

From Financing Tool to Governance Instrument: The Impact of Supply Chain Finance on Accounting Information Transparency

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Abstract

Supply chain finance has become an important tool for easing corporate financing constraints, yet its influence on the quality of corporate information environments is still not fully clear. Based on data from Chinese A-share listed companies from 2010 to 2024, this study examines how supply chain finance affects accounting information transparency, and considers agency costs as a possible channel through which this effect operates. The results suggest that supply chain finance is associated with higher levels of accounting information transparency. Further analysis shows that this improvement is partly driven by a reduction in agency costs, which helps to strengthen the overall information environment inside firms. The effect is not uniform across firms. It is more evident in non-state-owned enterprises, in firms followed more closely by financial analysts, and in companies facing stronger financing constraints. From an information governance perspective, these findings help clarify the broader consequences of supply chain finance, and offer some empirical support for its development alongside improvements in corporate information disclosure and governance practices.

Keywords

supply chain finance, accounting information transparency, agency costs, information governance

1. Introduction

In recent years, the global economic landscape has been undergoing noticeable shifts. China's economy has also moved away from a period of rapid expansion and is now increasingly oriented toward high-quality development. Against this backdrop, how to better serve the real economy and ease financing constraints for small and medium-sized enterprises has remained a central concern for both policymakers and researchers. Supply chain finance, as an emerging financing arrangement that connects capital flows, logistics, and information flows, offers a possible response to the "credit gap" faced by SMEs in traditional lending markets by leveraging transaction data and credit information across upstream and downstream supply chains [1].

At the same time, the functioning of supply chain finance is closely tied to the quality of information transmission. In practices such as accounts receivable financing, inventory pledge financing, and prepayment financing, credit assessment by financial institutions largely relies on accounting information and transaction

data provided by core firms and their partners along the supply chain. Once such information becomes inaccurate, incomplete, or delayed, it may not only distort lending decisions but also increase the risk of contagion across the supply chain. This naturally raises a question that deserves closer attention: whether the introduction of supply chain finance affects the accounting information transparency of participating firms.

For quite a long time, supply chain finance has mainly been discussed in terms of its role in easing financing constraints, with attention paid to firm financing capacity, operating performance, and risk-taking behavior. Yet as the practice develops further, its potential role in shaping the information environment and acting as an external governance mechanism has gradually attracted more interest. The existing literature does not offer a consistent view. Some studies suggest that supply chain finance, supported by real transactions and ongoing monitoring, can enhance corporate information transparency [2], while others argue that more complex supply chain structures may be exploited by firms, leading to greater information concealment and stronger earnings management incentives [3].

Based on this context, this study uses Chinese A-share listed firms as the sample to examine the impact of supply chain finance on accounting information transparency, and further explores its mechanism from the perspective of agency costs. Compared with prior research, the focus is not only on the financing effects of supply chain finance, but also on its broader economic consequences in terms of information governance, providing additional empirical evidence for understanding its governance implications.

2. Theoretical Foundation and Research Hypotheses

2.1 Theoretical Foundation

2.1.1 Signal Transmission Theory

In environments where information asymmetry is strong, firms with better fundamentals usually have an incentive to send credible signals to the outside market, so as to reduce adverse selection in external financing [4]. Participation in supply chain finance can be understood as one of these external signals. Financial institutions, by linking logistics, capital flows, and information flows, conduct a more thorough check of the firm's real transaction background. To some extent, this functions as an external validation of the firm's operating condition and credit profile, which helps narrow the information gap between firms and outside investors [5].

Under such a financing arrangement, firms that want to maintain access to relatively stable and lower-cost funding are likely to pay more attention to the quality of their financial disclosure, and to present more complete and less distorted accounting information to the market. At the same time, the risk control and monitoring arrangements embedded in supply chain finance—such as the supervision of receivables settlement accounts—also create ongoing external constraints on how information is produced and reported. From a signaling perspective, this provides a basis for expecting that supply chain finance may improve information transparency.

2.1.2 Principal-Agent Theory

The separation between ownership and control rights, together with the resulting information asymmetry, has long been viewed as a key source of agency problems and information distortion inside firms [6]. Managers may, under incentives such as private benefits or employment security, engage in earnings manipulation or other forms of opportunistic behavior to protect their own interests [7]. Prior literature generally finds that external monitoring mechanisms can help limit such behavior and reduce agency costs [8].

Supply chain finance can be seen as one such external governance arrangement. Once financial institutions become embedded in the capital cycle of the supply chain, their continuous tracking of cash flows effectively strengthens external monitoring over managerial actions, which in turn helps reduce agency costs. When agency costs decline, the space for manipulating accounting information is also compressed. Managers have less incentive to rely on complex accounting treatments for private gains, and reported earnings are more likely to reflect underlying economic reality [9-10]. Empirical evidence from Yu Xiaoyue et al. further suggests that supply chain finance, through the integration of information flows within the supply chain, can improve the quality of corporate information disclosure [11].

