

Review

Summary of Research on Order Financing Decision Optimization and Risk Management

Yi-fan Fu^{1,2} and Mu Zhang^{1,*}

- ¹ School of Big Data Application and Economics, Guizhou University of Finance and Economics, Guiyang (550025), Guizhou, China
- ² Guizhou Institution for Technology Innovation & Entrepreneurship Investment, Guizhou University of Finance and Economics, Guiyang (550025), Guizhou, China
- * Correspondence: zhangmu01@163.com; Tel.: +86-0851-88510575

Received: October 25, 2022; Accepted: December 25, 2022; Published: December 31, 2022

Abstract: To alleviate the pressure of financing for small and medium-sized enterprises in my country, order financing has become one of the effective ways to solve the financing difficulties of China's small and medium-sized enterprises. Order financing is a kind of supply chain financing mode. Compared with traditional accounts payable financing, order financing advances the financing link, accelerates the capital turnover efficiency, and better solves the urgent demand for funds of small and medium-sized enterprises. This paper reviews the research status of order financing from three aspects: order financing model evolution, decision optimization, and risk management. Through combing the existing literature, it puts forward appropriate policy recommendations for the order financing model under the current development status, which will provide direction for the development of order financing in the future.

Keywords: Order Financing; Model Evolution; Decision Optimization; Risk Management; Literature Review

1. Introduction

Order financing is a kind of supply chain financing mode. Compared with traditional accounts payable financing, order financing will advance the financing link and speed up the capital turnover efficiency, to better solve the urgent demand for funds for small and micro enterprises. Order financing is a business form of supply chain finance. Order financing was initially applied in international trade, also known as package loan, which is a model in which financial institutions such as banks provide loan services to exporters with capital problems during the period from receipt of orders by exporters to shipment of goods ordered, based on orders received by foreign companies by domestic exporters.

At present, our country is in a crucial stage of economic transformation and development. To achieve the goal of high-quality development, we must rely on the healthy development of small and medium-sized enterprises. In recent years, order financing, a financial innovation model, not only provides a new solution to the difficult problem of financing and expensive financing for small and medium-sized enterprises, but also expands the scope of banking financial services to a certain extent. As an innovative business in the supply chain financial model developed by banks and other financial institutions, order financing has brought new profit points for the financial industry. The risk brought

by the order financing model to related enterprises and banks also needs to be studied urgently. This paper will sort out the relevant literature on order financing from three aspects: model evolution, decision optimization, and risk management, and clarify the development context and existing problems of the order financing business.

2. Research on the Evolution of the Order Financing Model

From the perspective of financing methods, order financing is considered to be an effective way to solve the emergency loan financing of small and medium-sized enterprises in China. Foreign countries have a relatively early understanding and research on order financing. For example, Novembrino et al. (1996) [1] discussed order financing in international transactions through a case and analyzed the call signals sent by the lending institutions to the order financing institutions; Marks et al. (2009) [2] believe that the traditional POF refers to a supplier's loan to a financial institution conditional on a purchase contract signed by the buyer.

Since 2008, some domestic scholars have started in logistics finance and opened a new era of order financing research in China. They believe that order financing, inventory pledge financing, and accounts receivable financing are the three major forms of supply chain finance. Based on the risk analysis model of order financing business in the value chain process, this paper analyzes the basic structure of logistics finance in depth and considers that order financing business is an effective financing arrangement to solve the financing difficulties of small and medium-sized enterprises in the supply chain (Li Yixue and Wu Lihua, 2008) [3]. Liu Yaya and Zeng Youxin (2009) [4] found that suppliers can apply for loans from financial institutions with the orders of core manufacturers in the supply chain as a guarantee. After the financial institutions review the authenticity of the orders and evaluate the value of the orders and the corresponding risks, they can grant certain credit lines to help enterprises purchase the necessary raw materials for production. This model not only has a flexible and fast market commodity information collection and feedback system, but also has a perfect logistics management information system. In the research on the credit guarantee model of small and medium-sized enterprises, the "1+N" supply chain financing model is adopted for enterprises that do not meet the bank pledge requirements and have insufficient individual credit, and the seller's credit is enhanced through the third-party guarantee model (Zhao Jian and Huo Jiazhen, 2009) [5]. Li Juan (2010) [6] Research found that the adoption of stage loans can make the relationship among banks, logistics enterprises, and small and medium-sized enterprises reach a balanced state under the condition of incomplete information, produce appropriate and reasonable quantities of products, and complete the normal production and sales of products. Through the impact on profit, profit margin, and decision-making caused by the numerical changes of order financing cost, order financing interest, and order financing value ratio, logistics enterprises are promoted to make better choices in the process of order financing business, control their costs and obtain more market profits (Hong Yitian, 2020) [7].

