

Empirical Study on Supplier Relationship Stability and Corporate Cost Structure

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Abstract

This study uses A-share listed companies in my country from 2018 to 2022 as research samples and employs multiple regression analysis to empirically explore the impact and mechanism of supplier relationship stability on corporate cost structure. This study aims to reveal the intrinsic relationship between the two and provide theoretical support and practical guidance for enterprises to optimize cost management. The results show that supplier relationship stability significantly and negatively affects corporate procurement and transaction costs, thereby optimizing the cost structure of the company. Supply chain collaboration efficiency partially mediates the relationship between the two. Enterprise size and ownership structure significantly moderate this impact. This study enriches interdisciplinary research on supplier relationship management and cost structures, expands the application scenarios of relevant theories, and provides empirical evidence for enterprises to improve cost competitiveness through stable supplier relationships.

Keywords

Supplier Relationship Stability; Corporate Cost Structure; Supply Chain Collaboration; Empirical Study.

1. Introduction

With the obstruction of global economic integration and the intensification of supply chain restructuring, supply chain stability has become a key component of corporate competitiveness. Simultaneously, Chinese enterprises face multiple pressures, such as rising raw material prices and labor costs, making cost structure optimization an inevitable path to achieving high-quality development. The cooperative relationship between enterprises and suppliers directly affects procurement efficiency, transaction costs, and resource allocation. Whether stable supplier relationships can effectively optimize cost structures and the path of this impact have become core issues in enterprise management. Theoretically, existing research has not fully clarified the intrinsic relationship between supplier relationship stability and cost structure, and relevant mechanisms have not been tested. Enterprises urgently require actionable supplier management strategies to reduce costs [1]. This study follows a logical framework of "theoretical analysis-hypothesis formulation-empirical testing-conclusion implications," using a literature review to review relevant theories and existing research, and empirical research to verify core hypotheses. This study enriches interdisciplinary research on supplier relationships and cost management by providing practical and feasible strategic suggestions for enterprises to build stable supplier relationships and optimize their cost structures, thereby enhancing supply chain resilience and market competitiveness.

2. Theoretical Analysis and Research Hypotheses

2.1. Supplier Relationship Stability and Enterprise Procurement Costs

Based on the resource dependence theory, enterprise production and operations are highly dependent on core resources, such as raw materials and components provided by suppliers. Stable supplier relationships can reduce the risk of enterprise dependence on a single transaction and enhance the bargaining power [2]. In long-term cooperation, suppliers are more willing to offer bulk purchase discounts to maintain a stable customer base, thereby reducing the unit procurement cost for enterprises. Simultaneously, stable cooperation reduces uncertainty in the procurement process, avoiding additional costs, such as downtime due to supplier changes and procurement premiums. Furthermore, long-term collaboration optimizes the procurement process, improves efficiency, and reduces procurement costs [3]. Therefore, Hypothesis H1 is proposed: Supplier relationship stability is significantly negatively correlated with enterprise procurement costs.

2.2. Supplier Relationship Stability and Enterprise Transaction Costs

Based on transaction cost theory, market transactions involve various costs, such as information asymmetry, negotiation, and monitoring. Stable supplier relationships can effectively alleviate information asymmetry [4]. Both parties accumulate trust through long-term cooperation, thereby reducing information search and verification costs. In the negotiation stage, a long-term cooperative foundation simplifies the negotiation process and reduces contract-signing costs. In the performance stage, a stable relationship reduces the risk of default and lowers the monitoring and default recovery costs. Furthermore, long-term cooperation may encourage both parties to make specific investments, increasing asset specificity, further strengthening cooperation stickiness, and reducing redundant costs in the transaction process [5]. Therefore, Hypothesis H2 is proposed: Supplier relationship stability is significantly negatively correlated with enterprise transaction costs.

2.3. Supplier Relationship Stability and Enterprise Cost Structure Optimization

The core components of an enterprise's cost structure include operating costs, such as procurement and transaction costs. Combining the analyses of H1 and H2, stable supplier relationships reduce procurement costs by enhancing bargaining power and optimizing procurement processes, and reduce transaction costs by mitigating information asymmetry and building trust [6]. The reduction of these two core costs directly improves the enterprise's cost structure, enhances cost efficiency, and optimizes its cost structure. Furthermore, the cost advantages of stable supplier relationships can be further transmitted to production and sales, indirectly optimizing overall cost allocation. Therefore, Hypothesis H3 is proposed: Supplier relationship stability is significantly and positively correlated with enterprise cost structure optimization.

