

# STRATEGIES OF MITIGATING INFORMATION ASYMMETRY IN SUPPLY CHAIN FINANCING

*Jerry C. Wei, Mendoza College of Business, University of Notre Dame, Notre Dame, IN 46556, USA  
574-631-5460, [jwei@nd.edu](mailto:jwei@nd.edu)*

*Xiande Zhao, China Europe International Business School, Pudong, Shanghai, 201206 China,  
86-21-2890-5687, [xiande@ceibs.edu](mailto:xiande@ceibs.edu)*

*Qiuping Huang, School of Business, South China University of Technology, Guangzhou, 510641 China,  
[qiuqiu0624@126.com](mailto:qiuqiu0624@126.com)*

## ABSTRACT

This study investigates how financial lenders can simultaneously reduce credit risk and coordination costs. Through multiple case studies in pre-payment financing, pre-production financing, and post-shipment financing, this paper develops a set of propositions that forms a conceptual model for supply chain financing. The model integrates three theories that are relevant to supply chain financing: credit rationing theory, transaction cost theory, and information processing theory. Grounded on empirical evidences, this model provides some important insights to supply chain practitioners and academicians.

**Keywords:** Supply chain financing, Information processing capability, Credit risk, Coordination costs

## INTRODUCTION AND THEORETICAL SUPPORT

Supply chain finance (SCF) is a set of financial solutions suitable for the small or medium enterprises (SMEs) whose working capital needs arisen from supply chain trading. Consistent with critical financial needs, we categorize SCF into three distinct types, including: pre-payment financing, pre-production financing and post-shipment financing. Specifically, a buyer incurs a need for pre-payment financing when it wants to postpone its account payable. Furthermore, a supplier incurs a need for pre-production financing when it wants to purchase raw materials to fulfill orders. Likewise, a supplier incurs a need for post-shipment financing when it wants to receive money sooner than the due date of its account receivable.

In this paper, we interpret the SCF cases through the lenses of three theories so as to explore the strategies for SCF credit risk management. Specifically, the credit rationing theory (CRT) can well explain why traditional financial institutions restrict themselves in the SME business and even refuse to lend to the SME clients. According to CRT, information asymmetry is the root cause of this phenomenon [7][8][66][74], based on the rationale that the financial institution is unwilling to take increasing risk when information asymmetry between lender and borrower is high. While the CRT is good in pinpointing the root cause, it cannot go further to analyze the lender's coordination costs arising from the risk controlling process. In this regard, transaction cost theory (TCT), which highlights the organizational pursuit of cost minimization [16][17][61], is applied to identify the types of transaction costs (including transaction risk and coordination costs) the drivers of increasing costs (including opportunism behavior and uncertainty) [35]. To further explore the tradeoff between credit risk and coordination costs, which is not well addressed in TCT, we apply the concepts of information processing theory (IPT), which emphasizes how the enterprises achieve high business performance (i.e. lower risk and costs) through a good matching between information processing capability (IPC) and information processing requirement (IPR) [24][27][28][56][62][70]. By integrating IPT with CRT and TCT, we can better understand the critical role of specific IPC in managing SCF credit risk and coordination costs. Table 1 summarizes how SCF is

pertinent to each of the three theories.

	Credit rationing theory (CRT)	Transaction cost theory (TCT)	Information-processing theory (IPT)
Rationale behind the theory	To better identify and control credit risk by mitigating the information asymmetry between lenders and borrowers	To achieve competitive advantage by minimizing the transaction costs	To achieve better business performance by matching the information-processing capability with information-processing requirement
Perspectives on SCF	Emphasize the importance of mitigating information symmetry in controlling pre-loan and post-loan SCF credit risk	Emphasize the importance of pre-loan and post-loan cost reduction in the risk management processes	Emphasize the importance of information-processing capability development in matching increasingly complicated SCF information-processing requirement
Importance on SCF	To give deep insights on the identification and control of credit risk in SCF	To give deep insights on the cost control in the risk management processes in SCF	To give deep insights on the tradeoff between risk exposure and cost reduction
Limitations in the context of SCF	Does not cover the cost issues in SCF	Does not identify how to minimize the risk and costs simultaneously	Does not highlight the corresponding information-processing capability used for SCF risk management
Major reference articles	Stiglitz and Weiss (1981); Bester (1985, 1987); Williamson (1987)	Coase (1937); Clemons <i>et al.</i> (1993); Grover and Malhotra (2003); Rindfleisch and Heide (1997)	Galbraith (1969, 1973); Tushman and Nadler (1978); Egelhoff (1991); Rogers <i>et al.</i> (1999); Premkumar <i>et al.</i> (2005)