The "three rural issues" are the basic issues in the overall development of China's reform and opening-up. Li Han (2014) [8] said that by establishing a loan guarantee fund pool to further expand and improve the loan guarantee insurance business, the ultimate goal is to establish an "order + futures + shortage" order finance model. Lan Qinggao (2014) [9] through analysis shows that it is concluded that order financing solves the problem of shortage of funds for farmers upstream of the dairy supply chain. During the implementation of breeding, the existing breeding capacity and self-

owned fund status must be inspected to reasonably determine the financing proportion and financing period. Wu Haixia (2015) [10] proposed to apply for loans to three types of subjects, namely, farmers, leading agricultural enterprises, and farmers' professional cooperatives. The financing mode is generally "order + credit evaluation + guarantee" (joint guarantee, mortgage, or guarantee insurance). To address the concerns of the acquisition enterprises about the price risk of order financing, Shouguang City has introduced an insurance mechanism to obtain loans in the form of guarantee insurance by insurance companies, which greatly broadens the applicability of "order financing". Wang Tingrui and Chu Yongze (2015) [11] proposed a centralized credit model for agricultural order financing, forming a bundled credit model. The "bank + company + agricultural cooperative organization + farmers + insurance + trust" and other models formed by agricultural order financing transform decentralized loans into batch loans through upstream and downstream connections, which is beneficial to the intensive and large-scale operation of agricultural credit, thus realizing mutual benefit and win-win for all parties. Taking the order-based agriculture in Longhai City as an example, a multi-link and multi-organization order-based financing model of fresh agricultural products supply chain, namely "bank + core processing enterprises + cooperative organizations + farmers + futures market + agricultural insurance + government", has been formed. It introduces the agricultural insurance and futures markets, ensures the effective operation of order-based financing with the help of its financial guarantee function, solves the financing problem of farmers, stabilizes the supply of high-quality goods for the core enterprises, and expands the credit scope for the Agricultural Bank (Song Equality, 2016) [12]. Taking Shouguang City in Shandong Province as an example, under the "company + farmers + order financing" model, farmers' production behavior meets the requirements of the consumption environment on the quality of agricultural products and plays an important demonstration role in guiding farmers' production from output to quality (Hu Huiyong, 2020) [13]. Based on defining the concepts and relevant theories of the pig supply chain and order financing model, according to the basic logic of the "demand, supply, and demand model", this paper sorts out the financing status of pig breeding subject from the aspects of fund demand, financial supply, and traditional financing model, and analyzes the financing difficulties of pig breeding subject from three aspects of industrial scale process, fund supply channel and credit evaluation display degree. Finally, it concludes that the order financing model of pig breeding can alleviate the difficulty of pig breeding subject to a certain extent (Wang Xi, 2021) [14]. Based on the agricultural supply chain and the order financing model of "farmers + cooperatives + banks + core enterprises" of agricultural cooperatives, combined with the financing difficulties of Chinese herbal medicine planting in Yunnan Province, this paper analyzes the financing status of Chinese herbal medicine growers in Yunnan Province, and combining with the application situation in Yunnan Province, puts forward specific suggestions for promoting their development (Wang Caifen and Li Fuchang, 2021) [15]. By constructing the theoretical framework of order financing to increase the income of largescale farmers, this paper uses the generalized structural equation model method based on the zeroexpansion model to conduct the empirical test, which provides the theoretical basis and empirical experience for strengthening the agricultural order financing model and risk prevention (Jiang Boheng and Wen Tao, 2022) [16].

With the development of e-commerce, network distributors, which are the intermediate distributors with the network as the main distribution channel, have begun to appear, and the network distributors are mainly small and micro enterprises. Liang Fei (2015) [17] proposed that the

difference between the online order financing model and the traditional order financing model is that the traditional order financing model is to finance small and medium-sized enterprises according to the orders of the core enterprises in the supply chain, while the online order financing model does not depend on the core enterprises, and enterprises directly finance from banks according to the orders of customers. Xu Liqi (2016) [18] proposed electronic order financing for internet supply chain finance, which refers to a business model in which upstream financing enterprises (suppliers) and downstream core manufacturers sign real and effective electronic orders in a third-party B2B ecommerce platform, with which suppliers apply to commercial banks for financing, which can be seamlessly connected with factoring financing or bill discounting. Rebecca (2017) [19] actively explored the incentive mechanism, game mechanism, and financing strategy of the electronic order financing model, and put forward effective measures for financing strategies of e-commerce platforms and risk control for banks to carry out electronic order supply chain financing, which provided theoretical guidance for optimizing the financing process of small and medium-sized enterprises and promoting banks to efficiently carry out electronic order financing services. Huang Yingcan (2018) [20] proposed that the advantages of the supply chain model based on B2B platform over the traditional supply chain finance model are not only in online credit, but also in the ability to obtain a real large amount of basic transaction information; Providing various business flow, logistics, and information flow data; Diversifying sources of pooled financing; Cost savings. Based on the three-dimensional trust, the seller's electronic order financing can enhance the bank's trust perception, and a green supply chain seller's electronic order financing transaction model based on the threedimensional trust is proposed to alleviate the manufacturer's financing demand in the green supply chain (Yin Qin, 2019) [21]. The research shows that the supply chain seller's electronic order financing model under the consideration of institutional trust improves the compliance revenue of the participants, effectively promotes mutual trust among the financial participants in the supply chain, and promotes each participant to establish a long-term and stable strategic cooperation relationship (Yang Qifeng et al., 2019) [22]. Through the internet platform set up by the government, the government has made innovative research on the new mode of internet order financing, made full use of the big data and credit reporting system, introduced partners such as banks and commercial insurance, and made the cooperation orders between enterprises circulate and trade online. Compared with the traditional financing mode, it has the advantages of strengthening the credit reporting system, enabling information technology, innovating the evaluation system, dynamic risk control, risk sharing among three parties, and expanding the scale of financing (Li Haocheng et al., 2021) [23].