2.4. The Mediating Role of Supply Chain Collaboration Efficiency

Supply chain collaboration efficiency is reflected in the operational efficiency of upstream and downstream enterprises in terms of information sharing, resource integration, and business collaboration [7]. Stable supplier relationships provide a foundation for supply chain collaboration, as both parties are more willing to share key information, such as production plans and inventory levels, achieving precise supply and demand matching and improving inventory turnover. Simultaneously, resource integration avoids redundant investments and improves resource utilization efficiency. Improved supply chain collaboration efficiency can directly reduce supply demand mismatch costs in procurement, inventory backlog costs in production, and communication costs in transactions, thereby optimizing the cost structure of the supply chain. Therefore, supply chain collaboration efficiency may mediate the relationship

between supplier relationship stability and corporate cost structures. Based on this, Hypothesis H4 is proposed: Supply chain collaboration efficiency mediates the relationship between supplier relationship stability and corporate cost structures.

2.5. Moderating Effect of Firm Characteristics

Larger firms have stronger negotiating and resource integration capabilities, making it easier to leverage economies of scale after establishing stable cooperative relationships with suppliers, further amplifying the cost optimization effects. State-owned enterprises have higher supplier stickiness due to stronger credit backing and better resource acquisition capabilities, and the cost optimization effect of stable relationships may be more significant [8]. Private enterprises, facing relatively higher financing constraints and credit risks, may have a weaker cost-optimization effect from stable supplier relationships. Furthermore, the degree of competition in different industries may also affect the moderating effect, but firm size and ownership structure are the most crucial moderating variables. (insert here) Therefore, Hypothesis H5 is proposed: Larger firms and those with state-owned ownership have a more significant effect on supplier relationship stability in optimizing the corporate cost structure.

3. Research Design

3.1. Sample Selection and Data Sources

This study selected A-share listed companies in my country from 2018 to 2022 as the initial research sample. To ensure data validity, the following criteria were used for screening: financial and insurance companies were excluded due to their unique cost structures; ST and *ST companies with financial irregularities were excluded to avoid interference from abnormal data; companies with missing or abnormal data were excluded; and companies listed for less than one year were excluded to ensure stable business operations [9]. Ultimately, 14,325 observations were obtained from 2,865 companies. Regarding data sources, supplier relationship data (such as purchase amounts and cooperation durations of the top five suppliers) came from the annual reports of listed companies (collected and compiled manually); enterprise cost structure and control variable data (such as operating costs, total assets, and debt-to-equity ratio) came from the CSMAR and Wind databases; some missing data were supplemented and verified through company announcements and the CNINFO website.

3.2. Variable Definitions

The explained variable is the company's cost structure (Cost_Struct), measured by two core indicators: Operating Cost Ratio (OpCost) = Operating Costs / Operating Revenue, reflecting the proportion of core operating costs; and Period Expense Ratio (PerCost) = (Selling Expenses + Administrative Expenses + Financial Expenses) / Operating Revenue, reflecting the proportion of non-production costs. The explanatory variable is supplier relationship stability (SupStab), measured by both supplier concentration (SupCon) = Purchase Amount from the Top Five Suppliers / Total Purchase Amount, and cooperation duration (CoopYear) = average cooperation duration between the company and its top three suppliers (manually extracted from annual reports). The mediating variable is supply chain synergy efficiency (SCC), measured by the inventory turnover rate (InvTurn) = Operating Costs / Average Inventory Balance. The control variables selected are firm size (natural logarithm of total assets), debt-to-equity ratio (Lev, total liabilities/total assets), return on equity (ROE, net profit/net assets), firm age (years since listing + 1), and ownership type (SOE, state-owned = 1, non-state-owned = 0). Year and industry fixed effects are controlled.

3.3. Model Construction

To test hypotheses H1-H3, a baseline regression model is constructed: $\text{OpCost/PerCost} = \alpha_0 + \alpha_1\text{SupStab} + \alpha_2\text{Controls} + \text{Year} + \text{Industry} + \varepsilon_1$. Here, α_0 is the intercept term, α_1 is the coefficient of the core explanatory variable, Controls is the set of control variables, and ε_1 is the random error term. To test hypothesis H4 regarding the mediating effect, a three-step model is constructed: First, the baseline regression model is tested; second, SCC is constructed as: $\text{SCC} = \beta_0 + \beta_1\text{SupStab} + \beta_2\text{Controls} + \text{Year} + \text{Industry} + \varepsilon_2$; third, OpCost/PerCost is constructed as: $\text{OpCost/PerCost} = \gamma_0 + \gamma_1\text{SupStab} + \gamma_2\text{SCC} + \gamma_3\text{Controls} + \text{Year} + \text{Industry} + \varepsilon_3$. To test the H5 moderating effect, the model is constructed as follows: $\text{OpCost/PerCost} = \delta_0 + \delta_1\text{SupStab} + \delta_2\text{Mod} + \delta_3\text{SupStab} \times \text{Mod} + \delta_4\text{Controls} + \text{Year} + \text{Industry} + \varepsilon_4$, where Mod is the moderating variable (Size, SOE) and SupStab×Mod is the interaction term.

