Short-Selling Mechanism and Earnings Management in Supply Chains: Evidence from Network Spillovers

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Abstract: This study investigates the spillover effects of short-selling mechanism on corporate earnings management within supply chain networks. While prior literature predominantly focuses on the direct governance effects of short selling at the firm level, we extend this perspective by examining how such external governance pressures propagate through inter-firm economic linkages. Using a comprehensive sample of Chinese A-share listed firms from 2010 to 2025 and exploiting the staggered implementation of the margin trading and securities lending (MTSS) system, we construct a novel measure of firms' exposure to short-selling mechanism via their supply chain partners. Our findings reveal a significant and positive relationship between short-selling exposure of focal firms and earnings management among their supply chain peers, suggesting a "defensive spillover effect" whereby connected firms increase opportunistic reporting in response to heightened uncertainty and reputational concerns. Further analyses show that this effect is moderated by supply chain dependence and internal governance: the spillover is more pronounced among highly dependent firms and those with stronger governance structures, highlighting heterogeneous behavioral responses to external shocks. These results challenge the conventional view of short selling as a uniformly beneficial governance mechanism and underscore the importance of considering network structures in understanding corporate financial reporting behavior. Overall, this study contributes to the literature by integrating insights from corporate governance, supply chain networks, and earnings management, and by providing new evidence on how external market forces shape firm behavior beyond organizational boundaries.

Keywords: Short Selling; Earnings Management; Supply Chain Networks; Governance Spillovers; External Governance; China Capital Market; MTSS System

1. Introduction

1.1 Background and Motivation for the Research

Short selling is an important part of modern capital markets because it helps investors identify bad news and strengthens corporate governance from the outside. Short selling puts pressure on managers to be more transparent by allowing informed investors to trade against companies that are overvalued. A growing body of research indicates that lowering short-selling restrictions results in less earnings management, improved disclosure quality, and a more efficient market ([5]Fang et al., 2016; [1]Hou et al., 2017; [3]Chen and Liu, 2014). Although this is a step forward, most of the research conducted so far has only examined how short-selling mechanism directly affect the companies they target, treating them as separate decision-making units.

In reality, companies work in complicated supply chain networks. These include long-term contracts, economic interdependence, and links between information. These networks help plan production, but they also play a big role in sending information and shocks. Previous research has shown that shocks specific to a company, like financial or operational problems, can spread along supply chains. These shocks affect the performance and value of connected companies ([10]Cohen and Frazzini, 2008; [11]Hertzel et al., 2008; [12]Barrot and Sauvagnat, 2016). Nonetheless, the impact of external governance pressures, such as mechanism of short-selling, on spillover effects among supply chain partners remains largely unexamined.

This is especially important in emerging markets like China, where supply chain relationships are often based on high dependence and relational

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contracting ([13]Xiang and Liu, 2025). China's capital market has become a natural laboratory for studying the real effects of short-selling mechanism since the margin trading and securities lending (MTSS) system was first introduced and then gradually expanded. At the same time, regulatory bodies have emphasised the importance of considering systemic risks from a supply chain perspective. This illustrates the importance of understanding how governance shocks at one company impact other companies connected to it.

In light of this, this study looks into whether mechanism of short-selling affect the earnings management behaviour of peer firms in the supply chain. When a focal firm is under pressure to short-sell, the negative signals that come with it, like more scrutiny, worries about its reputation, and possible financing problems, may also affect its trading partners. People in the same supply chain may react in different ways. On the one hand, they might cut back on earnings management to show that they are open and honest and stay away from any possible governance issues. On the other hand, they might use defensive earnings management to make performance more stable and lower perceived spillover risks. To figure out the bigger effects of short selling as a way to govern from the outside, it's important to know which of these responses is the most common.

This study advances the literature by redirecting focus from individual firms to supply chain networks. First, it broadens the range of short-selling research by looking at its effects on other firms through real economic links. Second, it adds to the growing body of research on supply chain networks by showing how signals related to governance, not just operational shocks, spread between companies. Third, it reveals new information about what causes earnings management by focusing on the importance of connections between firms and outside pressures for good governance. These contributions collectively help us understand how capital market mechanisms interact with economic networks and influence corporate financial reporting practices.

1.2 Literature Review

This study pertains to three domains of literature: (1) the governance implications of short selling, (2) supply chain networks and the transmission of shocks, and (3) peer influences on corporate financial conduct. This paper constructs a network-based framework to examine the impact of external governance pressures on firms beyond their organisational confines.

1.2.1 Short selling as an external governance mechanism

A substantial corpus of literature investigates the function of short selling in enhancing corporate governance and the quality of financial reporting. Short selling improves price efficiency and puts pressure on managers by letting investors trade on bad news. [5]Fang et al. (2016) utilize the Regulation SHO pilot as a natural experiment to demonstrate that alleviating short-selling constraints results in substantial reductions in discretionary accruals and enhances the probability of fraud detection. Evidence from the Chinese market indicates that the implementation and growth of margin trading and securities lending (MTSS) diminishes earnings management and alleviates agency issues ([3]Chen and Liu, 2014; [1]Hou et al., 2017). Additional research indicates that short selling diminishes information asymmetry and stock price volatility ([2]Xiao and Kong, 2014).

Even with these improvements, most of the research still focuses on outcomes at the firm level, assuming that the effects of short selling on governance are only felt within the firm. This viewpoint neglects the potential for short-selling mechanism to produce more extensive economic ramifications via inter-firm connections. Specifically, the impact of short selling on economically interconnected firms is still an unresolved empirical inquiry.