2.2 Research Hypotheses

2.2.1 Supply Chain Finance and Accounting Information Transparency

From the perspective of signal transmission theory, participation in supply chain finance can push firms to pay more attention to the quality of their information disclosure. In order to keep access to a relatively stable and low-cost financing channel, firms have incentives to send more credible financial signals to the outside market. At the same time, financial institutions continuously review and track firms' financial and transaction information, which in practice also works as an ongoing external constraint and helps ease information asymmetry [9]. These two forces—signaling incentives and external monitoring—tend to work together, making improvements in accounting information transparency more likely.

That said, existing studies also point out a more complicated picture. Supply chain finance may, in some cases, increase earnings management incentives, especially in private firms. However, this negative effect is not fixed, and tends to be weaker when firms have stronger internal control systems [3]. In other words, the influence of supply chain finance on earnings management is not purely one-directional; it depends on how internal governance and external monitoring interact. Given the overall improvement in governance practices among Chinese A-share listed firms, the following hypothesis is proposed:

H1: The higher the degree of participation in supply chain finance, the higher the enterprise's accounting information transparency.

2.2.2 The Mediating Role of Agency Costs

From the perspective of principal-agent theory, the effect of supply chain finance on information transparency is unlikely to be purely direct. A more plausible channel is through the reduction of agency costs. When financial institutions become embedded in the capital cycle of the supply chain, their monitoring of cash flows and transactions strengthens external supervision over managerial behavior, which in turn helps curb opportunistic actions and reduce agency costs [12].

Once agency costs decline, this improvement tends to spill over into the process of financial reporting. With fewer conflicts of interest between managers and shareholders, the incentive for managers to manipulate earnings through aggressive accounting practices is also reduced [13-14]. As a result, reported earnings are more likely to reflect the firm's actual economic conditions. Gao Yingchao and Fu Wenbo also find that stable supply chain relationships can improve accounting information quality by alleviating agency conflicts [8], which offers supporting evidence for this mechanism.

Overall, the following hypothesis is proposed:

H2: Agency costs play a mediating role in the relationship between supply chain finance and accounting information transparency, meaning that supply chain finance improves transparency by reducing agency costs.

3. Research Design and Related Variables

3.1 Sample Selection and Data Sources

The financial and economic data used in this study are obtained from the CSMAR database. Since the development of supply chain finance in China has mainly accelerated after 2010, and to ensure data availability and consistency in measuring key variables, the sample covers Chinese A-share listed companies in Shanghai and Shenzhen from 2010 to 2024. Industry classification follows the CSRC 2012 industry classification standard.

The sample is filtered as follows: (1) financial firms are excluded; (2) ST and *ST firms are removed; (3) observations with missing key variables are dropped; (4) all continuous variables are winsorized at the 1% and 99% levels to reduce the influence of outliers. After these steps, the final sample consists of 22,861 firm-year observations.

3.2 Variable Design and Model Construction

3.2.1 Variable Design

(1) Dependent Variable

Accounting Information Transparency (*Tran*)

The measurement of accounting information transparency does not have a single standard. Ball et al. suggest that timeliness and conservatism together can capture the concept of financial reporting transparency [15]. From the perspective of earnings opacity, Bhattacharya, Daouk, and Welker argue that low transparency in financial reporting is mainly reflected in earnings aggressiveness, loss avoidance, and earnings smoothing [16].

In the literature, three main approaches are commonly used to measure accounting information transparency: first, using disclosure evaluation scores released by authoritative institutions; second, constructing original indicator systems; and third, using proxies such as earnings aggressiveness and earnings smoothing to indirectly reflect disclosure quality.

Following this line of research and drawing on the method of Dai Bin et al. [17], this study constructs a composite indicator based on earnings aggressiveness and earnings smoothing to measure accounting information transparency (*Tran*). The specific calculation formulas are as follows:

$$Tran_{i,t} = \left[\frac{Deciles(EA_{i,t}) + Deciles(ES_{i,t})}{2} \right] \quad (1)$$

(1.1) Earnings Aggressiveness (EA)

Following Bhattacharya et al. [16], this study uses accruals as a proxy variable. The theoretical basis is that earnings-aggressive behavior essentially involves deferring economic losses and accelerating revenue recognition. This implies that, holding cash flows constant, expected accruals will increase with the degree of earnings aggressiveness. The calculation formula is as follows:

$$EA_{i,t} = \frac{ACC_{i,t}}{TA_{i,t}} \quad (2)$$

$$ACC_{i,t} = \Delta CA_{i,t} + \Delta CL_{i,t} + \Delta CASH_{i,t} + \Delta STD_{i,t} - \Delta DEP_{i,t} + \Delta TP_{i,t}$$

where i denotes the i -th listed company, $TA_{i,t}$ represents total assets at the beginning of year t , and $ACC_{i,t}$ represents the accruals in year t , $\Delta CA_{i,t}$ is the increase in current assets in year t , $\Delta CL_{i,t}$ is the increase in current liabilities in year t , $\Delta CASH_{i,t}$ is the increase in cash and cash equivalents in year t , $\Delta STD_{i,t}$ is the increase in long-term liabilities due within one year in year t , $\Delta DEP_{i,t}$ is the depreciation and amortization expense in year t , and $\Delta TP_{i,t}$ is the increase in taxes payable in year t . The larger the value of EA , the more likely the firm is to inflate current-period profits through accounting techniques, indicating lower accounting information transparency.

