

# Research on Risk Control of Supply Chain Finance Based on Blockchain Technology

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**Abstract:** The supply chain finance has become one of the hotspots of the application of blockchain technology as a way to give full play to the role of blockchain new technology in promoting supply chain finance. This paper analyzes and explores the risks in supply chain finance and considering the characteristics of blockchain technology proposes a new way of risk control of supply chain finance based on blockchain technology. This aims to improve the risk control and prevention of supply chain finance and to show the huge role of blockchain technology in risk control of supply chain in order to better carry out supply chain finance for serving the real economy.

## 1. Introduction

There are more and more researches on blockchain technology in recent years at home and abroad. However, relevant researches are mostly based on the application of blockchain technology in financial transactions and the development of supply chain finance, but there are few researches on risk control.[1] This represents the shortage of research between blockchain technology and supply chain finance. This paper explores the characteristics of blockchain technology, analyzes and studies various risk characteristics and risk response in current risk control of supply chain finance, and applies blockchain technology to risk control of supply chain finance.[2] The combination of these two characteristics and needs contributes to resolving the traditional difficulties in the above risks of supply chain, which has theoretical and practical implications for the bank's subsequent upgrade of the risk control system and mechanism of supply chain finance.

## 2. Risk of Supply Chain Finance

In the actual operation of supply chain finance, there are mainly the following risks, as shown in Figure 1:

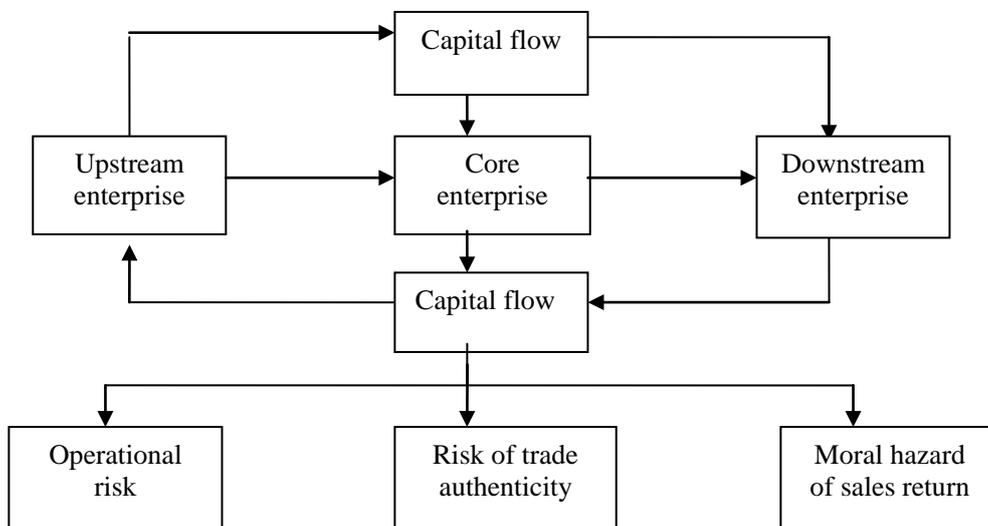


Figure 1 Risk pattern of supply chain finance

## **2.1 Operational Risk**

Operational risk is one of the most preventive risks in the supply chain finance business. Banks must strictly follow the established operational procedures to conduct business in the process of carrying out business.[3] In the prepaid business of supply chain finance such as Confirming Storage, the core enterprise and the downstream distributor are both independent economic entities and some core enterprises lack strict access and management to downstream distributors in carrying out supply chain financing business.[4] Therefore, once a business dispute occurs, the core enterprise will not be willing to take the responsibility of guarantee compensation and repurchase. Any improper operation in business as well as issues about rights and obligations may lead to liability exemption or even internal and external fraud for core enterprises.

## **2.2 Risk of Trade Authenticity**

The core idea of supply chain finance is self-compensation, which stems from the authenticity of trade. The real trade produces real financing demand and real debt, which is the source of repayment of future supply chain financing. Judging from the risk events of supply chain financing business in recent years, the phenomenon of “fake trade, real financing” is very common. The same batch of account receivable, inventory, and advance payment are repeatedly pledged by different financiers and from different banks. The actual amount of financing obtained may be magnified several tens of times, which fully embodies the risks arising from the trade authenticity of the supply chain financing business. In order to defraud bank loans, many companies fabricate trades and accounts receivable and repeatedly pledge accounts receivable and inventory. For example, if problems occur in the operation of bank, it will greatly increase the difficulty of risk control of supply chain.