1.2.2 Supply chain networks and the spread of shocks

Another pertinent body of literature underscores the significance of supply chain networks in the dissemination of information and economic shocks among firms. Companies are part of production networks where relationships between upstream and downstream partners create ways for both operational dependence and information to flow. [10]Cohen and Frazzini (2008) demonstrate that stock price information from customer firms progressively integrate into supplier valuations, indicating that investors exhibit an underreaction to supply chain linkages. [11]Hertzel et al. (2008) assert that financial distress disseminates through supply chains, influencing the valuation of interconnected firms. [12]Barrot and Sauvagnat (2016) also find that

exogenous shocks, like natural disasters, stop suppliers from making things and cause their customers to lose a lot of money, especially when the inputs are very specific.

In addition to market outcomes, previous research indicates that supply chain relationships affect the financial reporting practices of firms. Companies that rely more on customers or suppliers are more likely to manage their earnings to keep relational contracts and meet the expectations of their counterparties ([5]Fang and Zhang, 2016). These results indicate that supply chains not only convey economic shocks but also influence firms' strategic responses, including accounting decisions.

Nevertheless, current research predominantly examines the dissemination of real or operational shocks. It is still not clear if signals related to governance, like mechanism to short-sell, can spread through supply chain networks and affect the behaviour of connected firms. This limitation is significant because governance pressures are fundamentally distinct from operational shocks; they are anticipatory, information-driven, and frequently associated with reputational considerations.

1.2.3 Peer effects and corporate behaviour based on networks

A burgeoning body of literature investigates the impact of peer behaviour on corporate decision-making. Utilising theories of social learning and imitation, previous research has identified substantial peer influences on corporate policies, including investment, financing, and mergers and acquisitions ([6]Wan et al., 2016). From a network standpoint, companies integrated within interconnected frameworks-such as board interlocks or social networks-demonstrate correlated behaviour attributable to information dissemination and strategic imitation ([7]Chen, 2015).

These results indicate that companies do not operate independently; rather, they react to cues from their competitors. Most studies, on the other hand, look at weaker connections, like social networks or industry affiliations, where interactions are indirect and informational. On the other hand, supply chain relationships are strong ties that are based on contracts, repeated interactions, and a lot of economic dependence. Consequently, behavioural responses in supply chains may be more significant and economically impactful.

Even though people are becoming more interested in peer effects, we still don't know much about how external governance shocks change how peer firms report their finances in networks with strong links. It is still unclear whether companies change how they manage their earnings when governance signals affect their supply chain partners.

1.3 Research Gap and Contribution

When looked at as a whole, the existing literature gives us important information about (i) how short selling affects governance, (ii) how shocks spread through supply chain networks, and (iii) how peer effects change how companies act. But these strands have mostly grown in parallel, leaving a big gap where they meet.

First, past research on short selling has mostly looked at direct effects on individual firms, with little focus on effects that happen between firms. The second point is that the supply chain literature focuses on how operational shocks spread but mostly ignores signals related to governance. Third, peer effects studies often use weak-link networks, which don't fully show how strong contractual relationships like supply chains work.

This study fills in the gaps by looking at whether mechanism of short-selling affect how peer firms in the supply chain manage their earnings. This paper brings together ideas from outside governance, network theory, and accounting behaviour to create a single framework for understanding how governance pressures spread from one company to another. In this way, it adds to the body of research on short selling by looking at it outside of firms, adds to the supply chain literature by introducing governance-driven spillovers, and adds to the peer effects literature by focusing on strong-link economic networks.

2. Theoretical Framework and Research Hypotheses

2.1 Theoretical Framework

This research employs a tripartite theoretical framework, incorporating signal transmission theory, resource dependence theory, and corporate governance theory, to examine the propagation of short-selling mechanism within supply chain networks and their subsequent impact on corporate financial reporting practices.

In signal transmission theory, short-selling is

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seen as a way to share negative information about a company's financial health or how it is run ([14]Spence, 1973; [15]Diamond & Verrecchia, 1987).Unlike conventional disclosures issued by corporations, short selling represents an external, market-driven signal, indicating that knowledgeable investors harbor doubts concerning a company's valuation.Short sellers are driven to identify and capitalize on negative information, a practice that frequently garners heightened interest from investors, analysts, and regulatory bodies ([16]Karpoff & Lou, 2010).Consequently, a corporation's engagement in short selling can amplify market scrutiny and potentially damage its public image. It is crucial to recognize that these indicators possess ramifications that extend beyond the confines of the specific company.Through economic interdependencies, such as those found in supply chains, adverse signals can propagate to other companies via shared informational ecosystems and investor perceptions. This suggests that governance-related signals may transcend a company's internal confines.

Resource dependence theory suggests that a firm's strategic responses to external pressures are fundamentally shaped by its reliance on key partners ([29]Hillman et al., 2009). Subsequent investigations underscore that these dependencies influence not only power relations but also the behavioral adjustments of firms operating within volatile contexts ([21]Drees & Heugens, 2013). Supply chain actors often depend on critical customers or suppliers for financial support, vital resources, and operational stability. These inter-organizational linkages represent a substantial source of both benefits and constraints.As a result, when a major company faces financial difficulties, its supply chain partners might become less confident in the reliability of current contracts, the expected demand, or the likelihood of getting paid.

