

Credit Risk Management Strategies and Optimization of Revenue Enhancement Paths for Small and Medium-Sized Enterprises in the Context of Supply Chain Finance

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Abstract: By systematically analyzing the current situation and causes of credit risks in small and medium-sized enterprises, management strategies are proposed from four dimensions: the construction of a multidimensional credit risk identification system, the optimization of supply chain oriented credit evaluation models, the innovation of risk control methods involving multiple parties, and the cultivation of credit awareness in small and medium-sized enterprises; Meanwhile, exploration of avenues explore avenues for revenue generation from four aspects: reducing financing costs, improving capital utilization efficiency, expanding business opportunities, and optimizing operational management. The research aims to provide a credit risk management framework and profit optimization plan that can be used as a reference for participants in supply chain finance, and promote the healthy development of the supply chain finance ecosystem.

1. Introduction

Against the backdrop of rapid development in supply chain finance, small and medium-sized enterprises, as key nodes in the supply chain, have a direct impact on their credit risk management, which directly affects the stable operation and overall efficiency of supply chain finance. However, currently small and medium-sized enterprises face high difficulty in identifying credit risks, unsuitable evaluation systems, limited control effects, and high default rates in the supply chain finance scene. Based on the collaborative characteristics of supply chain finance, this article deeply analyzes the causes of credit risk in small and medium-sized enterprises, and proposes systematic optimization strategies from the perspectives of risk management and profit enhancement, providing theoretical support and practical guidance for the practice of supply chain finance^[1].

2. The current situation and causes of credit risk for small and medium-sized enterprises in the context of supply chain finance

2.1 Current Performance of Credit Risk

In the context of supply chain finance, the credit risk of small and medium-sized enterprises mainly presents three characteristics: "insufficient coverage, high non-performing rate, and concentrated

risk", and the risk exposure is deeply linked to the supply chain transaction link. The specific manifestations can be further quantified through the following core data and tables:

Table 1 Core Indicators of Credit Risk in Supply Chain Finance for Chinese Small and Medium sized Enterprises from 2020 to 2023

indicator	2020	2021	2022	2023
Supply chain finance financing coverage rate (%)	31.2	33.5	35.8	38.5
Non performance rate of supply chain loans for small and medium-sized enterprises (%)	3.8	4.0	4.3	4.2
Annual number of credit default events (incidents)	128	145	162	155
Average default amount (RMB 10000)	560	620	680	710

According to Table 1, although the coverage of supply chain finance financing for small and medium-sized enterprises has shown a steady increase from 31.2% to 38.5% from 2020 to 2023, credit risk is still operating at a high level. Specifically, the non-performing loan ratio of supply chain loans for small and medium-sized enterprises continues to be higher than 3.8%, reaching a peak of 4.3% in 2022. Although it slightly falls back to 4.2% in 2023, it is still significantly higher than the overall non-performing loan ratio of commercial banks during the same period (1.62%, data from the China Banking and Insurance Regulatory Commission in 2023), reflecting that the credit quality of small and medium-sized enterprises in the supply chain finance scene is significantly lower than the market average level; Secondly, there is a trend of "double increase" in default events and default amounts. The average default amount in 2023 has increased by 26.8% compared to 2020, indicating that the "destructive" nature of credit risk for small and medium-sized enterprises continues to increase. The impact of a single default event on the overall stability of financial institutions and supply chains is becoming increasingly significant.

From the perspective of supply chain finance models, there are significant differences in the risk characteristics of different financing models, as shown in the following table:

Table 2 Comparison of Credit Risks of Small and Medium sized Enterprises under Different Supply Chain Finance Models

financing model	Proportion of financing scale (%)	Non performing loan ratio (%)	Risk mitigation effect (1-5 points)	High risk links
account receivable financing	45.2	3.5	4.2	Delay in confirming the ownership of core enterprises
inventory financing	28.6	4.8	3.5	Depreciation of inventory and disputes over ownership of goods
order financing	18.3	5.2	3.0	Insufficient ability to fulfill orders
Prepaid financing	7.9	4.1	3.8	Supplier delivery delay

