

Problems and Optimization Suggestions for Risk Management and Control in Supply Chain Finance

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Abstract. The difficulty of financing for small and medium-sized enterprises is an old problem. Supply chain finance has been highly expected over the years. It has turned into transaction data in the industrial chain on a credit basis, giving financing channels for enterprises that could not borrow money. However, in actual operation, there are many risk events. In practice, risk events such as overdue accounts receivable cannot be recovered, inventory pledge supervision is absent, and the authority and responsibility of the participating subjects are unclear. This paper uses the theory of information asymmetry and the theory of synergy and adopts the method of combining literature review and logical analysis to divide the risks of supply chain finance into five categories: credit risk, operational risk, market risk, legal risk, and collaborative risk, and analyze them one by one. Then point out the specific problems in the current control from the three links of risk identification, evaluation, and execution. Finally, three suggestions are put forward: establish a comprehensive risk identification list and early warning mechanism, formulate multi-dimensional evaluation standards, promote data sharing, clarify the responsibilities of all parties, and accelerate digital transformation. The study found that there is a conduction relationship between various risks, and a single-dimensional control strategy is difficult to work. The theoretical contribution of this article lies in the construction of the analysis framework of "risk type, problem link and optimization path".

Keywords: Supply chain finance, risk control, risk management

1. Introduction

Supply chain finance is not a new concept. Simply put, it is to integrate the flow of information, logistics and capital in the supply chain to provide financing for core enterprises and upstream and downstream small and medium-sized enterprises. Loannou and Demirel analyze the application of blockchain technology in supply chain finance from the three cross-perspectives of operations, finance and law, and found that research in this field has grown rapidly in recent years, especially in risk management and technology empowerment [1].

The core cause of the financing constraints of small and medium-sized enterprises is the serious information asymmetry between banks and enterprises. This is theoretically called information asymmetry. Supply chain finance uses transaction data to make up for this information gap. Soni et al. put forward a decision-making framework for the implementation of Industry 4.0 technology for

the sustainable supply chain finance of small and medium-sized enterprises, pointing out that financial technology means can effectively alleviate the problem of information asymmetry [2]. It must be coordinated with logistics and information flow, so that the financial performance of the entire supply chain can go up. This judgement was later confirmed by many studies.

Theoretically, supply chain financial risk control can dialogue with two core theories. One is the theory of information asymmetry. There are different degrees of information asymmetry between financial institutions and small and medium-sized enterprises, between core enterprises and upstream and downstream, which is the deep cause of credit risk and collaborative risk [3]. The other is the theory of synergy. Supply chain finance involves multiple participants, and the degree of coordination between parties directly affects the efficiency of risk identification and disposal [4].

From a practical point of view, the scale of China's supply chain financial market continues to expand. Participants have expanded from banks to core enterprises, logistics companies and science and technology platforms, and the industries covered have also spread from manufacturing to agriculture, medicine, and retail. But the problem follows. Credit defaults, operating errors, market fluctuations, legal disputes, and poor coordination between parties occur from time to time. The systematic review of Gu et al. conducted an empirical study using Chinese enterprise data to find that supply chain finance has a significant impact on green innovation and productivity, but it also points out that risk control is a key factor restricting its effectiveness [5].

Existing research has done a lot of work on the identification of financial risk types in the supply chain and individual risk control measures, but there are two gaps. First, there are not many people who systematically analyze the three types of risks, problems, and optimization suggestions. Second, the research on risk control from the perspective of information asymmetry and synergy at the same time needs to be deepened. This article tries to fill these two gaps and build an analysis framework of "risk type, problem link, optimization path".

The structure of this article is as follows: the second part talks about the development status and risk types, the third part analyses the problems in control, the fourth part gives countermeasures, and the fifth part summarizes and points out the limitations of research.

2. The current situation of supply chain finance development and risk control

2.1. The overall development trend of supply chain finance in China

In recent years, the domestic supply chain finance has indeed developed rapidly. The specific size of the market is different, and the statistical caliber of different institutions is different, but the general trend is the same as the financing balance is rising, the number of participating in subjects is increasing, and the coverage of industries is expanding. In the past, it was mainly banks doing it. Now core enterprises are also building their own platforms, and logistics companies and technology companies have also come in.

Judging from the distribution of industries, the manufacturing industry has always been the main battlefield, because the supply chain of the manufacturing industry is long, there are many upstream and downstream enterprises, and the volume of receivables and payables is large. The retail industry has also gone earlier, especially large supermarkets and e-commerce platforms. The circulation of agriculture and medicine is lagging, but the growth rate is not slow.

There are several features worth mentioning. First, supply chain finance mainly serves small and medium-sized enterprises, which is its most direct positioning. Xu et al. mentioned in the summary that supply chain finance can reduce the information asymmetry between financial institutions and small and medium-sized enterprises, making it easier for the latter to obtain working capital [5].