3. Research on Order Financing Decision Optimization

To solve the financial difficulties in the early production process, the enterprise generally adopts internal financing or external financing. Internal financing refers to applying for deferred payments from upstream enterprises or accepting advance payments from downstream enterprises, while external financing refers to applying for loans from financial institutions. However, financing in the procurement period takes a long time to repay, and financing enterprises need to pay higher loan interest. The study found that financing companies applying for order financing and suspending payment to upstream suppliers at the same time, and reasonably setting the order quantity and wholesale price of the core companies can alleviate the shortage of funds for suppliers and retailers to a large extent, and improve the supply chain performance (Zhang Xin et al., 2015) [24]. Zhao Ruixue (2018) [25] studied order financing to reverse the factoring financing model in supply chain finance. Combining internal and external financing, considering whether a supplier accepts a retailer's order under different reverse factoring rates, different optimal strategies resulting from the game between the retailer and the supplier were obtained.

The profit of financial order financing participants in the supply chain is affected by various factors. From the perspective of financing enterprises, it is found that if the current price of the retailer's capital is higher than the risk-free interest rate, then the bank interest rate will be somewhere between the two, suppliers choose order financing, and the enterprise's profit is larger (Wang Zongrun and Shi Jiaxing, 2018) [26]. Combining the supply chain finance model of order financing with the supply chain coordination model of the call option contract, and introducing the "call option contract model under no financing model" to compare, this paper discusses the impact of the option strike price and the supplier's initial capital under the three models, to make the profit distribution between the supplier and the retailer change (Xu Qing, 2016) [27]. Combining with the buyer's electronic order financing, this paper constructs a three-dimensional trust mechanism from three aspects of the system, personality, and reputation, and uses the method of game theory to establish a mathematical model of buyer's electronic order financing based on three-dimensional trust perception. The research results show that the three-dimensional trust mechanism enhances the banks' trust perception in the unfamiliar network environment and improves their willingness to participate in the financing. The interest rate decision-making formula of a bank is its trust perception function. When the bank senses a higher degree of trust through rational calculation of threedimensional trust variables, the interest rate it decides will be lower. Accordingly, the higher the optimal product quality level decided by the supplier, the larger the optimal order quantity decided by the retailer (Wang Shuoxin, 2019) [28]. Research by Yin Qin (2019) [21] shows that the threedimensional trust mechanism of the green supply chain can promote banks' perception of trust in the green supply chain and reduce their loan interest rates. Institutional trust and personality trust as exogenous trust variables in three-dimensional trust mainly affect banks' perception of trust in the green supply chain by positively affecting reputation trust as decision variables, thus affecting manufacturers' and retailers' transaction decisions, and further affecting the overall profit of green supply chain. Based on the analysis of the advantages of the order financing model of pig breeding from three aspects of fund demand, financial supply, and traditional financing model, the study found that when the initial capital level of the pig breeding subject is low, the profit situation of financial institutions under the traditional commercial financing business and order financing business is quite different, and the profit of financial institutions increases with the increase of the initial capital level of pig breeding subject (Wang Xi, 2021) [29].

The decision of each participant in order financing directly determines the effectiveness of supply chain finance. Through numerical analysis, the optimal operation strategy of the supply chain order financing model under the control of a bank risk cap is studied. The impact of bank risk caps on the optimal decision of suppliers and retailers is analyzed (Wang Wenli et al., 2013) [30]. Under the assumption of bank risk neutrality and random demand, the overall decision-making and bank decision-making strategies of the supply chain finance order financing model are studied. It is found that the overall maximum revenue of supply chain finance is only related to the order quantity, and the decision of bank loan interest rate is related to risk-free revenue, supplier's capital demand, and

default rate of core enterprises, which decrease with the increase of supplier's capital demand and increase with the increase of risk-free interest rate (Xu Liqi, 2016) [18]. Song Ping et al. (2018) [31] apply the newsboy model and the Stackelberg game to construct the expected profit model for financing participants. The higher the reputation level determined by suppliers, the higher the retailer's order quantity, the higher the bank's trust level, and the lower the interest rate. Decentralized decision-making cannot achieve the coordinated results of financial supply chains. Taking electronic order financing as the starting point, this paper discusses the impact on the revenue and decision-making behavior of both parties from the fixed fee, royalty fee, and mixed fee respectively, and discusses the optimal financing decision-making problem when the B2B platform, enterprise, and bank obtain the maximum revenue under the entrusted credit model, joint credit model and separate credit model (Huang Yingcan, 2018) [20]. Wang Ying and Chen Zhi (2021) [32] used the numerical analysis method to analyze the factors such as the sensitivity of production decision-makers to the penalties for under-production, the residual value of inventory, and the distribution of defective rate and established a model for banks to make lending decisions through the contents of orders under different distributions, which provided decision-making basis for production and financial decision-makers.