Table 2 shows that the non-performing loan ratio of the order financing model is the highest, reaching 5.2%, mainly due to its high dependence on the future performance ability of small and medium-sized enterprises. However, small and medium-sized enterprises generally have weak resistance to market fluctuations, poor production stability, and are easily affected by factors such as rising raw material prices, production equipment failures, and technical defects, resulting in orders being unable to be completed on schedule. Although accounts receivable financing accounts for the highest proportion of financing scale (45.2%), the non-performing loan ratio is the lowest (3.5%), and the risk mitigation effect is the best (4.2 points), mainly due to the indirect credit endorsement

and accounts receivable confirmation mechanism provided by core enterprises, effectively reducing the difficulty and risk exposure of financial institutions' credit evaluation. Inventory pledge financing has a non-performing loan ratio of 4.8% and a weak risk mitigation effect (3.5 points) due to issues such as large fluctuations in inventory value and disputes over ownership of goods. Although the prepaid financing model has the lowest proportion of financing scale (7.9%), the non-performing loan ratio (4.1%) and risk mitigation effect (3.8 points) are both at a moderate level. The main risks are concentrated in the rising cost of capital occupation caused by supplier delivery delays and supply chain interruption risks.^[2]

2.2 Analysis of the Causes of Credit Risk

(1) Small and medium-sized enterprises themselves

Small and medium-sized enterprises commonly suffer from prominent problems such as financial irregularities and lack of credit records. According to a special survey conducted by the Ministry of Industry and Information Technology in 2023, 68% of small and micro enterprises have not established a complete financial statement system that complies with accounting standards, and 35% of enterprises have no valid credit records in the central bank credit system, making it difficult for financial institutions to conduct credit evaluations through traditional financial indicators. More seriously, some small and medium-sized enterprises have a tendency to deliberately conceal negative information in order to obtain financing, such as order default history, inventory impairment risk, abnormal business changes, and other key information. This information asymmetry directly triggers the risk of "adverse selection": high-risk enterprises are more inclined to apply for high amount financing, while high-quality enterprises are excluded from low interest financing channels due to evaluation bias, ultimately leading to a continuous increase in the overall risk level of supply chain finance.

(2) At the supply chain level

As the "credit hub" of the supply chain, the collaborative willingness and data sharing ability of core enterprises directly affect the level of risk control. According to the "China Supply Chain Finance Blue Book (2023)", currently only 32% of core enterprises have established dynamic data sharing mechanisms, and most enterprises only provide static transaction vouchers to financial institutions, such as contract copies, invoice summaries, etc., lacking real-time feedback on key information such as performance progress, inventory turnover status, and logistics trajectory of small and medium-sized enterprises, making it difficult for financial institutions to achieve dynamic monitoring and early warning of risks. In addition, the "chain structure" characteristic of the supply chain exacerbates the transmission effect of risk: if a small and medium-sized enterprise in a certain link defaults (such as being unable to repay accounts receivable financing on time), it may trigger domino effects such as upstream raw material supply interruption and downstream order fulfillment delay, ultimately triggering a chain reaction of credit risk throughout the entire supply chain^[3].

(3) External environment

From a macro perspective, the credit system for small and medium-sized enterprises presents a "fragmented" feature - enterprise credit information is scattered across multiple departments such as central bank credit reporting, industry and commerce, taxation, and customs, and a unified national "supply chain credit database" has not yet been formed. Financial institutions need to invest high costs to integrate heterogeneous data from multiple sources, which not only reduces risk control efficiency but also increases operational risks. At the regulatory policy level, the innovative models of supply chain finance (such as rights confirmation financing, dynamic pledge, electronic warehouse single item pledge, etc.) lack clear legal definitions and operational norms. For example, there are standard deficiencies in the registration process of property rights, ambiguous rules for default

disposal, and incomplete cross departmental collaborative regulatory mechanisms, which have led financial institutions to face dual pressures of "compliance risk" and "operational risk". As a result, they choose to narrow their business scope or raise financing thresholds, indirectly exacerbating the financing constraints faced by small and medium-sized enterprises. The mismatch between this policy and innovation not only limits the service efficiency of supply chain finance, but also creates a vicious cycle of "risk financing growth".

