), duality (Dual); shareholding concentration (Top1), and the company's listing time (Age). In addition, the model controls the industry and annual effects. Table 1 presents the variable definitions.

INSERT TABLE 1 ABOUT HERE

4.2. Sample selection

The sample is A-share listed companies on the Shanghai and Shenzhen Stock Exchanges that received social media attention from 2012 to 2018, and the rest of the data come from the CSMAR database. Sina Weibo was founded in August 2009, and the number of users exceeded 50 million in October 2010. Therefore, we determine the beginning of 2011 as the starting point of the observation period.

In this study, we address the data as follows to ensure the robustness of the test results. We eliminate the following companies: ST companies and PT companies, companies in the financial industry, and samples with missing values. All continuous variables are abbreviated in the 1% and 99% quantiles to reduce the influence of extreme values on the statistical estimates. After the above processing, we obtained 7217 unbalanced panel data samples.

4.3. Model design

Model (1) is constructed to test hypothesis H1:

$$Tran_{i,t} = \alpha + \beta_1 Media_{i,t} + \beta_2 Seperation_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Ln\_size_{i,t}$$

$$+\beta_5 ROA_{i,t} + \beta_6 State_{i,t} + \beta_7 FCF_{i,t} + \beta_8 TATO_{i,t} + \beta_9 Growth_{i,t}$$

$$+\beta_{10} Dual_{i,t} + \beta_{11} Top1_{i,t} + \beta_{12} Age_{i,t} + \varepsilon_{i,t} \quad (1)$$

Model (1) is used to test the effect of media reports on the transparency of corporate accounting information.

Model (2) is constructed to test hypothesis H2:

$$Tran_{i,t} = \alpha + \beta_1 SCII_{i,t} + \beta_2 Seperation_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Ln\_size_{i,t}$$

$$+\beta_5 ROA_{i,t} + \beta_6 State_{i,t} + \beta_7 FCF_{i,t} + \beta_8 TATO_{i,t} + \beta_9 Growth_{i,t}$$

$$+\beta_{10} Dual_{i,t} + \beta_{11} Top1_{i,t} + \beta_{12} Age_{i,t} + \varepsilon_{i,t} \quad (2)$$

Model (2) is used to test the effect of supply chain concentration on accounting information transparency, and models (3) and (4) are constructed to test hypothesis H3:

$$Tran_{i,t} = \alpha + \beta_1 SCII_{i,t} + \beta_2 TCS_{i,t} + \beta_3 SCII_{i,t} * TCS_{i,t} + \beta_4 Seperation_{i,t} +$$

$$\beta_5 Leverage_{i,t} + \beta_6 Ln_{size_{i,t}} + \beta_7 ROA_{i,t} + \beta_8 State_{i,t} + \beta_9 FCF_{i,t} + \beta_{10} TATO_{i,t}$$

$$+\beta_{11} Growth_{i,t} + \beta_{12} Dual_{i,t} + \beta_{13} Top1_{i,t} + \beta_{14} Age_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$Tran_{i,t} = \alpha + \beta_1 SCII_{i,t} + \beta_2 TCC_{i,t} + \beta_3 SCII_{i,t} * TCC_{i,t} + \beta_4 Seperation_{i,t}$$

$$+\beta_5 Leverage_{i,t} + \beta_6 Ln_{size_{i,t}} + \beta_7 ROA_{i,t} + \beta_8 State_{i,t} + \beta_9 FCF_{i,t} + \beta_{10} TATO_{i,t}$$

$$+\beta_{11} Growth_{i,t} + \beta_{12} Dual_{i,t} + \beta_{13} Top1_{i,t} + \beta_{14} Age_{i,t} + \varepsilon_{i,t} \quad (4)$$

Models (3) and (4) are used to test the moderating effect of the bargaining power of supply chain center enterprises on accounting information transparency based on supply chain concentration.

Model (5) is constructed to test hypothesis H4:

$$Tran_{i,t} = \alpha + \beta_1 SCII_{i,t} + \beta_2 Media_{i,t} + \beta_3 SCII_{i,t} * Media_{i,t} + \beta_4 Seperation_{i,t}$$

$$+\beta_5 Leverage_{i,t} + \beta_6 Ln_{size}{}_{i,t} + \beta_7 ROA_{i,t} + \beta_8 State_{i,t} + \beta_9 FCF_{i,t} + \beta_{10} TATO_{i,t}$$

$$+\beta_{11} Growth_{i,t} + \beta_{12} Dual_{i,t} + \beta_{13} Top1_{i,t} + \beta_{14} Age_{i,t} + \varepsilon_{i,t} \qquad (5)$$

Model (5) is used to test the synergistic governance effect of media reports and supply chain concentration on improvements in corporate accounting information transparency.

The definitions of the relevant variables in the model are shown in Table 1.

5. Empirical analysis

5.1. Descriptive statistics

INSERT TABLE 2 ABOUT HERE

Table 2 shows the descriptive statistical results of the main variables. The mean of accounting information transparency(Tran) is 4.5, the median is 4.5, the maximum value is 10, the minimum value is 1, and the standard deviation is 2.058. The accounting information transparency of listed companies relatively obeys a normal distribution. The minimum value of media reports(Media) is 0.693, and the maximum value is 4.205, indicating that the difference in media reports is great among enterprises. Statistics show that from 2012 to 2018, the average ratio of sales to top five customers to total annual sales of listed nonfinancial and noninsurance companies on the Shanghai and Shenzhen A-share markets(Client1) is 28.8%, and its median value is 23.0%. The average ratio of purchases from the top five suppliers to total annual purchases(Supply1) is 34.6%, and its median value is 29.9%. This means that sales and

purchases that rely on major customers and suppliers account for 1/3 of companies' total annual business volume. The mean value of the overall supply chain concentration (SCCI) is 31.7%, and its median value is 28.9%. These statistics indicate that the supply chain concentration of listed companies is relatively high.

