

Reverse Factoring Based on Agricultural Supply Chain: Model Innovation and Risk Management

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Abstract: Reverse factoring, applied by the large and credit-worthy core enterprises, can help the seed and fertilizer suppliers in the agricultural supply chain receive finance from accounts receivable, thus activating and releasing the capital flow in the supply chain. The risks of reverse factoring mainly come from credit risks. Therefore, risk prevention strategies are proposed from three aspects: establishing a credit evaluation system for the whole supply chain centered on the core enterprise, relying on the digital agricultural supply chain system, and strengthening the authenticity review and special account management of accounts receivable.

1. Introduction

The widespread use of advanced agricultural technologies and large-scale agricultural machinery has made large-scale operation the primary factor in the efficiency of agricultural production. At the same time, agricultural production has strong seasonal and cyclical characteristics. Due to prepayments for seeds, fertilizers or land rent, farmers or other agricultural business entities are in urgent short of large amount of funds in the short term. The capital recovery period is at least six months or more, resulting in a capital gap and financing demand.

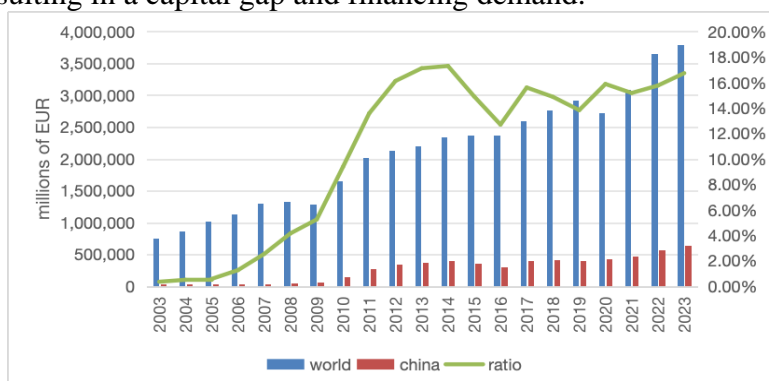


Figure 1: China Factoring Turnover to the World.

Data Source: 2010-2024 FCI Annual review

With traditional small-scale farming, the capital gap is mainly filled by farmers' self-accumulation and private lending. With the advancement of the agricultural large-scale process, the demand for funds in the agricultural supply chain is increasing sharply. External financing has become a key element and an inevitable choice for the development of large-scale planted agriculture. At present, the problem of "financing difficulties" in the agricultural supply chain is very prominent: farmers with low education level and "small farmer mentality" actually have few willingness to take loans; agricultural enterprises without qualified collateral find it difficult to obtain bank loans. Therefore, financing constraints have become the main factor restricting the development of the agricultural supply chain.

Klapper (2006) was among the first to research on reverse factoring, providing econometric methods to analyze the benefit of factoring and reverse factoring for financing SMEs^[1]. Panos Kouvelis and Fasheng Xu (2021) constructed a supply chain theoretical framework for reverse factoring and pointed out the applicable conditions of reverse factoring: core enterprises should provide reverse factoring services only for SME suppliers with relatively low credit ratings (but higher than a certain threshold)^[2]. Li Guangrong (2020) revealed the influencing factors of the credit risk of agricultural supply chain finance^[3]. Lin Qiang, Fu Wenhui, and Wang Yongjian (2021) studied the internal financing model of the "company + farmer" order financing in agricultural supply chain, providing optimal decisions and expected income situations^[4]. Lu Qihui, Zhang Shaoliang, and Tan Qianhong (2024) analyzed the purchase order finance and revealed the influence of the wholesale price discount coefficient on the profits of supply chain members and the choice of financing models^[5].

2. Factoring Business Model Based on Agricultural Supply Chain Finance

Though the factoring has a long history abroad, the factoring business started quite late in China, but has developed extremely rapidly (Figure 1). In 1990, only Bank of China carried out a small amount of international factoring. China's first commercial factoring company was established in 1995. In 2006, China's total factoring volume was less than 1% of the world, but it rose to 26% in 2023. Since 2011, China's factoring volume has ranked first in the world for many years.

