LJMU Research Online

Be Nguema, B, Gongbing, BI, Akenroye, TO and Elbaz, J

The Effects of Supply Chain Finance on Organizational Performance: A Moderated and Mediated Model

http://researchonline.ljmu.ac.uk/id/eprint/14335/

Article

The Effects of Supply Chain Finance on Organizational Performance: A Moderated and Mediated Model

Abstract

Purpose- This paper draws on the dynamic capabilities approach, and aims to empirically investigate the impact of supply chain finance (SCF) on firm performance (e.g. operational risk and operational performance), the critical effect of environmental dynamism (ED) as moderator and supply chain risk (SCR) and a mediator in the relationship between SCF and OP.

Design/methodology/approach –This study is based on empirical data collected from a survey of 210 companies and their supply chains in mainland China. Structural equation modeling is used to test our proposed relationships.

Findings – The findings show that SCF significantly mitigates the SCR, which subsequently has a significant positive effect on organizational performance (e.g., cost performance and operational performance). The findings also show that when environmental dynamism (ED) is high, the relationship between SCF and SCR is stronger and vice versa. Moreover, supply chain risk (SCR) mediates the relationship between supply chain finance (SCF) and organizational performance (OP).

Hypothesis regarding the moderating effect of environmental dynamism (ED) on the paths joining supply chain finance (SCF) and supply chain risk (SCR) was also supported. Supply chain risk (SCR) has a significant negative effect on organizational performance (OP). However, hypothesis regarding the effect of environmental dynamism (ED) on supply chain risk (SCR) was not supported.

Research limitations/implications- This study has some limitations.

First, we conducted our research with Chinese organizations. This may result in low generalizability in other contexts. In addition, we employed survey method and cross-sectional data design in this study, which may generate the potential issue of common method bias (CMB). However, the findings of this study will help organizations across China and other emerging economies to adopt SCF as a secure financing mechanism to enhance working capital and mitigate risk.

In addition, our paper provides some new managerial insights for decision makers in organizations, while exploring different factors such as supply chain finance (SCF), supply chain risk (SCR), and environmental dynamism (ED), and their effect on organizational.

Originality/value- This study has greatly developed a general SCF adoption model that helps to guide

empirical research investigating the critical impact of SCF on firm performance.

Keywords: Supply chain finance, supply chain risk, organizational performance, environmental dynamism

Paper type Research paper

1. Introduction

The current economic environment is beset with various challenges, including major competition, uncertainty, and high turbulence (Gligor et al., 2015; Brusset, 2016; Hazen et al., 2017).

Aslam et al. (2018) state that firms are increasingly adopting different strategies to remain competitive. The 2008 financial crisis led to reduction in the concession of new loans to organizations; there were major growth in the interest charged by banks (Ivashina and Scharfstein, 2010). These events were generated by a strong rise in perceived corporate risk, as described by corporate credit ratings.

Indeed, the post-crisis distribution of corporate credit ratings among the most important rating agencies indicated a significant reduction in the number of non-financial corporations, as well as a growth in ratings (Chava and Purnanandam,2011). Moreover, the raised perception of credit risk and higher capital needs conducted by Basel II led to an overall raise in bank risk aversion, and a subsequent restriction of trade finance advantages toward further risks (Asmundson et al., 2011).

As a result, liquidity-scarce organizations tried to compensate for the contraction in financial institutions such as bank lending, by raising access to trade credit, increasing payment terms, reducing settlement terms with customers, and mitigating risk (Klapper and Randall, 2011).

Researchers proposed that executives often face trade-offs between flexibility and efficiency, where giving priority to one over the other is prejudicial (Eisenhardt et al., 2010).

Others state that organizations can pursue both flexibility and efficiency by building ambidexterity capability (Kristal et al.,2010; Liu et al., 2013; Blome et al., 2013a; Ojha et al., 2018; Aslam et al., 2018).

Lenders and financial institutions have adopted several financing strategies which help organizations to increase their working capital and achieve the superior operational and financial performance (Wang et al., 2013). One of the most critical of these strategies is supply chain finance (SCF), which aims to increase financial flow (Hofmann, 2005; Pfohl and Gomm, 2009) through solutions adopted by financial institutions (Chen and Hu, 2011; Lamoureux and Evans, 2011).

SCF can improve organizational performance by facilitating longer payment terms while offering better receivable facilities to their suppliers (Wuttke et al.,2016). (Tanrisever et al., 2012) emphasized that firms widely adopt SCF to expand their payment terms in order to increase their working capital.

SCF includes a wide range of solutions and strategies (Gelsomino et al., 2016), but all share common supply chain characteristics. For instance, the quality of relationships between supply chain players and financial institutions significantly impact the successful adoption of SCF solutions (Wuttke et al., 2013). Moreover, reverse factoring (one of the most critical SCF approaches in which a buyer organization smooths early payment of its trade credit involvements to suppliers) is based on the attribution of buyer-supplier relationships to finance a risky supplier (Caniato et al., 2016).

However, many organizations do not adopt traditional financial credit rating perspectives, and are mainly focused on performance characteristics such as operational performance, operational risk and debt level (Edwards, 1997; Wood, 1981). Thus, SCF dramatically impacts business by offering risk-free credit facilities to the supply chain members for smooth operation of supply chains (Basole and Bellamy 2014). (Song and Wang 2013) argued that organizations with a high degree of financial risk urge their managers to employ different financial solutions to grow the firm's working capital.

Initially, financial institutions such as banks required security to mitigate the risks of granting credit (Duan and Yang, 2009). This affected the productivity of organizations and put pressure on their activities. To overcome this situation, practice and research on SCF has improved OP and working capital (Pfohl and Gomm 2009). SCF has become a critical scheme for streamlining financial management at organizational level (Gomm, 2010). However, little is known about the effects of SCF on OP. More specifically, there are no studies on the effects of SCF on OP (e.g., operational risk and operational performance) and supply chain risk mitigation schemes. To our knowledge, there has been a paucity of literature regarding the role of SCF in untangling OP and supply chain risk.

To address these research gaps, this paper attempts to investigate the effects of SCF on OP.

It explores both the moderating effect of environmental dynamism (ED) and the mediating effect of supply chain risk (SCR) in the relationship between SCF and OP. This paper seeks to make four contributions to academic research. This study advances research on SCF by investigating its effects on OP (i.e., operational risk and operational performance). The second contribution of this paper is to recognize SCF as a risk mitigation scheme for an organization. Third, to our knowledge, this is one of the first studies which empirically builds a conceptual model between SCF, supply chain risk (SCR), environmental dynamism (ED), and OP. To the best of our knowledge, less work has been conducted to investigate the moderating effect of ED and the mediating effect of SCR in the relationship between SCF and OP. We tried to address this gap by investigating the moderating effect of ED and the mediating effect of SCR in the relationship between SCF and OP which has not been examined in previous literature. We use the resource-based theory (RBV) of the organization to predict the effects of SCF on OP. The rest of the paper is organized as follows: Section 2 presents a literature review. Section 3 presents our research methodology.

Section 4 presents the results. Discussion, implications of the study and future research directions are presented in section 5. Finally, section 6 presents the conclusion.

2. Theoretical background and hypotheses development

2.1. Dynamic capability view (DCV)

The dynamic capability view (DCV) is described as a "high-level practice that, in combination with its execution input flows, lends upon an organization's management a set of decision abilities for generating important outputs of a specific type" (Winter 2003).

According to (Ambrosini and Bowman, 2009; Teece, 2007), dynamic capability refers to the capability of an organization to build and redesign its internal and external resources.

(Coyne et al., 1997; Prahalad and Hamel, 1990) found that the dynamic capabilities theory is based on the resource-based view (Barney, 1986, 1991) and the core competency theory.

According to the resource-based view, organizational performance is established from the capability and differences in resources an organization holds, which are valuable, rare, imperfectly imitable, and non-substitutable (Barney, 1991). The scholar investigated theory of RBV to create a competitive edge for measuring organizational performance.

(Barney, 1991) proposed that the firms have various types of resources including supply chain finance (SCF), and organization utilizes such resources to secure possible superior performance.

Hence, SCF is considered valuable resource that can greatly enhance the firm's capabilities and therefore lead toward higher an organizational performance. Previous scholars have employed the dynamic capability to addressing the utilization of the firm's resources for the achievement of higher firm's performance (Melville et al., 2004). To respond to changing environments, an organization has to build and relocate its different resources and capabilities (SCF) based on its management process and market positions. An organization must have capabilities to implement appropriate strategies required for uncertain, changing environments (Liao et al., 2010).

Thus, to ensure great competitive advantage in a dynamic environment, SCF is a critical source of competitiveness and organizational renewal. Further scholars (Damanpour et al., 2009; Teece et al.,1997) found that the ability to redesign organizational processes through different resources and capabilities is valuable in dynamic environments in which competitive advantages and positions erode swiftly because of innovations, customer requirements, market context, and legal systems.

While PrimeRevenue (2016) claims that SCF is the best approach to enhance the firm's working capital and reduce the supply financial risks which in turn, greatly enhance organizational performance. (Hofmann and Belin, 2011) theoretically investigated the SCF solutions and proposed that SCF may mitigate the potential risk of default and enhance the working capital management and firm performance in dynamic environment (e.g., environmental turbulence). The current literature differentiates between ordinary capabilities (OC and dynamic capabilities (DC) (Winter, 2003; Teece, 2012). Ordinary capabilities, also known as the resource base of the organization (Pezeshkan et al., 2016), are characterized by their in-depth integration into organization patterns to improve the efficiency of its functions (Teece, 2012); they may involve the adoption of the different practices that are essential to perform activities (Teece, 2014). The DC, also called higher order capability (Teece, 2014) was implemented by (Teece et al.,1997) as an expansion of the resource-based view (RBV) to describe the competitive advantage of an organization in turbulent markets and highly dynamic, changing environments (Winter, 2003; Teece, 2012; Eckstein et al., 2015). (Teece, 2012) argued that the DC is organizational ability to generate and establish external resources to overcome changing business environments. Many conceptualizations of DC have been investigated in the literature.