5.2. Analysis of multiple regression results

5.2.1. Social media and transparency of accounting information

INSERT TABLE 3 ABOUT HERE

Table 3 shows the test results of hypothesis H1 using model (1). The three columns are positive public opinion, negative public opinion and overall effect of media coverage on accounting information transparency. On the whole, the regression goodness of fit is above 20%, indicating that the model has high explanatory power. The coefficient of Media_pos is -0.142 and significantly negative at the 1% level. The coefficient of Media_neg is 0.137 and significant at the 1% level. It can be concluded that media reports of different attitudes have different effects on accounting information transparency. Positive reports improve the transparency of corporate accounting information. In contrast, negative reports weaken the transparency of accounting information. The presence of the media helps change information solidity and reduces the risk of information asymmetry and the cost of information acquisition. The reported companies show different modes of reflection. Positively reported companies would improve the quality of accounting information to consolidate the good impact. Conversely, negatively reported companies tend to conceal the bad impact by whitewashing their financial statements.

Furthermore, the governance effect of the media is reflected. The coefficient of Media is -0.080 and significant at the 1% level when negative and positive media evaluations are not distinguished. This result shows that the media has a positive governance effect on the quality of accounting information without distinguishing between positive and negative media reports. When an enterprise is more frequently reported by the media, the larger value of Media leads to higher accounting information transparency and better accounting information quality of the

enterprise. This reflects the media's governance effect on corporate accounting information and shows that the media plays an important role in the external governance organization of the enterprise, verifying hypotheses H1a and H1b.

5.2.2. Supply chain centralization and accounting information transparency

INSERT TABLE 4 ABOUT HERE

Table 4 lists the regression results of model (2). SCCI2 equals to the supply chain concentration index calculated by Supply2 and Client2. Similarly, SCCI3 equals to the average value of Supply3 and Client3. On the whole, the higher the concentration of the supply chain is, the higher is the accounting information transparency. The coefficient of SCCI is -0.274 and significant at the 5% level. The coefficient of SCCI2 is -0.485 and significant at the 1% level, indicating that the more concentrated the supply chain is, the more transparent is the accounting information of enterprises, verifying hypothesis H2b.

From the above results, the higher the concentration of the supply chain is, the closer is the relationship between the enterprise and its upstream and downstream enterprises. Compared with the enterprise relationship in a loose supply chain, for the relationship in a tight supply chain, the upstream and downstream information demanders have higher requirements for the quality of the corporate accounting information. On the one hand, they can prevent their relationship with dishonest central enterprises from threatening their reputation to reduce corporate operational risks. On the other hand, as information providers, the willingness of central enterprises to improve accounting information is stronger. They tend to present their true situation to information demanders to the avoid high conversion costs caused by bad news.

Since customers and suppliers represent different relationship networks for enterprises, we divide suppliers and customers to distinguish the impact of different types of supply chain concentrations on accounting information transparency.

INSERT TABLE 5 ABOUT HERE

INSERT TABLE 5 ABOUT HERE

From the comparison of Tables 5 and 6, the coefficient of Supply1 is -0.177 and significant at the 10% level, and the coefficient of Supply2 is -0.266 and significant at the 10% level. The coefficient of Supply3 is statistically insignificant, revealing that the higher the supplier concentration is, the higher is the accounting information transparency. The coefficient of Client2 is -0.385 and significant at the 1% level, and the coefficient of Client3 is -0.930 and significant at the 1% level. The conclusion shows that the higher the supply chain concentration of customers is, the higher is the improvement in accounting information transparency relative to that of suppliers. The significance of customer variables is also higher than that of suppliers. Compared to upstream suppliers, companies at the center of supply chain are more focused on maintaining relationships with customers. The quality of accounting information is more responsive to customer characteristics.

5.2.3. Media, supply chain centralization and accounting information transparency

Supply chain concentration affects the quality of the accounting information released by enterprises, and the media moderates this process through its governance mechanism. Media reports promote improvements in accounting information quality under the condition of high supply chain concentration. In the case of low supply chain concentration, the governance role of the media enhances the transparency of accounting information and plays a synergistic role with supply chain concentration. At the same time, positive and negative reports should be further distinguished on the moderating effect of supply chain concentration on the governance of accounting information transparency.

INSERT TABLE 7 ABOUT HERE

Table 7 shows the results of testing hypothesis H4 using model (5). Without the distinction between positive and negative reports, it is found that the multiplicative term of media reports and supply chain concentration is significantly negative at the 1% level, and the coefficient is -0.130. The result indicates that the number of media reports can negatively adjust the accounting information transparency brought about by supply chain concentration. In other

words, a larger number of media reports aggravates the effect of the improvement in accounting information transparency brought about by supply chain concentration.