Table 1: Main differences between factoring and reverse factoring

	Factoring	Reverse factoring
Business initiator	suppliers	Core enterprise (buyers)
Risk assessment focus	Supplier's credit risk, performance capacity, and quality of accounts receivable.	The credit risk and repayment ability of the core enterprises
Business process characteristics	Supplier applies, factors review the supplier's qualification and accounts receivable, the due diligence of supplier is more critical.	Core enterprises establish cooperative relations with factors, core enterprises have high participation and the process is relatively simplified.
Applicable scene	It is suitable for the suppliers with high credit status, while buyers are more small and scattered.	Core enterprises are in a strong position, suppliers are numerous and scattered.
Financing cost	higher	lower

Factoring is essentially a tool for selling accounts receivable to obtain financing. Depending on the initiator of factoring, it can be divided into factoring and reverse factoring (Table 1). As for factoring, the creditor of the accounts receivable (the supplier) submits an application, then sells the accounts receivable to the factor and obtains corresponding funds in advance. In reverse factoring,

the payer of the accounts receivable, submits an application to help SMEs suppliers obtain corresponding funds in advance by selling their accounts receivable. Generally speaking, under factoring, factors tend to only accept large and medium-sized suppliers with a certain amount of financial strength and creditworthiness. Suppliers need to have strong contract performance capabilities. In factoring, SMEs suppliers with low creditworthiness may be restricted from entry or bear higher financing costs (higher discount rates). As an innovative type, the core enterprise in the supply chain endorses SMEs suppliers with its relatively high credit rating, helping them obtain funds on more favorable terms and also enabling the factor to reduce business risks.

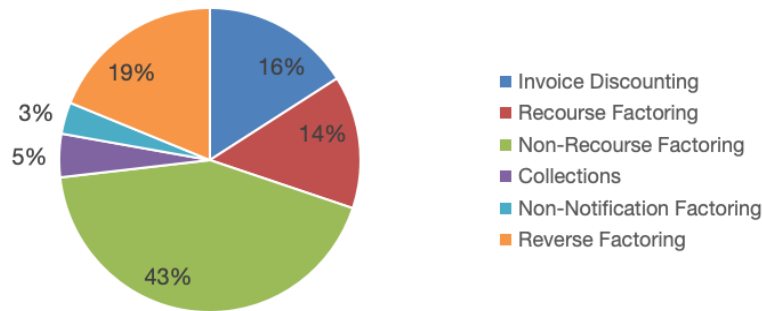


Figure 2: Global domestic factoring classification in 2023

Data Source: FCI Annual review 2024

In the past decade, reverse factoring has developed rapidly. According to FCI statistics, in 2017, the total global reverse factoring was 50,010 million euros, accounting for only 3.49% of world. By 2023, the total global reverse factoring had reached 258,854 million euros, accounting for 17.06% of the world. As shown in Figure 2, reverse factoring has become the second largest category, accounting for 19%.

At present, the problem of "financing difficulties" in the agricultural supply chain is very prominent, and financing constraints have become the main factor restricting the development of the agricultural supply chain. As shown in Figure 3, applied by a large and credit-worthy core enterprise, reverse factoring can help the seed and fertilizer suppliers in the agricultural supply chain receive finance from accounts receivable, thus activating and releasing the capital flow in the supply chain. The development of digital technology has enhanced the transparency of commodity transactions in the agricultural supply chain, helped the factors to carry out risk management, and further expand the growth of reverse factoring.