Dependence levels dictate both vulnerability to risks and the speed of response. Organizations with higher dependence are more vulnerable to disruptions in their key exchange relationships. Consequently, companies with a high degree of dependency often view short-selling as a potential economic risk, which leads to quicker changes in their behavior. In this context, supply chain connections act as channels, allowing shocks to spread and intensifying external pressures.

Finally, the prevailing corporate governance paradigm posits that a firm's response to external influences is significantly shaped by internal governance structures, including board supervision, ownership configurations, and monitoring frameworks ([17]Daily et al., 2003). The potential for short selling demonstrates that enhanced external scrutiny can bolster the efficacy of these governance mechanisms, thereby increasing the probability of detecting and penalizing managerial misconduct ([18]Aguilera et al., 2008).So, businesses usually try to be more open and limit earnings management to keep their credibility in the market.

However, the reactions of supply chain partners are more complex. Increased scrutiny might lead companies to use more careful and transparent reporting methods to show they can be trusted and to protect their reputation. In contrast, the pressure to perform, caused by potential problems in supply chain relationships, could make management's self-interested actions in financial reporting even worse.The reporting behavior of a firm ultimately reflects a trade-off between governance constraints and performance incentives, a trade-off influenced by firm-specific governance characteristics ([28]Bebchuk & Weisbach, 2010).

By combining these points of view, this study sees short-selling mechanism as external governance shocks that cause network spillovers through links in the supply chain.The propagation mechanism functions via two principal channels.The first is an information channel, which means that bad news about the main company changes what people in the market think and expect about related companies. The second is an economic channel, which means that when there is more uncertainty and possible problems, it changes the way businesses work and what they want to do. These channels work together to change how supply chain peers report their finances.This theoretical framework serves as the basis for the empirical hypotheses formulated in the subsequent sections.

2.2 Research Hypothese

Based on the theoretical research outlined above, this paper posits the following hypotheses:

2.2.1 mechanism from short selling and effects on the supply chain

mechanism of short-selling are a strong form of

external governance because they make it more likely that bad news will come out and be reflected in market prices. When a company is the target of short-selling pressure, it usually means that there are concerns about the quality of its financial reporting, its corporate governance, or its underlying fundamentals. Investors, analysts, and regulators usually pay more attention to these kinds of signals, which raises the expected costs of managerial opportunism. Previous research has shown that short-selling pressure limits earnings management at the focal firm level, but not much is known about how it affects other firms that are connected to the focal firm.

Firms within supply chains are interconnected through repeated transactions, contractual relationships, and operational interdependencies. These linkages facilitate the transmission of both firm-specific shocks and informational signals across organizational boundaries. When a focal firm is subject to short-selling mechanism, its supply chain partners may interpret this as a negative signal regarding the focal firm's credibility and stability. Given that short sellers are often perceived as informed traders who uncover unfavorable information, such mechanism represent a credible and salient market signal.

Short-selling mechanism can affect supply chain peer firms through two primary channels. The first is an information channel. Negative signals associated with the focal firm may prompt investors and other stakeholders to reassess the risk exposure of economically linked firms. This reassessment can lead to intensified scrutiny and external pressure on supply chain partners, even in the absence of direct short-selling activity targeting those firms.

The second channel operates through economic linkages. Short-selling pressure on the focal firm may raise concerns about its future performance, financial health, and ability to honor contractual obligations. These concerns can generate uncertainty regarding ongoing transactions, potential disruptions in supply chain operations, and fluctuations in demand. Such uncertainty may adversely affect the operating environment and financial stability of peer firms.

In response to these pressures, supply chain firms may adjust their financial reporting behavior. While increased scrutiny can incentivize greater transparency, an alternative and often dominant response is defensive earnings management. Facing heightened uncertainty about future cash flows and potential reputational spillovers from the focal firm, managers of peer firms may engage in income smoothing or opportunistic reporting to stabilize market expectations and maintain stakeholder confidence. This behavior is particularly likely when firms seek to mitigate the adverse valuation effects associated with perceived contagion risk.

The net effect of these competing forces depends on their relative strength. In environments characterized by elevated uncertainty and strong economic dependence within the supply chain, defensive incentives are likely to dominate. As a result, firms may resort to more aggressive earnings management to cushion against negative shocks and preserve access to external financing.

Accordingly, this study proposes the following hypothesis:

H1: The earnings management practices of supply chain peer firms are positively associated with the short-selling mechanism faced by focal firms.

2.2.2 Dependence on the supply chain

The effects of short-selling mechanism on other companies are not likely to be the same for all of them. Instead, they are likely to depend on how the supply chain relationships are set up. The extent to which supply chain partners depend on a central firm significantly influences how they respond to external governance changes.

Resource dependence theory suggests that companies rely on important partners for essential resources like raw materials, income, and operational stability. This dependence limits their ability to change their strategies (Pfeffer and Salancik, 1978). In supply chains, greater dependence indicates stronger economic ties and a reduced ability to quickly replace partners ([19]Kale and Shahrur, 2007). Therefore, companies with a high reliance on a central firm are more vulnerable to disruptions affecting that firm.

This dependence makes the spread of short-selling mechanism worse through two main ways. First, a stronger dependence increases the sensitivity of information.Companies that do business with each other often keep a close eye on their partners and know more about their situations than other companies. So, they are more likely to respond to signals related to governance, like

short-selling pressure. Second, being more dependent makes the economy more fragile. When a focal firm faces short-selling mechanism, worries about its financial health and ability to keep its contracts become more directly operational and financial risks for partners who depend on it ([10]Cohen and Frazzini, 2008).

