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Supply-Chain Concentration, Debt Covenants and Accounting Conservatism: Evidence from Financing Constraints and Asset Allocation Adjustment

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Abstract. This study investigates how concentration in firms' supplier and customer bases is related to accounting conservatism. Drawing on Chinese A-share listed companies over 2015–2024, we find that firms relying more heavily on a small set of major trading partners report less conservatively. The association survives alternative measurements and model specifications. Channel tests indicate that concentrated supply-chain relationships operate partly by tightening external financing conditions and by reducing asset specificity, both of which weaken creditors' incentives to demand conservative reporting. Specifically, greater dependence on key suppliers and customers increases firms' exposure to financing frictions while encouraging adjustments toward more redeployable assets, thereby reshaping the contractual role of conservative accounting. The effect is not uniform across firms: it is more evident for non-state-owned enterprises, growth-stage firms, and firms with less diversified operations. These cross-sectional differences suggest that ownership structure, life-cycle characteristics, and business diversification influence firms' sensitivity to supply-chain dependence. By linking upstream–downstream dependence to financial-reporting choices, the study extends research on supply-chain governance and accounting quality and provides evidence relevant to firms, creditors, and regulators. The findings also highlight the importance of incorporating supply-chain structure into assessments of reporting incentives, credit risk, and corporate governance.

Keywords: supply-chain concentration, accounting conservatism, financing constraints, asset specificity

1. Introduction

Supply-chain security and stability constitute an important foundation for a development framework centered on the domestic economic cycle. Against the background of industrial chain restructuring and rising external uncertainty, listed companies have become increasingly dependent on core suppliers and customers, making supply-chain concentration a vital practical factor shaping corporate operational decisions. Excessive upstream-downstream concentration can reshape firms' resource-access capacity, operational risks, and contractual game relationships with creditors. As a key attribute of accounting-information quality from the debt-covenant perspective, accounting

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conservatism functions to recognize losses in a timely manner, recognize gains prudently, protect creditors' interests, and mitigate information asymmetry [1]. Against this backdrop, examining how overall supply-chain concentration shapes accounting conservatism, through which channels, and with what cross-firm differences is both practically relevant and theoretically meaningful.

Prior work has considered supply-chain concentration in relation to firms' financing choices, operating risk, and accounting-information quality. When suppliers or customers are highly concentrated, major trading partners gain greater bargaining leverage and firms become more resource-dependent, increasing both operating and financial risk [2]. Specifically, growing supply-chain concentration reduces corporate investment efficiency, aggravates inefficient investment including under-investment and over-investment [3], and elevates corporate default risk by weakening innovation input and thus hurting operating performance.

Relevant research has further extended to the financial-reporting domain. High supply-chain concentration strengthens managers' incentives for earnings management and reduces earnings transparency [4]. Rising customer-base concentration also intensifies accrual-based earnings management [5], which indicates that supply-chain dependence can affect corporate accounting-information quality by altering operational pressure and financial-reporting incentives. Studies of accounting conservatism similarly report lower conservatism when supplier or customer concentration rises, with stronger effects documented for non-state-owned firms and industries with more intense competition. Nevertheless, existing studies mostly investigate supplier-side or customer-side concentration separately, paying insufficient attention to firms' holistic upstream-downstream dependence patterns. Moreover, few works identify contractual channels such as financing constraints and asset-allocation adjustments. Accordingly, there remains room for further research regarding how comprehensive supply-chain concentration influences accounting conservatism, whether such influence operates through financing-constraint and asset-allocation channels, and how the above relationship varies under different firm-level characteristics.

This paper uses Chinese Shanghai-Shenzhen A-share listed firms from 2015 to 2024 to test the relationship between supply-chain concentration and accounting conservatism. The empirical analysis begins with the baseline estimates and then subjects the result to multiple robustness checks. Second, it examines the mediating effects of financing constraints and asset specificity. Third, heterogeneity analyses are performed grouped by ownership nature, corporate life-cycle stages, and diversification levels. The study makes three main contributions. First, by combining supplier and customer concentration into a composite indicator, it evaluates firms' overall dependence on upstream and downstream partners and adds evidence to the literature on relational transactions and accounting conservatism. Second, it identifies two mediating transmission channels (financing constraints and asset specificity), opening the "black box" of how supply-chain concentration acts on accounting conservatism. Third, it expands heterogeneity boundaries covering corporate life-cycle and diversification, enriching contextual analyses in this research field. Practically, firms should properly control supply-chain concentration and pay attention to incentives behind accounting-policy choices under heavy supply-chain dependence. For creditors and auditors, overall supply-chain dependence patterns should be taken into account when evaluating corporate accounting-information quality. For regulators, they should further refine disclosure requirements for listed firms concerning major supplier and customer information, especially the five largest counterparties, to safeguard the interests of investors and creditors.