(1.2) Earnings Smoothness (ES)

Earnings smoothing is usually reflected in firms using accrual adjustments to offset fluctuations in operating cash flows, so that reported profits appear more stable over time. Following Bhattacharya et al., this paper measures earnings smoothness based on the absolute value of the correlation between changes in accruals and operating cash flows. The basic idea is that when accruals are used to smooth earnings, they tend to move in the opposite direction of cash flow changes, leading to a negative correlation between the two. In this sense, a higher absolute value of ES implies a stronger degree of smoothing and, in turn, lower accounting information transparency. The calculation procedure is as follows:

$$ACC_{i,t} = NI_{i,t} - CFO_{i,t} \quad (3)$$

To eliminate the influence of firm size, beginning total assets $Assets_{i,t-1}$ are used for standardization to obtain the change in accruals $\Delta ACC_{i,t}$ and the change in operating cash flows $\Delta CFO_{i,t}$:

$$\Delta ACC_{i,t} = \frac{ACC_{i,t} - ACC_{i,t-1}}{Assets_{i,t-1}}, \Delta CFO_{i,t} = \frac{CFO_{i,t} - CFO_{i,t-1}}{Assets_{i,t-1}} \quad (4)$$

Then, for each firm i and year t (requiring $t \geq 3$), the ΔACC and ΔCFO sequences over the past three years ($t-2, t-1, t$) are taken, the Pearson correlation coefficient between the two is calculated, and its absolute value is obtained:

$$ES_{i,t} = |Corr(\{\Delta ACC_{i,t-2}, \Delta ACC_{i,t-1}, \Delta ACC_{i,t}\}, \{\Delta CFO_{i,t-2}, \Delta CFO_{i,t-1}, \Delta CFO_{i,t}\})| \quad (5)$$

The two indicators are then combined: EA and ES are each assigned a 50% weight, converted to decile rankings, and then grouped and ranked to obtain the overall accounting information transparency measure (*Tran*). A larger value of *Tran* indicates greater earnings opacity (i.e., lower transparency).

(2) Explanatory Variable.

Supply Chain Finance (SCF)

There is still no widely accepted measure of supply chain finance in the existing literature. Most studies rely on one of two approaches. The first uses text analysis to identify supply chain finance activities, while the second constructs proxy variables from firms' financial statement data.

Text-based measures generally assess a firm's involvement in supply chain finance through the disclosure of keywords such as "supply chain finance," "accounts receivable financing," or "factoring" in annual reports, or through the reporting of related business activities. Although this approach can capture whether a firm participates in supply chain finance, it also faces several limitations. Annual report disclosures are partly shaped by managerial preferences and reporting styles, meaning that firms engaged in similar activities may describe them quite differently. In addition, some firms may participate in supply chain finance without explicitly mentioning related terms in their reports, which can lead to under-identification. More importantly, indicators based on keyword frequency or dummy variables mainly reflect the existence of participation and provide limited information about the actual scale or intensity of supply chain finance activities.

By comparison, measures derived from financial statement items can more directly capture the extent to which firms are embedded in supply chain financing arrangements. Since supply chain finance is fundamentally built on credit relationships arising from transactions between upstream and downstream firms, its development is often accompanied by increases in liabilities such as short-term borrowings, notes payable, and accounts payable. Following Pan Weihua et al. [18], this study uses the ratio of the sum of short-term borrowings, notes payable, and accounts payable to year-end total assets as a proxy for supply chain finance. The measure is calculated as follows:

$$SCF_{i,t} = \frac{STL_{i,t} + NP_{i,t} + AP_{i,t}}{TA_{i,t}} \quad (6)$$

where STL , NP , AP , TA denote short-term borrowings, notes payable, accounts payable, and total assets at the end of the year, respectively.

Compared with text-based measures, this indicator offers several advantages. First, it is less affected by differences in disclosure practices and can better reflect the actual scale of supply chain financing. Second, as a continuous variable, it allows variation in the degree of participation to be captured rather than simply distinguishing between participation and non-participation. Third, all relevant data are obtained from publicly available financial statements, which improves data consistency and makes the measure particularly suitable for large-sample empirical analysis.

(3) Control Variables.

Referring to existing studies and considering the research theme and variable settings, this paper controls for relevant factors that may affect accounting information transparency from aspects such as corporate financial characteristics, corporate governance characteristics, and external supervision characteristics. In terms of financial characteristics, the paper controls for corporate profitability (ROA), capital structure (Lev), growth ($Growth$), size differences ($Companysize$), and cash flow from operating activities (OCF). In terms

of corporate governance, it controls for ownership concentration ($Top1$), duality of chairman and general manager ($Dual$), and board size ($Boardsize$). In terms of external supervision, it controls for audit quality differences ($Big4$). In terms of enterprise development characteristics, it controls for listing age ($ListingAge$) to reflect differences in corporate maturity and capital market experience. In addition, year and industry fixed effects are controlled. The specific variable definitions are shown in the table below.