Second, the role of core enterprises is becoming more and more important. Without the credit endorsement and transaction data of core enterprises, many businesses cannot be done at all. Third, digitalization is being pushed, but the progress is uneven. The digital level of industry shows significant differentiation. Head institutions have used blockchain and big data technology, and small and medium-sized institutions still rely on manual audit and offline operation. Fourth, the policy level has been encouraging. Since about 2017, the Ministry of Commerce, the Central Bank and other departments have issued several guidelines one after another.

However, as the scale has increased, the risks are also accumulating. The study of Feng et al. found that supply chain finance promotes enterprise innovation and investment by easing financing constraints, but this promotion will be greatly discounted in the absence of risk control [6].

2.2. The core types of risks in supply chain finance

Supply chain finance involves more people and links, and naturally there are many types of risks. Overall, the following categories are more cores.

Credit risk is the most often mentioned. To put it bluntly, those who borrow money don't pay it back, or those who should pay don't pay. In the accounts receivable financing model, if the core enterprise does not give money, or if there is a problem with the operation of small and medium-sized enterprises, the financing party will lose money. Yang et al. used the credit data of Chinese small and medium-sized enterprises to make empirical evidence and found that in the financing of accounts receivable, the payment behavior of core enterprises has a great impact on credit risks, and delay or refusal to pay will directly lead to default [7]. The trouble with credit risk is that the financial information of small and medium-sized enterprises is often not standardized, and it is not easy for banks to judge with traditional methods [8].

The operation risk is more hidden. Supply chain finance has many links from signing contracts, transferring the rights to the final allocation of funds, and any error in any link may cause losses.

When discussing the advanced risk management model, Nnaji et al specifically mentioned that the intensive link of manual operation is a high incidence area of operational risk, and the main reasons are information input errors and irregular processes [9]. In many places, the probability of wrong information and process errors is high. In domestic practice, some institutions still rely on manual review of documents, which is not only inefficient, but also prone to errors.

Market risks come from outside. As soon as commodity prices fluctuate, the pledge value of inventory pledges may shrink. As the industry cycle goes down, the enterprises in the whole chain are tense. There are also cases of sudden interruption of the supply chain. For example, in the years of the epidemic, many enterprises suffered this loss.

Legal risks cannot be ignored. If the contract is not standardized, the guaranteed relationship is not clear, or the legal provisions are different in different places, which may make the financing party's claims not guaranteed.

Collaborative risk refers to the problem caused by the lack of information and unclear responsibility between the parties. From the perspective of the theory of information asymmetry, collaborative risk is essentially caused by the uneven distribution of information and poor communication between multiple subjects. From the perspective of the collaborative theory, the successful implementation of supply chain finance is highly dependent on joint decision-making and information sharing among participating subjects [4, 8]. The five types of risks have cross-conduction and superimposed amplification effects, and collaborative risks will aggravate information asymmetry, thus increasing credit risk losses. For example, poor coordination will lead

to increased information asymmetry, and information asymmetry will make credit risk assessment inaccurate, which will eventually lead to losses.

3. The problems existing in the risk management of supply chain finance

3.1. Problems at the risk identification level

The first problem is that the identification is not comprehensive. Many institutions focus on credit risks and do not pay much attention to operational risks, market risks, legal risks, and collaborative risks. It is not difficult to understand, credit risk is the most intuitive, and if something happens, people cannot get the money back. But other types of risks can also cause losses and ignoring them is tantamount to leaving a blind spot.

The second problem is that the identification is not accurate. There are big and small risks, both main and secondary, and there are direct causes and conducive paths. However, in practice, it often relies on empirical judgement and lacks scientific method support. What is the most important risk, how big the impact is, and when it is likely to break out, these key issues are often unclear.

The third problem is the identification lag. Most practices are to trace back in the future, the risk has already occurred and then analyze the cause. The financial chain of the supply chain is long and has many links, and the risks are exposed, and losses have often been caused. The early warning mechanism is basically missing.

3.2. Risk assessment-related issues

The imperfect evaluation system is a problem. There is no unified standard in the industry. Each institution uses its own indicators and weights, and the results cannot be compared horizontally. Moreover, the indicators are narrow, and most of them focus on financial data, and insufficient consideration is given to the operation of the supply chain, the authenticity of transactions, and the degree of coordination of all parties.

The evaluation method is also traditional. Many institutions are still using manual audits, and credit officers judge based on experience. It's not that experience is useless, but the financial business of the supply chain is getting more and more complex and large. It is too busy purely by relying on people, and the accuracy rate is difficult to guarantee.

Data barriers and information asymmetry lead to risk assessment distortion and misalability, which becomes the core root cause of risk control failure. This problem is particularly prominent in supply chain finance. There are data barriers between all parties. Financial institutions cannot get the real business data of small and medium-sized enterprises. They can only rely on the information provided by core enterprises and fragmented external data to make judgements. Naturally, the results are easy to be biased. When Ma et al. studied China's supply chain financial service providers, they found that the supply chain coordination factors [4].