These mechanisms together suggest that companies that rely more on their supply chains have stronger reasons to respond to mechanism of short-selling. When companies are under more scrutiny and have more exposure, they tend to use conservative reporting methods. This is done to show their trustworthiness and reduce the risks for their partners. Therefore, the reduction in earnings management, as discussed in Section 2.2, is expected to be more significant in companies with greater dependence.

This study proposes the following hypothesis:

H2: The negative relationship between short-selling mechanism and earnings management among peer firms in the supply chain is stronger for firms that are more dependent on the supply chain.

2.2.3 Internal governance and unequal responses

The previous analysis shows how mechanism of short-selling can spread through supply chain networks. However, companies are not likely to respond to these external governance shocks in the same way. Instead, the internal governance structures of corporations shape how managers weigh reputational concerns against self-serving incentives.

Corporate governance theory suggests that internal governance mechanisms are crucial for holding managers accountable and solving agency problems ([28]Bebchuk and Weisbach, 2010). Companies with strong governance, such as boards that monitor management, greater institutional ownership, and better internal controls, are better at preventing opportunistic behavior by managers and encouraging clear financial reporting. Conversely, companies with weaker governance are more likely to allow managers to make decisions that benefit themselves.

When supply chain peers face short-selling mechanism that impact focal firms, these governance disparities lead to asymmetric behavioral responses. For companies with good internal governance, more outside scrutiny makes existing monitoring systems work better and raises the expected cost of manipulating earnings. Because of this, managers at these companies are more likely to respond in a way that focuses on compliance, which means they will cut back on earnings management to show that they are open and to set themselves apart from partners who might be risky.

Companies with weak internal governance, on the other hand, have different reasons to act. Limited oversight and weaker internal controls make it easier for managers to take advantage of situations. When short-selling spillovers occur, the management of affected firms may experience heightened performance pressures, potentially stemming from disruptions in supply chain dynamics or increased market scrutiny. Rather than enhancing the quality of their financial disclosures, these managers might resort to defensive earnings management strategies. Such strategies could be employed to conceal vulnerabilities, stabilize reported performance, or mitigate perceptions of risk relative to the focal firm ([20]Graham et al., 2005). Furthermore, negative events affecting the focal firms can engender a "noise environment," which, in turn, may foster opportunistic reporting practices, thereby encouraging such behavior.

The differences in these responses suggest that internal governance acts as a filter that decides how companies respond to changes in external governance. Strong governance aligns managerial goals with long-term reputations and transparency. This reduces earnings management. In contrast, weak governance encourages short-term opportunistic behavior, which leads to more earnings manipulation.

Consequently, this research posits the following hypothesis:

H3: The impact of short-selling mechanism on earnings management within supply chain peer firms is contingent upon the quality of internal governance. Specifically, companies with better governance tend to reduce earnings management. In contrast, companies with weaker governance often increase it, especially when short-selling becomes widespread.

3. Research Design

3.1 Data and the Sample Selection

This study analyzes Chinese A-share listed companies from March 2010 to 2025. The sample period starts with the start of the margin trading and securities lending (MTSS) system, which makes it easier to find short-selling

mechanism in a way that is almost natural.

The China Stock Market and Accounting Research (CSMAR) database is where all the information comes from. Companies that are part of the MTSS program are thought to be at risk of short-selling. We use customer-supplier linkage data from CSMAR to build supply chain relationships. This lets us see how focal firms are connected to their upstream and downstream partners.

We leave out financial firms and observations with missing key variables, as is normal. The 1st and 99th percentiles are used to winsorize all continuous variables. The final sample comprises firm-year observations containing comprehensive data on financial reporting, short-selling exposure, and supply chain relationships.

3.2 Definitions of Variables

We define earnings management using the absolute value of discretionary accruals estimated from the modified Jones model ([22]Dechow et al., 1995). The main independent variable, Spillover, captures whether a firm's supply chain partners are exposed to short-selling mechanism through MTSS eligibility.It is constructed by combining short-selling eligibility with supply chain linkages.

Specifically, we first define a treatment indicator $Treat_{j,t}$ for each focal firm j, which equals one if firm j is included in the margin trading and securities lending (MTSS) program in year t, and zero otherwise.

Next, we identify supply chain relationships using customer–supplier linkage data. We define $Link_{i,j}$ as an indicator variable that equals one if firm i has a stable supply chain relationship with firm j, and zero otherwise.

To capture the intensity of exposure, we further assign weights $W_{i,j}$ based on the importance of the relationship, measured by the proportion of transactions (e.g., sales or purchases) between firm i and firm j.

The spillover measure is then constructed as:

$$Spillover_{i,t}=\sum_{j\in SC(i)} w_{i,j} \cdot Treat_{j,t} \quad (1)$$

where $SC(i)$ denotes the set of supply chain partners of firm i. This measure reflects the overall exposure of firm iii to short-selling mechanism through its connected partners.

To examine cross-sectional variation, we consider supply chain dependence (Dep), measured by the importance of major customers or suppliers ([19]Kale and Shahrur, 2007), and internal governance (Gov), proxied by firm-level governance characteristics ([28]Bebchuk and Weisbach, 2010).

We further include a set of standard firm-level control variables, including firm size, profitability, leverage, cash flows, growth, and analyst coverage, following prior literature ([23]Dechow et al., 2010). Detailed definitions of all variables are reported in Table 1.