Table 1: Variable Names and Definitions

Variable Category	Variable Name	Variable Symbol	Variable Definition
Dependent Variable	Accounting Information Transparency	Tran	Composite indicator composed of earnings aggressiveness and earnings smoothness
Explanatory Variable	Supply Chain Finance	SCF	The sum of short-term borrowings, notes payable, and accounts payable divided by total assets at the end of the year
Mediating Variable	Agency Costs	AC1	Operating expense ratio
		AC2	Management expense ratio
Control Variables	Profitability	ROA	Return on total assets
	Financial Leverage	Lev	Asset-liability ratio at the end of the year
	Growth Ability	Growth	Operating revenue growth rate
	Cash Flow from Operating Activities	OCF	Net cash flow from operating activities divided by total assets
	Firm Size	Size	Natural logarithm of total assets at the end of the period
	Ownership Concentration	Top1	Shareholding proportion of the largest shareholder
	Duality	Dual	Dummy variable equal to 1 if the chairman and general manager are the same person, otherwise 0
	Board Size	Boardsize	Number of board members
	Big Four Auditor	Big4	Dummy variable equal to 1 if audited by an international Big Four firm, otherwise 0
	Listing Age	ListingAge	Current year minus the listing year

3.2.2 Model Construction

To examine the impact of corporate supply chain finance strategies on accounting information transparency, this paper constructs the following model:

$$Tran_{i,t} = \alpha_0 + \alpha_1 SCF_{i,t} + \eta \sum Controls_{i,t} + \sum Year + \sum Ind + \varepsilon_{i,t} + \lambda_i + \mu_{it} \quad (7)$$

where the dependent variable $Tran_{i,t}$ represents the accounting information transparency of firm i in year t , $SCF_{i,t}$ is the core explanatory variable, $\sum Controls_{i,t}$ represents a series of control variables, $\sum Year$ denotes year fixed effects, $\sum Ind$ denotes industry fixed effects, and $\varepsilon_{i,t}$ is the random error term. This paper focuses on the regression coefficient α_1 . If α_1 is significantly positive, it indicates that supply chain finance can improve accounting information transparency.

4. Empirical Results Analysis

4.1 Descriptive Statistics Results

Table 2 presents the descriptive statistics of the main variables. Accounting information transparency (Tran) has a mean value of 5.453 and a standard deviation of 1.994. The minimum value is 1.000, indicating considerable variation in transparency across firms during the sample period. Such variation provides a basis for examining the relationship between supply chain finance and accounting information transparency.

For the key explanatory variable, supply chain finance (*SCF*), the mean value is 0.237 and the standard deviation is 0.149. This suggests that firms differ substantially in their level of participation in supply chain finance activities.

Among the control variables, the average return on assets (*ROA*) is 2.44%, indicating that most sample firms remain profitable on average. Financial leverage (*Lev*) has a mean value of 49.33%, suggesting a moderate reliance on debt financing. The statistics for firm size (*Size*) show a relatively broad distribution, reflecting the presence of firms of different scales within the sample.

The mean value of *Big4* is 7.73%, implying that only a small proportion of firms are audited by international Big Four accounting firms. The largest shareholder's ownership stake (*Top1*) averages 33.39%, which points to a relatively concentrated ownership structure. For *Dual*, the mean value is 22.69%, indicating that the positions of chairman and general manager are combined in roughly one-fifth of the sample firms. *ListingAge* has an average of 14.13 years, suggesting that most firms are relatively mature. The average board size (*Boardsize*) is 8.68 directors, while the mean growth rate (*Growth*) reaches 10.98%, reflecting generally positive growth performance during the sample period.

Table 2: Descriptive Statistics Results

VarName	Obs	Mean	SD	Min
<i>Tran</i>	22861	5.4531	1.994	1.00
<i>SCF</i>	22861	0.2366	0.149	0.00
<i>ROA</i>	22861	0.0244	0.075	-2.65
<i>Lev</i>	22861	0.4933	0.194	0.01
<i>Size</i>	22861	22.6495	1.350	17.39
<i>Big4</i>	22861	0.0773	0.267	0.00
<i>Top1</i>	22861	33.3916	14.982	0.29
<i>Dual</i>	22861	0.2269	0.419	0.00
<i>ListingAge</i>	22861	14.1332	6.822	4.00
<i>OCF</i>	22861	0.0478	0.071	-0.91
<i>Boardsize</i>	22861	8.6821	1.747	4.00
<i>Growth</i>	22861	0.1098	0.558	-0.93

4.2 Analysis of Baseline Regression Results

The baseline regression results are reported in Table 3. To reduce the influence of time-specific shocks and industry heterogeneity, year and industry fixed effects are included in the model.

Column (1) reports the regression using only supply chain finance (*SCF*) as the explanatory variable. The coefficient on *SCF* is significantly negative, suggesting a close relationship between supply chain finance and accounting information transparency. Since the transparency measure used in this study is a reverse indicator, a lower value corresponds to higher transparency. The negative coefficient therefore implies that firms with greater participation in supply chain finance tend to exhibit higher accounting information transparency.

After year and industry fixed effects are introduced, the coefficient on *SCF* remains negative and statistically significant at the 1% level. The same pattern can be observed when control variables are further added. Across all specifications, the estimated coefficient of *SCF* shows little change in either sign or significance, indicating that the result is relatively stable.

The coefficients of the control variables are generally in line with expectations. Overall, the evidence suggests that supply chain finance is associated with higher accounting information transparency, providing support for Hypothesis H1.