For instance, (Teece, 2014) investigated a conceptualization of DC with three dimensions namely: the sensing capability, the seizing capability and reconfiguring capability. The sensing capability helps the organization to identify new opportunities that can meet customer demands and business opportunities; the seizing capability helps the organization to identify required resources to satisfy customer needs and business opportunities, while reconfiguring capability includes all functions that recombine bundles of resources and ordinary capabilities to innovate and respond to changes in the business environment (Teece, 2014; Fainshmidt and Frazier, 2016). (Wilhelm et al.,2015) also found three dimensions of DC, sensing capability, learning capability and reconfiguring capability.

The learning capability plays the role of seizing capability described by (Teece, 2014). According to (Wilhelm et al. ,2015), learning capability is the ability to expand opportunities to efficiently face environmental changes. Learning capability is similar to the seizing capability as suggested by (Teece ,2014). All these capabilities help organizations to increase customer demand and business opportunities (Wu, 2010) while sustaining and growing by reacting to changes in the new environment (Wilden et al., 2013; Mikalef and Pateli, 2017). They also enable organizations to adapt mechanisms to mitigate costs (Wilden et al., 2013); innovate profit (Teece, 2007); provide themselves new sets of decision choices (Wilden et al., 2013); and bring new skills, practices, and outcomes (Pezeshkan et al., 2016). Thus, the overall goal is to reach competitive advantage (Wilden et al., 2013).

(Eisenhardt and Martin, 2000) found that the expansion of other resources and even their transformation into new sources of competitive advantage, are attributed to DC. DC helps organizations to shape the market in ways that will increase value creation (Augier and Teece, 2009; Katkalo et al., 2010). Researchers claim that the capacity of organizations to sense threats and seize business opportunities (Wilden et al., 2013), then rapidly reconfigure their resources to build business value depicts different types of performance among organizations (Wilden et al., 2013). All these previous studies are significant in understanding not only the effects of SCF, but also its impact on OP (cost and operational performance). This study proposes that in environmental dynamism (ED) or in a rapidly changing business environment, organization may use its valuable resource such as supply chain finance (SCF) to mitigate supply chain risk (SCR) and achieve competitive advantage. In addition, this study uses supply finance as a required capability in order to gain a sustainable competitive position in environmental dynamism (ED).

2.2. Supply chain finance

The concept of supply chain finance (SCF) was initially used by (Stemmler 2002), the scholar emphasized that the principle of SCF is to integrate the finance with the supply chain mechanism. (Johnson and Templar, 2011) defined SCF as a critical solution for settling current credit issues by improving the overall financial performance of the organization and minimizing the financial and operational risk of interruption at the supply chain level. SCF can greatly mitigate the total supply chain cost of firms, especially the capital cost (Waller et al., 1999). Firms can obtain cost reduction advantage through SCF in following aspects. First, firms can lower inventory cost through SCF solutions

For instance, (Dong and Xu, 2002; Waller et al., 1999) found that the vendor-managed inventory method reduces the inventory holding and managing cost of the focal firms. The improved accuracy can further decrease the inventory holding (Dong et al., 2007; Sari, 2007). In addition, (Valentini and Zavanella, 2003) claimed that SCF solutions can mitigate the stock out issues of firms due to the secure of supply chain. Second, firms can lower the capital cost by using SCF solutions. Further scholars (Randall and Theodore Farris, 2009) also proposed that the cash-to-cash cycle is determined by the arrangements of inventory, account receivables, and account payables.

Finally, (Wuttke et al., 2013b) proposed that weak working capital position of firms in supply chain is closely related to the use of SCF solutions for minimizing perceived liquidity risk.

Moreover, many companies often have limited access to financing opportunities and suffer from high financing interest cost, leading to the potential high cost of final products delivered to customers. Through SCF solutions, firms (the supply chain partners) can build collaboration to greatly improve the cash flow, share the financial risk and lower financing interest cost over the whole supply chain (Berger and Udell,2006; Klapper, 2006). According to (Wuttke et al., 2013a), firms can minimize operational cost through SCF solutions by reducing the suppliers' cash flow risk, supply chain disruption risk, and transaction costs. (Chen ,2016) argued that SCF involves both the inventory system and the financial system. Thus, exploring the apparatus of SCF is not just necessary, but major sources of capital are required for enhancing the SC efficiency and improving the SC partners' profitability of (Chen, 2016). (Zhao and Huchzermeier ,2018) argued that SCF is an event triggered financing solution to perform the organization's operations. SCF is a profit-shifting and risk-shifting strategy in different market environments to enhance OP in financial institutions such as banks (Chen ,2016).

(Zhao and Huchzermeier, 2015) investigated the risk management for enhancing OP by considering the operational and financial management of organizational resources. (Gronum et al. ,2012) studied OP in SC networks, and argue that strong-ties enhance OP. (Song et al.,2016) explored the organization SC network influence and SCF, and they found that bridge ties have a significant direct effect on the credit quality of organizations. Moreover, (Zhu et al.,2017) developed an organization credit risk framework in the context of SCF and found that this model plays a critical role for financers to access the organization creditability, increase the cash flow, mitigate the risk of whole SC default and make effective credit decisions. Many organizations face a shortage of funds to meet their daily operational requirements, which directly or indirectly influence performance (Song et al., 2016; Lekkakos and Serrano, 2016). To overcome such difficulties, SCF is a critical and new financial solution provided by financial institutions and financial service providers to organizations, to increase their working capital with lower capital cost and lower risk (Lamoureux and Evans, 2011; Pfohl and Gomm, 2009).

Previous studies for instance (Theodore Farris and Hutchison, 2002; Wuttke et al., 2013a), also proposed that SCF solutions can significantly influence the capital cost of firms by minimizing the cash-to-cash cycle. (Gunasekaran et al. ,2004) argued that the performance of an organization describes how it patches up the ways for performing operational objectives. (Johnson and Hofmann, 2014) pointed out that SCF is a strategy for shared responses of participants that need integration across the organizations for working capital optimization and OP. The conceptual model is shown in Figure 1.

The hypotheses are developed as follows.

[Add Figure 1. Conceptual model here]

2.3. Supply chain finance, supply chain risk and organization performance

Traditionally, the inventory and other resources of an organization are financed by financial institutions which increased the risk for an organization. (Gomm, 2010) stated that particular threats to a specified asset could not be supposed. Instead, the risk is similar to an overall threat to the organization. SCF has become available in the market to overcome the traditional threat such as supply chain risk. (Johnson and Templar, 2011) described SCF as a critical solution to settle existing credit issues by enhancing the financial performance of organizations. As per PrimeRevenue (2016), SCF is the best strategy to increase working capital and minimize the supply chain risk (SCR).

Song et al. (2016) used structural equation modelling to establish the relationship between network ties and firm credit concern. (Ali et al., 2018) concluded that SCF adoption factors directly and indirectly improve supply chain effectiveness. (Gao and Xing, 2015) proposed that buyers and suppliers always require credit to run their operations effectively and need risk-free financing solutions to meet their funding requirements, otherwise organizational performance will be affected.

(Gomm, 2010) explored cash management and financial structure within the supply chain as SCF.

(Camerinelli, 2011) examined SCF as the accumulation of products & services that financial institutions provide to organizations to encourage physical flow and cash flow. (Wang et al. ,2017) emphasized that information reliability with financial flow greatly decreases the market disruption risk and affects supply chain performance. (Caniato et al., 2016) developed a framework to improve the flow of financial management by means of SCF. (Gelsomino et al.,2016; Chen, 2016) proposed SCF includes the inventory system with the financial system. The scholars divided the SCF into two groups, trade credit (B2B) and crowdfunding. While (Chen, 2016) proposed that SCF is a profit-shifting and risk-shifting strategy for firms in different market contexts to greatly enhance firm performance in the presence of financial institutions such as banks. Further scholars for instance (Chakuu et al., 2017) proposed that SCF is suitable for mitigating the overall supply chain risk (SCR) of firms.

(Song et al., 2018) compared the SCF solutions provided by banks and financial service providers that help organizations to obtain risk-free credit. Similarly, (Ali et al., 2019) suggested that SCF enhances organizational performance by greatly reducing supply chain risk (SCR).

Moreover, (Hofmann and Belin, 2011) argued that SCF can be regarded as a way to improve working capital which mitigates SCR and enhances operational performance (OP) of firms. (Juttner et al.,2003) proposed that control of vulnerability (Risk) and mitigation are the main concerns related to the management of supply risk. This is described as the supply risk function to mitigate vulnerability at the firm level. Thus, an effective risk mitigation strategy provides successful decision making to address the unpredicted event of firms (Sodhi and Tang 2012). Variations are being developed with major risks, such as disruption of the whole chain (Waters, 2011). (Vu-Nguyen et al. ,2017) argued that adoption of effective vulnerability mitigation schemes improves working capital and mitigates the risk at organizational level. A few studies have tended to the alleviation of risks in the supply chain but did not explore mitigation factors regarding different risk types.

(Eckstein et al.,2015) emphasized that'' the direct performance impacts are often necessary, but they seem unable of completely catching the involvement of the business fact''. Moreover, (Sousa and Voss, 2008) proposed that the performance effects of some supply chain practices depend upon the environmental context. While prior studies clearly state that a turbulent external environment can either improve or disrupt an organization's most critical capabilities (Afuah, 2001).

For example, (Eisenhardt and Martin, 2000) and (Chen et al. , 2015) argued that ED is a critical factor in

DC theory, which emphasizes that the difference of competitive advantage caused by means of exploitation of organizational capability depends on ED. Environmental dynamism (ED) generates pressure on organizations to employ organizational capability to perform their operations (Droge et al., 2004). However, other scholars propose that the choices of customers are environmentally dynamic (Lee & Chu, 2013). (Venkatraman & Camillus, 1984) argued that organizations must build a close link between the products/services they provide and customers' needs in order to keep market position. Organizations with a high level of ED behave positively in sensing business opportunities (Lee & Chu, 2013). Earlier research employed the framework of agency theory (Eisenhardt, 1989) in managing SCF to mitigate SCR, which subsequently enhances OP. Both (Eisenhardt, 1989) and Zsidisin and Ellram ,2003) stated that agency theory is related to the study of issues that occur when one member, the main, gives the task to another member. (Eisenhard, 1989) proposed that buffer-oriented issues are derived from mitigation approaches while behavior-oriented issues are derived from mechanisms by which organizations focus on task-related functions towards mitigation of risks.