## **2.3 Moral Hazard of Sales Return**

In terms of supply chain financing business of the receivable ones, the bank shall specify the relevant management requirements such as the nature of the return account and the payment request in the product plan and the agreement contract, and shall issue a notice of change of the sales return account to the buyer before the loan is released and obtain the buyer’s written confirmation. It shall require the buyer to return the money according to the bank’s designated route, and clearly indicate the legal liability for no payments in accordance with the contract. At the same time, the monitoring of buyer's return route should be strengthened to ensure that the amount, period, and route of the buyer's payment are in line with the business service plan. In the following cases, the bank doesn’t effectively monitor the accounts receivable and doesn’t promptly and regularly inform the buyer of the relevant information of the accounts receivable as well as doesn’t investigate and verify the payment and changes of the funds under the accounts receivable. This misses the opportunity to find the risks and doesn’t find that arrears between the buyer and the seller have all been settled and the risk occurs until the customer runs.

## **3. New Way of Blockchain Technology Reshaping the Risk Control of Supply Chain Finance**

Supply chain finance refers to asset wealth management and credit creation involving banks, core enterprises, upstream and downstream enterprises and related service entities (such as logistics companies). It clearly defines the responsibility and rights of each role and records the trail of every character, which can be used as evidence to resolve borrowing disputes in the future. It is the cornerstone for conducting supply chain finance and managing the risk control to take the law as the criterion, follow the business norms and contract requirements, and record the relevant transaction activities in a timely and complete manner. With the special design of supply chain product, the supply chain finance belongs to multi-agent finance of indirect property with more precise and three-dimensional credit structure. However, credit innovation technology based on complex products and transaction requires commercial banks to deeply study the supply chain knowledge system. The complex operational structure and the fineness of credit creation increase the difficulty

of risk control. Blockchain technology naturally matches with the characteristics of supply chain finance. The application of blockchain technology to risk control of supply chain finance ultimately brings great impacts on risk control of supply chain, mainly as follows:

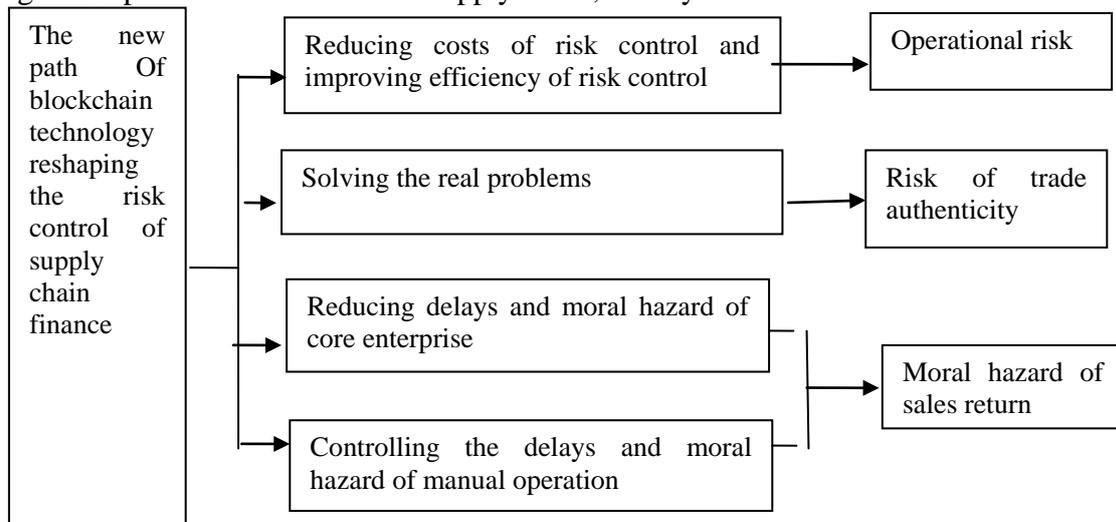


Figure 2 The new path of blockchain technology reshaping risk control of supply chain finance

### 3.1 Reducing Costs and Improving Efficiency of Risk Control

The logistics, document flow and capital flow data under the traditional supply chain can be obtained in a timely, complete and true way in the blockchain. Subsequent its analysis in the form of historical transaction data will greatly simplify the search costs. And since the relevant data is chained and it completely reflects the entire chain of trading activities of the supply chain, it significantly simplifies the costs in analyzing the transaction settlement methods, cycle, and performance quality between the various levels of the supply chain. It is not necessary to do various comparison analysis; and since each transaction is recorded according to the consensus mechanism, signed by the key, and endorsed by the members of the whole system, it is not necessary to review the identity of the relevant subject, the transaction history and the transaction documents, which significantly reduces the cost of risk control.