**Table 1.** An integration of three theories to explain supply chain financing

SCF is the financing mode in which the lenders offer financing solutions to a batch of SC SMEs to finance their current assets (e.g. prepayment, accounts receivable, inventory) incurred in their SC transactions [5][12][21], so as to satisfy their short-term capital needs [75]. Correspondingly, the major source of SCF clients' repayment will be the future cash inflows generated from the SC transactions [65]. To manage the SCF credit risk, the lenders are supposed to focus on the SC transaction processes during which the current assets are generated and converted to cash. Specifically, in this paper, SCF credit risk is the likelihood of default due to the clients' inability, which arises from the failure of the SC transactions, or unwillingness to pay back the SCF loans [19][39].

Based on our review of literature, there is no comprehensive classification on SCF credit risk. In this paper, we comprehend and classify SCF credit risk from the perspective of CRT. Based on the following discussion, we can explain and understand clearly the logical relationship between different types of SCF credit risk and different enablers for managing the credit risk.

## **SCF and CRT**

According to the CRT, the SCF lenders have to bear credit risk due to adverse selection and moral hazard caused by the information asymmetry between themselves and clients [66][74]. For more details, when the lenders encounter situations in which they cannot obtain adequate information regarding the SC transactions, they are not able to make accurate judgments before loans [19]. The information asymmetry dilemma reflects the difficulty of the lenders in discriminating between reliable clients and high-risk clients. When the lenders cannot make effective judgment, inefficient pricing occurs. As a result, the reliable clients tend to switch to other alternative funding sources to apply better (i.e. lower interest rate, larger line of credit) SCF services, leaving the high-risk clients to dominate. Then the lenders suffer from the adverse selection problem, subsequently, bearing high pre-loan credit risk [66].

Furthermore, when information asymmetry exists after loan was approved, the clients may use the loan proceeds to invest on something else, rather than to support their SC transactions in accordance with the loan contracts. These opportunistic behaviors are driven by clients' interests on high-return projects and such interests are unlikely to be attenuated. Then the lenders suffer from the moral hazard problems, subsequently, bearing high post-loan credit risk [74].

Based on the above discussion, we classify the SCF credit risk into two types: pre-loan SCF credit risk arising from adverse selection and post-loan SCF credit risk arising from moral hazard. According to the CRT, the SCF lenders are supposed to obtain SC transactional data to reduce the information asymmetry, subsequently mitigate the pre-loan and post-loan credit risk. In this paper, we will discuss how the lenders identify and control the SCF credit risk based on the following two strategies of mitigating information asymmetry: reviewing trade structures and controlling transaction loops.

## **SCF and TCT**

From the perspectives of TCT [35][61], the SCF coordination costs refer to the costs incurred by the lender in evaluating a loan applicant, making a credit decision and implementing the credit decision [16][17]. We classify the SCF coordination costs into two categories: the evaluation costs incurred from managing pre-loan credit risk (i.e. the costs of evaluating clients and making SCF credit decisions) and the implementation costs incurred from managing post-loan credit risk ( i.e. the costs of implementing the SCF credit decisions).

According to the TCT, the lenders need to reduce the SCF credit risk and coordination costs simultaneously so that they can reduce the overall transaction costs [35] and gain better competitive advantage [9]. Based on our review of literature, insufficient research gives comprehensive insights on the important issues of credit risk and costs in the SCF context. The IPT emphasizes that firms can achieve good performance by matching the IPC with the IPR. Such IPC can be developed by establishing an appropriate information-processing mechanism [27]. In accordance with the IPT, the SCF lenders can better reduce the credit risk and coordination costs by obtaining sufficient IPC for the fulfillment of specific IPR.

## **SCF and IPT**

Firstly, we attempt to understand the SCF IPR from two perspectives, including the routinism of SCF

activities and the interdependency among parties involved in certain SCF projects [24]. On one hand, SCF lenders can effectively locate the resources to strengthen the IPC while understanding the routinism (routine, non-routine) of the activities in the SCF projects. Some scholars emphasize the linkage between identifying routinism of activities and the effectiveness of management. Peng [52] highlighted that it was imperative for companies to better understand the routines in order to develop the appropriate IPC so as to improve the business performance. Similarly, quite a few scholars (e.g. [9][18][24][45][48]) study the series of frequent, predictable task activities from the lens of organizational routines.