Hence, this study is conducted to examine the effect of SCF on OP (e.g., cost performance and operational performance). It also provides a new concept of SCF as a risk mitigation scheme at organizational level. Therefore, we predicted the following hypotheses.

Hypothesis 1: Supply chain finance significantly and positively reduces supply chain risk

Hypothesis 2: Supply chain finance greatly and positively impacts organizational performance

Hypothesis 3: Supply chain risk significantly and negatively impacts organizational performance

Hypothesis 4: Supply chain risk significantly mediates the relationship between supply chain finance and organizational performance

2.4. Moderating role of environmental dynamism

Environmental dynamism (ED) refers to the volatility and unpredictability of organization's external environment (Miller and Friesen, 1983; Schilke, 2014a). ED is a critical component in the DC theory (Schilke, 2014a), which emphasizes that the impact of DC on organizational performance (see Chen et al., 2015) and other supply chain characteristics like SCF and SCR (Boyle et al., 2008; Gligor et al., 2015; Rojo et al., 2018) depends on the degree of dynamism of the organization's external environment

(Eisenhardt and Martin, 2000). (Levinthal ,2000) suggested that the advantages of DC rely on the existence of underlying organizational practices, but also on the circumstances in which capabilities are used. (Eisenhardt and Martin, 2000) proposed that in moderately dynamic markets, organizations usually pursue foreseeable ways. Thus, great DC in moderately dynamic environments relies on exploiting current knowledge. However, variations in high-change markets are usually nonlinear and less foreseeable (Alexander et al., 2018). According to (Afuah, 2001), environmental dynamism (ED) can influence supply chain finance (SCF) and supply chain risk (SCR).

Therefore, we can hypothesize:

Hypothesis 5: Environmental dynamism significantly and positively influences supply chain risk

Hypothesis 6: Environmental dynamism significantly moderates the relationship between supply chain finance and supply chain risk.

3. Methodology

3.1. Sampling and data collection

To test our research hypotheses, we employed a survey approach to collect data from randomly selected companies and their supply chains in mainland China.

To obtain a representative sample, we employed the Yellow Pages of China Telecom in each of the five mainland China cities and the executives of the Chinese Supply chain Association as our sampling pool. This method is adequate for studies that test hypotheses, develop measurement scales, or establish theoretical research frameworks (Lee and Shim, 2007). For each randomly selected organization, we identified a key informant, who typically had a title such as supply chain managers who were in charge of the company's internal and external processes. We targeted these executives as they are mostly knowledgeable about organizational issues and their application in other business functions.

Moreover, we designed our questionnaire by adopting relevant measures from extensive literature.

We measured the items of our study using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Since we conducted our study in the Chinese context, we followed the technique of double translation as suggested by (Brislin, 1980). We then used the classic translation-transcription method to translate the English questionnaire into the Chinese questionnaire.

We employed this method to support the reliability and validity of the scales, as recommended by

(Douglas and Craig, 2007). Five Chinese researchers with expertise in SCM revised the main questionnaire and made their recommendations. The revised Chinese questionnaire items were then pilot tested. We interviewed 30 potential respondents to make sure that the measures are understandable in the Chinese context. To increase our response rate, we contacted three Chinese scholars to make further phone calls to help the data collection process. After merging the surveys of managers, there were only 210 usable responses, which represent a response rate of 13.69%.

Although we collected data using double-respondent matching, we also investigated common method bias, employing Harman's one-factor test (Podsakoff et al., 2003).

The results indicated that 5 factors were extracted with adequate values greater than 1.0, representing about 73.04% of the variance, and the first cause represented 16.60% of the variance.

We then assessed the common method bias by comparing the fit between the one-factor model and the measurement model. The one-factor model indicated a weak fit ($\chi 2$(df)= 2551.71(268)), and was inferior to ($p < 0.01$) the fit of measurement model (($\chi 2$(df)=511.7(241)). Accordingly, common method bias was not a major issue in our study. Given the potential non-response bias, we compared both the early and late pools of our study as suggested by (Armstrong & Overton, 1977).

The pattern was then split into two groups (early 25% and late 25%). Both groups indicated no significant dissimilarity in organization size, organization age and total assets. Therefore, the outcomes revealed that non-response bias was not a significant issue in our study. Table 1 shows the results of the sample demographic.

[Add Table 1 here]

3.2. Measures

This research used an extensive literature review to examine the scale items of the instrument for ensuring the content and face validity of the measures (see Appendix). The scale of ED was adopted from the earlier study of (Schilke, 2014a; Miller and Friesen, 1983). They measured this scale using four items (α =0.812). The scale of SCF was taken from the work of (Zhang, 2015) who measured this scale with four items (α =0.874). The scale of SCR was adopted from the research of (Juttner and Ziegenbein, 2009) who used seven items (α =0.891). The scale of OP was taken from the study of Kotabe, (1990) who used three items (α=0.943). In addition, this paper also included the sample characteristics of organization as control variables, such as organization size, organization age, and total assets, which are in line with the earlier study of (Song et al., 2018).

4. Data analysis and results

4.1. Measurement model

In this study, we employed confirmatory factor analysis (CFA) to test the validity of measures as shown in Table 2 and Appendix. The reliability of the measures was well explored. Composite reliability (CR) test explores internal consistency and reliability of latent constructs. The CR threshold is 0.70 or higher. Values between 0.60 and 0.70 are recommended in exploratory research and between 0.70 and 0.90 in other types of research; values below 0.6 are considered lacking reliability (Hair et al., 2011; Nunnally and Bernstein, 1994).

[Add Table2 Results of Confirmatory Factor Analysis here]

Table 2 shows that each construct fulfilled the recommended value and that all constructs have reliability. Cronbach's alpha is a common test for internal reliability of latent constructs (Bryman and Bell, 2011) and recommended to be higher than 0.70 (Hair et al., 2011; Urbach and Ahlemann, 2010). Convergent validity is presented by average variance extracted (AVE) and should be higher than 0.50 as recommended (Hair et al., 2010; Fornell & Larcker, 1981). All of the latent constructs in Table 2 have sufficient convergent validity: AVE > 0.6. Factor loading accounts for non-dimensionality of the measuring items (Awang, 2012). The value of factor loading for an established item should be 0.6 or higher.

The remaining eligible items, listed in Table 2, show an adequate convergent validity, internal consistency and reliability of measuring items and are all consistent with the recommended threshold value.

4.2. Discriminant validity

Performing discriminant validity is a building block of model evaluation as suggested by (Hair et al., 2010). Discriminant validity ensures the originality of a measuring construct and shows that the phenomenon of interest is not captured in other measures (latent variables) within the research model

(Hair et al., 2010; Henseler et al., 2015). Thus, this study employs both Fornell–Larcker and heterotrait monotrait ratio (HTMT) criteria for discriminant validity assessment.

The second criterion for discriminant validity assessment, HTMT, is usually applied for performing discriminant validity in PLS-SEM. Literature on PLS-SEM emphasizes that many researchers mainly employ the Fornell–Larcker criterion and cross-loadings for discriminant validity assessment in variance-based SEM. The standard criterion (i.e. Fornell–Larcker criterion) for discriminant validity assessment necessitates the square root of AVE to be significant than the correlation of the construct with all other constructs in the structural model.

The factor relationships between a pair of latent variables should be less than the square root of AVE of each variable as indicated in Fornell Larcker Criterion (Table 3) through factor correlation matrix. The measure of the validity suggests the square root of AVE shown in bold fonts across the diagonal of Table 3 for each variable is always significant than the correlation value for any pair of variables. Thus, we greatly achieved discriminant validity, still heterotrait-monotrait (HTMT) ratio has to be tested because (Garson, 2016) reported the short comings of Fornell-Larcker criterion analysis and was also supported by (Henseler et al., 2015).

[Add Table 3 Fornell-Larcker here]

Since a well-fitting model requires heterotrait correlations should be smaller than monotrait correlations, meaning that the HTMT ratio should be below 1.0.The proposed ideal value of HTMT ration should be below 0.90 as suggested by (Henseler et al., 2015). HTMT value close to 1 shows lack of discriminant validity; yet, some scholars for instance (Henseler et al., 2015, p. 129) propose a conservative value of 0.85 for HTMT and a broader value of 0.90. According to this recommendation, if HTMT values are below 0.85, discriminant validity is not a critical issue. For t-statistics of the outer model, we used bootstrapping method having 5000 subsamples. The Bootstrap outcome approximates the normality of data as suggested by (Wong 2013). In the bootstrapping calculation, for two tailed test having significance level of 0.05, this study proposes that all the path coefficients are significant as all the values are above 1.96 (Wong 2013). Table 4 indicates that HTMT values satisfy even the more conservative criterion, as all the values are below 0.85.

[Add Table 4 Heterotrait-Monotrait Ratio (HTMT) here]

[Add Figure 2 Results of the research model here]

[Add Table 5 Model fit indices here]

4.3. Structural model analysis

To test the hypotheses and point out the statistical significance of the path coefficients in our research model, SEM was employed. The fit of the model is satisfactory, chi-square (X^2) = 658.68 and degree of freedom (df) = 219. Figure 2 indicates the relationships between constructs in the model. Relevant fit statistics such as root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted GFI (AGFI), normed fit index (NFI), Tucker–Lewis index (TLI) and comparative fit index (CFI) were computed. These model fit indices are in line with the recommended guidelines and depict that our research model has a good fit with the data as suggested by (Browne and Cudeck, 1993; see Table 5).

4.4. Linear regression model and hypotheses testing

To test the effects of supply chain finance on organizational performance (e.g. operational risk and operational performance), we run linear regression analysis by using PLS-SEM analysis.