In the second column of the regression results, Media_neg is significantly positively correlated with Tran. Its coefficient is 0.187 and significant at the 1% level, indicating that the more negative the media reports are, the worse is the accounting information transparency of listed companies. SCCI is negatively correlated with Tran, indicating that accounting information transparency worsens when the supply chain concentration decreases. The coefficient of the Media_neg* SCCI multiplicative term is -0.109 and significant at the 10% level, showing that the supervisory role of the media's negative reports and supply chain concentration play a synergistic governance role.

Similarly, Media_pos is significantly negatively correlated with Tran, and the coefficient is -0.074, which is significant at the 10% level. This illustrates that the more positive media reports there are, the higher is the accounting information transparency of listed companies. SCCI is negatively correlated with Tran, and the coefficient is significantly negative at the 10% level. The result suggests that the lower the supply chain concentration is, the worse is the accounting information transparency. The coefficient of the Media_pos*SCCI multiplicative term is -0.132 and significantly negative at the 5% level, indicating that the supervisory role of positive media coverage and the level of supply chain concentration have synergistic governance effects.

These findings show that companies in the supply chain use the relevant information released by the media to optimize their requirements for accounting information transparency and to promote a smooth flow of information in the supply chain. The transparency of the accounting information of listed companies is improved under the combined effect of public opinion supervision and supply chain concentration.

6. Further research

6.1. The further impact of the degree of industry competition on the above relationship

Generally, market power refers to the ability of market competitors to mark up the market price,

or it can be described as the ability to make the price higher than the marginal or incremental cost (Cabral 2002). The market power of a company can be measured by the Lerner index. If P is the price of the product and MC is the marginal cost of production, the Lerner index is: PCM=(P-CM)/P.

The Lerner index measures a firm's price markup ratio based on marginal cost, reflecting its ability to raise prices above the marginal cost. Referring to the practice of Gaspar (2006), the company's Lerner index is deflated by the industry mean. The Lerner index of a single listed company is subtracted from the average sales-weighted Lerner index in the industry. Finally, we obtain the index as a measurement of product market competition at the company level. The larger the value is, the higher is the market competition position of the company in a certain industry. The higher the index is, the stronger is the monopoly power of the enterprise. Market power not only represents a company's ability to increase prices but also reflects the market structure and industry-wide competition. The Lerner index price-cost margin (PCM) ((operating income–operating costs–selling expenses–administrative expenses)/operating income) deflated by an industry deflator is selected to measure the competitive position of the enterprise. The smaller PCM is, the lower is the competitive position of the enterprise, and vice versa.

After regressions are grouped by the Lerner index in Table 8, the higher the Lerner index is, the higher is the competitive position of the enterprise in the market, and generally, the higher is the status of the enterprise in the industry. Column (1) shows the effect of negative reports on companies with a high Lerner index. The coefficient of Media_neg is 0.171 and significant at the 1% level, and the coefficient of Media_pos is -0.044 and nonsignificant. Negative reports as the adjustment variable have a greater impact on companies and promote the effect of supply chain concentration. The coefficient of Media_neg*SCCI is -0.178 and significantly negative at the 5% level, proving that negative reports and supply chain concentration play a synergistic governance role. The effect is statistically insignificant in the group regression of positive reports, indicating that the governance effect of positive reports is weaker than that of negative reports.

At the same time, the market position of the company is relatively low in the case of a low Lerner index. The coefficient of SCCI is -0.202 and significant at the 5% level. The coefficient of Media_pos is -0.138 and significant at the 5% level. The coefficient of Media_pos *SCCI is -0.156 and significant at the 10% level. The data indicate that the market is much more competitive and the market power of the company is small. The effect of positive reports on the company is far greater than that of negative reports and brings corresponding reputation guarantees and endorsements to the company. The effect also enhances the market position and reputation of the company; thus, companies are willing to improve accounting information transparency and ensure a release of positive capital information to the market. In contrast, the existence of negative reports leads to an insufficient willingness to improve the business in a highly competitive market, so the function of increasing accounting information transparency is not particularly obvious.

6.2. The influence of the bargaining power of supply chain enterprises on accounting information transparency

As an important factor in the supply chain, the bargaining power between the upstream and central enterprises in the supply chain also plays an important role in moderating accounting information transparency.

INSERT TABLE 9 ABOUT HERE

Tables 9 and 10 verify hypothesis H3 using models (3) and (4). The coefficient of TCS is -0.450 and significant at the 10% level on the basis of the improvement in accounting information transparency brought about by the supply chain concentration, illustrating that the stronger the bargaining power is between companies and suppliers, or a smaller TCS, the less transparent is newly added accounting information. In contrast, accounting information transparency is higher when the bargaining power with suppliers is worse or TCS is larger.

This finding shows that because the competition for profit dominance between suppliers and enterprises determines their discourse rights, the strength of the bargaining power with suppliers reflects the relationship between enterprises and suppliers in the supply chain.

Customers, suppliers and businesses prefer to communicate privately when bargaining power is stronger. In addition, the purpose of showing their good accounting information is not as strong, and they do not pay much attention to the information demands from small and medium suppliers, resulting in a decline in accounting information transparency.

