# Research Overview of Risk Management Of SMEs Accounts Receivable Financing Based on Supply Chain Finance

**Aimin Deng, Bo Yu**

*Abstract*— Since accounts receivable become effective collateral, the financing of accounts receivable financing for SMEs is becoming increasingly important. This paper analyzes the theory and content of the receivable financing model and its financing risk and the risk identification, evaluation, evaluation and treatment in the process of management. It also analyzes the existing risk assessment and risk management The author points out the deficiencies. This paper finds that: Accounts receivable financing provides a new idea to alleviate the financing difficulties of SMEs in China; there is a big disagreement on the types of receivables financing risk; that should be from the banks, enterprises and the law three levels Strengthen the supply chain financial risk prevention and management.

*Index Terms*— Accounts Receivable Financing, Supply Chain Finance, Risk Management, Risk assessment.

## I. INTRODUCTION

In October 1, 2007,the formal implementation of the "Property Law" accounts receivable as a valid collateral, so that accounts for more than 60% of the value of assets of SMEs receivables in the financing to be fully utilized, but also accounts receivable Financing has become a new field for commercial banks to compete with each other. In 2016, the central bank and other 8 ministries jointly issued the "financial support for industrial growth and structural adjustment to increase the efficiency of a number of opinions", which referred to the development of accounts receivable financing, strengthening the movable property financing unified registration system, improve the receivable Account pledge and transfer, to promote more supply chain to join the accounts receivable pledge financing service platform to support commercial banks to further expand the receivables pledge financing scale. In fact, the industrial enterprises of the accounts receivable itself is a very substantial stock. Haitong Securities Research report shows that China's industrial enterprises, net accounts receivable from 6 trillion in 2010 increased to 10.7 trillion in 2014, five years increased by 1.75 times the average annual growth rate of 15%. In this paper, from the perspective of supply chain finance model and credit risk evaluation, this paper summarizes the domestic research on supply chain finance accounts receivable financing mode, risk types and risk management and puts forward the viewpoints and insights for the future supply chain finance The research of accounts receivable financing provides a direction for reference.

**Aimin Deng,** School of Economics and Trade, Hunan University, Changsha, China

**Bo Yu,** School of Economics and Trade, Hunan University, Changsha, China,

## II. COMPREHENSIVE REVIEW

### A. The review of the accounts receivable financing model

Accounts Receivables financing refers to the enterprise will be receivable debt as a guarantee to the bank to apply for loans to obtain funds, the purpose is to enhance the liquidity of the assets, so that its financing costs and its business cycle synchronization. Banks and other financial institutions in addition to providing funds to enterprises, but also provides debt collection, account management and other services.

China's research on accounts receivable is lagging behind, such as the introduction of the international factoring business concept, mode of operation and comparison with other financing methods and other articles. During this period, the enterprise appeared on the business development of the main body of the study.

China's accounts receivable financing and other supply chain financial services to the 21st century, only a certain degree of progress. Xiaoming Lu(2002) pointed out that the current types of receivables financing services are: asset mortgages, discounted bills, factoring and forfaiting. From the perspective of accounts receivable financing and management, factoring is a more structured, more complete, and more widely used business variety than any other form. Analyzes the use of factoring in international trade, and further reveals the new characteristics and development trend of international settlement and trade financing market.Shuyun Chen, Guoqiang Liu (2007) analysis of the current situation of SMEs on financing, with the principle of asset securitization, designed for SMEs accounts receivable securitization joint financing model based on cooperation and mutual assistance, offered to finance innovative ways of providing relief A New Idea of Financing Difficulties for Small and Medium - sized Enterprises in China. Lihong Chen, Fangchun Peng(2008) Describe the history of supply chain finance and propose receivable financing model is a new way of financing small and medium enterprises. RH Liu(2011) analyzed the major causes affecting the development of the pledged accounts receivable financing in SMEs,discussed the risks in pledged accounts receivable financing from the perspective of integrity,and explored the means,and mechanisms for establishing pledged accounts receivable credit information sharing and promises punishment system. QiHui Lu, Feizeng Liu, Weihua Zhen (2012) pointed out that there are no other means of financing, SMEs may produce discontinuities appear, and supply chain accounts receivable financing can make continuous production and rapid growth The market can achieve in the short cycle of optimal yield; receivables financing can also enable manufacturers to be continuous supply, revenue