Table 1. Definitions of Variables

Variable Type	Symbol	Variable Name	Definition
Dependent	|DA|	Earnings Management	Absolute value of discretionary accruals estimated using the modified Jones model.
Independent	Spillover	Short-Selling Spillover	Indicator (or intensity measure) capturing whether a firm's supply chain partners are exposed to short-selling through MTSS eligibility.
Moderating	Dep	Supply Chain Dependence	Proportion of sales (or purchases) associated with major customers or suppliers.
Moderating	Gov	Internal Governance	Proxy for governance quality, such as ownership structure or board independence.
Control	Size	Firm Size	Natural logarithm of total assets.
Control	ROA	Profitability	Net income divided by total assets.
Control	Lev	Leverage	Total liabilities divided by total assets.
Control	TAcc	Total Accruals	Portions of accounting profit not supported by cash flows

3.3 Empirical Model

To examine the spillover effects of short-selling mechanism on supply chain peer firms, this study employs a panel regression framework with firm and year fixed effects. Given the gradual expansion of short-selling eligibility in China, the empirical design also incorporates a DID-style logic by exploiting time-varying exposure to short-selling mechanism through supply chain partners.

To examine the spillover effects of short-selling

mechanism on supply chain peer firms, we estimate the following baseline model:

$$EM_{i,t}=\alpha+\beta_1 Spillover_{i,t}+\gamma' X_{i,t}+\mu_i+\lambda_t+\varepsilon_{i,t} \quad (2)$$

where $EM_{i,t}$ denotes earnings management of firm i in year t, measured by the absolute value of discretionary accruals based on the modified Jones model ([22]Dechow et al., 1995; [24]Kothari et al., 2005). $Spillover_{i,t}$ captures the exposure of firm i to short-selling mechanism through its supply chain partners. $X_{i,t}$ is a vector of control variables that may affect earnings management, following prior studies on financial reporting quality and earnings management ([26]Cohen et al., 2008).
Firm fixed effects (μ_i) are included to control for time-invariant firm characteristics, while year fixed effects (λ_t) are used to absorb common macroeconomic shocks and institutional changes over time. Standard errors are clustered at the firm level to account for serial correlation in panel data settings ([25]Petersen, 2008).
The coefficient of interest is β_1. A positive and significant β_1 indicates that short-selling mechanism faced by focal firms increase earnings management among their supply chain peer firms, supporting H1.
To examine whether supply chain dependence moderates the spillover effect, we extend the baseline model by introducing an interaction term:

$$EM_{i,t}=\alpha+\beta_1 Spillover_{i,t}+\beta_2(Spillover_{i,t}\times Dep_i)+\gamma' X_{i,t}+\mu_i+\lambda_t+\varepsilon_{i,t} \quad (3)$$

where $Dep_{i,j}$ measures supply chain dependence. Following prior studies on customer-supplier linkages and economic dependence, higher dependence reflects stronger reliance on major trading partners ([10]Cohen and Frazzini, 2008; [27]Patatoukas, 2012). The interaction term captures the moderating effect of dependence on the spillover relationship. A negative β_2 indicates that higher supply chain dependence weakens the positive spillover effect of short-selling mechanism on peer firms' earnings management, consistent with H2.
To further examine the role of internal governance, we estimate:

$$EM_{i,t}=\alpha+\beta_1 Spillover_{i,t}+\beta_2(Spillover_{i,t}\times Gov_i)+\gamma' X_{i,t}+\mu_i+\lambda_t+\varepsilon_{i,t} \quad (4)$$

where *Govi,j* represents governance quality. The interaction term reflects how internal governance affects the transmission of spillover effects. A negative β_2 suggests that stronger governance weakens the positive spillover effect, supporting H3.

4. Empirical Results

4.1 Statistics that describe

Table 2 shows the main variables used in this study and their descriptive statistics. The average value of earnings management (｜DA｜) is 0.069, with a standard deviation of 0.083. This means that companies have a moderate level of discretionary accruals, but there is a lot of variation between observations. The minimum and maximum values are 0.001 and 0.516, which means that there is a lot of variation in how companies manage their earnings.
The mean for spillover is 0.011 and the standard deviation is 0.050. This means that, on average, companies are not very exposed to short-selling mechanism through their supply chain partners, but some companies are much more exposed. The maximum value of 0.359 shows that there is a lot of variation across the board, which is important for finding spillover effects.
In terms of moderating variables, supply chain dependence (Dep) has a mean of 1.269 and a standard deviation of 0.772. This means that companies rely on their main trading partners in very different ways. The mean for internal governance (Gov) is 0.462, which means that about 46.2% of the observations are rated as having stronger governance traits.
The average size of a Chinese A-share listed firm is 21.995, which is in line with the size of the firms in the study. The average return on assets (ROA) is 0.035, which means that the average company is doing well. The average leverage (Lev) is 0.415, which means that the company is not too heavily leveraged.
Lastly, total accruals (TAcc) have a wide range, with a mean of −390.6 million and a large standard deviation. This shows that there are extreme values in accounting accruals. In general, the descriptive statistics show that there is enough variation between the variables to make regression analysis possible.