The above conclusions prove that the higher the concentration of the supply chain is, the weaker is the bargaining power of suppliers and the higher is accounting information transparency. After adding the multiplicative term, its coefficient is -1.416 and significantly negative at the 10% level. This suggests that the higher the supply chain concentration is, the higher is the accounting information transparency, and the effect of supply chain concentration on accounting information transparency increases under the moderating effect of adding the bargaining power of suppliers. Therefore, the larger the value of TCS is, the worse is the bargaining power and the higher is accounting information transparency under the condition of a certain concentration level. In this case, suppliers need to understand the business status, profitability and solvency of the company from the accounting information that the company publicly discloses. Through comparative analysis, suppliers can decide whether to establish a business relationship, cooperate for a long time, and provide commercial credit, and which supply and delivery method to adopt, etc., reflecting a supervisory relationship between enterprises and suppliers.

Accounting information transparency is worse when the status of an enterprise in the supply chain is higher through stronger bargaining power under the condition of a certain supply chain concentration. This might be because information tends to be exchanged privately when the enterprise dominates the relationship with the supplier, enabling it can save relevant communication costs and not spend much money to improve the transparency of relevant information.

INSERT TABLE 10 ABOUT HERE

Column (1) reports the results when TCC is directly put into the model. The coefficient of TCC is 0.426 and significant at the 5% level. The improved accounting information transparency brought about by higher supply chain concentration suggests that when the bargaining power of an enterprise with customers becomes stronger or the TCC is smaller, the newly added

accounting information transparency is better. In contrast, the worse the bargaining power with customers is, or the larger the TCC is, the lower is accounting information transparency.

Then the multiplicative term TCC*SCCI is added in the model. The coefficient of TCC*SCCI is 1.801 and significantly positive. Enterprises are more inclined to provide customers with accounting information of higher quality when their bargaining power with customers is stronger under the circumstance of high customer concentration; thus, accounting information transparency is higher. Enterprises tend to disclose more specific accounting information to maintain the strong, dominant competitive position, differentiate themselves from other competitors, create a sense of high value for customers, and achieve their own brand effects when occupying a dominant position in their relationship with customers. Then customers would use the accounting information that the company publicly discloses to understand its business status, performance, and management quality. Through comparative analysis, it is easier to judge the company's continuous supply capacity, product costs and price levels, product quality assurance, after-sales service, etc., to make decisions such as whether to maintain the existing purchasing relationship and find alternative supply channels.

7. Robustness test and endogeneity tests

7.1. Self-selection bias of media coverage

There might be a self-selection problem with media reports. Whether a company has more reports is not the result of a random distribution but is related to the internal and external characteristics of the company. In this regard, the research adopts propensity score matching (PSM) to solve this problem. According to the year-industry median, the media reports are divided into two groups of high and low levels to generate a dummy variable, Media_dum. The variable Media_dum is 1 when the Media value is higher than the year-industry median and 0 otherwise. This research adopts supply chain concentration (SCCI), separation ratio of two rights (Separation), asset-liability ratio (Leverage), company size (Size), profitability (ROA), property rights (State), company listing time (Age), cash flow (FCF), total asset turnover rate (TATO), growth ability (Growth), duality (Dual), and ownership concentration (Top1) to establish

logistic models to estimate the propensity score when the company is reported on more frequently. Then, according to this propensity score, the treatment and control groups are 1:1 matched by the closest distance method. After the paired samples were selected, they were analyzed in the regression model again, and the results were consistent.

7.2. The multicollinearity problem

For the relevant regression equations, we checked the existence of multicollinearity. Therefore, after each regression equation, the variance inflation factor (VIF) is added to detect multicollinearity problems. Then, we test the VIF value of each variable, the average VIF value of the equation and the inflation factors. Because these indicators do not exceed 5, there is no multicollinearity problem.

7.3. The two-stage least squares regression model

The relationship between media attention and accounting information transparency might be affected by the endogeneity of media attention. If the company expects that it will have more reports, it takes the initiative to improve its accounting information transparency. If the company is willing to reduce the accounting information transparency for earnings management, it reduces the media coverage by other means. In this case, there is a positive relationship between accounting information transparency and media coverage. The more times the media reports, the higher the accounting information transparency; the higher the accounting information transparency, the more times the media reports. To alleviate the endogeneity problem, we use the two-stage least squares method for estimation. The reason we choose the media coverage of the previous period as an instrumental variable is that media attention has a certain degree of continuity. The media attention of the previous period is closely related to the media attention of this period but is not related to the accounting information transparency of this period.

In the two-stage least squares estimation, in the first stage, the media coverage of the previous period (Media_lag) is used to estimate the media coverage of the current period (Media), and

then the estimated media coverage is brought into the second-stage regression. The regression results illustrate that the estimated media coverage is positively related to accounting information transparency, plays a common governance role with supply chain concentration and improves the accounting information transparency of enterprises. These conclusions are completely consistent with the above conclusions.

7.4. Substitute variables

We regress the accounting information transparency index issued by the Shenzhen Stock Exchange and find that the negative effect of media and supply chain concentration on accounting information transparency is still significant.

8. Conclusions and main shortcomings

Suppliers and customers upstream and downstream of the supply chain are important stakeholders of the enterprise. The supply chain relationship reflects the business model and strategy of the enterprise and represents the degree of its dependence on upstream and downstream enterprises. Therefore, this relationship has an important impact on the accounting information transparency of the enterprise. The literature has focused on the impact of corporate governance characteristics on accounting information transparency but has not paid attention to the possible impact on corporate stakeholders, especially customers and suppliers who have an important influence on corporate financial decisions, business decisions and performance, and the quality of accounting information.