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2. Theory and hypothesis development

2.1. Supply-chain concentration and conservative reporting

Accounting conservatism plays a contracting role by requiring bad news to be reflected in earnings more quickly than good news, thereby limiting information asymmetry and protecting lenders [1]. As typical relational transactions, supply-chain relationships can reshape the power structure between upstream and downstream trading partners as well as firms' financial-reporting incentives. As dependence becomes concentrated, core suppliers and customers gain bargaining leverage and the focal firm becomes more reliant on a narrow set of counterparties [6], increasing operating and default exposure [2].

On the one hand, under a highly concentrated supply-chain structure, the loss of major customers or termination of cooperation by core suppliers will generate substantial shocks to corporate operations. To sustain long-term trading relationships, firms have incentives to inflate book-level performance and reduce the release of negative operational signals. Higher supply-chain concentration strengthens managers' earnings-management incentives and lowers earnings transparency [4], and growing customer-base concentration also intensifies corporate accrual-based earnings management [5]. On the other hand, long-term stable business ties enable major customers and suppliers to obtain private corporate information via orders, procurement and payment collection channels, which correspondingly reduces their reliance on public financial reports. Existing studies document that both rising supplier concentration and customer concentration reduce corporate accounting conservatism [7]. Accordingly, supply-chain concentration may weaken firms' reporting incentives for timely bad-news recognition.

H1: Greater supply-chain concentration is associated with lower accounting conservatism.

2.2. Mechanisms of supply-chain concentration affecting accounting conservatism

2.2.1. Financing-constraint mechanism

Growing supply-chain concentration aggravates firms' resource dependence on core trading partners. Strong bargaining power of large customers may extend payment cycles and occupy corporate capital, thus deteriorating cash-flow conditions and external financing circumstances. Higher customer concentration significantly tightens corporate financing constraints [6]. Meanwhile, operational risks induced by supply-chain concentration also affect banks' credit-granting decisions [8].

Rising financing constraints further alter firms' financial-reporting incentives. When firms rely heavily on external funds such as bank credit, timely recognition of large-scale losses may weaken profitability and debt-repayment indicators, raising debt-covenant pressure and the risk of credit tightening. To preserve financing capacity and debt-covenant room, management has stronger incentives to delay the recognition of adverse losses, which lowers accounting conservatism.

H2: Supply-chain concentration reduces corporate accounting conservatism by aggravating financing constraints.

2.2.2. Asset-specificity mechanism

Supply-chain concentration also reshapes firms' asset-allocation decisions. As firms become more dependent on a small set of customers and suppliers, hold-up risks stemming from transaction

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interruptions and counterparty opportunistic behaviors increase. Specific assets usually have limited alternative usage and low liquidation value; their sunk costs become prominent once supply-chain relationships break down. Asset specificity also acts as a critical channel through which supply-chain concentration influences corporate financing and operational decisions [8]. Therefore, to mitigate asset-value losses caused by disrupted trading relationships, firms may cut investment in specific assets and improve asset versatility and re-deployability.

From the debt-covenant perspective, higher asset re-deployability improves potential liquidation value of corporate assets and strengthens creditors' collateral protection from tangible assets. When creditors obtain better collateral protection, their demand for accounting conservatism to timely identify and transmit downside risks declines correspondingly. This weakens the contractual incentives for firms to adopt conservative accounting policies.

H3: Supply-chain concentration reduces corporate accounting conservatism by lowering asset specificity.