continued to grow, the supplier's initial cash the more manufacturers the higher the expected return; when the supply When the strength of the business is weak, the financial institution can obtain the larger financing total return. When the strength of the supplier reaches a certain level, the total income of the financial institution will decrease.Z Liao，X Zhao，Z Feng（2015）pointed out that through the establishment of game model, games of perfect information and two parties for accounts receivable financing mode were analyzed, and enable it to achieve the Nash equilibrium. Through the analysis: strengthening the punishment on all kinds of breach can help to reduce the credit risk and enhance the financing of enterprise credit in SMEs.Yujuan Yang(2015) pointed out that the accounts receivable financing model, the enterprise with purchase documents and other transaction vouchers to bank institutions and loans to pay interest, the downstream business payment payment, the contract canceled. Wei Jiang, Wentao Yao(2016) pointed out that after the implementation of the Property Law in 2007, both the state-owned and private listed companies, the use of receivables pledged financing behavior has increased.The state-owned company and the region where the financial development level of the company will be more high use of receivables pledged financing; customer receivables concentration will weaken the company's use of receivables pledged financing behavior, the customer is private Listed companies are more likely to obtain receivables pledged financing. Yanjuan Chen(2016) pointed out that the accounts receivable financing model to the strength of the reputable core business and the formation of accounts receivable for the collateral security certificate, in real cooperation conditions, the upstream SME suppliers to provide loans.

Accounts receivable financing mode operation process in SMEs shown in Figure 1.①The parties to the transaction of goods; ②The financing side of the debtor receivables receivable related documents; ③The financing side to the documents pledged to banks and other financial institutions; ④Debt enterprises (core enterprises) issued to the bank accounts receivable certificates and Payment undertaking; ⑤Financing enterprises to obtain loans for follow-up production and operation; ⑥Debt sales companies will be paid directly to the financing of the bank's specific account.
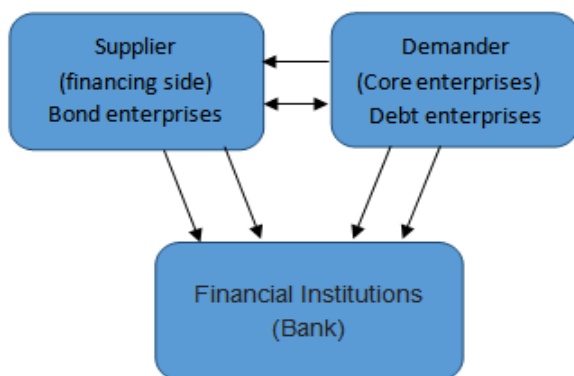


## B. the receivables financing risk identification research summary

The identification of supply chain risk is based on the analysis of relevant information, data, data and phenomena of the supply chain, and then classifies the source of the analysis and then determines the type of risk.Risk identification is the first step of supply chain risk management (SCRM). Only when the risks are identified and judged accurately can we assess and evaluate the risks and formulate reasonable risk management measures.