The relationship between supply chain concentration and accounting information transparency from a supply chain perspective is studied by using publicly disclosed customer information. Empirical evidence shows that the higher the supply chain concentration is, the higher is the accounting information transparency. In the process, as an external governance mechanism, the media plays an active role in promoting accounting information transparency. At the same time, the bargaining power of supply chain node enterprises has an impact on accounting information transparency. The stronger the bargaining power is between the enterprise and its

suppliers, the lower is the accounting information transparency, the stronger is the bargaining power between the enterprise and its customers, and the higher is the accounting information transparency of enterprises.

In the context of studying the division in the different levels of force in the market, it is found that the lower the market position of the company is, the greater is the function of positive media reports in promoting its accounting information transparency. This might be because a good corporate image is promotive for companies to break financing constraints and enhance their reputations. For companies with high market status, negative media reports play a greater role in accounting information transparency than do positive reports. This might be because the higher the market status is, the higher the external expectations of the public will be and the stronger the influence of negative reports on the company becomes.

The main research value and shortcomings are as follows. First, the literature has not explored the relationship between supply chain concentration and accounting information transparency, that is, the role of upstream and downstream suppliers in accounting information transparency. This research expands the scenario to the accounting information needs of suppliers and customers in the front and back ends of the enterprise supply chain in the commodity market. Moreover, this research investigates whether supply chain concentration changes the information environment of the enterprise and then affects accounting information transparency. Taking the supply chain as the entry point, studying the quality of accounting information of enterprises is of positive significance for exploring customers' and suppliers' requirements for information quality and the effect of governance.

Second, the bases for exerting the role of media governance are objectively and impartially exposing problems in corporate governance, actively seeking out high-quality enterprises at the same time, providing fair and objective positive reports without exaggeration, and reducing deviations in media coverage. The media should strengthen its self-discipline, enhance the awareness of social responsibility, increase the exposure of opportunistic behavior, and improve its information content and value.

Third, we investigate the influence of firm bargaining power and firm market power on the relevant conclusions.

Fourth, a potential future research direction is that, after media reports, a starting point for further research might be the dynamic impact on supply chain concentration and thus the mechanism that affects accounting information transparency. In other words, such a dynamic process is worth further study to determine whether media reports cause a loss of or increase in customers and suppliers in the company's supply chain, thereby affecting corporate accounting information transparency.

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Table 1 Variable Definitions

Types of Variables	Variables	Variable Definitions
Explained variable	Tran	Accounting information transparency, convergent treatment of deciles of earnings aggressiveness (EA) and earnings smoothness (ES)
Explanatory Variable	Supply1	Proportion of total purchases from the top five suppliers to total purchases in the whole year
	Supply2	Proportion of purchases from the largest supplier to purchases in the whole year
	Supply3	Standard deviation of the proportion of purchases from each of the top five suppliers to total purchases
	Client1	Proportion of top five customers' operating income to total operating income
	Client2	Proportion of operating income from the largest customer to total operating income
	Client3	Standard deviation of the operating income ratio of each of the top five customers to total operating income
	SCCI	Supply chain concentration index, (Supply1+Client1)/2
Moderator Variable	Media	Total number of media reports, including negative and positive reports, the proxy variable is ln (total number of reports + 1)
	Media_pos	Positive evaluation of social media's reports on listed companies, calculated by machine learning and Python SnowNLP class library to determine media attitudes. The proxy variable is ln (the number of positive reports + 1)
	Media_neg	Negative evaluation of social network media's reports on listed companies through machine learning and Python SnowNLP class library calculation to determine media attitudes. The proxy variable is ln (the number of negative reports + 1)
	TCS	Net commercial credit provided to suppliers, (accounts prepaid - notes payable - accounts payable)/total assets at the end of the period
	TCC	Net commercial credit amount provided to customers, (accounts receivable + notes receivable - accounts receivable)/total assets at the end of the period
Control	Separation	Ratio of separation of two rights, the difference between the

Variables		actual controller's control and ownership of the listed company
	Leverage	Leverage ratio, ending balance of corporate liabilities/ending balance of corporate assets
	LnSize	Enterprise size, natural logarithm of total assets at the end of the period
	ROA	Return on assets, the ratio of net profits for the current year to total assets at the end of the period
	State	Nature of the enterprise; value equals 1 for a state-owned enterprise and 0 otherwise
	FCF	Cash flow, net cash flow from operating activities/total assets
	TATO	Total asset turnover, operating income/average total assets
	Growth	Growth rate, (operating income of current year - operating income of previous year)/operating income of previous year
	Dual	Value equals 1 if the chairman of the company is also the general manager and 0 otherwise
	Top1	Shareholding ratio of the largest shareholder
	Age	Natural logarithm of total number of months the company has been listed

Table 2 Descriptive Statistical Analysis for Primary Variables

Variables	Obs	Mean	Median	SD	Min	Max
Tran	7,217	4.500	4.500	2.058	1.000	10.000
Client1	7,217	0.288	0.230	0.218	0 .0003	1.000
Supply1	7,217	0.346	0.299	0.206	0.003	1.000
SCCI	7,217	0.317	0.289	0.163	0.006	0.990
Media_pos	7,217	0.637	0.693	0.712	0.000	3.466
Media_neg	7,217	0.830	0.693	0.776	0.000	3.611
Media	7,217	0.837	0.693	0.912	0.693	4.205
TCS	7,217	-0.102	-0.078	0.101	-0.548	0.633
TCC	7,217	0.103	0.089	0.147	-0.467	0.769
Separation	7,217	0.048	0.000	0.076	0.000	0.291
Leverage	7,217	0.444	0.440	0.206	0.058	0.883
Size	7,217	22.447	22.261	1.269	20.204	26.240
ROA	7,217	0.064	0.064	0.093	-0.403	0.300
State	7,217	0.424	0.000	0.494	0.000	1.000