4.3 Robustness Tests

Although the baseline results provide support for H1, additional tests are conducted to examine whether the findings are sensitive to alternative specifications. The robustness checks mainly include addressing potential endogeneity concerns, replacing the dependent variable, and adjusting the sample period.

Table 3: Baseline Regression Results

	(1)	(2)	(3)	(4)
	Tran	Tran	Tran	Tran
SCF	-1.4765***	-1.6876***	-1.5541***	-1.4738***
	(-16.7374)	(-14.9235)	(-14.2056)	(-9.7084)
ROA			5.9902***	5.9122***
			(30.8563)	(12.1683)
Lev			0.1854**	-0.0124
			(1.9667)	(-0.0926)
Size			0.0276**	0.0204
			(2.3005)	(1.2857)
Big4			-0.1464***	-0.1436**
			(-2.8553)	(-2.5130)
Top1			-0.0017*	0.0002
			(-1.8529)	(0.1678)
Dual			0.0083	-0.0194
			(0.2626)	(-0.5422)
ListingAge			0.0030	0.0017
			(1.5139)	(0.7131)
OCF			-6.6511***	-5.9376***
			(-34.2705)	(-21.4918)
Boardsize			-0.0411***	-0.0097
			(-5.4223)	(-1.0918)
Growth			-0.0866***	-0.0741
			(-3.7547)	(-1.5660)
Constant	5.8025***	5.8523***	5.6648***	5.5627***
	(235.4292)	(191.9395)	(22.9321)	(17.0982)
YearFE	No	Yes	No	Yes
IndFE	No	Yes	No	Yes
Observations	22,861	22,859	22,861	22,859
R-squared	0.012	0.047	0.080	0.103

Note: Figures in parentheses are *t*-statistics based on clustered robust standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.3.1 Endogeneity Treatment

One concern is that the estimated relationship may be influenced by reverse causality or unobserved factors that affect both supply chain finance and accounting information transparency. To alleviate this issue, an instrumental variable approach is adopted. Drawing on the classic research frameworks of Leary & Roberts and Peng Zhen et al. [19-20], this paper introduces the “peer effect” as an identification strategy and selects the mean value of supply chain finance in the same industry and same year after excluding the firm itself (*IV_SCF*) as the instrumental variable for corporate supply chain finance (*SCF*).

The instrumental variable is calculated as follows:

$$IV_SCF = \frac{\sum SCF_{ind,t} - SCF_{i,t}}{N_{ind,t} - 1} \quad (8)$$

where $\sum SCF_{ind,t}$ represents the total supply chain finance business scale of all sample firms in industry *ind* in year *t*, $SCF_{i,t}$ is the supply chain finance scale of the firm itself *i* in that year, and $N_{ind,t}$ is the total number of firms in that industry during the year.

The choice of this instrument is motivated by both relevance and exogeneity considerations. Firms operating in the same industry are often exposed to similar competitive conditions and financing environments, and their financing decisions may be influenced by peer behavior. As a result, when the overall level of supply chain finance among industry peers increases, individual firms are also more likely to expand their own participation in supply chain finance activities.

At the same time, the construction of the instrument excludes the focal firm itself. The variable therefore reflects an industry-level tendency rather than the behavior of any single firm. Although peer firms may affect a firm's financing choices through industry-wide spillover effects, their decisions are unlikely to directly influence the firm's accounting information transparency. Any effect is expected to occur mainly through the firm's own adoption of supply chain finance, which supports the validity of the instrument.

Table 4 reports the two-stage regression results. In the first stage, the coefficient on the instrumental variable is positive and statistically significant, suggesting a strong association between peer participation and firm-level supply chain finance. The identification tests also support the quality of the instrument. The Kleibergen-Paap rk LM statistic is 29.594 ($P = 0.000$), rejecting the under-identification problem, while the Kleibergen-Paap rk Wald F statistic reaches 160.412, well above the conventional critical value of 16.38, indicating that weak instrument concerns are unlikely to be serious.

The second-stage results, reported in column (3), continue to show a significantly negative coefficient on *SCF*. The estimated coefficient is -1.385 and remains significant at the 1% level. Given the construction of the transparency indicator, this result suggests that greater participation in supply chain finance is associated with lower earnings opacity and higher accounting information transparency. Overall, the main findings remain largely unchanged after addressing potential endogeneity concerns.

Table 4: Instrumental Variable Test Results

	(2)	(3)
	First Stage	Second Stage
	SCF	Tran
<i>IV_SCF</i>	5.385***	
	(0.425)	
<i>SCF_hat</i>		-1.385***
		(0.313)
<i>_cons</i>	0.079***	5.967***
	(0.014)	(0.107)
<i>YearFE</i>	Yes	Yes
<i>IndFE</i>	Yes	Yes
<i>K-P rk Wald F Statistic</i>	160.412	
<i>K-P rk LM Statistic</i>	29.594***	
<i>N</i>	22861	22861
<i>Adj. R²</i>	0.734	0.095

Note: Figures in parentheses are *t*-statistics based on clustered robust standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.3.2 Replacing the Explanatory Variable

As an additional check, the measure of supply chain finance is replaced with an alternative indicator. Following Liu Yiming et al. [21], supply chain finance (*SCF_new*) is measured as the ratio of short-term borrowings and notes payable to total assets. Compared with the baseline measure, this specification excludes accounts payable and therefore reduces the potential influence of trade credit on the measurement of supply chain finance.