The linear regressions results show that predictor has different impacts on organizational performance. Table 8 shows the results of two linear regressions for organizational performance variables such as operational risk and operational performance in Model 1 and Model 2.

The goodness-of-fit Chi-square values are 86.245 and 96.298 for operational risk and operational performance, respectively. The test results show that all two models are significant, and organizations in some industries are more likely to use SCF to greatly reduce operational risk and enhance operational performance. In line with our hypotheses, SCF (β=0.29,t=3.813, $p<0.01$: Model 1) positively and greatly reduces operational risk, therefore (H1 accepted). In Model 2 SCF (β=0.23,t=2.410, $p<0.01$) significantly and positively enhances operational performance, therefore (H2 accepted).

Similarly, SCR (β=-0.36,t=1.280, $p<0.01$) strongly and negatively influences operational performance, therefore, (H3 accepted). To confirm whether supply chain risk (SCR) mediates the relationship between supply chain finance (SCF) and organizational performance (OP), the indirect effect was tested by using the bias-corrected bootstrap-ping (1000 times iterations) approach as suggested by (Hayes and Preacher, 2010). Table 7 shows the result of mediation analysis that indirect effect of supply chain finance (Indirect effect= .128) on organizational performance through supply chain risk was greatly mediated, thus confirming that (H4 is accepted). Therefore, this result proves that supply chain finance significantly mitigates the supply chain risk which, subsequently, improves the organizational performance. Moreover, the results of coefficients in both Model 1 and Model 2 of Table 8 show that environmental dynamism (β=0.03,t=1.120, p=0.30) marginally and negatively influences organizational performance, therefore (H5 rejected). Moreover, we tested the moderating effect of environmental dynamism in the relationship between supply chain finance and supply chain risk by employing the product-term approach suggested by (Cohen and Cohen, 1983).

Consistent with our hypothesis of moderation, the results show that environmental dynamism significantly moderates the direct relationship between supply chain finance and supply chain risk.
As shown in Table 6, the interaction between supply chain finance and environmental dynamism is greatly and positively related to supply chain risk (β=0.19, t=4.338, p<0.01), therefore, (H6 accepted). In this study, we further considered t-test, measure of the coefficients of Pearson's determination (R^2), size of the effect (f^2) or Cohen's Indicator, predictive Validity (Q^2) or Stone-Geisser indicator and interpretations of path coefficients. The current study also determined the prediction accuracy of the model by using the variance portion (value of R^2 /Squared multiple correlations). Findings predict that supply chain finance accounted 38% variance in supply chain risk and 25% variance is accounted by all predictors of the research in criterion constructs (i.e. organizational performance) (see Figure 2).

According to (Cohen, 1988), R^2 =2% is classified as having a small effect, R^2 =13% as a medium effect, and R^2 =26% as having a large effect. To get the Q2 value, blindfolding test was made by using smart-PLS and it was found to be above zero for all the values, while the Cohen's Indicator (f^2) obtained through the blindfold process. Following Cohan's (1988) guideline which suggests that f^2 values of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large effect sizes, respectively, it can be emphasize that in general, the exogenous variables have medium to large f^2 and q^2 effect sizes on the endogenous variables (see Table 8). Therefore, we propose that our hypothesized model is reliable.

[Add Table 6: The results of hypotheses testing and moderation analysis here]

[Add Table 7: Results of Mediation analysis here]

[Add Table 8: Linear regression model results here]

[Add Figure 3 here]

5. Discussion

In this study, we investigate the impact of supply chain finance on two types of organizational performance (e.g. operational risk and operational performance). We found that most of our hypotheses were greatly accepted; our findings and significance are discussed as follows.

First, our results show that supply chain finance is a critical driver of organizational performance (e.g. operational risk and operational performance). Thus, when we compare our findings with those from previous research on supply chain finance (Hofmann, 2005; Gelsomino et al., 2016; Zhao and Huchzermeier, 2018; Johnson and Hofmann, 2014), our ressults show that one of the goals for supply chain finance adopters is to resolve their operational risk and operational performance issues.

The outcomes suggest that supply chain executives are more likely to use supply chain finance if they feel pressures from insufficient organizational performance. This finding is consistent with prior literature that claims that supply chain finance is a reliable strategy to greatly enhance the firm's working capital and reduce the supply financial risk which, therefore, improve organizational performance (PrimeRevenue,2016).

In addition, our finding is in line with the prior study of (Talluri et al.,2013). The scholars proposed that supply chain finance is as a critical predictor of risk mitigation in the supply chain. Therefore, our study empirically identified supply chain finance as an effective risk mitigation scheme which supports supply chain managers to minimize their risk level in order to continue their operations in more effective way. Second, we identify consistent results regarding the negative impact of supply chain risk on organizational performance (e.g. operational risk and operational performance).

Companies with a high level of supply chain risk potentially face operational risk issues, which raised the risk for an organization. As proposed by (Christopher and Peck, 2004), defined risk issue as a presentation of genuine unsettling impacts emerging from supply chain risks.

This finding is consistent with the study of (Juttner, Peck, and Christopher, 2003), they found that control of risk and mitigation are the main concerns related to the management of supply risk which is defined as the supply risk assessment to mitigate risk issue in the whole supply chain.

These findings also greatly complement the study of (Hoeing and Thun, 2009), they systematically offered a viewpoint about specific risk-involved in the supply chain. Thus, it is interesting to find that supply chain risk significantly and negatively affects organizational performance (Sodhi and Tang 2012). Last, our findings show that in environmental dynamism, organization may use its valuable resource to reduce supply chain risk and achieve competitive advantage.

Moreover, the results show that environmental dynamism significantly moderates the relationship between supply chain finance and supply chain risk. This finding is in line with the previous literature (Barney, 1991; Liao et al., 2010; Eisenhardt and Martin, 2000; Schilke, 2014a). Those scholars claimed that to respond to changing environments, an organization must have capabilities to adopt more effective strategies required for changing environments Therefore, to ensure a high competitive advantage in a dynamic environment, organizations use supply chain finance as a critical source of competitiveness and performance.

5.1. Theoretical implications

This study makes several contributions to theory. First, this paper contributes to the literature of risk mitigation strategies by identifying the supply chain finance as a significant risk minimization strategy for companies, and expands the study of (Kurniawan et al., 2017) on risk mitigation strategies.

Second, our paper is one of the first attempts to offer large sample empirical examination of the impact of supply chain finance on organizational performance in emerging economies.

We not only identify the current status of the impact of supply chain finance on firm performance in China, but also identify the benefits and outcomes of SCF. We fill the research gap and respond to the future call of supply chain finance, its obstacles and influence on firm performance suggested the previous literature by (Chakuu et al.,2017; Gelsomino et al.,2016).

We address this issue by conducting statistical analyses based on reliable data to test the overemphasis on conceptual modeling work in the field of supply chain management. Last, this research greatly contributes to supply chain management literature, including different operational factors such as operational risk and operational performance through SCF decisions.

In addition, we enrich the understanding of the relationship between supply chain management and financial management. Our empirical investigation significantly expands analytical study on the relationships between operational decisions and financial decisions (Protopappa-Sieke and Seifert, 2010). Therefore, our findings propose that SCF offers great opportunity to both key members of the supply chain to minimize the overall firm risks and improve their performance.

5.2. Managerial implications

From a practical perspective, this paper provides some relevant and significant managerial implications for practitioners, executives and organizations. First, our findings will help practitioners or executives to mitigate their organizations' risk by employing risk mitigation strategies, specifically SCF, to improve liquidity and working capital of their organizations. Second, the findings can be used to help the decision-making process in coordinating goods, capital, and information along the supply chain. Finance executives should closely work with supply chain managers to mitigate supply chain cost by emphasizing on the integrated management of financial flows along their companies. It is necessary for supply chain managers to know about the risk types involved in the supply chains. Second, our findings imply that the insufficiency of firm performance can drive supply chain executives to make SCF adoption decisions. On the other hand, different factor such as operational risk and operational performance can significantly influence managers' decisions in supply chain finance. Last, this study provides a supportive decision making to SC managers while gaining a better understanding of the SCF, and firm performance, their benefits, and their potential obstacles. Therefore, supply chain managers may focus on the critical role of supply chain finance if they consider a high performance.

5.3 Limitations and future research

Although the aim of the research has been greatly achieved by investigating the critical role of supply chain finance, but there are a few limitations, our sample is relatively limited and the study remains exploratory. First, our empirical research is based on data collected from companies and their supply chains in mainland China. The context may limit the generalizability of our results.

Further research can test our proposed model employing data collect from other counties or developed economies. In addition, further research can broaden their scope by collecting data from all supply chain partners connecting suppliers, companies and customers.

Second, only the impact of supply chain finance on performance is considered in our proposed model. Other critical factors such as drivers, enablers, or even obstacles of supply chain finance adoption should be investigated in further research.

Third, we only consider operational risk and operational performance in general as the challenges and benefits of organizational performance. Other specific factors such as supply chain cost reduction could be investigated in future research and more significant findings are expected.

Due to the practice-based and exploratory nature of our study, further investigation needs more theoretical understanding of the impact of SCF models and confirmation of the knowledge derived from analytical models. A potential direction is to consider the influence of moderators and understand the boundaries of theories in SCF research. Fourth, although this study provides some reliable findings about the relationship between SCF and firm performance in China, it is not clear whether these relationships will be the same in other countries. Future study should investigate cross-cultural differences in the relationship between SCF and performance. In particular, studies which compare the impact of SCF on firm performance in developed versus developing economies will be more significant. Last, we essentially employ cross-sectional data to test the relationships, which are limited in inferring causal relationship. It will be fruitful for future research to investigate and develop experiments or even employ longitudinal data to test the causal relationships among our main variables.

6. Conclusions

This study proposes that supply chain finance is an effective solution for organizations in recent economic downturn and financial crisis. It is imperative for supply chain managers to understand the advantages of adopting supply chain finance and make rational supply chain finance decisions.

In addition, we propose a supply chain finance model to investigate its impact on organizational decisions and the performance implications. Supply chain finance is an increasingly critical area of research, as supply chains become more widely dispersed across the globe. This study addresses some key roles in supply chain finance, as well as raising a number of critical research questions that remain to be resolved. Therefore, our empirical findings offer significant insights to both academics and practitioners.