Table 2. Main Variable used Table

Variable	Obs	Mean	Std. Dev.	Min	Max
|DA|	52073	0.069	0.083	0.001	0.516
Spillover	52283	0.011	0.050	0.000	0.359

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Dep	52283	1.269	0.772	0.110	3.627
Gov	51581	0.462	0.499	0.000	1.000
Size	52283	21.995	1.289	19.185	25.874
ROA	52283	0.035	0.075	-0.315	0.249
Lev	52283	0.415	0.328	0.110	2.008
TAcc	52246	-390644704.668	4529330105.170	-329244000000.000	97425320000.000

4.2 Baseline Results(H1)

Table 3 presents the baseline regression results examining the impact of short-selling mechanism (Spillover) on the earnings management of supply chain peer firms. The coefficient on Spillover is positive (0.0148) and statistically significant at the 5% level ($p < 0.05$), indicating that when core firms face short-selling pressure, their supply chain partners tend to increase earnings management. This finding highlights a defensive behavioral response: peer firms appear to manipulate reported earnings strategically to mitigate potential reputational or financial risks associated with their partners' exposure to external monitoring.

This pattern contrasts with the traditional perspective that short selling serves primarily as an external governance mechanism, which would constrain opportunistic managerial behavior ([5]Fang et al., 2016). Instead, our results suggest that negative external shocks can propagate through supply chain networks, inducing contingent behavioral adjustments rather than uniformly improving reporting quality.

Examining control variables, we find that firm size (Size) is negatively and significantly associated with earnings management, implying that larger firms are less inclined to engage in opportunistic reporting, potentially due to more established internal control mechanisms or greater reputational concerns. Leverage (Lev) is positively and significantly associated, consistent with the notion that financially constrained firms have stronger incentives to manipulate earnings. Profitability (ROA) is negatively and significantly related to earnings management, suggesting that more profitable firms face lower incentives for opportunistic reporting.

Collectively, these baseline results provide clear evidence of a defensive spillover effect within supply chain networks: short-selling mechanism faced by core firms lead peer firms to adjust their reporting behavior in a way that stabilizes perceived performance and mitigates external scrutiny. This mechanism underscores the importance of considering networked economic relationships when evaluating the effectiveness and consequences of external governance shocks.

Table 3. H1 Result

Variables	H1
Spillover	0.0148** (0.0072)
Size	-0.0047*** (0.0003)
Lev	0.0216*** (0.0012)
ROA	-0.0164*** (0.0049)
Observations	52,071
Industry FE	Yes
Year FE	Yes
Standard errors	IID
Adj. R^2	0.0451
Within R^2	0.0105
RMSE	0.0809

4.3 The Moderating Role of Supply Chain Dependence (H2)

To investigate the moderating effect of supply chain dependence, we perform a subsample analysis by categorizing firms according to size. Companies that are in the top 50% of the size distribution are called large companies, and the rest are called small companies. Table 4 shows the results.

For small businesses, the coefficient associated with the interaction term Spillover × Dep is negative (-0.0038) and exhibits only marginal significance at the 10% level ($p = 0.082$). This suggests that supply chain dependence weakens the positive relationship between short-selling pressures and earnings management. Put simply, smaller firms that are heavily dependent on their primary partners appear to shy away from employing defensive earnings management techniques.

Conversely, for large firms, the interaction term is negative (-0.0025) but lacks statistical significance ($p = 0.200$), implying that supply chain dependence does not exert a substantial influence. The results suggest that large companies show less responsiveness to supply chain interdependencies when facing short-selling shocks that affect their business partners.

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The findings reveal substantial disparities in the mechanisms through which governance spillovers propagate. Small enterprises, distinguished by their constrained financial capacities and heightened dependence on crucial trading relationships, exhibit increased susceptibility to external disturbances impacting supply chain networks. Consequently, this reliance may compel smaller enterprises to adopt more cautious operational strategies or to adhere more stringently to regulatory requirements. Conversely, larger corporations typically gain advantages from more diversified customer portfolios, enhanced negotiating leverage, and improved access to external financial resources.This means they don't have to rely on just one supply chain partner, which makes dependence less of a factor in their decisions.

In general, the results show that the size of a company affects how supply chain dependence affects it. It is more noticeable in small businesses, but not at all in big businesses. This further substantiates that the spillover effect of short-selling mechanism functions via firm-specific channels and underscores the necessity of acknowledging heterogeneity in supply chain structures.

Table 4. H2 Result

Variables	Small Firm	Big Firm
Spillover	0.0077* (0.0043)	-0.0009 (0.0035)
Dep	0.0098*** (0.0007)	0.0094*** (0.0007)
Lev	0.0466*** (0.0018)	0.0111*** (0.0015)
ROA	-0.0242*** (0.0064)	0.0132* (0.0076)
Spillover × Dep	-0.0038* (0.0022)	-0.0025 (0.0020)
Constant	0.0409*** (0.0013)	0.0518*** (0.0013)
Observations	26,091	
Residual standard error	0.08151	

4.4 The Moderating Role of Internal Governance (H3)

To delve deeper into the influence of internal governance on the spillover effect of short-selling mechanism, we perform a subsample analysis focused on governance quality among small firms. We limit the sample to companies in the bottom half of the size distribution and then split them into two groups based on the median value of the governance index: high-governance and low-governance. Table5 shows the results.The coefficient on Spillover is positive (0.0300) and statistically significant at the 5% level (t = 2.05) for small firms with high governance quality. This means that when core firms threaten to short-sell, their supply chain partners' earnings management goes up significantly. Conversely, for small businesses with weak governance, the Spillover coefficient approaches zero and is not statistically significant. This suggests that these companies don't consistently react to external governance changes. The findings suggest that internal governance acts as a crucial "filter" when external governance pressures are applied, particularly in small businesses.