3. Credit risk management strategies for small and medium-sized enterprises in the context of supply chain finance

3.1 Building a multidimensional credit risk identification system

Breaking through the limitations of traditional single data sources, we integrate multi-source heterogeneous data—including corporate financial statements, supply chain transaction records, logistics and warehousing data, e-commerce platform activities, third-party credit data, and publicly available government information—to construct a comprehensive data graph. The indicator design should follow a three-tier structure of "financial indicators - supply chain indicators - behavioral indicators": financial indicators include core indicators such as asset liability ratio, current ratio, cash flow coverage ratio, etc. that reflect the company's debt paying ability; The supply chain indicators include key indicators that reflect the efficiency of supply chain collaboration, such as accounts receivable turnover days, inventory turnover rate, order fulfillment rate, and core enterprise cooperation years; Behavioral indicators include auxiliary indicators reflecting a company's credit behavior, such as historical default records, abnormal fluctuations in transaction frequency, and concentration of related party transactions. Dynamic monitoring requires the construction of a real-time warning system based on big data and artificial intelligence technology. Through machine learning models, multi-dimensional indicators are dynamically weighted and analyzed to achieve accurate prediction of default probability; At the same time, the introduction of blockchain technology ensures the immutability and traceability of transaction data, improving the efficiency and accuracy of capturing risk signals.

3.2 Optimizing the credit evaluation model guided by the supply chain

Traditional credit evaluation models often focus on static financial data of enterprises and are difficult to adapt to the dynamic characteristics of supply chain finance. A dynamic evaluation model based on supply chain transaction data needs to be constructed, introducing characteristic variables such as supply chain stability index, industry risk coefficient, and core enterprise credit migration rate. Combined with machine learning algorithms such as logistic regression, random forest, and XGBoost, a highly discriminative and highly predictive evaluation model should be constructed. Model validation requires the use of K-fold cross validation, ROC curve analysis, stress testing, and other methods to verify its robustness and ensure its applicability in different economic cycles and industry scenarios. At the same time, it is necessary to establish a dynamic update mechanism for the model, regularly adjusting the weights of feature variables and model parameters based on changes in the supply chain environment and the evolution of corporate credit behavior, in order to maintain the timeliness and accuracy of the evaluation results.

3.3 Innovative risk control measures involving multiple stakeholders

Stakeholders should establish a four-party collaborative risk control network comprising financial institutions, core enterprises, small and medium-sized enterprises, and third-party service providers

to foster a virtuous ecosystem of shared risk and mutual benefit. Financial institutions need to deepen strategic cooperation with core enterprises and reduce information asymmetry risks through the credit endorsement and supply chain control capabilities of core enterprises; Stakeholders should also engage third-party service providers such as logistics companies, e-commerce platforms, and credit reporting agencies to enhance risk management effectiveness through measures including cargo supervision, transaction verification, and credit scoring. All parties should explore innovative risk-sharing mechanisms, such as establishing risk reserve pools, introducing supply chain insurance products, and issuing asset-backed securities, to achieve the rational dispersion and transfer of risks across all nodes in the supply chain. At the same time, it is necessary to establish a cross subject information sharing platform to promote real-time interoperability of transaction data, logistics data, and capital flow data, and improve the collaborative efficiency and accuracy of risk control.

3.4 Strengthen the cultivation of credit awareness among small and medium-sized enterprises

Stakeholders should Conduct regular specialized training sessions on credit management, inviting industry experts and scholars to interpret cutting-edge theories and practical case studies in credit risk management within the supply chain finance sector. This initiative is intended to enhance the credit risk identification and prevention capabilities of corporate finance personnel and management. Regulatory bodies and financial institutions should establish a credit incentive and disciplinary mechanism to implement preferential financing rates, prioritize business cooperation, and increase credit limits for enterprises with good credit standing. They should also impose joint disciplinary measures on enterprises with poor credit, such as restricting financing channels, increasing financing costs, and publicly disclosing adverse credit records, thereby fostering a credit-oriented environment where “rewarding integrity and restricting dishonesty.” Industry associations and credit reporting agencies should cultivate a culture of integrity by promoting credit information sharing and the dissemination of credit value through industry self-regulatory bodies and credit reporting platforms. They should organize forums on credit culture development, recognize trustworthy enterprises, foster an industry-wide atmosphere that values credibility and integrity, and encourage small and medium-sized enterprises to transition from passive compliance to proactive credit management.