The results are reported in column (2). The coefficient on the alternative supply chain finance measure remains significantly negative, and the sign is consistent with the baseline regressions. This suggests that the main findings are not sensitive to the specific measurement of supply chain finance.

4.3.3 Replacing the Dependent Variable

Information transparency is not only related to the timeliness and relevance of information disclosure, but also to whether disclosed information is sufficiently complete, prudent, and capable of reflecting a firm's actual financial condition [22]. To further examine the stability of the results, accounting information transparency is measured using the disclosure evaluation ratings published in the "Integrity File" of the Shenzhen Stock Exchange.

The disclosure quality ratings are classified into four categories: excellent, good, pass, and fail, which are assigned values of 4, 3, 2, and 1, respectively. The regression results are reported in Table 5. After replacing

the dependent variable, the coefficient on *SCF* is -0.1737 and remains significant at the 1% level after controlling for firm characteristics as well as year and industry fixed effects. The direction and significance of the coefficient are broadly consistent with the benchmark results.

4.3.4 Changing the Sample Period

The sample period is further adjusted to reduce the influence of several unusual years that may have introduced substantial external shocks. Specifically, observations from 2008–2009, 2015, and 2020–2021 are excluded. These years correspond to the global financial crisis, the period of significant stock market volatility, and the COVID-19 pandemic, respectively.

Column (4) of Table 5 reports the estimation results after the sample adjustment. The coefficient on *SCF* remains negative and statistically significant at the 1% level. Although the sample composition changes, the main relationship observed in the baseline regressions remains largely unchanged.

Table 5: Robustness Test Results

	(1)	(2)	(3)	(4)
	Baseline	Replace Explanatory Var.	Replace Dependent Var.	Delete Special Years
	Tran	Tran	Tran_new	Tran
<i>SCF</i>	-1.474***		0.317***	-1.532***
	(-9.71)		(4.57)	(-9.30)
<i>SCF_new</i>		-2.168***		
		(-13.16)		
<i>ROA</i>	5.912***	5.872***	1.804***	6.395***
	(12.17)	(12.06)	(11.05)	(10.54)
<i>Lev</i>	-0.012	0.027	-0.604***	0.063
	(-0.09)	(0.22)	(-10.01)	(0.42)
<i>Size</i>	0.020	0.020	0.154***	0.023
	(1.29)	(1.26)	(21.15)	(1.32)
<i>Big4</i>	-0.144**	-0.165***	0.118***	-0.165***
	(-2.51)	(-2.94)	(3.83)	(-2.76)
<i>Top1</i>	0.000	-0.001	0.004***	-0.000
	(0.17)	(-0.55)	(6.99)	(-0.20)
<i>Dual</i>	-0.019	-0.008	0.005	0.005
	(-0.54)	(-0.22)	(0.32)	(0.13)
<i>ListingAge</i>	0.002	0.001	-0.005***	0.003
	(0.71)	(0.31)	(-4.43)	(1.15)
<i>OCF</i>	-5.938***	-6.081***	0.292***	-6.146***
	(-21.49)	(-21.98)	(2.84)	(-20.00)
<i>Boardsize</i>	-0.010	-0.010	0.019***	-0.004
	(-1.09)	(-1.15)	(4.55)	(-0.40)
<i>Growth</i>	-0.074	-0.076	0.056***	-0.070
	(-1.57)	(-1.60)	(2.96)	(-1.33)
<i>_cons</i>	5.563***	5.555***	-0.486***	5.401***
	(17.10)	(17.16)	(-3.24)	(15.21)
<i>YearFE</i>	Yes	Yes	Yes	Yes
<i>IndFE</i>	Yes	Yes	Yes	Yes
<i>N</i>	22859	22859	18503	18386
<i>Adj.R2</i>	0.099	0.103	0.206	0.104

Note: Figures in parentheses are t-statistics based on clustered robust standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