The optimal decision is taken by the supplier when the information is incomplete. By constructing the optimal decision model of inventory pledge financing stage loan (PIWRSF) with complete information and renegotiation, it is concluded that a stage loan is better than a direct loan. When the moral hazard of logistics enterprises increases, the combination of inventory pledge, contract, and stage financing can make the suboptimal solution under incomplete information tend to the optimal solution under complete information (Li Juan et al., 2010) [6]. The simulation results of Ouyang Ni (2016) [33] show that due to the uncertainty of market prices and the absence of a 100% continuous price increase, farmers' continuous performance decision in their orders has a positive and powerful impact on optimizing their scale and revenue. Under the conditions of asymmetric information and bounded rationality assumptions, an evolutionary game model of financing behavior between banks and NVOCC is constructed, and the stability analysis of different behavior strategies is carried out. The results show that the bank's pledge rate, the amount of penalty for default, and the strength of NVOCC's willingness to repay are the important influencing factors of whether NVOCC will default. The bank's appropriate pledge rate, the amount of penalty for default is large enough, and a strong willingness to repay will effectively reduce the probability of default of NVOCC, thus avoiding financing credit risk (Huang Weixing and Gao Gengjun, 2020) [34].

To sum up, the initial capital of the supplier and the trust degree of corporate reputation have an important impact on the final revenue of all parties. Taking the form of stage loans and continuous performance have a positive impact on their scale and revenue; The retailer's profit is affected by the current price of capital, market demand, and the predetermined quantity of products; Banks should pay close attention to whether suppliers' capital requirements are reasonable, default rates of core enterprises, risk-free interest rates and reasonable adjustment of risk caps. All the above decisions will affect the overall effectiveness of supply chain finance order financing.

4. Research on Risk Management of Order Financing

Order financing business refers to a business in which a financial institution, based on a valid sales order signed by an enterprise, applies the risk control method of "one single loan, one collection

settlement" to issue a fully-enclosed loan for that order. At present, domestic research on order financing risk mainly focuses on risk analysis and prevention, risk identification and evaluation, etc.

In terms of risk analysis and prevention and control, based on the understanding of the connotation of order financing business, Li Yixue (2008) [35] believes that the pre-loan assessment of order financing business should focus on the assessment of the risks in the order fulfillment process, which can be specifically analyzed from three parts: the assessment of the borrower's entity, the assessment of the order and the assessment of the supervision level of the financier. Based on the risk analysis model of order financing business in the value chain process, Li Yixue and Wu Lihua (2008) [3] describe the risks encountered by borrowing enterprises in the process of realizing order financing more comprehensively. The research shows that the risk of the order fulfillment process is the most important factor affecting the loan repayment of order financing business; Environmental risk, information system risk, the default risk of downstream manufacturers, and supervision risk of logistics enterprises may affect the financing business by affecting the order fulfillment process; To ensure the safety of order financing, the financier should carefully analyze and manage the five types of risks. Based on the risk analysis of each link in the order financing business process, for order financing of products meeting the bank pledge requirements, the financing risk can be effectively controlled through the combination of several supply chain financing methods without limiting the core enterprise status of its downstream procurement enterprises (Zhao Jian and Huo Jiazhen, 2009) [5]. Wang Qian (2014) [36] proposed that commercial order financing products have the following risks: the access standard of the order financing core business enterprise is relatively low, the borrower is a trade-oriented enterprise, the investigation requirements on the relevance between the core customer and the borrower are lacking, the order type applicable to the products is not clear, the regulations on financing operation links are not detailed, and the capital flow and trade logistics do not match. Zhu Liefu and Ding Nanxi (2015) [37] explained the connotation and significance of the order financing business of rural financial institutions for agricultural enterprises, deeply analyzed the systematic risks of order financing of agricultural enterprises, and revealed the non-systematic risk characteristics such as credit risk, order risk and operation risk of order financing of agricultural enterprises, and gave specific countermeasures for rural financial institutions to control the systematic risk and non-systematic risk business of order financing business of agricultural enterprises. Based on the perspective of banks, Dong Zhenning et al. (2015) [38] elaborated on the concept and business process of order financing and pointed out that its business risks are divided into four categories and 11 subcategories from four different perspectives: raw material suppliers, production enterprises, downstream core enterprises, and 3PL, and elaborated the control methods of various risks respectively. Comparing order financing with traditional financing, from the perspective of business risk control methods, banks in order financing actively control risks, control capital flow by opening special closed accounts for participants, and control logistics by relying on real-time feedback information from cooperating 3PL enterprises, thus achieving maximum risk control in the process (Liu Wenjuan et al., 2015) [39]. Xu Liqi (2016) [18] constructed a risk control strategy with typical Internet characteristics and combined with the specificity of the Internet supply chain financial order financing model, specifically proposed a whole-process risk control mechanism including outsourcing of operation links, deconstruction of key variables and introduction of corresponding mechanisms, as well as collaboration and cooperation among platforms through information integration, matching, and control. Taking the electronic order financing model under B2B e-commerce supply chain finance as the research object, this paper identifies and analyzes the operational risks of electronic order financing from the four links of B2B e-commerce transaction link, electronic order financing link, online payment link, and logistics warehousing supervision link, and starting from the human factors and systematic factors in reducing the operational risks, puts forward the financial operational risk control strategy of B2B e-commerce supply chain (Wang Jin, 2017) [40]. Taking the order financing guarantee business of GS Nongdan Company as the research object, this paper points out the problems existing in the risk control of order financing guarantee business, such as the unsound risk control system and inadequate implementation of rules and regulations, through the on-site investigation of the applicant farmers and all aspects of GS Nongdan Company's business, and puts forward suggestions for improving the business risk control, including constructing the risk control system of order financing guarantee business, standardizing the implementation of the risk management system, strengthening the performance ability construction of the risk management department, improving the talent team and performance evaluation mechanism, and accelerating the construction of the risk management information system (Guo Yundong, 2020) [41].