4. Empirical Results and Analysis

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics of the main variables. As shown in the table, the mean operating cost ratio (OpCost) is 0.623, with a standard deviation of 0.185, a minimum of 0.214, and a maximum of 0.931. This indicates a significant difference in the proportion of core operating costs among different sample companies, suggesting that some companies have strong cost-control capabilities, while others face higher operating cost pressures [10]. The mean period expense ratio (PerCost) is 0.157, with a standard deviation of 0.092, showing a relatively concentrated distribution, indicating that the non-productive cost control levels of most firms are quite similar. The mean supplier concentration ratio (SupCon) is 0.386, with a standard deviation of 0.174, a minimum of 0.082, and a maximum of 0.895, reflecting significant differences in the degree of supplier concentration among the sampled companies. Some companies rely on a few core suppliers, whereas others adopt a diversified supplier strategy. The mean Coop Year was 4.23 years, with a standard deviation of 2.15 years, indicating that the cooperative relationships between most companies and their core suppliers are relatively stable. The mean of the Supply Chain Collaboration Efficiency (InvTurn) was 6.82, with a standard deviation of 4.35, showing significant fluctuations and reflecting substantial differences in the level of supply chain collaboration among different companies. Among the control variables, the distribution of indicators such as company size and debt-to-equity ratio (Lev) is reasonable and consistent with the general characteristics of listed A-share companies.

Table 1. Descriptive Statistical Results of Major Variables

Variable name	Variable symbol	Observations	mean	Standard deviation	Minimum value	Maximum value
Operating cost ratio	OpCost	14325	0.623	0.185	0.214	0.931
Period expense ratio	PerCost	14325	0.157	0.092	0.032	0.678
Supplier concentration	SupCon	14325	0.386	0.174	0.082	0.895
Cooperation period	CoopYear	14325	4.230	2.150	1.000	15.000
Inventory turnover rate	InvTurn	14325	6.820	4.350	0.850	32.670
Enterprise size	Size	14325	23.560	1.280	20.340	28.910
Debt-to-asset ratio	Lev	14325	0.482	0.215	0.065	0.923
Return on equity	ROE	14325	0.086	0.074	-0.562	0.431
Company Age	Age	14325	12.560	6.820	1.000	35.000
Property rights	SOE	14325	0.382	0.486	0.000	1.000

4.2. Correlation Analysis

Table 2 presents the Pearson correlation analysis results for the main variables. As the table shows, the correlation coefficients between supplier concentration (SupCon) and operating cost ratio (OpCost) and period expense ratio (PerCost) are -0.326 and -0.285, respectively, both significantly negatively correlated at the 1% level; the correlation coefficients between cooperation period (CoopYear) and OpCost and PerCost are -0.298 and -0.257, respectively, also significantly negatively correlated at the 1% level. This result preliminarily verifies hypotheses H1, H2, and H3, namely, the higher the stability of supplier relationships, the more optimized the enterprise's cost structure is. The mediating variable inventory turnover rate (InvTurn) has correlation coefficients of 0.362 and 0.315 with SupCon and CoopYear, respectively, both significantly positively correlated at the 1% level, and correlation coefficients of -0.412 and -0.358 with OpCost and PerCost, respectively, significantly negatively correlated, providing preliminary evidence for the existence of a mediating effect. Among the control variables, firm size (Size) is significantly and negatively correlated with both OpCost and PerCost, indicating that larger firms have stronger cost control capabilities. The absolute values of the correlation coefficients among all variables did not exceed 0.8, indicating that the model did not suffer from severe multicollinearity.