Acknowledgement

This research was supported by the National Natural Science Foundation of China (grant numbers

71731010).

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This research was supported by the National Science Foundation of China (nos. 71731010).

Reference

Aslam, H., Blome, C., Roscoe, S., Azhar, T.M. (2018), "Dynamic supply chain capabilities: how market sensing, supply chain agility and adaptability affect supply chain ambidexterity". Int. J. Oper. Prod. Manag, Vol. 38, No. 12, pp. 2266–2285.

Augier, M., Teece, D.J., (2009), "Dynamic capabilities and the role of managers in business strategy and economic performance". Organization Science, Vol. 20, No. 2,pp. 410–421.

Afuah, A., (2001), "Dynamic boundaries of the firm: are firms better off being vertically integrated in the face of a technological change?" Acad. Manag. J, Vol. 44, No. 6, pp. 1211–1228.

Alexander, A., Kumar, M., Walker, H. (2018), "A decision theory perspective on complexity in performance measurement and management". Int. J. Oper. Prod. Manag, Vol. 38, No. 11, pp. 2214–2244.

Afuah, A. (2001), "Dynamic boundaries of the firm: are firms better off being vertically integrated in the face of a technological change?" Acad. Manag. J, Vol. 44, No. 6, pp.1211–1228.

Ali, Z., B. Gongbing, and A. Mehreen. (2018), "Does Supply Chain Finance Improve SMEs Performance? The Moderating Role of Trade Digitization." Business Process Management Journal. doi:10.1108/BPMJ-05-2018-013.

Ali, Z., B. Gongbing, and A. Mehreen. (2019), “Predicting Supply Chain Effectiveness Through Supply Chain Finance:Evidence From Small and Medium Enterprises.” The International Journal of Logistics Management, Vol. 30, No. 2, pp. 488–505.doi:10.1108/IJLM-05-2018-0118.

Armstrong, J.S., Overton, T.S. (1977), “Estimating nonresponse bias in mail surveys”.J. Mark.Res, Vol. 14, No. 3, pp. 396–402.

Asmundson, I., et al., (2011). Trade Finance in the 2008–09 Financial Crisis: Evidence from IMF and BAFT–IFSA Surveys of Banks. The World Bank, Washington, DC.

Aslam, H., Blome, C., Roscoe, S., Azhar, T.M. (2018), “Dynamic supply chain capabilities: how market sensing, supply chain agility and adaptability affect supply chain ambidexterity”. Int. J. Oper. Prod. Manag, Vol. 38, No. 12, pp. 2266–2285.

Awang, Z. (2012), A Handbook on SEM: Structural Equation Modelling, 5th edition, Center of Graduate Studies, Kuala Lumpur.

Ambrosini V., Bowman C., What are dynamic capabilities and are they a useful construct in strategic management?, International Journal of Management Reviews, 11, 1, 29–49, 2009.

Basole, R. C., and M. A. Bellamy. (2014), “Supply Network Structure, Visibility, and Risk Diffusion: A Computational Approach.” Decision Sciences, Vol. 45, pp.753–789.

Barney J.B., Strategic factor markets: Expectations,luck, and business strategy, Management Science,32, 10, 1231–1241, 1986.

Barney J., Firm resources and sustained competitive advantage, Journal of Management, 17, 1, 99–120,1991.

Boyle, E., Humphreys, P., McIvor, R. (2008), “Reducing supply chain environmental uncertainty through e-intermediation: an organisation theory perspective”. Int. J. Prod.Econ, Vol. 114, No.1, pp.347–362.

Browne, M.W. and Cudeck, R. (1993), Alternative Ways of Assessing Model Fit, Sage focus editions, New York, Vol. 154, 136-159.

Bryman, A. and Bell, E. (2011), Business Research Methods, 3rd ed., Oxford University Press,New York.

Brusset, X. (2016), "Does supply chain visibility enhance agility?" Int. J. Prod. Econ.Vol. 171, pp. 46–59.

Blome, C., Schoenherr, T., Kaesser, M. (2013), "Ambidextrous governance in supply chains:the impact on innovation and cost performance". J. Supply Chain Manag, Vol.49, No. 4, pp. 59–80.

Brislin, R.W. (1980), "Translation and content analysis of oral and written materials",Methodology, Vol. 2 No. 1, pp. 389-444.

Berger, A.N., Udell, G.F., 2006. A more complete conceptual framework for SME finance.J. Bank. Financ. 30, 2945–2966.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Chen, Y. (2016), "Essays on supply chain finance", unpublished PhD dissertation, The Graduate School of The University of Minnesota.

Coyne K.P., Hall S.J.D., Clifford P.G., Is your core competence a mirage?, The Mckinsey Quarterly, 2, 40–54, 1997.

Chen, X., Hu, C., (2011). The Value of Supply Chain Finance. InTech, pp, pp.111–132 (Published).

Chava, S., Purnanandam, A. (2011), "The effect of banking crisis on bank-dependent bor-rowers". J. Financ. Econ, Vol. 99, No.1, pp. 116–135.

Camerinelli, E. (2011). "B2B Finance: A New Name for Supply Chain Finance." AccessedJune5,2017.http://aitegroupblog.com/banking-payments/b2b-finance-a-new-name-for-scf/.

Caniato,F.,Gelsomino,L.M.,Perego,A.and Ronchi,S.(2016),“Does finance solve the supply chain financing problem?”, Supply Chain Management: An International Journal, Vol. 21No. 5, pp. 534-549.

Caniato, F., L. M. Gelsomino, A. Perego, and S. Ronchi. (2016). “Does Finance Solve the Supply Chain Financing Problem?” Supply Chain Management: An International Journal, Vol. 21, pp. 534–549.

Chakuu, S., D. Masi, and J. Godsell. (2017). “A Systematic Literature Review on Supply Chain Finance Actors, Instruments, and Processes.” Paper presented at international conference on Production research in Poznan,750–755. Poland.doi:10.12783/dtetr/icpr2017/17703.

Cohen, J., and P. Cohen. 1983. Applied Multiple Regression Correlation Analysis for the Behavioral Sciences. Hillsdale,NJ: Erlbaum.

Chen, D.Q., Preston, D.S., Swink, M. (2015), “How the use of big data analytics affects alue creation in supply chain management”. J. Manag. Inf. Syst, Vol. 32, No.4, pp. 4–39.

Duan, H. B., X. J. Han, and H. B. Yang. (2009), “An Analysis of Causes for SMEs Financing Difficulty.” International Journal of Business and Management, Vol. 4, pp.73–75.

Damanpour, F., R. M. Walker, and C. N. Avellaneda. 2009. Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. Journal of Management Studies 46 (4): 650–75.

Douglas, S.P. and Craig, C.S. (2007), “Collaborative and iterative translation: an alternative approach to back translation”, Journal of International Marketing, Vol. 15 No. 1, pp. 30-43.

Droge, C., Jayaram, J., Vickery, S.K. (2004), The effects of internal versus external integration practices on time-based performance and overall firm performance.

Dong, Y., Xu, K., 2002. A supply chain model of vendor managed inventory. Transp. Res.E Logist. Transp. Rev. 38, 75–95.

Dong, Y., Xu, K., Dresner, M., 2007. Environmental determinants of VMI adoption: an exploratory analysis. Transp. Res. E Logist. Transp. Rev. 43, 355–369.

Eisenhardt, K.M., Furr, N.R., Bingham, C.B (2010), " CROSSROADS—microfoundations of performance: balancing efficiency and flexibility in dynamic environments". Organ. Sci, Vol. 21, No. 6, pp.1263–1273.

Eckstein, D., Goellner, M., Blome, C., Henke, M. (2015), "The performance impact of supply chain agility and supply chain adaptability: the moderating effect of product complexity". Int. J. Prod. Res, Vol. 53, No. 10, pp. 3028–3046.

Eisenhardt, K.M., Martin, J.A. (2000), "Dynamic capabilities: what are they? Strateg. Manag". J. 21 (10-11), 1105–1121.

Eisenhardt, K. M. (1989), "Agency Theory: An Assessment and Review." Academy of Management Review, Vol. 14, pp. 57–74.

Edwards, B. (1997), "Credit Management Handbook", 4th ed. Gower Publishing, Hampshire.

Fainshmidt, S., Pezeshkan, A., Lance Frazier, M., Nair, A., Markowski, E. (2016), "Dynamic capabilities and organizational performance: a meta-analytic evaluation and extension". J.Manag. Stud, Vol. 53, No. 8, pp.1348–1380.

Fornell, C. and Larcker, D.F. (1981), "Structural equation models with unobservable variables and measurementerror:algebraand statistics", Journalof Marketing Research,Vol. 18No.3,pp.382-388.

Gligor, D.M., Esmark, C.L., Holcomb, M.C. (2015), "Performance outcomes of supply chain agility: when should you be agile?" J. Oper. Manag, Vol. 33, pp. 71–82.

Gao, D., N. Ruan, and W. Xing. (2015), "Advances in Global Optimization". Accessed May 3,2017.

https://link.springer.com/book/10.1007%2F978-3-319-08377-3.

Gelsomino, L. M., R. Mangiaracina, A. Perego, and A. Tumino. (2016), “Supply Chain Finance: A Literature Review.” International Journal of Physical Distribution & Logistics Management, Vol. 46, pp. 348–366.

Gronum, S., Verreynne, M.L. and Kastelle, T. (2012), “The role of networks in small and medium-sized enterprise innovation and firm performance”, Journal of Small Business Management, Vol. 50 No. 2, pp. 257-282.

Gomm, M. L. (2010). “Supply Chain Finance: Applying Finance Theory to Supply Chain Management to Enhance Finance in Supply Chains.” International Journal of Logistics Research and Applications, Vol. 13, pp. 133–142.

Gunasekaran, A., Patel, C. and McGaughey, R.E. (2004), “A framework for supply chain performance measurement”, International Journal of Production Economics, Vol. 87 No. 3, pp. 333-347.