In terms of risk identification and evaluation, Deng Aimin, Xiong Jian, and Zhangfan (2010) [42] based on the research results of domestic and foreign experts on order financing and the definition of its connotation, identified the risk types of order financing business using questionnaires and indepth interviews. On this basis, established an order financing risk early warning index system, and constructed an order financing risk early warning model based on BP neural network. Zhao Qi (2013) [43] established an order financing risk assessment index system, and established an order financing risk assessment model combining rough set theory and credibility theory, established a risk assessment information system through expert scoring, reduced the assessment index system, calculated the weight of each secondary index after reduction, and finally obtained a comprehensive evaluation value combining credibility theory. Zhao Qi (2013) [44] has established an index system for evaluating the order financing risk, and uses the method of combining the extension level analysis with the fuzzy comprehensive evaluation to evaluate the order financing risk. It is more reasonable and convenient than the traditional analytic hierarchy process to use the extension interval number to express the relative importance degree among the indexes quantitatively. Through expert scoring, an extension interval judgment matrix is established, the weights of evaluation indexes at each level are calculated, and a comprehensive evaluation value is finally obtained by combining fuzzy comprehensive evaluation. Under different circumstances, Chang Qing (2014) [45] uses the elastic coefficient method to conduct quantitative research on the financial risk transmission effect of order financing. For each different situation, it uses the elastic coefficient method to conduct quantitative calculations on each risk transmission effect, and studies the impact on the revenue of financing enterprises, core enterprises, banks, and logistics enterprises when the raw material price of financing enterprises changes and the resulting supply chain financial risk is transmitted along the supply chain, and studies the risk transmission effect to which they are subjected. Combined with other participants in the online order financing model, the credit risk evaluation index system is established, the weight of the evaluation index does not depend on the expert evaluation method, and the credit risk evaluation system of online distributors is constructed by the Logistic regression method combined with factor analysis. The credit risk evaluation results are more objective and scientific (Liang Fei, 2015) [46]. Taking "orders" as the lead, the risk of different stages is analyzed and a twostage risk level evaluation model is constructed. The first stage judges the authenticity of the business

order through two first-level indicators; In the second stage, the index system including subject credit, pledge rate, order fulfillment ability, inventory, etc. is constructed, and the measurement methods of various indexes are described in detail. The various quantitative indexes are uniformly projected to 0-10 points by using the processing methods of the exponential function, cosine function, power function, etc. Then the ANP method and AHP method are used to determine the weights of various indicators, and a risk level evaluation model is constructed to classify the risks into five levels (Dong Zhenning et al., 2017) [47]. The research results of Han Yahui (2019) [48] show that the research on credit risk evaluation of order financing needs dynamic analysis from multiple perspectives. Relevant credit risk managers should not only pay attention to the qualification of financing enterprises, but also pay attention to the core enterprise qualification in the supply chain. In addition, as the cooperative supervisor and guarantor of banking and other finance, the third-party logistics enterprise is also the focus of the credit risk monitoring department. Based on combing the evolution process of the electronic order model and its risks, Tian Ran and Xu Kun (2020) [49] describe the risk relationship among various entities from a systematic perspective, determine the key risk factors, and perform simulation analysis by using the principle of system dynamics. It is pointed out that the electronic order financing system consists of multiple subsystems, and a feedback relationship is formed among each subsystem. Controlling the risks of each subsystem is helpful to reduce the overall risk of electronic order financing. Huang Weixing and Gao Gengjun (2020) [50] applied the order financing model under supply chain finance to the field of non-vehicle carriers. Using the evolutionary game method, under the assumptions of information asymmetry and bounded rationality, they constructed an evolutionary game model of financing behavior between banks and non-vehicle carriers, analyzed the stability of different behavior strategies, and carried out numerical simulations. Through the discussion on the model of supply chain finance of marine water products, He Jing and Gu Limin (2021) [51] used the fuzzy analytic hierarchy process (FAHP) to evaluate the financial risks of the supply chain of marine water products, providing the basis for the next step of risk prevention and control, and striving to promote the application of supply chain finance in marine water products industry, with more scientific and objective evaluation results. According to the order financing business process of the case company, the influencing factors of the order financing risk of the e-commerce platform are identified. Based on the risk identification results of the case, an evaluation index system of the order financing risk of the e-commerce platform is constructed, and then the order financing risk of the case company is evaluated by using the comprehensive analytic hierarchy process and expert scoring method. Finally, the proposed measures are obtained, such as setting up a hierarchical access standard for order financing vehicles, strengthening the performance inspection of pledged vehicles, establishing a platform dealer transaction database, designing a dealer reward and punishment mechanism, building an automobile industry database and an emergency early warning mechanism (Mou Baishen, 2021) [52].