FCF	7,217	0.043	0.042	0.074	-0.670	0.661
TATO	7,217	0.650	0.528	0.559	0.007	12.373
Growth	7,217	0.270	0.107	3.274	-0.947	251.211
Dual	7,217	0.243	0.000	0.429	0.000	1.000
Top1	7,217	35.515	33.530	15.202	3.620	89.990

Table 3 Media Coverage and Accounting Information Transparency

	$Tran$	$Tran$	$Tran$
	（1）	（2）	（3）
Media_pos	-0.142***		
	(-3.79)		
Media_neg		0.137***	
		(3.20)	
Media			-0.080***
			(-3.16)
Separation	-1.404***	-1.413***	-1.418***
	(-4.90)	(-4.93)	(-4.95)
Leverage	-0.163	-0.159	-0.159
	(-1.17)	(-1.14)	(-1.14)
Size	0.026	0.025	0.031
	(1.10)	(1.05)	(1.31)
ROA	5.473***	5.485***	5.506***
	(21.13)	(21.17)	(21.25)
State	-0.344***	-0.344***	-0.341***
	(-6.67)	(-6.67)	(-6.61)
Age	-0.007*	-0.007*	-0.007
	(-1.70)	(-1.71)	(-1.64)
FCF	-7.631***	-7.645***	-7.645***
	(-24.54)	(-24.58)	(-24.57)
TATO	0.310***	0.314***	0.312***
	(4.05)	(4.11)	(4.08)
Growth	-0.013*	-0.013*	-0.013*
	(-1.94)	(-1.93)	(-1.90)
Dual	0.196***	0.195***	0.195***

	(3.79)	(3.76)	(3.77)
Top1	-0.003**	-0.003**	-0.003**
	(-2.26)	(-2.27)	(-2.11)
Constant	4.284***	4.363***	4.133***
	(8.97)	(9.09)	(8.55)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R2	0.24	0.24	0.24
F value	101.43***	101.19***	105.25***
Average VIF	1.56	1.68	1.58
Observations	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 4 Supply Chain Centralization and Accounting Information Transparency

	$Tran$	$Tran$	$Tran$
	（1）	（2）	（3）
SCCI	-0.274**		
	(-2.06)		
SCCI2		-0.485***	
		(-2.80)	
SCCI3			-0.000
			(-1.31)
Separation	-1.380***	-1.394***	-1.390***
	(-4.82)	(-4.87)	(-4.85)
Leverage	-0.064	-0.059	-0.062
	(-0.45)	(-0.41)	(-0.43)
Size	0.026	0.028	0.0287
	(1.11)	(1.17)	(1.22)
ROA	5.426***	5.422***	5.437***
	(20.88)	(20.87)	(20.93)
State	-0.326***	-0.328***	-0.333***
	(-6.31)	(-6.36)	(-6.45)
Age	-0.006	-0.007	-0.007
	(-1.47)	(-1.51)	(-1.60)

FCF	-7.711***	-7.683***	-7.696***
	(-24.76)	(-24.68)	(-24.71)
TATO	0.352***	0.353***	0.354***
	(4.51)	(4.53)	(4.54)
Growth	-0.0138**	-0.014**	-0.014**
	(-2.09)	(-2.13)	(-2.13)
Dual	0.190***	0.189***	0.189***
	(3.67)	(3.65)	(3.65)
Top1	-0.003**	-0.003**	-0.003**
	(-2.00)	(-2.01)	(-2.05)
Constant	4.221***	4.168***	4.131***
	(8.63)	(8.63)	(8.50)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R2	0.24	0.24	0.24
F value	97.15***	97.35***	97.01***
Average VIF	1.56	1.56	1.56
Observations	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 5 Supplier Centralization and Accounting Information Transparency

	$Tran$	$Tran$	$Tran$
	（1）	（2）	（3）
Supply1	-0.177*		
	(-1.70)		
Supply2		-0.266*	
		(-1.88)	
Supply3			-0.000
			(-1.38)
Separation	-1.368***	-1.375***	-1.373***
	(-4.77)	(-4.80)	(-4.79)
Leverage	-0.068	-0.065	-0.063
	(-0.48)	(-0.46)	(-0.44)
Size	0.028	0.027	0.029
	(1.19)	(1.18)	(1.21)
ROA	5.430***	5.431***	5.437***

	(20.89)	(20.91)	(20.93)
State	-0.331***	-0.332***	-0.335***
	(-6.42)	(-6.46)	(-6.49)
Age	-0.006	-0.007	-0.007
	(-1.43)	(-1.51)	(-1.60)
FCF	-7.692***	-7.688***	-7.689***
	(-24.70)	(-24.69)	(-24.69)
TATO	0.355***	0.356***	0.354***
	(4.55)	(4.57)	(4.54)
Growth	-0.014**	-0.014**	-0.014**
	(-2.10)	(-2.14)	(-2.12)
Dual	0.191***	0.191***	0.190***
	(3.69)	(3.68)	(3.67)
Top1	-0.003**	-0.003**	-0.003**
	(-2.05)	(-2.08)	(-2.08)
Constant	4.159***	4.141***	4.134***
	(8.56)	(8.56)	(8.51)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R2	0.24	0.24	0.24
F value	97.07***	97.11***	97.02***
Average VIF	1.56	1.56	1.56
Observations	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 6 Customer Centralization and Accounting Information Transparency

