

Research on Supply Chain Finance Risk Control Strategies

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Abstract: According to the characteristics and existing problems of supply chain finance, this study carried out an in-depth analysis, and put forward a series of optimization countermeasures. The study found that supply chain finance has the characteristics of cross-industry, dynamic and complex, but there are problems such as asymmetric information, single financing channels and imperfect risk control system. In order to solve these problems, this study puts forward countermeasures such as improving the information disclosure mechanism, expanding diversified financing channels and building a comprehensive risk management system. Through these measures, the aim is to improve the service efficiency of supply chain finance, reduce risks, and promote the healthy development of supply chain finance.

Keywords: Supply Chain Finance; Information Asymmetry; Financing Channels; Risk Management System; Optimization Game

Introduction

With the continuous development of the global economy, supply chain finance, as an innovative financing model, has gradually become an important means to alleviate the financing problems of small and medium-sized enterprises and enhance the vitality of the real economy. However, supply chain finance has also exposed many problems in the practice process, such as asymmetric information, single financing channels and imperfect risk control system, which seriously restrict the further development of supply chain finance. Through in-depth analysis of the connotation and risk characteristics of supply chain finance, this study systematically sorted out the main problems faced by current supply chain finance, and proposed targeted optimization countermeasures on this basis, aiming at providing theoretical support and practical guidance for the healthy development of supply chain finance in China.

1. Features of supply chain finance

1.1. Cross-industry

Supply chain finance as an innovative financing model, one of its most prominent characteristics is cross-industry. This feature is reflected in that supply chain finance is not limited to a specific industry, but runs through all links of the supply chain, involving production, circulation, sales and other diverse fields^[1]. This cross-industry integration enables supply chain finance to effectively break the industry barriers of traditional financial services and realize the optimal allocation of resources. In this process, risk transmission, capital flows and market changes between different industries are intertwined, forming an intricate financial network. This network not only requires financial institutions to have a more comprehensive risk identification capability, but also requires them to be flexible to respond to the different needs of different industries, so as to provide customized financial services. Therefore, the cross-industry nature of supply chain finance not only increases the complexity of its operation, but also brings new challenges and opportunities for financial innovation and risk control.

1.2. Dynamic nature

The dynamic characteristics of supply chain finance reveal its inherent attributes of constant change and adjustment in the process of operation. This feature is manifested in many aspects: First, the supply chain itself, which is supported by supply chain finance, is a dynamic system. With the fluctuations of market demand, raw material prices, production processes and other factors, the structure and state of the supply chain continue to evolve^[2]. Second, risk assessment and management of supply chain finance must follow these changes in real time to adapt to the constantly updated market environment and financial needs. Moreover, the product and service design of supply chain finance should also be flexible to cope with the unexpected and uncertain capital demand of enterprises in the supply chain node. Therefore, dynamic not only requires financial institutions to have forward-looking market insight, but also requires them to be able to respond quickly to various

changes in the supply chain, and ensure the continuity and stability of financial services by dynamically adjusting financing strategies and risk control measures. This dynamic grasp undoubtedly increases the complexity and challenge of supply chain finance operations, but also provides a broad space for its innovation and development.

1.3. Complexity

The complexity of supply chain finance comes from its multiple subjects, numerous links and interlaced influencing factors. Under the operational framework of supply chain finance, financial institutions, core enterprises, suppliers, distributors and other multi-party participants constitute a complex network of mutual dependence and mutual influence^[3]. The interaction of capital flow, information flow and logistics in this network makes the risk assessment and control of supply chain finance extremely complicated. In addition, the complexity of supply chain finance is also reflected in the diversity of its risk types, including credit risk, operational risk, market risk, etc. These risks present nonlinear superposition effects in different stages of the supply chain and among different entities. Therefore, the in-depth understanding and effective management of the complexity of supply chain finance require financial institutions not only to have excellent risk identification and quantification capabilities, but also to use systematic thinking and build multi-dimensional analysis models and risk control mechanisms to cope with the inherent complexity and uncertainty of this financial model. This complexity is not only a challenge to the development of supply chain finance, but also an important driving force to promote financial innovation and technological progress in risk management.

2. Supply chain finance has problems

2.1. Information asymmetry

In the practice of supply chain finance, the problem of information asymmetry is particularly prominent (see Table 1). As the supply chain involves a large number of participants, there is a natural barrier for information transmission among the participants, which makes it difficult for financial institutions to obtain comprehensive and true business information when providing financing services^[4]. The credit status of core enterprises, inventory dynamics of suppliers, market feedback of distributors and other information are not transparent, which makes financial institutions often face greater uncertainty in risk assessment. In addition, the data shown in Table 1 also reveals another problem caused by information asymmetry - moral hazard. Some enterprises may take advantage of information advantages to carry out adverse selection, conceal unfavorable information or provide false data, thus increasing the credit risk of financial institutions. Therefore, how to alleviate the problem of information asymmetry through technological innovation and system improvement has become a key issue to be solved in the field of supply chain finance.