For example, information sharing and joint decision-making have a significant impact on the implementation effect of supply chain finance, and insufficient coordination will directly increase risks. Qiao and Zhao also pointed out from the perspective of supply chain integration that alleviating information asymmetry is the key path to reduce financing risks [10].

3.3. Problems at the execution level of risk management

The division of responsibilities is not clear. Core enterprises, financial institutions, logistics parties, small and medium-sized enterprises, what risk responsibilities each party should bear is not clearly written in many business agreements. Once something goes wrong, it is not uncommon to blame each other, and the efficiency of risk disposal is naturally not high.

The control measures are not in place. It's not that there is no system, but that the system can't be established. There are loopholes in the credit guarantee mechanism, inventory supervision is formal, and the operation of the financing process is not standardized, these problems are quite common in practice. No matter how well it is written on paper, if the execution level is discounted, the effect will not come out.

The level of digital control is low. The head institutions are already exploring big data and blockchain, but the digital transformation of most of the participating subjects is still in the primary stage. The business still relies on manual operation, the system is still isolated, and real-time monitoring and intelligent early warning are basically not discussed.

4. Countermeasures and suggestions for optimizing the risk management of supply chain finance

4.1. Improving the risk identification system and enhancing the ability to predict risks

First, it is necessary to clearly define the types of risks. Credit risk, operational risk, market risk, legal risk, and coordination risk, and what are the core characteristics of each type, where are they most likely to occur, and a clear list needs to be prepared. This list is not just for show, it must be integrated into the daily business processes.

The identification method also needs to be improved. Qualitative judgement alone is not enough, and quantitative means must be combined. Tools such as the risk matrix method can be used to analyze the cause, scope of impact and probability of risk in combination with specific supply chain scenarios. Only when the method is right can the judgement be accurate.

Build a digital and real-time risk early warning system to automatically trigger early warnings for abnormal signals. It cannot always wait until the risk occurs before remedying it. Use digital means to monitor the operation of the supply chain in real time. Signals such as transaction abnormalities, contract fulfilment delays and business fluctuations will trigger early warnings as soon as they appear. The risk prevention and control model based on machine learning has significantly improved the accuracy and response speed of risk identification, which provides a technical reference for the construction of early warning mechanisms [6].

4.2. Establishing a sound risk assessment system and enhancing the accuracy of the assessment

The unified standard must be built first. Indicators should not only focus on financial data, but also include dimensions such as supply chain operation status, credit records, and coordination capabilities of all parties. Although the multi-dimensional evaluation system is time-consuming to build, it is much more reliable than a single indicator.

The evaluation method needs to be upgraded. Big data technology can be used to integrate transaction data, logistics data and capital flow data, and the evaluation efficiency and accuracy can be improved. This discovery reminds people that tools alone are not enough, and the ability of the organization must also keep up.

Break the data island between subjects and establish a compliant, secure, and traceable data sharing mechanism. All parties share the necessary data under the premise of legal compliance. The more sufficient information, the closer the assessment results are to the real situation. The information disclosure mechanism needs to be improved. An organization cannot grasp the key data without taking it out.

4.3. Strengthening the implementation of risk control measures and fulfilling the responsibility for risk management

The responsibility should be clear. Core enterprises, financial institutions, logistics parties, small and medium-sized enterprises should clearly write which section and what responsibility they are responsible for.

A liability traceability mechanism should also be established, and people can be found if something goes wrong. Specific measures need to be implemented. The credit guarantee mechanism needs to be improved, the financing process should be standardized, and the supervision of inventory pledge should be strengthened. Digitalization is not the icing on the cake, but a necessary way to improve control efficiency.

5. Conclusion

This article divides the risks of supply chain finance into five categories, which is credit risk, operational risk, market risk, legal risk, and collaborative risk. It analyses the problems in the current control from the three links of identification, evaluation, and implementation, and gives optimization suggestions. There are three judgements worth emphasizing, although credit risk is the most core, other types of risks will also cause losses, and all kinds of risks are transmitted to each other, the shortcoming of risk control is not a single point, and the three links of identification, evaluation and implementation need to be made up, digitalization is an important means to improve control ability, but it requires organizational ability and data. The sharing mechanism keeps up with the synchronization.

There are two aspects of theoretical contribution. First, the analysis framework of "risk type, problem link, optimization path" has been built, and the risk classification, problem diagnosis and countermeasure suggestions of scattered discussion are integrated into a logical chain. The second is to explain the deep mechanism of risk generation from the theory of information asymmetry and synergy. In practice, financial institutions and core enterprises need to make efforts at the same time in the three links of identification, evaluation, and implementation. Regulatory departments should promote the construction of unified evaluation standards and data sharing mechanisms.

The limitation of this article is literature review and logical analysis are used, but empirical data is not introduced; the differences between different industries are not discussed enough.

The mechanism of digital technology is not deeply discussed. Future research can be in-depth in the direction of the quantitative relationship between supply chain synergy factors and risk control effect, the specific application mechanism of artificial intelligence and blockchain, and the comparative research of different industries.

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