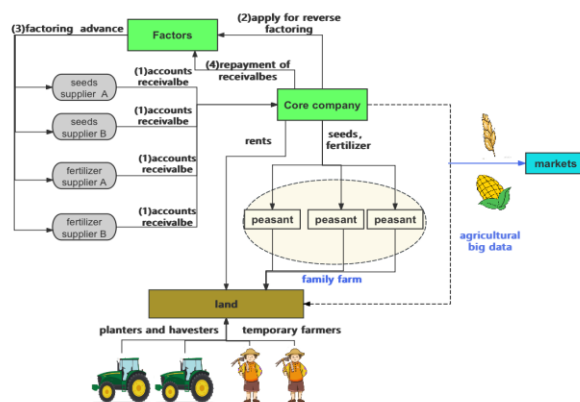


Figure 3: Reverse factoring on agricultural supply chain

3. Factoring Business Model Based on Agricultural Supply Chain Finance

3.1. Credit Risk

The basis of factoring lies in the accounts receivable formed by the transactions between the two parties of goods transactions. Only when the creditor of the accounts receivable repays in a timely manner can the factor recover the funds. Therefore, whether it is factoring or reverse factoring, the primary source of repayment is the repayment of accounts receivable. However, under factoring, customers are scattered and fragmented, making the repayment risk highly uncontrollable. Therefore, the factor focuses on the supplier's credit risk, the ability to deliver qualified goods on time, and the quality of accounts receivable, only considering the risk of the buyers as an exogenous factor. Under reverse factoring, suppliers are generally SMEs with relatively high default risk. The direct reason for adopting reverse factoring is to use the high credit rating of the core enterprise to obtain more favorable financing conditions for SMEs suppliers. Therefore, the key points of factor's risk control lie in the core enterprise's credit risk and the overall stability of the supply chain, and the supplier's default risk is considered as an exogenous factor.

Core Enterprise's Credit Risk The core enterprise plays a crucial credit support role in reverse factoring. The reverse factoring is led by the core enterprise in the agricultural supply chain. Through its transactions with seed and fertilizer suppliers and the accounts payable generated from leasing farmers' land, it applies to the factor for reverse factoring to help suppliers obtain sufficient funds for reinvestment in production. As the primary source of repayment, the core enterprise undertakes to pay the loans to the factor upon maturity. Although core enterprises often have good credit strength, they may still face the risk of deteriorating operations.

Overall Supply Chain Risk Reverse factoring belongs to the field of supply chain finance. Applied by the core enterprise, capital flow is injected into the entire supply chain at a relatively low financing cost. Generally speaking, the repayment of factoring is restricted by the overall risk and profitability of the agricultural supply chain, and the latter may be affected by agricultural climate risks, fluctuations in agricultural product market prices, and demand risks.

3.2. Operational Risk

Reverse factoring involves multiple participants and business processes, and the operational risk needs to be analyzed in combination with the reverse factoring business process.

Accounts Receivable Confirmation Risk In reverse factoring, it is crucial to accurately confirm the authenticity, amount, and aging of accounts receivable. However, in actual operations, since it involves three parties: the core enterprise, the supplier, and the factors, and inputs such as seeds and fertilizers need to continuously flow from suppliers to each agricultural production link, the information of accounts receivable needs to be updated constantly. Therefore, deviations or delays may occur during the information transmission process. For example, if the core enterprise fails to confirm the accounts receivable in a timely manner, or the confirmed content does not match the information submitted by the supplier, and the factor disburses financing without verifying clearly in time, it may face difficulties in recovering the accounts later.

System Operation and Process Risk With the innovative development of digital financial technology, reverse factoring business relies more on information systems for operation. However, these systems may have vulnerabilities or malfunctions, resulting in data errors or losses. In addition, unreasonable design or lax implementation of the reverse factoring can also lead to risks.

3.3. Legal Risk

China's factoring business started relatively late. Especially, as an emerging financial business, the reverse factoring has incomplete relevant theoretical research and legal systems. Therefore, legal risks have become an important risk of this business. Chapter 16 of Part III of the Civil Code of the People's Republic of China stipulates institutional norms for factoring contracts in terms of definition, content and form, recourse or non-recourse, and settlement of multiple factorings. However, in terms of the registration, publicity, and priority rights of accounts receivable assignment, the legal provisions are not clear and detailed enough. This makes it difficult for factors to have clear guidance on some key legal issues when carrying out such business. Once a dispute occurs, their legitimate rights and interests may be difficult to be effectively protected.