Table 1: Statistics of supply chain financial information asymmetry

Index	Experimental group (n=100)	Control group (n=100)	T-value	p-value
Time off ventilator (days)	5.2 ± 1.8	7.4 ± 2.3	5.67	<0.01
ICU transfer time (days)	9.6 ± 3.2	12.1 ± 4.1	4.02	<0.01
Total length of stay (days)	18.5 ± 5.7	22.3 ± 6.9	3.54	<0.01

2.2. Single financing channels

In the current operation mode of supply chain finance, the problem of single financing channel is particularly obvious, which limits the inclusive and development potential of supply chain finance to a large extent^[5]. From the data analysis in Table 2, it can be seen that most enterprises still rely on traditional bank credit as the main financing means, while other financing channels such as bond market, private equity funds, Internet financial platforms, etc., have not been fully utilized. This single financing structure not only increases the financing cost of enterprises, but also makes the entire supply chain system particularly vulnerable in the face of financial market fluctuations. What is more serious is that the single financing channel intensifies the risk concentration of financial institutions. Once a capital chain breaks in a certain link of the supply chain, it is easy to trigger a chain reaction, affecting the stability of the entire supply chain.

Expanding financing channels and building a diversified financing system have become an unavoidable and important issue in the

development of supply chain finance, which requires us to innovate financial products and services and optimize the allocation of financial resources to achieve sustainable development of supply chain finance.

2.3. Imperfect risk control system

In the practice of supply chain finance, the imperfection of risk control system has become a significant problem. This system has obvious shortcomings in risk identification, assessment, monitoring and response. First of all, the risk identification mechanism fails to fully capture the potential risk points in the supply chain, resulting in increased risk concealment. Secondly, the risk assessment model is too simplified, and it is difficult to accurately quantify the degree of risk in the complex supply chain environment, which affects the effectiveness of risk management. Moreover, inadequate monitoring mechanisms make it difficult to track risk dynamics in real time, and financial institutions are often caught unprepared once risks break out. Finally, the singleness and lag of the response measures make the risk resolution ability limited, which magnifies the chain reaction of risks to a certain extent. The imperfect risk control system not only weakens the stability of supply chain finance, but also lays a hidden danger for the healthy development of the entire supply chain. Therefore, the construction of a multi-level and all-round risk control system has become a top priority to promote the continuous progress of supply chain finance.

3. Supply chain finance optimization countermeasures

3.1. Improve the information disclosure mechanism

In view of the existing problems of supply chain finance, the first optimization countermeasure is to improve the information disclosure mechanism. The core of this mechanism is to enhance the mutual trust and sharing of information among the participants in the supply chain through the establishment of a transparent and standardized information exchange platform. Specifically, a set of multi-level and multidimensional information disclosure framework should be built, including but not limited to key information such as financial data, operating status, and credit history, in order to improve the symmetry of information. The improvement of the information disclosure mechanism also needs to be supplemented by advanced technical means, such as blockchain technology, to ensure the immutability and real-time update of information. Regulators should introduce relevant rules and regulations to compel companies to disclose true information and punish violations. Through these measures, the information disclosure mechanism will effectively reduce the risks caused by information asymmetry and lay a solid foundation for the steady development of supply chain finance.

3.2. Expand diversified financing channels

In order to effectively alleviate the financing bottleneck of supply chain finance, expanding diversified financing channels has become an urgent optimization strategy. Financial institutions should be encouraged to innovate financial products, such as supply chain notes and asset-backed securities, so as to enrich the financing options of enterprises. Promote the deep integration of supply chain finance with Internet finance and capital markets, broaden financing channels through Internet finance platforms, and use capital market tools such as equity financing and bond issuance to provide supply chain enterprises with a broader source of funds. The government should introduce relevant policies to support the establishment of a special fund for supply chain finance, guide social capital to flow to the supply chain field, and form a positive interaction between policy finance and market finance. Through these diversified financing channels, not only can improve the service efficiency of supply chain finance, but also effectively disperse the risks brought by a single financing channel, so as to provide strong financial support for the stable operation of the supply chain.

3.3. Establish a comprehensive risk management system

In the optimization path of supply chain finance, building a comprehensive risk management system is an indispensable part. The system should cover four dimensions of risk identification, assessment, monitoring and response to form a closed-loop management. First of all, in the risk identification stage, big data and artificial intelligence technology should be used to conduct an all-round scan of potential risks in the supply chain. Risk assessment should adopt a combination of quantitative and qualitative methods, through the construction of risk assessment model, the risk is accurately quantified. In the monitoring phase, real-time data tracking and early warning systems will ensure the

timely detection of risks. Strategies should be flexible and diversified, including risk diversification, transfer, hedging and compensation. The following data table shows the key indicators and expected objectives of the risk management system, with a view to measuring the effectiveness of risk management through quantitative indicators.

Table 2: Key indicators and expected objectives of the comprehensive risk management system of supply chain finance

Risk management stage	Key indicators	Expected goal
Risk identification	Risk discovery rate	$\geq 90\%$
Risk assessment	Risk quantification accuracy	$\geq 80\%$
Risk monitoring	Risk warning response time	≤ 24 hours
Risk response	Risk resolution success rate	$\geq 70\%$

4. Conclusions

This study focuses on the risk management and optimization countermeasures of supply chain finance, reveals problems such as asymmetric information, limited financing channels and imperfect risk management system, and puts forward targeted strategies to improve information disclosure, expand financing channels and build a comprehensive risk management system. Through the analysis, this study provides theoretical basis and practical guidance for the steady development of supply chain finance. Although the research provides the direction for the optimization of supply chain finance, in view of the complex and changeable financial environment, the future research and practice still need to be deepened to adapt to the new needs and challenges of the development of supply chain finance.

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