The types of receivables financing need to be clearly defined before effective identification of receivables financing risks. Although many experts and scholars at home and abroad have studied all kinds of risks in receivables financing, there are big differences in the understanding of the risk of receivables financing. Shihua Ma(2003) proposed supply chain risk including political risk, legal risk, economic risk and technology risk.Songtao Tang(2006) pointed out that the risk of accounts receivable pledged financing should include the essential characteristics of accounts receivable, the elements of pledge of accounts receivable, the effect and realization of pledge of accounts receivable, the defects of receivables pledged and suggestions for perfecting risks. Jianwei Liang, Wei Luo(2007) pointed out that the risk of accounts receivable financing is divided into the exclusion liability risk and bank documents audit risk two aspects.Youjun Fang(2010) pointed out that the accounts receivable pledge financing business risk points, the main risk, object risk, information asymmetry caused by the risk in many SMEs. As well as domestic and foreign accounts receivable risk control system comparison. Meiyuan Huo(2012) put forward at present, the supply chain risk identification factors are more detailed classification, but most of them from the enterprise itself, notcomprehensive enough, need to analyze the whole point of view from the supply chain network.Zhirong Ou and Zhinian Ye(2014) pointed out that the legal risk of pledge of accounts receivable has the risk of establishing the creditor's right of pledge of account receivable and the risk of the SMEs of the pledge contract of receivable, the former includes setting up accounts receivable The legal risk of the claim of the pledge, the assignable risk of the creditor's right to establish the pledge of the receivable, the risk of the defect of the right to establish the creditor's right of the pledge of the receivable, the value of the creditor's right of the pledge of the receivable The risks of overdue risk and the limitation of action to establish creditor's right of pledge of accounts receivable. The latter includes the relationship between the subject entity of the contract of pledge of receivables and the loss of priority caused by the third debtor.E Hofmann，S Zumsteg(2016) aims to investigate whether supply chain finance (SCF) solutions have the potential to create tripartite value in the international trade arena. Distinguishing three actors, this value proposition is examined by modeling an accounts receivable platform (ARP) program. Chuanqiu Xu and Chen Su(2016) put forward the risk of the receivables financing from the legal level, including the risk of fraud, the risk of the subject matter, the risk of the limitation of action, the risk of legal loopholes, there is no established debtor of the notice of the rules of the risk, pledge to achieve the process of possible legal risks in SMEs. Sihao Li(2016) studied the operational risks of receivables financing based on supply chain finance,

including internal fraud, internal fraud refers to the involvement of internal staff fraud, misappropriation of assets, violations of laws and regulations; external fraud, external fraud Including fraud, misappropriation of assets, violation of the law, mainly divided into security fraud and financial statements fraud; involved in the implementation and transaction process management risk events, including the business process system is not perfect, the system is not perfect, internal risk control, Information transmission is not timely and so on.

As a financing mode of supply chain finance, accounts receivable financing has different industry risks. There are many types of risk of accounts receivable financing, different professional, different industries, different enterprises are not the sameamong SMEs, a problem, credit is difficult to recover. As the first step of supply chain risk management, risk identification is an important link. Only by accurately identifying and judging the risk, can the risk be evaluated and evaluated in order to formulate reasonable risk management measures. Risk identification methods generally have case studies, questionnaires, interviews and so on. In the quantitative analysis method of supply chain risk identification, because the management practice of supply chain risk is short, and the current research framework of supply chain is still not formed, the existing literature mostly adopts qualitative analysis method to study supply chain risk, The literature on quantitative analysis is still scarce.

### C. A Summary of Research on Risk Assessment Methods of Receivables Financing

#### 1. Risk assessment method

Risk assessment methods of supply chain financial financing are: principal component analysis, artificial neural network method, analytic hierarchy process, logistic regression analysis and fuzzy comprehensive evaluation.

Principal Component Analysis (PCA), also called Principal Component Analysis (PCA), is designed to reduce the multidimensional index into a small number of comprehensive indicators (principal components) by using the idea of dimensionality reduction, in which each principal component can reflect most of the original variables Information, and the information contained in each other does not repeat. In this method, the complex factors are reduced to several principal components while the variables are introduced, which simplifies the problem and obtains more scientific and effective data. The steps are as follows: 1. Standardize the original index data; 2, Calculate the correlation matrix for the normalization matrix; 3, Contact the eigenvalues and eigenvectors by the characteristic equation of the matrix; Comprehensive evaluation.

Artificial neural network (ANN) is a complex neural network composed of neurons, which simulates the structure and behavior of neural networks. And function approximation. There are many types of neural network models, such as BP neural network, multi-layer perceptron, this part will mainly introduce the BP neural network evaluation method.