5. Brief Review

Order financing is currently an important way for small and medium-sized enterprises to obtain loans. Retailers submit orders to suppliers through their good reputation, thus applying to banks for order financing, thus avoiding the situation of capital fragmentation. The order financing model has become the mainstream supply chain financing model at the current stage. Through the research results of the existing literature, the following policy recommendations are put forward. First, improve laws and regulations and strengthen government supervision. The order financing model is different from the traditional financing model, which requires the government and relevant departments to establish and perfect the laws and regulations of supply chain financing. The government and relevant departments should clarify the business scope of order financing, standardize the corresponding process and the scope of responsibilities of each subject, and formulate sound risk prevention and control strategies to provide legal basis and institutional guarantee for financing risks. In addition, it is also necessary to establish a perfect supervision mechanism to supervise each entity and process in the order financing business, so as to avoid regulatory loopholes that may affect the healthy development of order financing.

Second, establish and improve the credit system. The credit of small and medium-sized enterprises is directly related to whether they can successfully apply for loans. Therefore, it is necessary to establish and perfect the credit database of enterprises and realize information sharing with the government, core enterprises, banks and other financial institutions. The government and relevant departments should strictly review their transaction records with the core enterprises and the development status of the supply chain where they are located, to improve the efficiency of order financing and reduce risks, to enable more small and medium-sized enterprises to obtain financing and enable enterprises to develop healthily.

Third, build an e-commerce financing service platform. The government and relevant departments should build an order financing service platform according to the actual situation, grasp the production and sales data of enterprises in real time, and discover abnormal data in time. The service platform can effectively solve the problems of small and medium-sized enterprises such as accounts, inventories, difficult and expensive financing and lack of collateral. The government needs to formulate relevant laws and regulations, clarify the legal effect of electronic certificate, safeguard the interests of various subjects in the order financing process from the legal source, strengthen supervision and punish the dishonesty, to promote the order financing mode dominated by e-commerce platforms to become an important financing channel for small and medium-sized enterprises.

Funding: This research was funded by the Regional Project of the National Natural Science Foundation of China, grant number 71861003.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

References

- [1] Novembrino T A. Financing international transactions[J]. Secured Lender, 1996,52(6):38.
- [2] Marks K H, L E Robbins, G Fernandez, J P Funkerhouser, D L Williams. The Handbook of Financing Growth: Strategies, Capital Structure, and M&a Transactions[M]. New Jersey NJ: John Wiley&Sons, 2009:356-358. DOI: <u>https://doi.org/10.1002/9781118267691</u>.
- [3] Li Yi Xue, Wu Lihua. Risk analysis and management of order financing business under logistics finance innovation [J]. Contemporary Finance and Economics, 2008(12):66-70. DOI: <u>CNKI: SUN: DDCJ.0.2008-12-013</u>.
- [4] Liu Yaya, Zeng Youxin. Research on Implementation of Order Financing Business in Logistics Enterprises
 [J]. Modern Business, 2009(03):180. DOI: <u>https://doi.org/10.3969/j.issn.1673-5889.2009.03.114</u>.