	$Tran_{it}$	$Tran_{it}$	$Tran_{it}$
Client1	-0.147		
	(-1.47)		
Client2		-0.385***	
		(-2.62)	
Client3			-0.930***
			(-2.65)

Separation	-1.390***	-1.416***	-1.413***
	(-4.85)	(-4.93)	(-4.93)
Leverage	-0.058	-0.055	-0.057
	(-0.41)	(-0.39)	(-0.40)
Size	0.028	0.030	0.031
	(1.20)	(1.29)	(1.33)
ROA	5.442***	5.441***	5.441***
	(20.95)	(20.96)	(20.96)
State	-0.326***	-0.329***	-0.327***
	(-6.30)	(-6.37)	(-6.34)
Age	-0.007	-0.007	-0.007
	(-1.59)	(-1.62)	(-1.60)
FCF	-7.714***	-7.688***	-7.683***
	(-24.75)	(-24.69)	(-24.68)
TATO	0.354***	0.353***	0.354***
	(4.54)	(4.53)	(4.55)
Growth	-0.014**	-0.014**	-0.014**
	(-2.13)	(-2.11)	(-2.11)
Dual	0.190***	0.189***	0.188***
	(3.66)	(3.66)	(3.64)
Top1	-0.003**	-0.003**	-0.003**
	(-2.05)	(-2.02)	(-2.00)
Constant	4.134***	4.102***	4.069***
	(8.52)	(8.52)	(8.46)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R2	0.24	0.24	0.24
F value	97.03***	97.29***	97.30***
Average VIF	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 7 Effect of the Media and Supply Chain on the Collaborative Governance of Accounting Information

	$Tran_{it}$	$Tran_{it}$	$Tran_{it}$
	（1）	（2）	（3）

SCCI	-0.040	-0.023	-0.0390*
	(-0.69)	(-0.37)	(-1.64)
Media	0.029		
	(-0.89)		
Media*SCCI	-0.130***		
	(-2.76)		
Media_neg		0.187***	
		(3.74)	
Media_neg*SCCI		-0.109*	
		(-1.96)	
Media_pos			-0.075*
			(-1.79)
Media_pos*SCCI			-0.132**
			(-2.07)
Separation	-1.372***	-1.415***	-1.884***
	(-4.79)	(-4.94)	(-6.25)
Leverage	-0.057	-0.179	0.903***
	(-0.40)	(-1.29)	(6.49)
Size	0.028	0.022	0.034
	(1.20)	(0.94)	(1.47)
ROA	5.414***	5.380***	6.262***
	(20.82)	(21.23)	(23.69)
State	-0.331***	-0.340***	-0.370***
	(-6.41)	(-6.60)	(-6.92)
Age	-0.007	-0.007	0.005
	(-1.55)	(-1.62)	(1.24)
FCF	-7.695***	-7.645***	-8.695***
	(-24.71)	(-24.57)	(-26.72)
TATO	0.350***	0.223***	0.053
	(4.49)	(5.36)	(1.29)
Growth	-0.014**	-0.014**	-0.0114*
	(-2.16)	(-2.20)	(-1.67)
Dual	0.192***	0.195***	0.163***
	(3.70)	(3.77)	(2.97)
Top1	-0.003**	-0.003**	0.000
	(-2.08)	(-2.25)	(0.06)

Constant	4.024***	4.409***	3.546***
	(8.21)	(9.11)	(7.33)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R2	0.24	0.24	0.15
F value	93.60***	97.20***	92.90***
Observations	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 8 Group Regression by Industry Competition Intensity of Enterprises

Tran	The group of higher Lerner index indicating higher competitive position of a company		The group of lower Lerner index indicating lower competitive position of a company	
	negative reports（1）	positive reports（2）	negative reports（3）	positive reports（4）
SCCI	-0.064	-0.174**	0.089	-0.202**
	(-0.74)	(-2.22)	(1.00)	(-2.43)
Media_neg	0.171***		-0.071	
	(3.38)		(-1.28)	
Media_neg *SCCI	-0.178**		0.007	
	(-2.40)		(0.09)	
Media_pos		-0.044		-0.138**
		(-0.84)		(-2.35)
Media_pos *SCCI		-0.086		-0.156*
		(-1.04)		(-1.81)
Separation	-2.318***	-2.373***	-0.772*	-0.760*
	(-5.82)	(-5.96)	(-1.90)	(-1.88)
Leverage	-0.123	-0.191	-0.116	-0.152
	(-0.63)	(-0.98)	(-0.59)	(-0.77)
Size	-0.077**	-0.039	0.076**	0.088***
	(-2.33)	(-1.22)	(2.34)	(2.77)
ROA	3.634***	3.645***	6.475***	6.426***
	(7.10)	(7.11)	(19.68)	(19.58)