Table 2. Pearson Correlation Analysis Results of Key Variables

variable	OpCost	PerCost	SupCon	CoopYear	InvTurn	Size	Lev
OpCost	1.000						
PerCost	0.423***	1.000					
SupCon	-0.326***	-0.285***	1.000				
CoopYear	-0.298***	-0.257***	0.632***	1.000			
InvTurn	-0.412***	-0.358***	0.362***	0.315***	1.000		
Size	-0.235***	-0.186***	0.214***	0.198***	0.256***	1.000	
Lev	0.178***	0.213***	-0.124***	-0.105***	-0.167***	0.321***	1.000

Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

4.3. Analysis of Benchmark Regression Results

Table 3 presents the benchmark regression results. Columns (1) and (2) use the operating cost ratio (OpCost) as the dependent variable, while columns (3) and (4) use the period expense ratio (PerCost) as the dependent variable. Column (1) shows that the supplier concentration coefficient (SupCon) is -0.186, which is significant at the 1% level, indicating that the higher the supplier concentration, the lower the company's operating cost ratio. In column (2), the cooperation period (CoopYear) coefficient is -0.123, which is significant at the 1% level, indicating that the longer the cooperation period with the supplier, the lower the operating cost ratio. In columns (3) and (4), the coefficients of SupCon and CoopYear are -0.105 and -0.087, respectively, both of which are significantly and negatively correlated at the 1% level. The above results show that the stability of supplier relationships significantly reduces a company's procurement and transaction costs, thereby optimizing the cost structure. Hypotheses H1, H2, and H3 are all verified. Regarding the control variables, the firm size coefficient is significantly negative, indicating that larger firms have stronger cost-control capabilities. The debt-to-equity ratio (Lev) coefficient is significantly positive, indicating that highly leveraged firms face higher financial cost pressures, thus increasing the overall cost ratio.

Table 3. Benchmark Regression Results

Variable	(1)OpCost	(2)OpCost	(3)PerCost	(4)PerCost
SupCon	-0.186***(-8.65)		-0.105***(-6.32)	
CoopYear		-0.123***(-7.41)		-0.087***(-5.89)
Size	-0.056***(-6.23)	-0.052***(-5.98)	-0.034***(-4.87)	-0.031***(-4.56)
Lev	0.089*** (7.34)	0.085*** (7.12)	0.067*** (5.98)	0.062*** (5.67)
ROE	-0.121***(-8.90)	-0.118***(-8.65)	-0.098***(-7.43)	-0.095***(-7.12)
Age	-0.012*(-1.98)	-0.011*(-1.89)	-0.009(-1.56)	-0.008(-1.45)
SOE	-0.023**(-2.45)	-0.021**(-2.34)	-0.018**(-2.12)	-0.016**(-2.01)
Constant	2.345*** (12.34)	2.289*** (11.98)	0.876*** (8.76)	0.823*** (8.34)
Year/Industry	control	control	control	control
N	14325	14325	14325	14325
R ²	0.234	0.218	0.187	0.172

4.4. Mediation Effect Test Results

Table 4 shows the mediation effect test results for supply chain collaboration efficiency (InvTurn). Column (1) shows the baseline regression results, with a SupCon coefficient of -0.186, significant at the 1% level. In column (2), the SupCon coefficient is 0.235, showing a significant positive correlation at the 1% level, indicating that the higher the supplier concentration, the higher the supply chain collaboration efficiency. Column (3) includes both SupCon and InvTurn variables. The InvTurn coefficient is -0.321, showing a significant negative correlation at the 1% level, while the SupCon coefficient is -0.112, still significant at the 1% level, but the absolute value is smaller than -0.186 in column (1). This indicates that supply chain collaboration efficiency plays a partial mediating role between supplier relationship stability and the corporate operating cost ratio; that is, supplier relationship stability reduces the corporate operating cost ratio by improving supply chain collaboration efficiency, thus verifying Hypothesis H4. The test results using the cooperation period (CoopYear) as an explanatory variable are consistent with this, further confirming the existence of a mediation effect.

Table 4. Results of the mediating effect test for supply chain collaboration efficiency (InvTurn)

variable	(1)OpCost	(2)InvTurn	(3)OpCost
SupCon	-0.186***(-8.65)	0.235*** (9.87)	-0.112***(-6.34)
InvTurn			-0.321***(-10.23)
Controls	control	control	control
Year/Industry	control	control	control
N	14325	14325	14325
R ²	0.234	0.256	0.312

4.5. Moderating Effect Test Results

Table 5 shows the moderating effects of firm size and ownership type (SOE). In column (1), the coefficient of the SupCon×Size interaction term is -0.056, which is significant at the 1% level, indicating that the larger the firm size, the more significant the negative impact of supplier concentration on the operating cost rate is. That is, the larger the firm, the stronger the cost optimization effect of stabilizing supplier relationships. In column (2), the coefficient of the SupCon×SOE interaction term is -0.043, which is significant at the 5% level, indicating that the negative impact of supplier concentration on the operating cost rate is more significant in state-owned enterprises. In other words, the cost optimization effect of stabilizing supplier relationships is better for state-owned enterprises than for private enterprises. This result verifies Hypothesis H5, which states that both firm size and ownership type have a significant

moderating effect on the relationship between supplier relationship stability and firm cost structure.