3. Methodology

3.1. Sample and data

The sample covers A-share firms listed in Shanghai and Shenzhen from 2015 through 2024. Firm-level information is primarily collected from the CSMAR database. Several screening procedures are implemented before empirical analysis. Specifically, ST and *ST firms and firms in the financial or insurance industries are excluded. Observations lacking key variables are excluded, and firm-year records that cannot provide sufficient consecutive information are also deleted. The resulting panel contains 32,966 firm-year observations for 4,883 listed companies. Extreme-value treatment is applied by trimming the upper and lower 1% tails of all continuous variables.

3.2. Variable descriptions

3.2.1. Dependent variable: accounting conservatism (Basu)

We measure accounting conservatism with the Basu [1] earnings–returns model. Following prior work, the conservatism coefficient is estimated in reverse at the industry-year level. Larger coefficients indicate a stronger degree of conservative financial reporting.

3.2.2. Independent variable: supply-chain concentration (SCC)

Supply-chain concentration (SCC) represents a firm's combined reliance on major suppliers and customers. Following Wu and Yao [9], we average two percentages: purchases accounted for by the five largest suppliers and sales accounted for by the five largest customers.

SCC takes values from 0 to 100. A higher score means that procurement and sales are concentrated among fewer counterparties and hence that dependence on key supply-chain partners is stronger.

3.2.3. Mediating variable: financing constraints (SA) and asset specificity (AS)

Two variables are used to assess the proposed mechanisms. Financing constraints are measured with the SA index of Hadlock and Pierce [10]; larger absolute SA values indicate more severe external financing frictions. Following Chi and Xu [11], asset specificity is calculated as the sum of net fixed

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assets, construction in progress, intangible assets, and long-term deferred expenditures divided by total assets. Higher values indicate that a larger share of assets is customized or specialized.

3.2.4. Control variables

The models include common firm-level covariates to reduce confounding from observable characteristics. Size is the natural logarithm of year-end total assets. ROA equals net income divided by total assets. Top1 is the ownership share of the largest shareholder. Lev is total liabilities scaled by total assets. TobinQ is market capitalization divided by year-end total assets. Table 1 reports the descriptive statistics.

Table 1. Descriptive statistics of variables

Variable	Observations	Mean	Std. Dev.	Min	Max
Basu	32966	1.3304	4.1858	-1.0170	20.0398
SCC	32966	33.7698	16.8680	5.3100	81.4100
Size	32966	22.3592	1.2955	20.0783	26.4046
ROA	32966	0.0286	0.0709	-0.2981	0.1962
Top1	32966	32.7222	14.6222	8.0310	73.1856
Lev	32966	0.4178	0.2039	0.0593	0.9169
TobinQ	32966	1.9979	1.2619	0.8197	8.2190

4. Results

4.1. Baseline regression results

H1 is tested using firm and year fixed effects. Standard errors are clustered by firm to allow for heteroskedasticity and within-firm serial correlation. Table 2 presents the baseline estimates. Column (1) includes only the two sets of fixed effects, whereas Column (2) adds the full set of firm-level controls.

Table 2. Baseline regression results

	(1) Basu	(2) Basu
SCC	-0.0092*** (0.0035)	-0.0069** (0.0034)
Size		0.1244 (0.1051)
ROA		-2.3353*** (0.5150)

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Table 2. (continued)

Top1		0.0005 (0.0065)
Lev		-0.0490 (0.4030)
TobinQ		-0.2143*** (0.0338)
Constant	1.6401*** (0.1171)	-0.7197 (2.3101)
Firm/ Year FE	Yes	Yes
Observations	32966	32966
Adj.R^2	0.3380	0.3406

Notes: Standard errors clustered by firm appear in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In Column (1), SCC enters with a coefficient of -0.0092 ($p<0.01$). With the full controls added in Column (2), the estimate is -0.0069 and remains significant at the 5% level. Thus, the negative relation is insensitive to the inclusion of controls, consistent with H1.

4.2. Robustness tests

4.2.1. Alternative measure of supply-chain concentration

We replace SCC with customer concentration (CC) and re-estimate the model. Column (1) of Table 3 reports a CC coefficient of -0.0059 ($p<0.05$), preserving the sign and significance of the baseline result.

4.2.2. Alternative measure of accounting conservatism

We also replace the Basu measure with the Khan and Watts [12] C-Score to address dependence on a particular conservatism proxy. Column (2) of Table 3 yields an SCC coefficient of -0.0046 ($p<0.05$), again supporting the baseline finding.