Small businesses are typically more vulnerable to external shocks due to limited resources, greater financial constraints, and a higher reliance on external stakeholders. However, only those with superior governance structures can effectively perceive and react to such signals.In this context, small businesses with good management seem more affected by reputation and market scrutiny. This leads them to use defensive earnings management to maintain their performance. In contrast, small businesses with poor governance might not have the internal controls or incentives needed to respond to external governance signals. As a result, their reactions are often weak or absent.

Table 5. H3 Result

Variables	Low Group	High Group
Spillover	0.0031 (0.0161)	0.0300** (0.0146)
Size	-0.0129*** (0.0014)	-0.0137*** (0.0013)
Lev	0.0348*** (0.0026)	0.0398*** (0.0026)
ROA	0.0032 (0.0099)	-0.0479*** (0.0089)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	11,210	14,064
Adj. R^2	0.0813	0.0903
Within R^2	0.0256	0.0337
RMSE	0.0776	0.0813

This finding is consistent with previous research suggesting that the effectiveness of external governance structures depends fundamentally on a company's internal governance abilities ([9]Popadak, 2014).External oversight does not operate in a vacuum; its influence is contingent upon the interaction between internal control systems and managerial behaviors.

The findings largely corroborate Hypothesis 3, suggesting that the spillover effect stemming from short-selling mechanism is contingent upon the robustness of governance mechanisms and the scale of the company. This effect is especially pronounced in smaller firms characterized by strong governance, thereby underscoring the impact of internal governance structures and firm-specific attributes on responses to external disturbances.

4.5 Robustness Analyses

To confirm the reliability and causal interpretation of the empirical findings, this study conducts several robustness checks. These checks examine how variables are treated, how the sample is adjusted, and the validity of the identification strategy.

(1) Winsorization of Continuous Variables

To mitigate the influence of outliers, all continuous variables are winsorized at the 5th and 95th percentiles.Table 6 shows the results of the regression based on the winsorized sample.

The coefficient for the main explanatory variable, Spillover, is still positive and statistically significant at the 5% level (β = 0.0154, t = 2.135, p = 0.032), which is in line with the baseline results. This finding shows that the positive spillover effect of short-selling mechanism on earnings management is not caused by outliers.

Table 6. Winsorization Result

Variables	H1,H2	H3
Spillover	0.0154** (0.0072)	0.0282*** (0.0102)
Size	-0.0077*** (0.0006)	-0.0075*** (0.0009)
Lev	0.0248*** (0.0013)	0.0256*** (0.0018)
ROA	-0.0140*** (0.0046)	-0.0274*** (0.0062)
Constant	Controlled	Controlled
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	25,981	14,064
Adj. R^2	0.0666	0.0769
Within R^2	0.0241	0.0265
RMSE	0.0567	0.0565

Also, the coefficients of the control variables stay the same: firm size (Size) is significantly negative, leverage (Lev) is significantly positive, and profitability (ROA) is significantly negative. These findings further validate the resilience of the baseline specification.

(2) Test of Placebo

To investigate whether the baseline results are influenced by unobservable factors or spurious correlations, we perform a placebo test utilizing random permutation.We randomly shuffle the key explanatory variable (Spillover) and re-estimate the model 500 times to get a range of estimated coefficients that show no causal relationship. Figure 1 shows how these placebo estimates are spread out. Figure 1 shows that the coefficients from random permutations are close to zero. This suggests that there's no consistent relationship between the shuffled explanatory variable and earnings management.The estimated coefficient from the initial regression analysis, shown by the red vertical line, is located at the far right of the distribution.

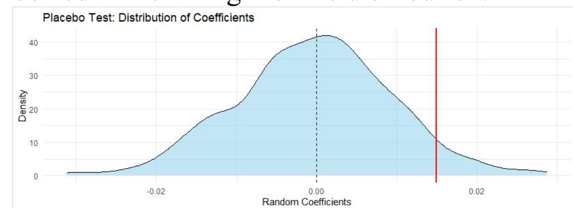

Figure 1. Placebo Result

This finding suggests that the observed spillover effect is unlikely to be attributable to random fluctuations or data characteristics. In contrast, this suggests a real economic relationship. Therefore, the placebo test effectively rules out other possible explanations, which strengthens the causal interpretation of the main findings.

The main results are still strong after winsorization, which reduces the impact of extreme values, and a placebo test, which checks the identification method.The results strongly suggest that the positive impact of short-selling mechanism on the earnings management of supply chain peer firms is not affected by outliers, sample selection, or random factors. This strengthens the validity and reliability of the study's conclusions.

5. Discussion

This study provides novel evidence on the spillover effects of short-selling mechanism within supply chain networks and their implications for corporate earnings management. The empirical results consistently show that short-selling pressure faced by focal firms leads to a significant increase in earnings management among their supply chain peer firms. This finding offers important insights into the unintended consequences of external governance mechanisms.

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5.1 Spillover of External Governance: From Discipline to Distortion

A key contribution of this study is the identification of a "governance spillover paradox." While prior literature suggests that short-selling serves as an effective external governance mechanism that constrains earnings management at the firm level, our findings reveal that such governance pressure may generate opposite effects for economically connected firms.