3.4. Fraud Risk

In the reverse factoring, the core enterprise and the supplier may act as related parties and collude. They may fabricate accounts receivable, fraudulently issue financial instruments related to accounts receivable, or beautify financial statements by manipulating transaction prices, transaction times and other means, posing a fraud risk of obtaining financing from the factor under false pretenses.

4. Risk Prevention Measures for Factors in Reverse Factoring Business of Agricultural Supply Chain

The credit risk of the core enterprise is the main risk in reverse factoring. During the transaction process of reverse factoring, if the core enterprise encounters payment difficulties and is unable to pay the due accounts payable, the accounts receivable purchased by the factor will become uncollectible bad debts. Therefore, this article focuses on analyzing the factor's credit risk prevention measures from the following two aspects.

4.1. Establish a Whole Supply Chain Credit Evaluation System Centered on the Core Enterprise

Firstly, at the business approval stage, the factor needs to assess the credit risk of the core enterprise. The factor should fully consider the core enterprise's credit rating, carefully review its financial statements, and conduct investigations and analyses on key financial indicators such as cash flow, profitability, and solvency. Based on the credit risk assessment level of the core enterprise, the factor sets different deduction rate standards, with enterprises with higher ratings adopting lower deduction rates. At the same time, the factor needs to exercise overall control over the reverse factoring limit of the core enterprise to avoid excessive credit extension to the supply chain that exceeds the core enterprise's repayment ability.

Secondly, the factor needs to closely monitor the overall risks of the supply chain. Specifically, the factor should pay attention to the cooperation between the core enterprise and upstream and downstream enterprises in the supply chain; To the impact of external risks such as agricultural climate on the yield and quality of agricultural products, and introduce agricultural insurance if necessary; To the changes in the market price and sales volume of agricultural products delivered by the supply chain. By comprehensively considering the conductivity and interrelationships among various risk factors, the factor adjusts the subjective evaluation of the overall risks of the agricultural supply chain in a timely manner. Based on the credit risk evaluation of the core enterprise, it needs to be adjusted upward or downward to reflect the changes in the overall supply

chain risks, and then the deduction rate and the overall control of the factoring limit are adjusted accordingly.

4.2. Rely on the Digital Agricultural Supply Chain System

The factor needs to establish a close cooperation mechanism with the core enterprise and rely on the digital agricultural supply chain system. This system builds an agricultural platform with multiple participants such as factors, suppliers, core enterprises, and end customers. With the help of block chain technology, it ensures the authenticity and immutability of supply chain transaction information. The information asymmetry problem is a major cause of credit risk, and strengthening the digitization of the agricultural supply chain system can effectively alleviate this problem.

Through this system, the factor can dynamically track relevant information of accounts receivable: review the authenticity of commodity transactions and the rationality of transaction prices between the core enterprise and suppliers; dynamically monitor the price, quantity information, and transaction frequency of inputs such as seeds and fertilizers within the agricultural supply chain; dynamically monitor the repayment frequency of the core enterprise's accounts receivable; and dynamically monitor the sales volume, price, and payment collection of the core enterprise's products. On this basis, the factor realizes digital control of credit risk and effectively reduces the risks of the reverse factoring.

4.3. Strengthen the Authenticity Review and Special Account Management of Accounts Receivable

Factoring is a financing method based on the theory of real bills, thus the core of its risk control necessarily revolves around accounts receivable. At the business approval stage, a full investigation should be conducted on the reliability, authenticity, and validity of accounts receivable. The factor needs to review the underlying contracts and invoices to ensure their authenticity and reliability and check whether the invoices are within the valid period.

In the control process, the factor should manage accounts receivable through special accounts. The core enterprise is required to open a special account for the collection of accounts receivable, and the factor should closely monitor the inflow and outflow of funds in the special account. The factor should strengthen the management of payment collection and establish a professional special account linkage deduction function to prevent customers from misappropriating the funds in the special account.

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