4.2.3. Additional high-dimensional fixed effects

We further absorb city-by-year and industry-by-year fixed effects to account for time-varying shocks at those levels. Columns (3) and (4) of Table 3 continue to show a significantly negative SCC coefficient, with no material change in the inference.

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Table 3. Robustness test results

	(1) Basu	(2) CScore	(3) Basu	(4) Basu
SCC		-0.0046**	-0.0092***	-0.0064**
		(0.0020)	(0.0035)	(0.0032)
CC	-0.0059**			
	(0.0029)			
Constant	-0.9202	-6.4868***	-0.6187	4.9300**
	(2.3370)	(1.1406)	(2.3595)	(2.1963)
Controls	Yes	Yes	Yes	Yes
Firm/ Year FE	Yes	Yes	Yes	Yes
City-year FE	No	No	Yes	No
Industry-year FE	No	No	No	Yes
Observations	32783	31989	31605	32966
Adj.R^2	0.3409	0.3409	0.3409	0.3409

4.3. Mechanism analysis

4.3.1. Financing-constraint mechanism

Column (1) of Table 4 reports an SCC coefficient of 0.0002 for the SA index ($p<0.01$). Because SA is negative for most observations, a positive movement in its absolute magnitude indicates tighter financing conditions. The estimate therefore implies that greater supply-chain concentration is associated with more severe external financing constraints. Combined with the baseline regression results, higher supply-chain concentration brings severer financing-constraint pressure and further suppresses corporate accounting conservatism. It verifies the financing-constraint transmission channel, and H2 holds. This result is consistent with risk-transmission and debt-covenant logic. Concerns over default risk triggered by high supply-chain concentration motivate management to conduct earnings smoothing to maintain credit access, which ultimately reduces accounting conservatism.

4.3.2. Asset-specificity mechanism

Column (2) of Table 4 gives an SCC coefficient of -0.0004 in the AS regression ($p<0.05$). This estimate indicates that asset specificity declines as supply-chain concentration rises. Together with the baseline result, this pattern supports the asset-specificity channel proposed in H3. The finding fits the logic of risk hedging and contractual substitution. To guard against opportunistic risks, firms shift toward assets with higher versatility. These assets provide collateral protection for creditors, which substitutes for the monitoring demand arising from accounting conservatism.

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Table 4. Mechanism test results

	(1) SA	(2) AS
SCC	0.0002*** (0.0001)	-0.0004** (0.0001)
Constant	-4.2549*** (0.0899)	0.5903*** (0.1008)
Controls	Yes	Yes
Firm/ Year FE	Yes	Yes
Observations	32966	25660
Adj.R^2	0.9767	0.8837

4.4. Cross-sectional heterogeneity

4.4.1. Heterogeneity based on ownership nature

Columns (1) and (2) of Table 5 split the sample by ownership. For non-SOEs, SCC is -0.0088 ($p<0.1$); for SOEs, the coefficient is -0.0056 and statistically insignificant. The negative association with conservatism is therefore concentrated in the non-SOE subsample.

Burdened with policy-related tasks, SOEs obtain implicit government guarantees and face relatively soft budget constraints with diversified credit access channels. Even when suffering operational fluctuations caused by supply-chain concentration, the probability of triggering debt covenants or credit tightening remains limited. Hence SOEs have weak practical incentives to delay the recognition of negative loss information. In comparison, non-SOEs commonly encounter credit discrimination and operate under hard budget constraints. Their capital chains are more vulnerable to disturbances from upstream and downstream relationships. To guarantee stable external financing, external operational constraints push non-SOEs to postpone loss recognition. Meanwhile, non-SOEs hold weaker bargaining power in supply-chain negotiations and face heavier pressure to maintain purchase-sales cooperation. This further strengthens such accounting-policy preference and produces a more pronounced inhibiting effect.

4.4.2. Heterogeneity based on firm life-cycle

Following Dickinson [13], firms are classified by the sign pattern of operating, investing, and financing cash flows into a growth group (start-up and growth stages) and a mature group (maturity, decline, and turbulent stages). In Table 5, SCC is -0.0089 for the growth group ($p<0.1$) but -0.0072 and insignificant for the mature group.