- [5] Zhao Jian, Huo Jiazhen. Research on order financing model independent of core enterprises [J]. Journal of Kunming University of Technology (Social Science Edition), 2009,9(12):62-65.
- [6] Li Juan, Xu Yu, Jia Tao. Risk management of order financing business under logistics finance innovation
 [J]. statistics and decision, 2010,(19):171-173. DOI: <u>CNKI: SUN: DDCJ.0.2008-12-013</u>.
- [7] Hong Yitian. Research on order financing strategy of the supply chain under logistics finance [J]. statistics and decision, 2020,36(01):176-180. DOI: <u>https://doi.org/10.13546/j.cnki.tjyjc.2020.01.039</u>.
- [8] Li Han, Wang Zhaoxu, Zou Lei. A Study on Feasible Approaches to Order Financing of Agricultural Products: Theoretical Analysis and Concrete Practice [J]. Credit Information, 2014,32(04):67-71.
- [9] Lan Qinggao, Wang Tingrui. Research on order financing of agriculture based on system dynamics: a case study of order financing of dairy farming [J]. Journal of the capital university of economics and business, 2014,16(04):32-40. DOI: <u>https://doi.org/10.13504/j.cnki.issn1008-2700.2014.04.004</u>.
- [10] Wu Haixia. Weifang City, the development of order financing and other new forms of financing, benefiting rural small and medium-sized enterprises [J]. Shang, 2015(12):228. DOI: <u>CNKI: SUN: SHNG.0.2015-12-190</u>.
- [11] Wang Tingrui, Chu Yongze. Analysis of agricultural order financing [J]. Journal of Dalian nationalities university, 2015,17(06):574-577. DOI: <u>https://doi.org/10.3969/j.issn.1009-315X.2015.06.010</u>.
- [12] Song Ping, Jiang Yixin, Yang Qifeng. An Example of the Design of Order Financing Model for Fresh Agricultural Products Supply Chain [J]. Journal of Finance and Accounting, 2016,(26):86-89. DOI: <u>CNKI:</u> <u>SUN: CKYK.0.2016-26-018</u>.
- [13] Hu Huiyong. "Research on Farmers' Production Behavior under the" Company + Farmers + Order Financing "Management Model [D]. Nanchang University, 2019.
- [14] Wang Xi. Research on Order Financing Model of Pig Breeding from the Perspective of Supply Chain [D]. Northeast Agricultural University, 2021.DOI: <u>https://doi.org/10.27010/d.cnki.gdbnu.2021.000626</u>.
- [15] Wang Caifen, Li Fuchang. Research on Order Financing in Supply Chain of Chinese Herbal Medicine in Yunnan Province [J]. Business Exhibition Economics, 2021(19):65-67.
- [16] Jiang Boheng, Wen Tao. How Order Financing Promotes Income Increase of Large-scale Farmers: Theory and Evidence [J]. Research on Financial Issues, 2022,(06):81-90.
- [17] Liang Fei. Credit risk assessment of online distributors under online order financing model [D]. University of Electronic Science and Technology, 2015.
- [18] Xu Liqi. Internet Supply Chain Finance, Electronic Order Financing Risk and Banking Decision Research[D]. Wuhan University of Technology, 2016.
- [19] Rebecca. Research on Supply Chain Financial Risks and Models Based on Electronic Orders [D]. University of Electronic Technology, 2017.
- [20] Huang Yingcan. decision analysis of electronic order financing based on B2B platform [D]. Xiamen University, 2018.
- [21] Yin Qin. E-order financing transaction decision of sellers in the green supply chain based on threedimensional trust [D]. Wuhan University of Technology, 2019.
- [22] Yang Qifeng, Yang Xiaoci, Song Ping. Game analysis of electronic order financing for supply chain financial sellers considering institutional trust [J]. Journal of Finance and Accounting, 2019,(10):132-138. DOI: <u>https://doi.org/10.19641/j.cnki.42-1290/f.2019.10.019</u>.
- [23] Li Haocheng, Wen Renling, Li Leping, Xu Chang. Innovative research on the financing model of small and micro agricultural enterprises takes the construction of an internet order financing platform as an example
 [J]. China Business Theory, 2021,(01):105-108. DOI: <u>https://doi.org/10.19699/j.cnki.issn2096-0298.2021.01.105</u>.
- [24] Zhangxin, Lin Qiang. Research on the Optimal Decision of a Three-echelon Supply Chain under Delayed Payment and Order Financing [J]. Journal of Wuhan University of Technology (Transportation Science and Engineering Edition), 2015,39(02):405-409.
- [25] Zhao Ruixue. Optimal Operation Strategy of the Supply Chain under the Financing Strategy from Order Financing to Reverse Factoring [D]. Beijing Foreign Studies University, 2018.
- [26] Wang Zongrun, Shi Jiaxing. research on supply chain order financing interest rate under asymmetric information [J]. financial theory and practice, 2018(01):81-85. DOI: <u>https://doi.org/10.3969/j.issn.1003-4625.2018.01.017</u>.
- [27] Xu Qing. Research on Supply Chain Coordination of Call Option Contracts under Order Financing [D]. Tianjin University, 2016.