Gelsomino, L.M., Mangiaracina, R., Perego, A., Tumino, A. (2016), “Supply chain finance: a literature review”. Int. J. Phys. Distrib. Logist. Manag, Vol. 46, No. 4, pp.348–366.

Garson, G. D. (2016). Partial least squares: Regression and structural equation models. Asheboro, NC: Statistical Associates Publishing.

Hofmann, E. (2005), “Supply chain finance: some conceptual insights”, Logistik Manag. Innov. Logistikkonzepte, Dtsch. Univ, Wiesbaden, pp. 203-214.

Hofmann, E., and O. Belin. (2011). Supply Chain Finance Solutions Relevance -Propositions- Market Value. Heidelberg:Springer-Verlag.

Hazen, B.T., Bradley, R.V., Bell, J.E., In, J., Byrd, T.A., (2017). Enterprise architecture: a competence-based approach to achieving agility and firm performance. Int. J. Prod.Econ, Vol. 193, pp. 566–577.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), “A new criterion for assessing discriminant validity in variance-based structural equation modelling”, Journal of the Academy of Marketing Science, Vol. 43No. 1, pp. 115-135.

Hofmann, E., (2005). Interorganizational Operational Management. Springer Gabler, Wiesbaden.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R. (2010), Multivariate Data Analysis, 7th ed., Pearson, New York, NY.

Hayes, A. F., and K. J. Preacher. 2010. “Quantifying and Testing Indirect Effects in Simple Mediation Models When the Constituent Paths are Nonlinear.” Multivariate Behavioral Research 45: 627–660.

Ivashina, V. and Scharfstein, D. (2010), “Bank lending during the financial crisis of 2008”, Journal of Financial Economics, Vol. 97 No. 3, pp. 319-338.

Johnson, M., and S. Templar. (2011), “The Relationships between Supply Chain and Firm Performance – The Development and Testing of a Unified Proxy.” International Journal of Physical Distribution & Logistics Management, Vol. 41, pp. 88–103.

Johnson, M., and E. Hofmann. (2014), “Financial Issues in Supply Chain Management And Supply ChainFinance.”AccessedOctober13,2017.http://www.emeraldgrouppublishing.com/products/journals/callforpapers.htm?id=4933&PHPSESSID=tke8d6c0efueo0lv3pm3rbkdl0.

Juttner, U., H. Peck, and M. Christopher. (2003), “Supply Chain Risk Management: Outlining an Agenda for Future Research.” International Journal of Logistics Research and Applications, Vol. 6, pp. 97–210.

Juttner, U., and A. Ziegenbein. (2009), “Supply Chain Risk Management for Small and Medium-Sized Businesses.” In Supply Chain Risk. International Series in Operations Research & Management Science, edited by G. A. Zsidisin and B. Ritchie, Vo. 199–217. Boston, MA, USA: Springer.

Klapper, L.F., Randall, D., (2011), “Financial crisis and supply-chain financing”.Trade Financ. Gt. Trade Collapse, Vol. 73.

Kristal, M.M., Huang, X., Roth, A.V., (2010), “The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance”. J.Oper. Manag. Vol. 28, No. 5, pp. 415–429.

Kotabe, M. (1990), “Corporate Product Policy and Innovative Behavior of European and Japanese Multinationals: An Empirical Investigation.” Journal of Marketing, Vol.54, pp. 19–33.

Kurniawan, R., S. H. Zailani, M. Iranmanesh, and P. Rajagopal, (2017). “The Effects of Vulnerability Mitigation Strategies on Supply Chain Effectiveness: Risk Culture as Moderator.” Supply Chain Management: An International Journal, Vol. 22, pp. 1–15.

Katkalo, V.S., Pitelis, C.N., Teece, D.J., (2010), “Introduction: on the nature and scope of dynamic capabilities, Ind. Corp. Chang, Vol. 19, No. 4, pp. 1175–1186.

Klapper, L., 2006. The role of factoring for financing small and medium enterprises. J.Bank. Financ. 30, 3111–3130.

Lee, T. & Chu, W. (2013), “How entrepreneurial orientation, environnemental dynamism, and resource rareness influence firm performance”. Journal of Management & Organization, Vol. 19, No. 2, pp. 167-187.

Lee, C.P., Shim, J.P., (2007). An exploratory study of radio frequency identification (RFID) adoption in the healthcare industry. European Journal of Information Systems, Vol. 16, No. 6, pp. 712–724.

Levinthal, D.A., (2000), “Organizational capabilities in complex worlds. In: Dosi, G., Nelson, R.R., inter, S.G. (Eds.), The Nature and Dynamics of Organizational Capabilities”. Oxford University Press, New

York, pp. 363–379.

Liu, H., Ke, W., Wei, K.K., Hua, Z., (2013), “The impact of IT capabilities on firm performance: the mediating roles of absorptive capacity and supply chain agility”. Decision Support Syst, Vol. 54, No. 3, pp. 1452–1462.

Lamoureux, J.-F., Evans, T.A., (2011). Supply Chain Finance: A New Means to Support the Competitiveness and Resilience of Global Value Chains. Social Science Research Network, Rochester, NY.

Liao S., Wu C., Hu D., Tsui K., Relationships between knowledge acquisition, absorptive capacity and innovation capability: An empirical study on Taiwan’s financial and manufacturing industries, Journal of Information Science, 36, 1, 19–35, 2010.

Lekkakos, S.D. and Serrano, A. (2016), “Supply chain finance for small and medium sized enterprises: the case of reverse factoring”, International Journal of Physical Distribution & Logistics Management, Vol. 46 No. 4, pp. 367-392.

Miller, D., Friesen, P.H., (1983), “Strategy-making and environment: the third link. Strategic Management Journal, Vol. 4, No. 3, pp. 221–235.

Melville, N., Kraemer, K. and Gurbaxani, V. (2004), “Information technology and organizational performance: an integrative model of ITbusiness value”, MIS Quarterly, Vol. 28 No. 2, pp. 283-322.

Mikalef, P., Pateli, A., (2017), “Information technology-enabled dynamic capabilities and their indirect effect on competitive performance: findings from PLS-SEM and fs QCA”.J. Bus. Res. Vol. 70, pp. 1–16.

Nunnally, J.C. and Bernstein, I.H. (1994), Psychometric theory, 3rd ed.,McGraw-Hill, New York, NY.

Ojha, D., Acharya, C., Cooper, D., (2018), “Transformational leadership and supply chain ambidexterity: mediating role of supply chain organizational learning and moderating role of uncertainty”. Int. J. Prod. Econ, Vol 197, pp. 215–231.

ong, H., and L. Wang. (2013), “The Impact of Private and Family Firms’ Relational Strength on Financing Performance in Clusters.” Asia Pacific Journal of Management,Vol. 30, pp. 735–748.

Pezeshkan, A., Fainshmidt, S., Nair, A., Frazier, M.L., Markowski, E. (2016), “An empirical assessment of the dynamic capabilities–performance relationship”. J. Bus. Res. Vol. 69, No. 8, pp. 2950–2956.

Pfohl, H.C. and Gomm, M. (2009), “Supply chain finance: optimizing financial flows in supply chains”, Logistics Research, Vol. 1 Nos 3-4, pp. 149-161.

Prime Revenue. (2016). “Supply Chain Finance Fundamental.” Accessed May 3,2017.https://primerevenue.com/wp-content/uploads/2016/08/supplychainFundamentals.pdf.

Prahalad C.K., Hamel G., The core competence of the organization, Harvard Business Review, May-June, 79–93, 1990.

Podsakoff, M.P., Mackenzie, B.S., Lee, J. and Podsakaff, P.N. (2003), “Common method biases in behavioral research: a critical review of the literature and recommended remedies”,Journal of Applied Psychology, Vol. 88 No. 5, pp. 879-903.

Pfohl, H.C., Gomm, M. (2009), “Supply chain finance: optimizing financial flows in supply chains”. Log. Res. Vol. 1, pp.149–161.

Protopappa-Sieke, M., Seifert, R.W., 2010. Interrelating operational and financial performance measurements in inventory control. Eur. J. Oper. Res. 204, 439–448.

Rojo, A., Stevenson, M., Llorens Montes, F.J., Perez-Arostegui, M.N. (2018), “Supply chain flexibility in dynamic environments: the enabling role of operational absorptive capacity and organizational learning". Int. J. Oper. Prod. Manag. Vol. 38 No. 3, pp. 636–666.

Randall, W.S., Theodore Farris, M., 2009. Supply chain financing: using cash-to-cash variables.

Sari, K., 2007. Exploring the benefits of vendor managed inventory. Int. J. Phys. Distrib. Logist. Manag. 37, 529–545.

Song, H., K. Yu, and Q. Lu. (2018). "Financial Service Providers and Banks' Role in Helping SMEs to Access Finance." International Journal of Physical Distribution & Logistics Management, Vol. 48, pp. 69–92.

Sodhi, M. S., and C. S. Tang. (2012), "Managing Supply Chain Risk". Vol. 172, pp. 3–332. New York, USA: Springer. doi:10. 1007/978-1-4614-3238-8.

Schilke, O., (2014). On the contingent value of dynamic capabilities for competitive advantage: the nonlinear moderating effect of environmental dynamism. Strateg. Manag. J, Vol. 35, No. 2, pp. 179–203.

Sousa, R., Voss, C.A. (2008), "Contingency research in operations management practices". Journal of Operations Management, Vol. 26, No. 6, pp.697–713.

Stemmler, L. (2002), "Supply chain finance: Eine notwendige Erweiterung der Lieferkettensteuerung", Wissenschaftssymposium Logistik der BVL, Vol. 1 No. 1,pp. 113-124.

Song, H., Yu, K., Ganguly, A. and Turson, R. (2016), "Supply chain network, information sharing and SME credit quality", Industrial Management & Data Systems, Vol. 116 No. 4,pp. 740-758.

Song, H., K. Yu, and Q. Lu. (2018), "Financial Service Providers and Banks' Role in Helping SMEs to Access Finance." International Journal of Physical Distribution & Logistics Management , Vol. 48, pp.69–92.