### 3.2 Solving the Problem of Authenticity

The problem of authenticity in traditional supply chain finance includes the authenticity of the transaction, the trading assets and the trade background. In the application of blockchain technology in the supply chain business, a one-to-one mapping relationship has been established between the automatic generated relevant documents and actual economic operations based on real business logic (such as procurement requirements), the use of encryption (non-tampering), identity authentication (non-repudiation), online signature (implementation of forensics). This enables that the blockchain data can reflect the authenticity of the transaction. With the public and notarized generated block data, the witness and record of each entity with its own credit can further strengthen the credibility of the block. At the same time, the block data is sent to all entities in the whole network without being affected by a single subject, and it is not tampered with data by a single member. [5] The blockchain technology replaces the signature of the legal documents of each subject with an electronic signature. Specifically, at the technical level, the public key and the secret key corresponding to the asymmetric cryptographic algorithm are used to encrypt the related transaction, and the information encrypted by the private key can obtain the same legal effect as the signature, thus ensuring the authenticity of the subject. And the transaction confirmed by the subject cannot be denied.

### 3.3 Reducing Delays and Moral Hazard of Core Enterprise

Pre-payments and inventory pledges have relatively high operational risks. The control of related shipments and regulatory risks is heavily dependent on the core enterprises/regulators. Whether the

core enterprises are shipped according to bank orders, and whether the regulators monitor the changes of the goods in real time, it will involve high moral hazard. The biggest role of blockchain technology in core enterprise delay and moral hazard control is to use the Internet of Things and the blockchain technology to record transactions and form real-time data of each order according to business logic and transaction process, from order to warehousing, logistics. Previously, these data were only controlled by the core enterprises and it is difficult for banks to control these data. Now since the above data are all in the same system, it is open to the banks. The changes in goods under each financing are received in real time. Therefore, it will greatly reduce the risk of core enterprises violating the contract. Blockchain technology not only restricts the delay/moral risk of core enterprises, but also binds to downstream dealers. Based on the principle of trade self-compensation, it requires that the sales of goods under the goods be repaid immediately. In practice, most are circulated extra corporeally and misappropriated, so the bank needs to spend a lot of personnel and time on the daily inventory of the goods. When there are many financing businesses, it is easy to cause confusion. Taking the sales of cars as an example, with the help of the Internet of Things and the blockchain, when the monitoring data shows that a car is no longer in the 4S shop and the physical location has been transferred, the financing can be immediately requested and the dealer will also actively repay the financing based on real-time monitoring of the goods.

### **3.4 Controlling the Delay and Moral Hazard of Manual Operation**

With the help of blockchain technology, the transaction contract and contract terms can be written into the system programmatically, and the system can be automatically executed in the smart contract way, so that the core functions of asset financing and transfer financing can meet the execution conditions. It will avoid delays and moral hazard during manual execution. Since the execution conditions of the blockchain are not changed by the subjective will of the person and as long as the relevant contract conditions are met, they will be executed according to the established contract, and the relevant accounts receivable funds are automatically transferred to the bank supervision account in real time. It will ensure that the transaction meets the contract requirements, reach an agreement, provide the trust and transaction efficiency of both parties, thus significantly reducing transaction costs.

## **4. Conclusion**

With the increasing emphasis on the revitalization of the real economy, supply chain finance has great potential for development as a bridge in terms of financing between core enterprises as well as upstream and downstream SMEs. As an emerging technology, the blockchain technology will provide a strong impetus for the further development of the supply chain and resolve the financing dilemma of current SMEs. At the same time, with the help of the characteristics of blockchain technology, it will reduce the cost of information acquisition and improve the operational efficiency. The real problem in the risk control of traditional supply chain finance can be solved and the operational risk and moral hazard can be greatly reduced. By this way, the credit fund flow is restricted to the manufacturing. At the same time, it will guide the business collection to achieve self-compensation according to the contract and greatly reduce the overall risk of supply chain financing.

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