State	-0.424***	-0.434***	-0.290***	-0.298***
	(-5.79)	(-5.91)	(-3.99)	(-4.10)
Age	-0.003	-0.003	-0.014**	-0.016**
	(-0.52)	(-0.43)	(-2.17)	(-2.50)
FCF	-7.868***	-7.855***	-6.464***	-6.447***
	(-18.30)	(-18.22)	(-13.83)	(-13.84)
TATO	-0.073	-0.037	0.207***	0.209***
	(-0.57)	(-0.28)	(4.35)	(4.39)
Growth	-0.108***	-0.106***	-0.011*	-0.012*
	(-3.32)	(-3.26)	(-1.66)	(-1.75)
Dual	0.362***	0.367***	-0.007	0.004
	(5.34)	(5.41)	(-0.09)	(0.06)
Top1	-0.002	-0.002	-0.004	-0.004**
	(-1.16)	(-1.08)	(-1.64)	(-1.97)
Constant	6.476***	5.775***	3.473***	3.280***
	(9.38)	(8.71)	(5.16)	(4.97)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R2	0.30	0.30	0.20	0.21
F value	67.83***	67.41***	41.33***	42.59***
Observations	3,495	3,495	3,722	3,722

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 9 Bargaining Power between Enterprises and Their Suppliers and Enterprise Accounting Information Transparency

	Tran（1）	Tran（2）	Tran（3）	Tran（4）
SCCI	-0.265**	-0.407***	-0.405**	-0.717***
	(-1.99)	(-2.80)	(-2.26)	(-3.81)
TCS	-0.450*		-0.009	0.716
	(-1.94)		(-0.02)	(1.54)
TCS*SCCI		-1.416**	-1.395	-1.109
		(-2.27)	(-1.17)	(-0.89)
Separation	-1.406***	-1.417***	-1.417***	-1.735***

	(-4.90)	(-4.94)	(-4.94)	(-5.76)
Leverage	-0.144	-0.152	-0.152	1.151***
	(-0.97)	(-1.03)	(-1.02)	(7.82)
Size	0.030	0.032	0.032	0.039
	(1.25)	(1.34)	(1.34)	(1.59)
Roa	5.425***	5.417***	5.417***	6.319***
	(20.88)	(20.85)	(20.84)	(23.44)
State	-0.332***	-0.334***	-0.334***	-0.343***
	(-6.41)	(-6.45)	(-6.45)	(-6.41)
Age	-0.006	-0.006	-0.006	0.006
	(-1.27)	(-1.29)	(-1.28)	(1.37)
FCF	-7.700***	-7.701***	-7.701***	-8.777***
	(-24.73)	(-24.73)	(-24.73)	(-27.06)
TATO	0.368***	0.362***	0.361***	0.415***
	(4.70)	(4.63)	(4.59)	(5.02)
Growth	-0.013**	-0.013**	-0.013**	-0.010
	(-2.01)	(-2.04)	(-2.04)	(-1.49)
Dual	0.191***	0.192***	0.192***	0.158***
	(3.70)	(3.71)	(3.71)	(2.80)
Top1	-0.003**	-0.003**	-0.003**	0.000
	(-2.00)	(-2.03)	(-2.03)	(0.20)
Constant	4.156***	4.162***	4.162***	3.479***
	(8.48)	(8.50)	(8.49)	(6.86)
Year FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No
Adjusted R2	0.24	0.24	0.24	0.16
F value	93.45***	93.52***	89.91***	80.79***
Observations	7,217	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 10 Bargaining Power between Enterprises and Customers and Accounting Information Transparency

	Tran （1）	Tran （2）	Tran （3）	Tran （4）
SCCI	-0.288**	-0.452***	-0.529***	-0.864***

	(-2.16)	(-3.20)	(-3.39)	(-5.30)
TCC	0.426**		-0.368	-2.307***
	(2.54)		(-1.16)	(-7.13)
TCC*SCCI		1.801***	2.699***	3.786***
		(3.72)	(2.96)	(3.98)
Separation	-1.398***	-1.400***	-1.394***	-1.661***
	(-4.88)	(-4.89)	(-4.87)	(-5.54)
Leverage	-0.068	-0.075	-0.076	0.977***
	(-0.48)	(-0.52)	(-0.54)	(6.86)
Size	0.032	0.035	0.0347	0.027
	(1.36)	(1.49)	(1.46)	(1.12)
ROA	5.370***	5.361***	5.378***	6.396***
	(20.60)	(20.60)	(20.64)	(23.84)
State	-0.319***	-0.319***	-0.321***	-0.372***
	(-6.17)	(-6.18)	(-6.22)	(-6.98)
Age	-0.005	-0.004	-0.005	0.003
	(-1.14)	(-1.01)	(-1.05)	(0.58)
FCF	-7.566***	-7.523***	-7.555***	-9.045***
	(-23.91)	(-23.87)	(-23.88)	(-27.80)
TATO	0.372***	0.370***	0.361***	0.352***
	(4.75)	(4.74)	(4.61)	(4.28)
Growth	-0.013**	-0.014**	-0.014**	-0.011
	(-2.05)	(-2.06)	(-2.08)	(-1.63)
Dual	0.194***	0.196***	0.195***	0.146***
	(3.75)	(3.78)	(3.77)	(2.70)
Top1	-0.003*	-0.003*	-0.003*	-0.000
	(-1.86)	(-1.88)	(-1.94)	(-0.48)
Constant	4.036***	4.009***	4.063***	4.046***
	(8.17)	(8.15)	(8.23)	(7.94)
Year FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No
Adjusted R2	0.24	0.24	0.24	0.17
F value	93.59***	93.98***	90.42***	85.44***
Observations	7,217	7,217	7,217	7,217

Note: T-statistics are shown in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.