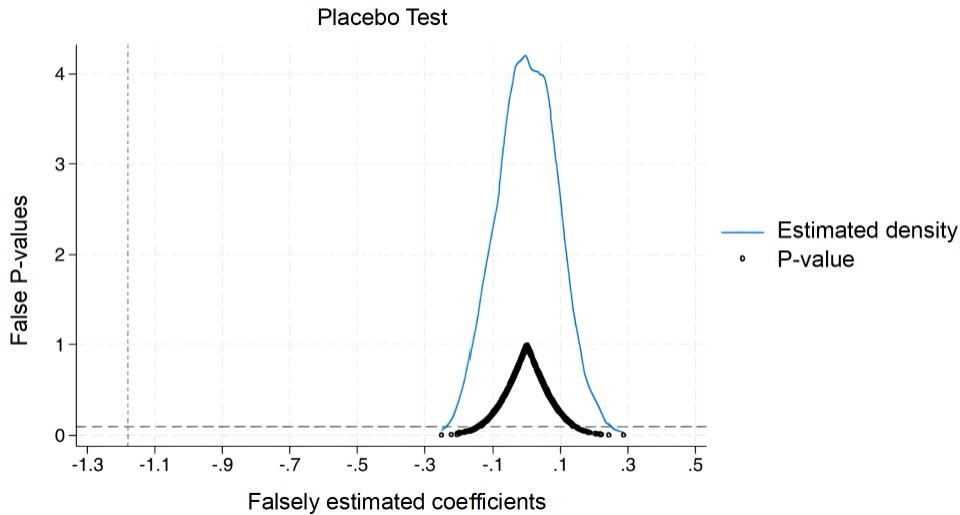
4.3.5 Placebo Test

To further examine whether the baseline findings are driven by unobserved factors or random chance, a placebo test is conducted. The model specification and control variables remain unchanged, while the supply chain finance variable is randomly reassigned 500 times. The regression is then repeated for each random assignment to obtain the distribution of placebo coefficients and their corresponding p-values.

The results are presented in the figure. Most of the coefficients generated from the random permutations are clustered around zero, and their associated p-values are generally above 0.1. By contrast, the coefficient obtained from the actual regression falls outside the main distribution of the placebo estimates and is clearly separated from the coefficients generated under random assignment.

These results suggest that the relationship observed in the baseline regression is unlikely to be driven by random disturbances alone. In other words, the association between supply chain finance and accounting information transparency appears to reflect more than a statistical coincidence. The placebo test therefore provides additional support for the main findings reported above.

Figure 1: Placebo Test



4.4 Mediating Effect

Agency theory suggests that the separation of ownership and management creates room for conflicts of interest between shareholders and managers [6]. When agency costs are high, managers may have stronger incentives to pursue private benefits or engage in inefficient expenditures. Under such circumstances, financial reporting can also become more susceptible to earnings manipulation and other forms of information distortion [7]. As a result, the quality and transparency of disclosed information may decline.

To explore whether agency costs serve as a transmission channel between supply chain finance and accounting information transparency, the mediating effect test follows the approach proposed by Jiang Ting [23]. Under the premise that the logic “an increase in agency costs will intensify management’s earnings manipulation motives and reduce information transparency” has been widely verified and accepted in the existing classic literature, this paper focuses on testing the effect path of the core explanatory variable (SCF) on the mediating variable of agency costs (AC). The model is specified as follows:

$$AC_{i,t} = \beta_0 + \beta_1 SCF_{i,t} + \sum \beta_k Controls_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (9)$$

$$Tran_{i,t} = \gamma_0 + \gamma_1 SCF_{i,t} + \gamma_2 AC_{i,t} + \sum \gamma_k Controls_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t}$$

This paper selects two classic proxies for agency costs: the first is the operating expense ratio (AC1), and the second is the management expense ratio (AC2). The formulas are as follows:

$$AC1 = \frac{Selling\ expenses + Administrative\ expenses}{Operating\ revenue}$$

$$AC2 = \frac{Administrative\ expenses}{Operating\ revenue} \quad (10)$$

Higher values of either indicator generally reflect greater managerial discretionary spending and, therefore, higher agency costs. The dependent variable, accounting information transparency (*Tran*), is measured using a reverse indicator, where lower values correspond to higher transparency. Firm-level control variables, together with industry and year fixed effects, are included in all regressions. The results are reported in Table 6.

Column (1) presents the benchmark result. The coefficient on supply chain finance (*SCF*) is -1.493 and significant at the 1% level. Given the construction of the transparency measure, the result suggests that greater participation in supply chain finance is associated with higher accounting information transparency.

Columns (2) and (3) examine the relationship between supply chain finance and agency costs. The estimated coefficients of *SCF* on *AC1* and *AC2* are -0.229 and -0.132, respectively, both significant at the 1% level. This indicates that firms with higher levels of supply chain finance tend to exhibit lower operating and management expense ratios. In other words, supply chain finance appears to be associated with lower agency costs. The findings are broadly consistent with the argument that supply chain finance may strengthen external monitoring and reduce managerial opportunism, thereby providing support for the proposed mediating mechanism.

Table 6: Agency Cost Mechanism Test Results

	(1)	(2)	(3)
	<i>Tran</i> (Total Effect)	<i>AC1</i> (Mechanism 1)	<i>AC2</i> (Mechanism 2)
<i>SCF</i>	-1.493***	-0.229***	-0.132***
	(-9.82)	(-4.84)	(-6.03)
<i>YearFE</i>	Yes	Yes	Yes
<i>IndFE</i>	Yes	Yes	Yes
<i>N</i>	22859	22859	22859
<i>Adj.R2</i>	0.099	0.066	0.075

Note: Figures in parentheses are *t*-statistics based on clustered robust standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.5 Heterogeneity Analysis

The baseline and mechanism tests suggest that supply chain finance is associated with higher accounting information transparency and lower agency costs. However, the strength of this relationship may vary across firms with different characteristics. To explore this possibility, heterogeneity tests are conducted from three perspectives: property rights, external monitoring, and financing constraints. The results are reported in Table 7.

4.5.1 Internal Property Rights Nature

Given the importance of ownership structure in China's institutional environment, the sample is divided into state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs) according to the nature of the ultimate controller.

Columns (1) and (2) of Table 7 show that the coefficient on *SCF* is significantly negative in the non-SOE group, while no significant effect is observed among SOEs. The difference between the two groups is statistically significant.