Teece D.J., Explicating dynamic capabilities: The nature and micro-foundations of (sustainable) enterprise performance, Strategic Management Journal, 28, 8, 1319–1350, 2007.

Teece, D. J., G. Pisano, and A. Shuen. 1997. Dynamic capabilities and strategic management. Strategic Management Journal 18 (7): 509–33.

Tanrisever, F., H. Cetinay, M. Reindorp, and J. Fransoo. (2012), "Value of Reverse Factoring in Multi-Stage Supply Chains." Working paper, Department of Industrial Engineering and Innovation Sciences, Netherlands, Eindhoven University of Technology.

Theodore Farris, M., Hutchison, P.D., 2002. Cash-to-cash: the new supply chain management metric. Int. J. Phys. Distrib. Logist. Manag. 32, 288–298.

Teece, D.J., Pisano, G., Shuen, A. (1997), "Dynamic capabilities and strategic management.Strateg. Manag. J, Vol. 18, No. 7, pp. 509–533.

Teece, D.J. (2012), "Dynamic capabilities: routines versus entrepreneurial action. J.Manag. Stud, Vol. 49, No. 8, pp. 1395–1401.

Teece, D.J. (2014), " The foundations of enterprise performance: dynamic and ordinary capabilities in an (economic) theory of firms". Acad. Manag. Perspect, Vol. 28, No. 4,pp. 328–352.

Urbach, N. and Ahlemann, F. (2010), "Structural equation modelling in information systems research using partial least squares", Journal of Information Technology Theory and Application, Vol. 11 No. 2,pp. 5-40.

Venkatraman, N., & Camillus, J. (1984), "Exploring the concept of 'fit' in strategic management". Academy of Management Review, Vol. 9, No. 3, pp. 513-525.

Vu-Nguyen, H., H. T. Nguyen, S. Deligonul, and S. T. Cavusgil. (2017), "Developing Visibility to Mitigate Supplier Risk:the Role of Power-Dependence Structure."Asia-Pacific Journal of Business Administration, Vol. 9, pp. 69–82.

Valentini, G., Zavanella, L., 2003. The consignment stock of inventories: industrial case and performance analysis. Int. J. Prod. Econ. 81, 215–224.

Waters, D. (2011), “Supply Chain Risk Management: Vulnerability and Resilience in Logistics”.Australia: Kogan.

Wang, T. R., Lan, Q. G., & Chu, Y. Z. (2013). Supply chain financing model: based on China's agricultural products supply chain. In Applied Mechanics and Materials (Vol. 380, pp. 4417-4421). Trans Tech Publications Ltd.

Wood, O.G. (1981), “Commercial Banking: Practice and Policy. Van Nostrand, New York,NY.

Winter, S.G., (2003), “Understanding dynamic capabilities. Strateg. Manag. J. Vol. 24, No 10, pp. 991–995.

Waller, M., Johnson, M.E., Davis, T., 1999. Vendor-managed inventory in the retail supply chain. J. Bus. Logist. 20, 183–204.

Wilhelm, H., Schl€ omer, M., Maurer, I. (2015), “How dynamic capabilities affect the effectiveness and efficiency of operating routines under high and low levels of environmental dynamism”. Br. J. Manag, Vol. 26, No. 2, pp. 327–345.

Wu, L.Y. (2010), “Applicability of the resource-based and dynamic-capability views under environmental volatility”. J. Bus. Res, Vol. 63, No. 1, pp. 27–31.

Wong, K. K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS. Marketing Bulletin, 24, Technical Note 1, 1-32

Wang, J. C., Z. Wang, Y. Y. Wang, and F. Lai. (2017), “Impacts of Information Reliability in a Supply Chain with Market Disruption Risks.” International Transactions in Operational Research, Vol. 24, pp. 737–761.

Wuttke, D.A., Blome, C., Foerstl, K., Henke, M., 2013a. Managing the innovation adoption of supply chain finance—empirical evidence from six European case studies. J. Bus.Logist. 34, 148–166.

Wuttke, D.A., Blome, C., Henke, M., 2013b. Focusing the financial flow of supply chains: an empirical investigation of financial supply chain management. Int. J. Prod. Econ.145, 773–789.

Wilden, R., Gudergan, S.P., Nielsen, B.B., Lings, I., (2013), "Dynamic capabilities and performance: strategy, structure and environment". Long. Range Plan. 46 (1–2),72–96.

Wuttke, D., C. Blome, H. Heese, and M. Protopappa-Sieke. (2016), "Supply Chain Finance: Optimal Introduction and Adoption Decisions." International Journal of Production Economics, Vol. 178, pp. 72–81.

Wuttke, D.A., Blome, C. and Henke, M. (2013), "Focusing the financial flow of supply chains: an empirical investigation of financial supply chain management", International journal of production economics, Vol. 145 No. 2, pp. 773-789.

Zhao, L. and Huchzermeier, A. (2015), "Operations–finance interface models: a literature review and framework", European Journal of Operational Research, Vol. 244 No. 3, pp. 905-917.

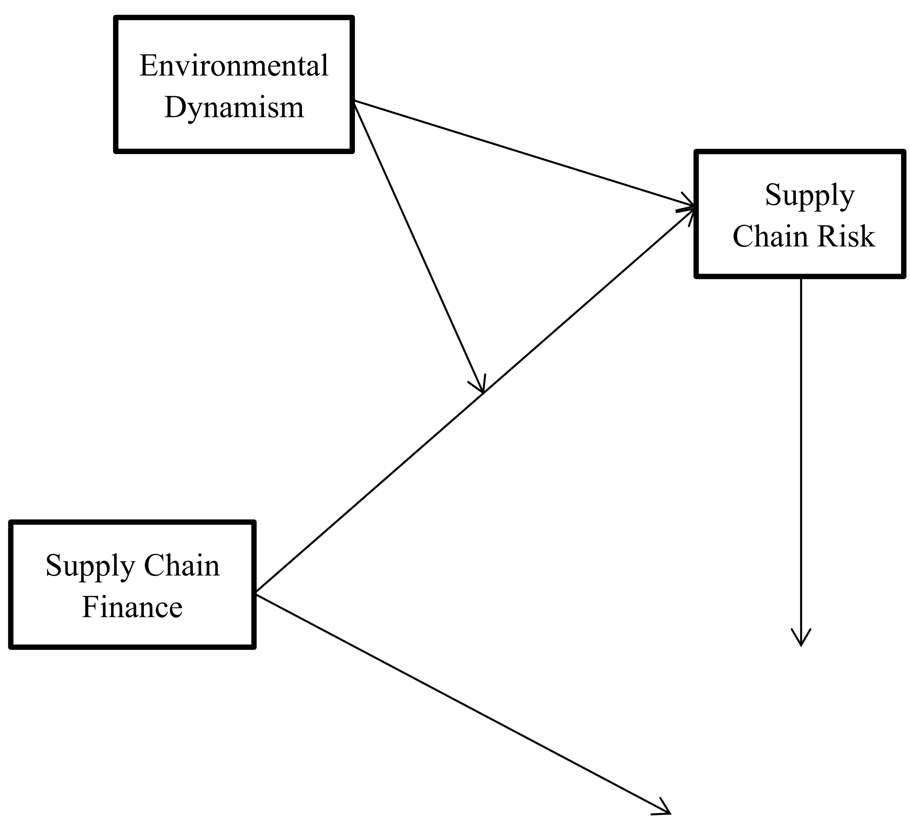
Zhao, L. and Huchzermeier, A. (2018), "Supply chain finance", in Speranza, M.G. and Oliveria, J.F. (Eds), Supply Chain Finance. EURO Advanced Tutorials on Operational Research, Springer, Cham, pp. 105-119.

Zhu, Y., Xie, C., Wang, G.J. and Yan, X.G. (2017), "Comparison of individual, ensemble and integrated ensemble machine learning methods to predict China's SME credit risk in supply chain finance", Neural Computing and Applications, Vol. 28 No.1, pp. 41-50.

Zsidisin, G. A., and L. M. Ellram. (2003), "An Agency Theory Investigation of Supply Risk M anagement." The Journal of Supply Chain Management, Vol. 39,pp.15–27.

Zhang, R. (2015), "The research on influence facts of supply chain finance operation", Proceedings of International Conference on Management Engineering and Management Innovation, Atlantis Press, Changsha, January.

Zhao, L., Huchzermeier, A. (2018). Supply Chain Finance: Integrating Operations and Finance in Global Supply Chains. Springer.



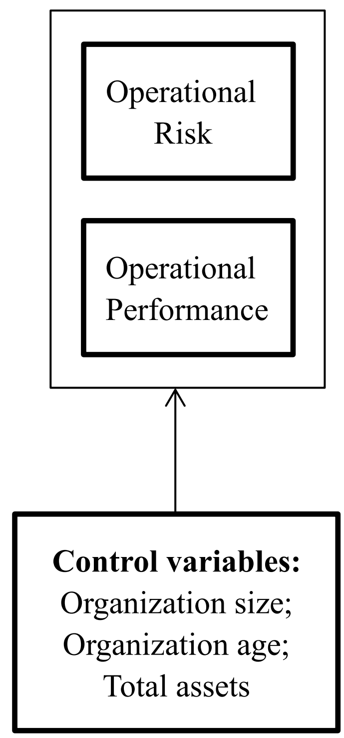


Figure 1. Conceptual model

Table 1: Sample demographic (n=210).