When a main company is targeted by short sellers, the fallout-heightened investigation, harm to its image, and possible financial difficulties-ripples through its network of suppliers.Instead of leading to more cautious reporting, peer firms often use defensive earnings management. This is done to stabilize perceived performance and reduce external uncertainty.

This finding emphasizes the interconnectedness of external governance mechanisms. In a networked economic system, disruptions in governance can extend beyond individual companies. This can then alter the incentives of related firms, which may inadvertently distort financial reporting practices.

5.2 The Amplifying Role of Supply Chain Dependence

Further analysis of H2's results shows that the spillover effect isn't uniform; instead, it depends on how much a company relies on its supply chain. Specifically, companies that are more dependent on their main suppliers show a stronger reaction to the threat of short-selling.

Resource dependence theory offers a valuable perspective on this occurrence. Organizations that exhibit substantial dependencies are more vulnerable to disruptions within their essential exchange relationships, thus heightening their susceptibility to governance-related shocks affecting their collaborators. Moreover, the presence of close economic connections facilitates and exacerbates the dissemination of negative signals, which subsequently elevates the perceived level of risk. As a result, firms that depend on external entities are more inclined to strategically employ earnings management.

They do this to maintain their reputation, secure funding, and preserve existing business relationships. This finding highlights how supply chain structures can amplify the effects of governance.

5.3 Internal Governance's Role in Behavioral Control

The findings for H3 indicate that internal governance significantly influences how companies react to external shocks. Specifically, the way companies respond to short-selling spillovers is affected by their internal governance structures

In firms characterized by weak governance, managerial discretion in reporting is amplified due to insufficient monitoring and internal controls. Consequently, short-selling spillovers frequently result in increased earnings management, reflecting defensive or opportunistic conduct.

Conversely, organizations with strong governance structures are constrained by internal oversight and the need to protect their reputation. These companies often use strategies that prioritize following rules. As a result, they are less likely to use aggressive reporting methods, which are meant to show transparency and build trust

The varied responses suggest that an organization's internal governance structures influence its actions. This, in turn, determines whether external pressures lead to opportunistic behavior or improved reporting practices.

5.4 Implications for Theory and Practice

Several important conclusions can be drawn from this research.

First, this study adds to the existing knowledge of short-selling and corporate governance by using a network perspective.

It shows that governance effects don't just happen in one company; they can spread through economic links. This helps us understand how governance works in markets that are connected to each other.

Second, the results add to the body of research on supply chain networks by showing that these networks are not only ways for operational shocks to get through, but also ways for signals related to governance to get through.

Furthermore, the results suggest that both regulatory agencies and investors should consider the broader systemic effects of short-selling. Although short selling can improve transparency within individual companies, it might also increase the likelihood of risk-taking or opportunistic behavior among related firms.

Ultimately, the results underscore the critical

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importance for corporate managers to fortify internal governance frameworks, thereby mitigating the adverse impacts of external disturbances and ensuring the integrity of financial reporting.

6. Conclusion

This study looks at how mechanism of short-selling affect earnings management in supply chain networks. By leveraging the incremental development of the margin trading and securities lending (MTSS) system in China and establishing firm-level vulnerability to short-selling risks via supply chain interconnections, we present novel evidence regarding the transmission of external governance pressures among interconnected enterprises.

The results show that when focal firms face short-selling mechanism, their supply chain peer firms are much more likely to manage their earnings. This finding suggests that external governance mechanisms, rather than consistently improving the quality of financial reporting, could inadvertently create spillover effects within interconnected environments.Specifically, peer firms appear to engage in defensive earnings management when faced with heightened uncertainty and reputational concerns stemming from supply chain dynamics

Further investigations reveal that this spillover effect is exacerbated by heightened supply chain reliance and attenuated by the caliber of internal governance structures. Specifically, firms exhibiting greater dependence on critical trading partners demonstrate a more pronounced susceptibility to governance disruptions, as well as more significant behavioral adjustments.Internal governance structures are also very important in determining how companies respond. Companies with weaker governance are more likely to act opportunistically, while companies with stronger governance are less likely to manipulate earnings too much.

The results of this study enhance the existing literature in multiple aspects. First, we expand the study of short-selling and corporate governance by demonstrating that governance effects can transcend organizational boundaries via economic networks. Second, we add to the supply chain literature by showing that signals related to governance can spread along inter-firm links, in addition to operational shocks. Next, we will explore the factors that influence earnings management, focusing on the interaction between external pressures and network structures.

Practically, the findings are significant for commercial entities, financial stakeholders, and regulatory authorities. Regulatory agencies should intensify their scrutiny of external governance's influence on the broader system, potentially employing a supply chain-oriented approach to risk evaluation. Investors could benefit from incorporating supply chain linkages into their risk assessment methodologies, given that governance challenges affecting a single firm can subsequently influence the behaviors of its affiliated entities. For corporations, strengthening internal governance frameworks can diminish the negative effects of external disruptions and preserve the reliability of their reporting procedures.

This study, though valuable, has some limitations. First, our analysis of supply chain relationships is based on observable transaction data. This might not fully capture the complex nature of the connections between companies. Second, while we did several tests to support our causal claims, there could still be unobserved factors that affect the results.Future research could improve these findings by examining more detailed network structures or using different identification strategies. Also, studying differences between countries or other forms of external governance would provide valuable insights.

Therefore, this research emphasizes that in a networked economy, the effects of external governance structures go beyond individual companies. These effects can spread through supply chain connections, potentially leading to wider, sometimes unexpected, consequences for how companies present their financial information.

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