Firms in the growth stage undergo rapid scale expansion with large capital expenditure and limited internally-generated cash flow. They are highly sensitive to external financing and heavily rely on bank credit and major-customer orders. Rising uncertainty induced by supply-chain concentration amplifies the risk of debt-covenant violation. Restricted by external financing conditions, growing firms tend to delay recognizing adverse loss information. Meanwhile, growing firms have not yet solidified their asset structure and enjoy large room for adjusting investment portfolios. Faced with opportunistic risks, they can flexibly cut investment in specific assets and improve asset versatility. Higher asset versatility strengthens collateral protection from tangible

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assets, and the contractual-substitution effect further weakens creditors' monitoring demand for accounting conservatism. For mature firms, business patterns become stable and internal cash flows build sufficient risk buffers. Operational shocks from supply-chain concentration can be absorbed by internal resources, so the negative inhibiting effect turns insignificant.

4.4.3. Heterogeneity based on diversification level

Diversification is measured using the income entropy index, and firms are split at the sample median. In Table 5, the SCC coefficient is -0.0142 for low-diversification firms ($p<0.05$) but 0.0001 and insignificant for high-diversification firms. The negative relation between SCC and conservatism is therefore confined to firms with relatively limited diversification.

The between-group difference can be explained by internal capital market theory and asset re-deployability theory. Firms with low diversification operate within a single business segment and lack cross-segment internal capital markets as risk buffers. Their operating performance is highly tied to upstream and downstream partners, and they have few business channels to disperse supply-chain-related risks. Besides, they have limited room for asset re-deployment and insufficient tangible collateral protection. As a result, creditors have to rely more on accounting conservatism for early risk warning, leading to a significant inhibiting effect of supply-chain concentration.

In contrast, highly diversified firms establish cross-business internal capital markets that can partially hedge supply-chain-driven operational shocks. Diversified business portfolios expand asset re-use possibilities, raise the share of versatile assets and enhance tangible liquidation protection. The contractual-substitution effect reduces creditors' monitoring demands for conservative financial reporting. Moreover, diversified structures increase the complexity of financial processing and allow cross-segment cost allocation and earnings smoothing. Local adverse shocks from supply-chain relationships can be absorbed, which weakens the influence of single supply-chain events on overall financial statements and renders the SCC inhibiting effect insignificant.

Table 5. Heterogeneity analysis results

	(1) Non-SOE	(2) SOE	(3) Growth group	(4) Mature group	(5) Low-diversification	(6) High-diversification
SCC	-0.0088* (0.0046)	-0.0056 (0.0055)	-0.0089* (0.0054)	-0.0072 (0.0045)	-0.0142** (0.0059)	0.0001 (0.0047)
Constant	-1.7454 (2.8658)	1.2017 (4.3687)	0.4203 (3.3167)	-1.9696 (3.2537)	-0.8207 (3.5907)	1.8127 (3.5105)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm/ Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22152	9879	11711	19755	15524	15465
Adj.R^2	0.3617	0.3058	0.3471	0.3473	0.3938	0.3358

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5. Conclusions and implications

Using 32,966 firm-year observations for Chinese A-share companies from 2015–2024, this study links overall supplier-and-customer concentration to accounting conservatism. Three findings emerge. First, higher SCC is associated with less conservative reporting, and the result persists when the main variables are replaced and when richer fixed effects are introduced. Second, the evidence is consistent with two channels: tighter external financing constraints and lower asset specificity, both of which reduce creditors' reliance on conservative reporting as a monitoring mechanism. Third, the negative relation is stronger for non-SOEs, firms in the growth stage, and firms with low business diversification.

Based on the above findings, firms should attach importance to potential risks arising from rising supply-chain concentration. They can strengthen their bargaining power by developing diversified cooperation channels and optimize asset-allocation structures. Firms should also strengthen disclosure and internal control to limit incentives to postpone bad-news recognition through earnings smoothing and thereby support higher-quality financial reporting. In addition, financial institutions should refine credit-risk assessment by taking corporate supply-chain characteristics into consideration. Regulators, meanwhile, can require more detailed disclosure of key upstream and downstream counterparties, intensify scrutiny of reporting quality in higher-risk firms, and improve the transparency of the capital-market information environment.

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