On the other hand, other scholars emphasize developing IPC according to the interdependency in tasks. Thompson [69] initially distinguished three types of interdependent relationships (i.e. pooled, sequential and reciprocal) among various organizational sub-units. He believed that, companies need to take different levels of interdependency into account to develop corresponding coordination mechanism (i.e. achieve certain IPC), so as to achieve better business performance. Working in a similar vein, some scholars, such as [3][24][36], utilize the concepts of sequential and reciprocal task characteristics to highlight the importance of fit between level of interdependency and coordination mechanism.

The discussion above indicates that there are two salient dimensions to understand the SCF IPR, including (1) the routinism of SCF business (routine or non-routine) and (2) the interdependency among parties to SCF business (pooled, sequential or reciprocal). Secondly, after understanding the specific types of SCF IPR (e.g. routine-reciprocal), lenders are supposed to develop the corresponding IPC (e.g. routine-reciprocal IPC). Finally, SCF lenders can develop the corresponding mechanism to achieve certain types of IPC. For example, Egelhoff [24] argue that a firm can develop one of 14 distinct kinds of information-processing mechanisms (such as single-cycle planning, stand-alone computer systems and integrated database computer systems) to achieve certain level of IPC.

In the following paragraphs, we will discuss what types of IPR, IPC, and information-processing mechanism are involved in the SCF projects. In addition, we will highlight how the SCF lenders can reduce different types of SCF credit risk and coordination costs through the improvement of the IPC.

## **METHODOLOGY**

In this paper, we emphasize the detailed contextual analysis of a limited number of case studies [25] for the following reasons: First, the critical issues of controlling risk and costs inherent in the design and the implementation process of SCF services have not yet been deeply explored in the current literature. By exploring and contrasting these multiple cases, we can provide the inference on the logical relationships among various critical concepts of SCF risk management, facilitating the development of SCF theories [82]. Second, our multiple-case method preserves the vitality of various experiences as they happened as well as presents the perspectives and insights of key decision makers in the SCF trade. By conducting multiple case analysis, we have a high confidence in examining the “what” and “why” of SCF risk and cost control practices [82] and identifying their implications on competitive advantages. Third, the validity can be improved after repeated verification and cross-checking in multiple cases.

To ensure the reliability of our research, we build upon the existing literature and develop a research plan, which sets out our research objectives, targets, methods and interview procedures, inquires specific details. The main data collection was performed during September 2014 to October 2015. To further check and establish validity in our study, we validate our data and research by cross verifying the same information with the use of triangulation [23][46]. We have conducted the semi-structured interviews in a fairly open manner to encourage two-way communication, as well as conducting site visits and collecting second hand data for the SCF projects.

All taped interviews were converted into written scripts; photos and notes about transaction flows at company sites were labelled; external publications were compared with company provided brochures to verify the validity. These materials were labelled, coded and consolidated into a database. We then followed the 3-stage coding process suggested by Corbin and Strauss [15]. We started with open coding using conceptual labeling and grouping in order to form categories and subcategories. In the phase of axial coding, we then examined the data to find evidence about the relationships across categories as well as between categories and subcategories. Categories that commonly appeared across all cases are unified into core categories or constructs in the phase of selective coding. The following constructs are the central phenomena of the study: IPC, strategies of mitigating information asymmetry, credit risk, coordination costs and competitive advantage.