4. Optimization of income enhancement path for small and medium-sized enterprises in the context of supply chain finance

4.1 Reduce financing costs

Small and medium-sized enterprises need to flexibly choose supply chain finance products such as accounts receivable financing, inventory financing, and advance payment financing based on their own business characteristics and financing needs, and use the credit endorsement of core enterprises to reduce financing costs. By negotiating with financial institutions, we strive for more favorable interest rate pricing and more flexible financing terms, such as using floating interest rates, revolving credit, and other methods to reduce funding costs. Government agencies and financial institutions should actively utilize policy tools such as government subsidies, tax incentives, and subsidized loans to reduce financing costs. This includes applying for specialized loans for technology-based SMEs and implementing green supply chain financial subsidies. At the same time, it is necessary to optimize the financing structure, broaden financing channels through issuing bonds, introducing strategic investors, and other means, reduce dependence on a single financing channel, and improve the controllability and stability of financing costs.

4.2 Improving the efficiency of fund utilization

Enterprises should enhance capital utilization efficiency through a three-pronged approach of cash flow management, inventory optimization, and accounts receivable management. They should establish a scientific cash flow forecasting model that combines historical data with market trends to accurately predict future cash flows, enabling rational planning of capital inflows and outflows to prevent idle funds or shortages. They should optimize inventory levels by adopting inventory management methods such as Economic Order Quantity (EOQ) and Just-in-Time (JIT) production, thereby reducing inventory backlog and capital tied up while improving inventory turnover rates. They should also strengthen accounts receivable management by establishing a customer credit assessment system. Implement differentiated collection policies for customers with varying credit ratings to shorten collection cycles and reduce bad debt risks. Simultaneously, At the same time, enterprises should utilize accounts receivable factoring and securitization to activate receivable assets and enhance liquidity.

4.3 Expanding Business Opportunities

The company should expand our 3D business through market analysis, establishing partnerships, and developing new products. We use strategic analysis tools such as SWOT analysis and Porter's Five Forces model to conduct in-depth analysis of market demand, competitive situation, and our own strengths and weaknesses, identifying potential business growth points and market gaps. The company should establish long-term, stable strategic partnerships with core enterprises and upstream/downstream businesses. It should expand business channels and increase market share through joint marketing, channel sharing, and technical collaboration. It should also increase investment in research and development to develop competitive new products through technological innovation and product upgrades, meet diverse and personalized customer needs, and cultivate new profit growth points^[4].

4.4 Optimizing Operations Management

The company should optimize operational management through three measures: process reengineering, cost control, and information technology development. It should Comprehensively streamline and optimize internal business processes by eliminating redundant steps, simplifying approval workflows, and enhancing operational efficiency. Adopt standardized and automated procedures to reduce human operational risks while improving consistency and uniformity in process execution. The company should strengthen cost control by implementing refined management of production and operational costs through methods such as standard costing and activity-based costing. Reduce unnecessary expenditures to enhance cost efficiency. It should also advance IT infrastructure development by introducing advanced management systems including ERP, CRM, and SCM to achieve integrated business data management, thereby improving decision-making efficiency and accuracy. At the same time, the company should leverage big data and artificial intelligence technologies to conduct in-depth analysis of operational data, uncover potential business optimization opportunities, and drive the intelligent and refined advancement of operational management.

5. Conclusion

This article systematically explores the optimization path of small and medium-sized enterprises in the supply chain finance scenario from the dual dimensions of credit risk management strategies and profit enhancement paths. By constructing a multidimensional credit risk identification system,

optimizing supply chain oriented credit evaluation models, innovating risk control methods involving multiple stakeholders, and strengthening the cultivation of credit awareness among small and medium-sized enterprises, the level of credit risk management for small and medium-sized enterprises can be effectively improved; By reducing financing costs, improving the efficiency of fund utilization, expanding business opportunities, and optimizing operational management, it is possible to achieve sustained improvement in the revenue of small and medium-sized enterprises. The research conclusion has important practical guidance significance for the participants in supply chain finance and helps promote the healthy development of the supply chain finance ecosystem.

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