Analytic Hierarchy Process (AHP) is a famous American operational research expert Professor Saaty in the mid-1970s, the principle is to break down the complex problems into various components, and then these parts according to the dominant relationship grouped to form an orderly ladder

Structure, which can effectively analyze the non-quantitative events quantitatively. It is widely used in the multi-objective and multi-decision system design scheme. Analytic hierarchy process can also evaluate supply chain risk, by determining the weight of supply chain risk factors, and then according to the importance of risk factors to sort, to identify the most important supply chain risk factors. The first step is to identify the risk and classify the risk factors. The second step is to construct the risk hierarchy model. The third step is to establish the risk factor judgment model. The fourth step is to determine the relative importance of the risk elements by analytic hierarchy process. The fifth step, the consistency test, if the test, you can calculate the overall importance, or go to the third step, re-establish the risk factor judgment model.

Fuzzy comprehensive analysis method, because many qualitative indicators are difficult to quantify, but only with "good", "poor" and so fuzzy concept evaluation, the application of fuzzy comprehensive evaluation method It can solve the quantification problem of qualitative index better, which makes fuzzy comprehensive evaluation method become the most comprehensive multi-index comprehensive evaluation method.

### 2. Research on credit risk assessment of supply chain finance

JiaMa(2009) proposed should strengthen the customer base of database construction, which will help to revise the existing credit evaluation system and improve and enhance its accuracy for SMEs. Xiaokui Xi(2011) on the basis of logical relationships influence risk of accounts receivable between different variables on the analysis, the accounts receivable risk assessment model based on Bayesian network in order to generate the credit transaction It is possible to estimate the probability of future risk. It provides a directive description and reasoning mechanism of credit transaction, and expresses the relationship between each incentive and the risk of accounts receivable. Effectively solve the shortage of receivables risk observation data, and on the basis of forecasting and decision analysis.Bushao Bai (2011) proposed the threshold fuzzy evaluation, the fuzzy evaluation of membership degree and the fuzzy comprehensive evaluation method for the supply chain financing enterprise credit level, and gave the evaluation operation flow, financing the SMEs credit level for the supply chain and Risk management provides a reference method and strategy. Yanxue Li(2011) introduced the application of AHP in financial risk assessment of supply chain, and proposed the principles of evaluating the credit risk of supply chain: the principle of systematic evaluation, the principle of evaluation of principal plus debt, the emphasis of process and Dynamic assessment principles. And show the evaluation process of supply chain financial risk, first, to construct evaluation index system and evaluation standard; secondly, to determine the weight of evaluation index and to carry out consistency test. Haiqing Hu, Lang Zhang, Zhangdao Hong (2012) the use of machine learning support vector machine (SVM) to establish credit risk assessment model; and through Credit Risk Assessment Model of BP neural network algorithm for establishing an empirical comparison of results, it was confirmed the credit risk evaluation index system of small and medium-sized enterprises from the perspective of supply chain finance can more accurately judge the credit situation of

SMEs and help to alleviate the financing difficulties of small and medium-sized enterprises. Shengxuan He and Songdong Shen(2016) analyzes the financial risks of online supply chain and analyzes the risk of online supply chain finance through the combination of analytic hierarchy process and fuzzy comprehensive evaluation. As the financing model is built on the supply chain real transactions carried out, so it inherited the risk of traditional supply chain finance. At the same time, with the accession of the Internet, the financing mode has changed, the risks arising from the new links and the risks arising from the traditional processes are superimposed, and the operational risks are changed and the risk of the electronic banking relationship arises. This paper improves the recognition of the main risks and identifies the risks in the online supply chain finance for the first time. By establishing a risk evaluation system consisting of 6 first-level indicators, 20 second-level indicators and 77 third-level indicators , The fuzzy comprehensive evaluation method based on third-party B2B platform for online supply chain finance risk assessment of the initial exploration.