- [28] Wang Shuoxin. Trust perception and transaction decision-making of buyer's electronic order financing participants [D]. Wuhan University of Technology, 2019. DOI: <u>https://doi.org/10.27381/d.cnki.gwlgu.2019.000540.</u>
- [29] Wang Xi. Research on Order Financing Model of Pig Breeding from the Perspective of Supply Chain [D]. Northeast Agricultural University, 2021.DOI: <u>https://doi.org/10.27010/d.cnki.gdbnu.2021.000626</u>.
- [30] Wang Wenli, Luo Jianwen, Zhang Qinhong. Research on Supply Chain Order Financing Strategy under Bank Risk Control [J]. China Management Science, 2013,21(03):71-78. DOI: https://doi.org/10.16381/j.cnki.issn1003-207x.2013.03.021.
- [31] Song Ping, Wang Shuoxin, Yang Qifeng. An Electronic Order Financing Contract Coordination Model Based on Reputation Trust [J]. Journal of Beijing University of Posts and Telecommunications (Social Science Edition), 2018,20(06):9-17+51.
- [32] Wang Ying, Chen Zhi. Research on Order Financing Decision under Uncertainty of Output and Payment Return [J]. Journal of Guangdong Open University, 2021,30(06):105-111. DOI: 10.19722/j.cnki.1008-7729.2018.0211
- [33] Ouyang Ni. Research on the Decision of Farmers' Order Fulfillment in Order Financing of Agricultural Products Supply Chain [D]. Hunan University, 2016.
- [34] Huang Weixing, Gao Gengjun. Order financing risk decision of NVOCC based on evolutionary game [J]. Manufacturing Automation, 2020,42(05):10-15.
- [35] Li Yixue. Logistics Finance Innovation-Pre-loan Evaluation of Order Financing Business [J]. statistics and decision, 2008(24):168-170. DOI: <u>CNKI: SUN: JXGY.0.2020-05-003</u>.
- [36] Wang Qian. Risk analysis and management suggestions on order financing products of commercial banks[J]. Modern Economic Information, 2014(19):355+362.
- [37] Zhu Liefu, Ding Nanxi. Risk control strategies for the order financing model of agricultural enterprises [J].
 Hubei Agricultural Sciences, 2015,54(04):1007-1009. DOI: <u>https://doi.org/10.14088/j.cnki.issn0439-8114.2015.04.061</u>.
- [38] Dong Zhenning, Liu Wenjuan, He Bin, Zhuo Wang. Research on the Risk of Order Financing Business [J]. Business Economics Research, 2015(11):99-100. DOI: <u>https://doi.org/10.3969/j.issn.1002-5863.2015.11.037</u>.
- [39] Liu Wenjuan, Dong Zhenning, He Bin, Zhuo Wang. Comparative analysis of order financing and traditional financing [J]. Logistics Technology, 2015,34(17):33-35.
- [40] Wang Jin. Research on financial risk control in B2B e-commerce supply chain [D]. Southeast University, 2017.
- [41] Guo Yundong. Research on Risk Control of Order Financing Guarantee of GS Nongdan Company [D]. Xidian University, 2020. DOI: <u>https://doi.org/10.27389/d.cnki.gxadu.2020.003320</u>.
- [42] Deng Aimin, Xiong Jian, Zhangfan. An early warning model of order financing risk based on BP neural network [J]. Journal of information, 2010,29(11):23-28.
- [43] Zhao Qi. Risk Assessment of Order Financing Based on Rough Set and Credibility Theory [J]. Logistics Technology, 2013,32(13):278-280.
- [44] Zhao Qi. Risk Assessment of Order Financing Based on Fuzzy Extension AHP [J]. Journal of Chongqing University of Technology (Social Sciences), 2013,27(02):35-39.
- [45] Chang Qing. Analysis of risk transmission effect of order financing based on the elastic coefficient method [D]. Southwest Jiaotong University, 2014.
- [46] Liang Fei. Credit risk assessment of online distributors under online order financing model [D]. University of Electronic Science and Technology, 2015.
- [47] Dong Zhenning, Liu Wenjuan, Zhuo Wang, He Bin. Research on the risk level evaluation of order financing business [J]. Logistics and Management, 2017,26(02):140-145. DOI: <u>https://doi.org/10.12005/orms.2017.0043</u>.
- [48] Han Yahui. Research on credit risk assessment of order financing of small and medium-sized enterprises under supply chain [D]. Hunan University, 2018. DOI: <u>CNKI: CDMD: 2.1018.103005</u>.
- [49] Tian Ran, Xu Kun. Risk Formation Mechanism and Simulation Analysis of Electronic Order Financing under E-commerce Background [J]. Journal of Finance and Accounting, 2020,(19):139-145. DOI: https://doi.org/10.19641/j.cnki.42-1290/f.2020.19.020.
- [50] Huang Weixing, Gao Gengjun. Order financing risk decision of NVOCC based on evolutionary game [J]. Manufacturing Automation, 2020,42(05):10-15. DOI: <u>CNKI: SUN: JXGY.0.2020-05-003</u>.

Yi-fan Fu and Mu Zhang / Journal of Risk Analysis and Crisis Response, 2022, 12(4), 222-234

- [51] He Jing, Gu Limin. Research on financial risk assessment of marine water supply chain based on order financing model [J]. Ocean Economics, 2021,11(04):54-62. DOI: <u>https://doi.org/10.19426/j.cnki.cn12-1424/p.2021.04.005</u>.
- [52] Mou Bochen. Risk Identification and Assessment of Order Financing for E-commerce Platform [D]. Beijing Jiaotong University, 2021. DOI: <u>https://doi.org/10.26944/d.cnki.gbfju.2021.003303</u>.



Copyright © 2022 by the authors. This is an open-access article distributed under the CC BY-NC 4.0 license (http://creativecommons.org/licenses/by-nc/4.0/).