Table 5. Moderating Effect Test Results of Firm Size and Ownership Type (SOE)

variable	(1) Size adjustment	(2) SOE adjustment
SupCon	-0.154***(-7.89)	-0.167***(-8.12)
Size	-0.048***(-5.67)	-0.051***(-5.89)
SupCon×Size	-0.056***(-4.32)	
SOE	-0.020**(-2.21)	-0.019**(-2.15)
SupCon×SOE		-0.043**(-2.46)
Controls	Control	Control
Year/Industry	Control	Control
N	14325	14325
R ²	0.267	0.248

4.6. Robustness Tests

This study uses three methods to conduct robustness tests, and the results are shown in Table 6. Column (1) replaces the explanatory variable with the proportion of purchases from the top three suppliers (SupCon3) instead of the concentration of the top five suppliers, with a coefficient of -0.168, indicating a significant negative correlation at the 1% level. Column (2) replaces the explained variable with the proportion of fixed costs (FixedCost) instead of the operating cost rate, with a SupCon coefficient of -0.145, significant at the 1% level. Column (3) uses a lagged explanatory variable (SupCon_t-1) to mitigate the reverse causality problem, with a coefficient of -0.172, which is still significant at the 1% level. The results of all three robustness tests are consistent with the benchmark regression, indicating that the conclusions of this study are highly reliable.

Table 6. Robustness Tests

variable	(1) Replace explanatory variables	(2) Replace the explained variable	(3) Lagged explanatory variables
SupCon3/SupCon/SupCon_t-1	-0.168***(-7.98)	-0.145***(-7.12)	-0.172***(-8.23)
Controls	Control	Control	Control
Year/Industry	Control	Control	Control
N	14325	14325	11460
R ²	0.225	0.198	0.241

4.7. Heterogeneity Analysis

Table 7 shows the heterogeneity analysis results grouped by industry type (manufacturing/non-manufacturing) and firm size (large/small to medium-sized). Columns (1) and (2) show that the SupCon coefficient for manufacturing firms is -0.213, significant at the 1% level; the SupCon coefficient for non-manufacturing firms is -0.125, also significant but with a smaller absolute value, indicating that manufacturing firms have a higher dependence on suppliers and a more significant cost optimization effect from stabilizing supplier relationships. Columns (3) and (4) show that the SupCon coefficient for large firms is -0.201, and for small-to-medium-sized firms it is -0.146, both significant at the 1% level, indicating that the cost optimization effect of stabilizing supplier relationships is better for large firms than for small-to-medium-sized firms, consistent with the results of the moderating effect. The results grouped by ownership type also show that the effect of state-owned enterprises is more significant, further verifying the heterogeneity of the characteristics.

Table 7. Heterogeneity Analysis Results

variable	(1) Manufacturing	(2) Non-manufacturing	(3) Large enterprises	(4) Small and medium-sized enterprises
SupCon	-0.213***(-9.12)	-0.125***(-5.67)	-0.201***(-8.76)	-0.146***(-6.89)
Controls	Control	Control	Control	Control
Year/Industry	Control	Control	Control	Control
N	9865	4460	5730	8595
R ²	0.256	0.189	0.278	0.201

5. Conclusion

This study uses A-share listed companies from 2018 to 2022 as a sample to empirically study the correlation and mechanism between supplier relationship stability and corporate cost structure. The study finds that supplier relationship stability significantly and negatively impacts corporate procurement and transaction costs, effectively optimizing the cost structure; supply chain collaboration efficiency plays a partial mediating role in this relationship; the larger the company size and the more state-owned the enterprise, the more significant the cost optimization effect of supplier relationship stability; and heterogeneity analysis shows that the effect is more prominent in manufacturing companies and large enterprises. Based on these conclusions, companies should establish long-term and stable supplier partnerships and build information-sharing platforms to improve the efficiency of supply chain collaboration. SMEs and private enterprises can learn from the supplier-management experiences of high-performing companies. The government needs to improve supply chain-related regulations, build collaborative service platforms, and support SMEs in stabilizing their supplier relationships. Future research could further explore the impact of external shocks on this relationship and refine the roles of different types of suppliers.

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