### D. the accounts receivable financing risk control and prevention summary

Songtao Tang(2006) from the legal level that the pledge of the essential characteristics of accounts receivable, receivables pledged to set the elements of the effectiveness of accounts receivable pledge and the realization of accounts receivable pledge defects and risk. And put forward the legal risk prevention measures: first, to choose the right pledger; second, select the appropriate pledged receivables; third, the development of detailed accounts receivable pledge contract; Tracking and management; fifth, the pledge will inform the debtor of accounts receivable and obtain their knowledge to confirm, in order to obtain the effect of the debtor against accounts receivable; sixth, the receivables pledge contract and related matters for notarization, may play a publicity role and against the effectiveness of third parties. Jinlian Yan(2008) pointed out that the use of "accounts receivable + credit insurance" financing model, this model will spread the risk of bank trade financing, banks do not need to worry about the original loan from the lender and the lender and so on Multi-party risk, the bank focused on the qualifications of the loan review, and the risk of the payer by the credit insurance company. Guanggui Li(2008) put forward, first, to gradually improve the credit system of SMEs; Second, SMEs should strengthen and improve their credit construction. Chunmin Zhou(2009) pointed out that for commercial banks, this part of the business can be outsourced or insured against risks. Xiaofeng Mu(2010) from the property law and guarantee law and a number of ways that the scope of the determination of the pledge to further standardize the determination of the pledge. Guirong Liu(2012) pointed out the reasons for the reverse selection of receivables financing, proposed that supply chain finance could solve the information asymmetry between banks and SMEs; the participation of logistics companies and e-commerce information platform effectively reduced the bank Supply chain finance simplifies the bank's credit assessment process; the commercial banks focus on their familiar supply chain production areas. Zhongliang Zhen(2014) to avoid the credit risk from accounts receivable

financing business, to build a "bank --- Enterprise" two-party game model, focusing on the inspection and disciplinary setting bank rate financing business development The paper analyzes the relevant parameters in the background of the accounts receivable financing business of the steel trade enterprises. The analysis shows that the banks take 10% -20% inspection rate, combined with the double loan interest rate penalty, can effectively reduce the false Of the accounts receivable financing phenomenon. Chiu Wing Ou (2014) pointed out that risk and receivables pledge contract parties exist Claims receivable pledge right of existence for from a legal perspective, put forward three proposals, the first substantive examination mode ; Secondly, to add a confirmation notification procedure; and thirdly, to remove the limitation of the guarantee registration period. Qihui Sun(2015) pointed out that according to supply chain finance accounts receivable financing mode with the repayment of self-sufficiency, the bank closed control of this operation, bank credit purposes need to write this feature, proposed to strengthen the government's policy and legal support , banks to strengthen the approval process of review and evaluation of SMEs to strengthen their own construction and other recommendations. LeBing Wang(2016) pointed out that the "Property Law" created the receivables pledge system to solve the problem of financing difficulties of SMEs in China, but the system in practice is faced with receivables from the guarantee of institutional competition. This system dilemma essentially originated from the misunderstanding of the legal nature of the receivables secured financing in our country, which led to the fact that the Property Law incorrectly stipulates its establishment requirements and publicity elements, which is not conducive to the financial innovation based on accounts receivable. Systemic risk control. Therefore, we should reconstruct the pledge system of accounts receivable from the perspective of the division of civil and commercial, solve the conflict of law between the law of property law and contract law, and better serve the guarantee financing of accounts receivable in our country.

As an important part of supply chain management, supply chain risk management has been paid more and more attention by domestic and foreign scholars. It has made a preliminary study on the theoretical content of supply chain risk management, and has made certain research on several aspects of its management process. But domestic scholars in this field got slow progress, there are still some shortcomings. For example, the models and algorithms of coping strategies are also the theoretical research based on hypothesis and simplification, lacking of empirical research and practicality.

### III. CONCLUSIONS

This paper summarizes the research on supply chain finance receivable financing model, receivables financing mode risk identification, risk assessment method and risk management in SMEs. From the literature review, it can be seen that the research on supply chain risk and supply chain risk management is comparatively systematic, which provides guidance for research on risk management of receivables financing. Because of the relatively short time proposed by China's supply chain finance, although the

government, financial institutions, enterprises and academia have already paid great attention to it, some achievements have been made in theory and practice, but there are still some shortcomings in the related research.

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