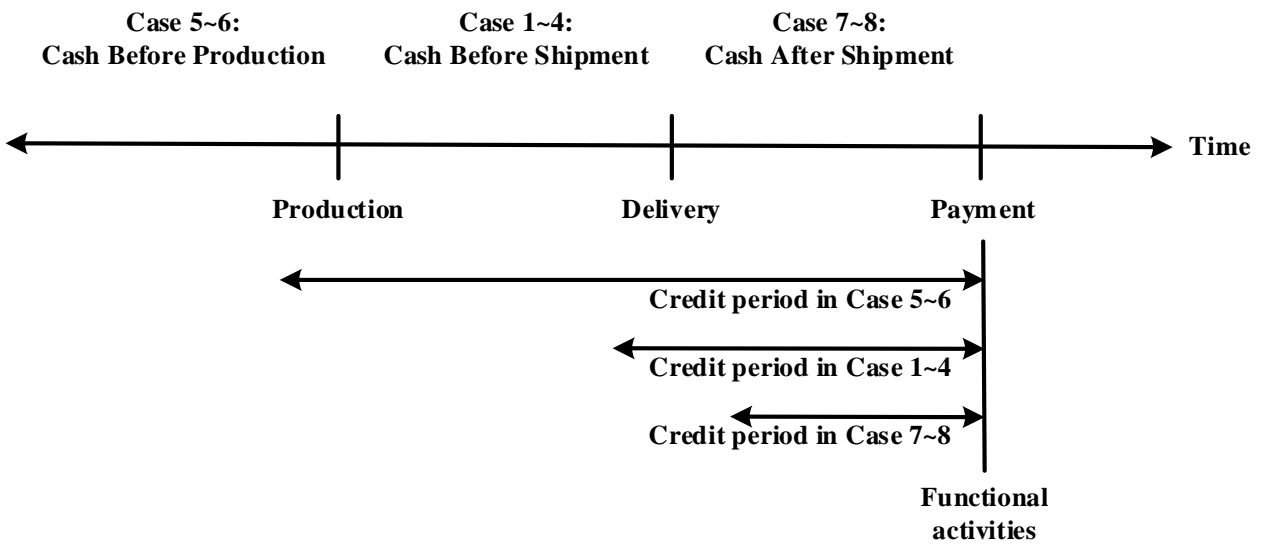
In the case selection, we used the following criteria to pick the most appropriate cases for analysis: (1) the inclusiveness of three categories of SCF (pre-payment financing, pre-production financing and post-shipment); (2) the inclusiveness of different types of SCF lenders (financial institutions, third-party service providers and large SC firms); and (3) the varieties of borrowers and the SCF implementation technologies used [25]. Based on these criteria, we selected eight cases from four lenders in seven industries in China to provide sufficient diversity through such “theoretical sampling” [82]. Unlike many developed markets, as of September 2017 China still lacks a widely accepted consumer credit rating system to gauge the creditworthiness among a fast-growing middle class, many of whom never have had a credit history [81]. Consequently, consumers and SMEs alike who have a hard time to borrow from state-owned banks turn to the fast-growing innovative lending models offered by private organizations.

As mentioned before, we arrange the eight cases into three categories (i.e. pre-payment financing, pre-production financing and post-shipment financing) by three types of financing needs, distinguished by the timing of payment. Figure 1 illustrates the differences in the timing between these SCF needs [49]. In regards to pre-payment financing, Cases 1 to 4 describe the situation where dealers and distributors need to pay the seller in advance before products are delivered because the sellers are powerful manufacturers of appliances or wholesalers of successful brands of drinks. These dealers and distributors borrow money from Bank A by using powerful sellers’ credit, and they need to pay back the interests and principal on a later day, sometimes even before they collect revenues from selling the products to end consumers. For post-shipment financing, Cases 7-8 are in the opposite side of the spectrum where small suppliers sell to powerful retailer or manufacturer. Instead of waiting for maturity of accounts receivable, a supplier can get their payment faster (but at a discount) by using post-shipment financing initiated by the more powerful buyer. The incentives for the buyer to organize post-shipment financing, wherein reverse factoring is one format, include an extension of the payment date and/or strengthened supplier relationships [41][63]. Regarding pre-production financing, Cases 5-6 provide the longest coverage of financing time window (credit period), from material and component procurement until finished product delivery. The third-part service providers may also serve as a coordinator to manage contact manufacturing, logistics and export customs clearance. Therefore, the unit of analysis is defined as each individual case, consisting of the lender, the core firm and the borrower. Each case is distinct in the combination of the players and the processes on which they interact with one another.

## **RESULTS**

We performed within-case and cross-case analyses through the lenses of three theories: CRT, TCT, and IPT. We came up with several propositions that form an integrated conceptual framework of SCF which helps lenders develop a competitive advantage. This framework contributes to the SCF literature by providing empirical support for the relationships among key constructs of SCF and two key strategies of credit risk management. To practicing managers, especially in emerging markets where innovative SCF

practices abound, we offer evidences and suggestions that credit risk can be controlled by integrated information system in lieu of collaterals.



**Figure 1.** Three types of supply chain financing

*References available upon request from the authors*