One possible explanation is that SOEs generally face fewer financing difficulties because of stronger access to external resources and financing channels. In addition, they are often subject to multiple layers of administrative oversight. Under such circumstances, the additional governance effect brought by supply chain finance may be relatively limited. For non-SOEs, however, supply chain finance tends to play a more important role in financing activities. As a result, participation in supply chain finance may create stronger incentives for maintaining disclosure quality and complying with external monitoring requirements. This may help explain the stronger effect observed among non-state-owned firms.

4.5.2 External Market Supervision Environment

The effectiveness of supply chain finance may also depend on the firm's external information environment. To examine this issue, the sample is divided according to analyst coverage.

Following Chen Qinyuan et al. [24] and Guan Jingyi et al. [25], analyst coverage (Lnanalyst) is measured as the natural logarithm of the number of analysts following a firm plus one. Firms with analyst coverage are assigned a value of 1, and those without analyst coverage are assigned a value of 0.

Columns (3) and (4) show that the coefficient on *SCF* remains significantly negative in both groups. However, the effect is noticeably stronger among firms covered by analysts. The coefficient in the analyst-covered group is -1.938, compared with -0.792 in the non-covered group, and the difference between the two groups is significant at the 1% level.

This finding suggests that analyst coverage may strengthen the governance effect of supply chain finance. While supply chain finance can improve information quality through transaction verification and monitoring, analysts may further process and disseminate this information to the capital market. In this sense, external information intermediaries appear to reinforce the influence of supply chain finance on accounting information transparency.

4.5.3 Underlying Resource Endowments

The governance effect of supply chain finance may also differ according to firms' resource endowments. Following the existing literature, the SA index is used to measure financing constraints. Firms are then divided into high-constraint and low-constraint groups based on the annual industry median.

Columns (5) and (6) report the corresponding results. The coefficient on *SCF* is significantly negative in both groups, indicating that supply chain finance is associated with lower information opacity regardless of the degree of financing constraints. At the same time, the effect is stronger among firms with lower financing constraints, and the difference between groups is statistically significant.

A possible reason is that firms facing lower financing constraints often possess better internal systems and stronger organizational capabilities. Under these conditions, the monitoring and information-sharing functions of supply chain finance may be implemented more effectively. By contrast, firms under severe financing pressure may still benefit from participation in supply chain finance, but limitations in internal governance and operational capacity could reduce the extent of the improvement in information transparency.

Table 7: Heterogeneity Test Results

	(1)	(2)	(3)	(4)	(5)	(6)
	State-owned	Non-state-owned	With Analyst	Without Analyst	High Financing Constraint	Low Financing Constraint
<i>SCF</i>	-1.213	-1.576***	-1.938***	-0.792***	-1.264***	-1.625***
	(-0.57)	(-7.28)	(-9.86)	(-3.43)	(-5.95)	(-7.60)
<i>YearFE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>IndFE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.465	0.083	0.121	0.093	0.105	0.109
<i>Inter-group Difference Test</i>	0.045**		0.000***		0.002***	
<i>N</i>	10833	12028	15530	7326	11428	11430

Note: Figures in parentheses are *t*-statistics based on clustered robust standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

5. Research Conclusions and Implications

Using data from Chinese A-share listed companies, this study explores the relationship between supply chain finance and accounting information transparency. The results suggest that firms with greater participation in supply chain finance generally exhibit higher levels of accounting information transparency. The mechanism analysis further shows that agency costs may serve as an important channel through which this effect operates. In other words, part of the improvement in transparency appears to be associated with a reduction in agency-related problems. The main findings remain broadly unchanged across a series of additional tests.

The heterogeneity analysis points to some differences across firms. The effect of supply chain finance is more evident among non-state-owned enterprises, firms receiving analyst coverage, and firms facing relatively

weaker financing constraints. This suggests that the governance role of supply chain finance may depend on the institutional environment and firm characteristics under which it operates.

Several implications can be drawn from these findings.

For firms, participation in supply chain finance should not be viewed simply as an additional financing channel. Since the effectiveness of supply chain finance relies heavily on the quality of transaction information, greater attention may need to be paid to the management of business data and disclosure practices. Strengthening the consistency of information across contracts, logistics records, and financial reports could help reduce information risks and improve the quality of corporate disclosure.

For financial institutions, the value of supply chain finance lies not only in providing credit support but also in improving information verification throughout the transaction process. Continued use of digital tools and data-sharing mechanisms may help strengthen risk identification and monitoring capabilities, especially in cases where transaction structures are relatively complex.

For regulators, the results provide some support for improving disclosure requirements related to supply chain finance activities. At present, differences in disclosure practices remain fairly common, making it difficult to compare firms on a consistent basis. More detailed disclosure standards may help investors better understand firms' financing arrangements and potential risks.

Finally, investors may benefit from paying attention not only to whether a firm participates in supply chain finance, but also to how such participation is reflected in its information environment. Differences in disclosure quality, internal governance, and transaction stability can still be substantial across firms. As a result, the presence of supply chain finance alone may not be sufficient to assess a firm's overall quality.

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Conflicts of Interest

The authors declare no conflict of interest.

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