Characteristics	N	Percent (%)
Agriculture	10	14.2
E-commerce	13	15
Logistics	7	4.1
Electronic devices	15	28
Woods	10	14
Beverage	8	7
Financial	12	17.7
Organization size (Employees)		
1-99	14	36.4
100-299	12	35.7
300-499	11	27.9
Organization age (Year)		
<6years	20	24.2

6-11years	12	36.4
11-24years	11	26.6
>24	8	12.8
Total assets		
RMB 5-15M	15	36.7
RMB15-25M	19	28.2
RMB25-60M	13	35.1

Table 2: Results of Confirmatory Factor Analysis

Construct	Items	Factor loadings	Mean	SD	alpha (α)	CR	AVE
SCF	SCF1	0.83	4.51	0.44	0.77	0.86	0.78
	SCF2	0.86	4.44	1.66	0.76	0.87	0.86
	SCF3	0.79	3.66	2.88	0.89	0.89	0.69
	SCF4	0.75	4.23	1.88	0.79	0.76	0.74
ED	ED1	0.90	4.13	0.52	0.88	0.75	0.90
	ED2	0.88	4.66	2.88	0.89	0.78	0.78
	ED3	0.78	5.44	1.88	0.75	0.92	0.88
SCR	SCR1	0.87	4.18	0.58	0.88	0.91	0.79
	SCR2	0.91	3.65	1.78	0.79	0.85	0.88
	SCR3	0.80	4.44	2.99	0.77	0.78	0.91
OP	OP1	0.89	4.14	0.56	0.78	0.93	0.79

OP2	0.78	4.33	1.99	0.88	0.81	0.87
OP3	0.86	3.55	2.32	0.84	0.88	0.73
OP4	0.78	4.33	3.38	0.74	0.92	0.93

Note: SCF=Supply chain finance, ED= Environmental dynamism, SCR=Supply chain risk, OP= Organizational performance

Table 3: Correlation among constructs and square root of the AVE (Fornell-Larcker)

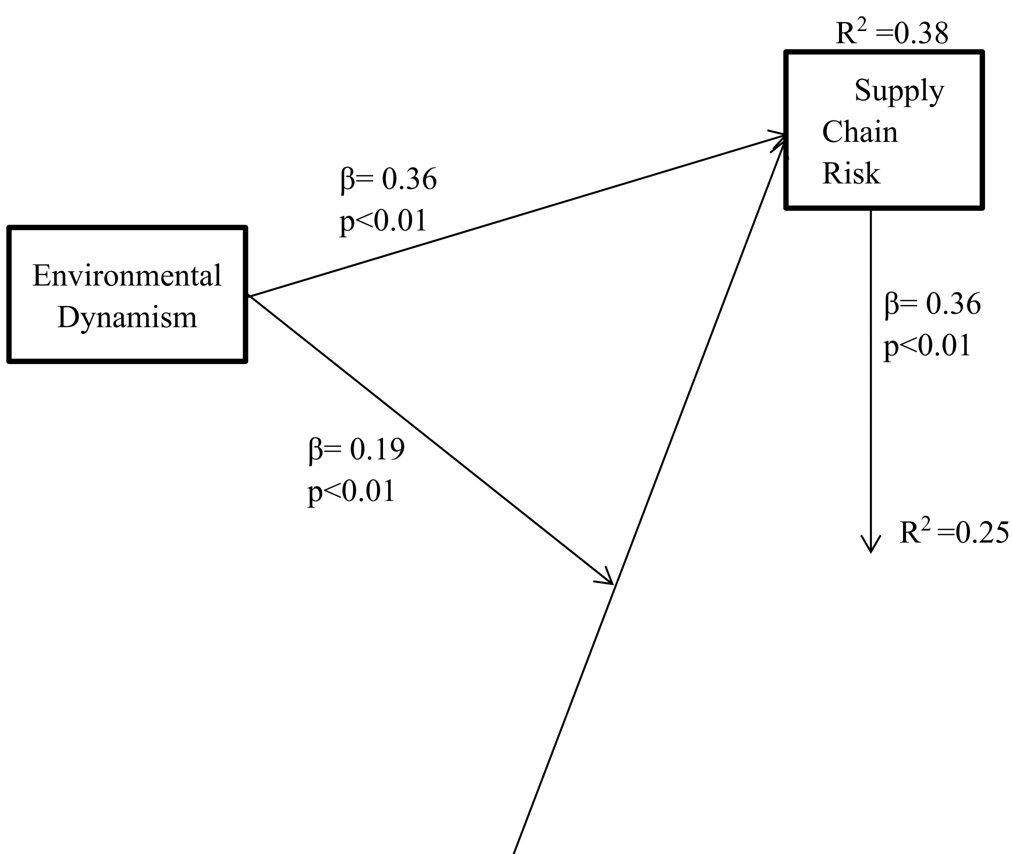
	1 SCF	2 SCR	3 ED	4 OP
1.Supply chain finance	**0.84**			
2.Supply chain risk	0.47	**0.90**		
3.Environmental dynamism	0.45	0.16	**0.81**	
4.Organizational performance	0.42	0.22	0.47	**0.83**

Notes: Italic values show square roots of the AVE; SCF= Supply chain finance; SCR=Supply chain risk; ED= Environmental dynamism; OP= Organizational performance

Table 4: Heterotrait-Monotrait Ratio (HTMT)

	1 SCF	2 SCR	3 ED	4 OP
1.Supply chain finance	0.754			
2.Supply chain risk	0.302	0.279		
3.Environmental dynamism	0.685	0.722	0.661	
4.Organizational performance	0.403	0.477	0.422	0.574

Note: SCF=Supply chain finance; ED= Environmental dynamism; SCR=Supply chain risk; OP= Organizational performance


R^2 =0.38
Supply Chain Risk
β= 0.36
p<0.01
Environmental Dynamism
β= 0.19
p<0.01
β= 0.36
p<0.01
R^2 =0.25

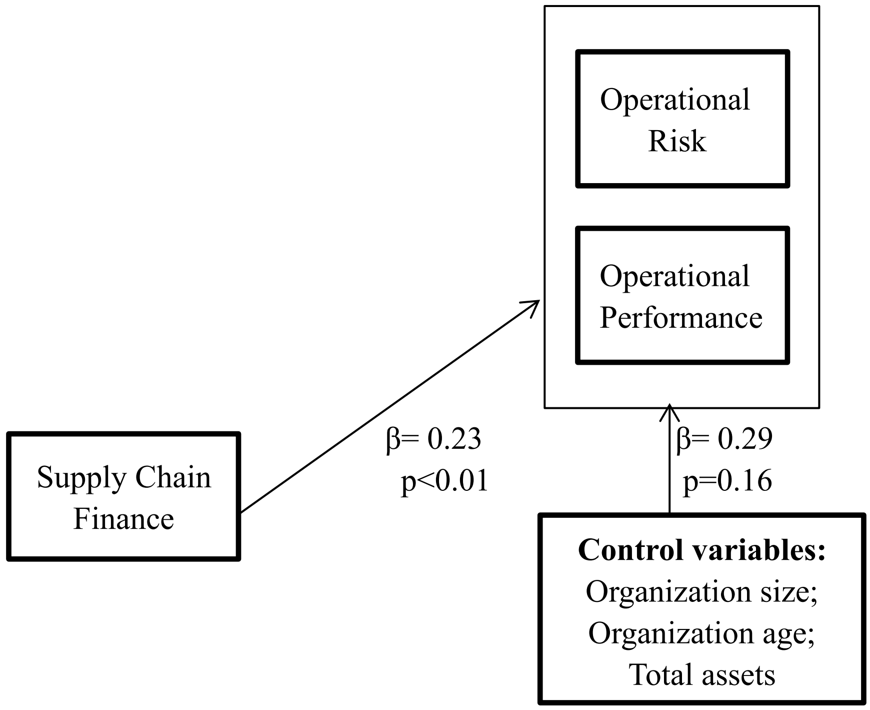


Figure 2: Results of the research model

Table 5: The results of model fitness.

Model fit indices	GFI	AGFI	CFI	NFI	TLI	RMSEA
Cuf-off value	>90	>0.82	>0.91	>0.81	>0.90	>0.079
Obtained value	>0.90	>0.87	>0.82	>0.87	>0.91	>0.048

Table 6: The results of hypotheses testing and moderation analysis

Hypothesis	Relationship	β	p-Value	Results
H1	SCF→SCR	0.29	<0.01	Accepted
H2	SCF→OP	0.23	<0.01	Accepted

H3	SCR→OP	-0.36	<0.01	Accepted
H5	ED→SCR	0.03	=0.30	Rejected
H6	SCF*ED→SCR	0.19	<0.01	Accepted

Note: SCF=Supply chain finance, SCR=Supply chain risk, ED=Environmental dynamism, OP=Organizational performance

Table 7: Results of Mediation analysis

Hypothesis	Relationships	Indirect effect	Upper-Bond Confidence 95%	Lower-Bond Confidence 95%	p-Value	Decisions
H4	SCF→SCR→OP	1.28	0.23	0.19	0.04	Accepted

Note: Bootstrapping iterations are 1000.

Table 8: Linear regression model results

Variables	Organizational Performance			
	Model 1: (Operational risk)		Model 2: (Operational performance)	
	Coefficients	Standard error	Coefficients	Standard error
Control variables				
Agriculture	0.151*	0.451	0.167**	0.407
E-commerce	0.078	0.299	0.115	0.851
Logistics	0.091	0.621	0.113**	1.233
Electronic devices	0.211**	1.007	0.213**	0.125
Woods	0.186**	0.398	0.210**	1.977
Beverages	−0.033	0.220	−0.029	0.900
Financial	0.19	1.098	0.224***	1.088

Organization size	−0.270***	0.732	−0.297***	0.991
Organization age	0.044	0.871	0.090	0.881
Total assets	0.179**	0.201	0.226***	1.092
Predictor				
Supply chain finance	0.297***	0.120	0.239***	0.132
Moderator				
Environmental dynamism	-0.244***	1.019	0.219***	0.431
Mediator				
Supply Chain Risk	-0.154***	0.123	-0.225***	0.211
Product				
SCF*ED→SCR	0.179***	0.192	0.289***	0.561
N	210	0.561	210	0.122
R^2	0.023	0.983	0.130	1.293
Change in R^2	1.438	1.988	1.259	0.128
F square	0.074	0.469	0.097	0.971
Adjusted F squared	0.013	0.856	0.015	1.975
Q squared	0.121	0.199	0.149	0.326
Adjusted Q squared	0.102	0.985	0.126	0.986
Chi-square (d.f.)	86.245 (18)***		96.298 (18)***	

Notes: *$p< 0.05$; ***$p< 0.001$

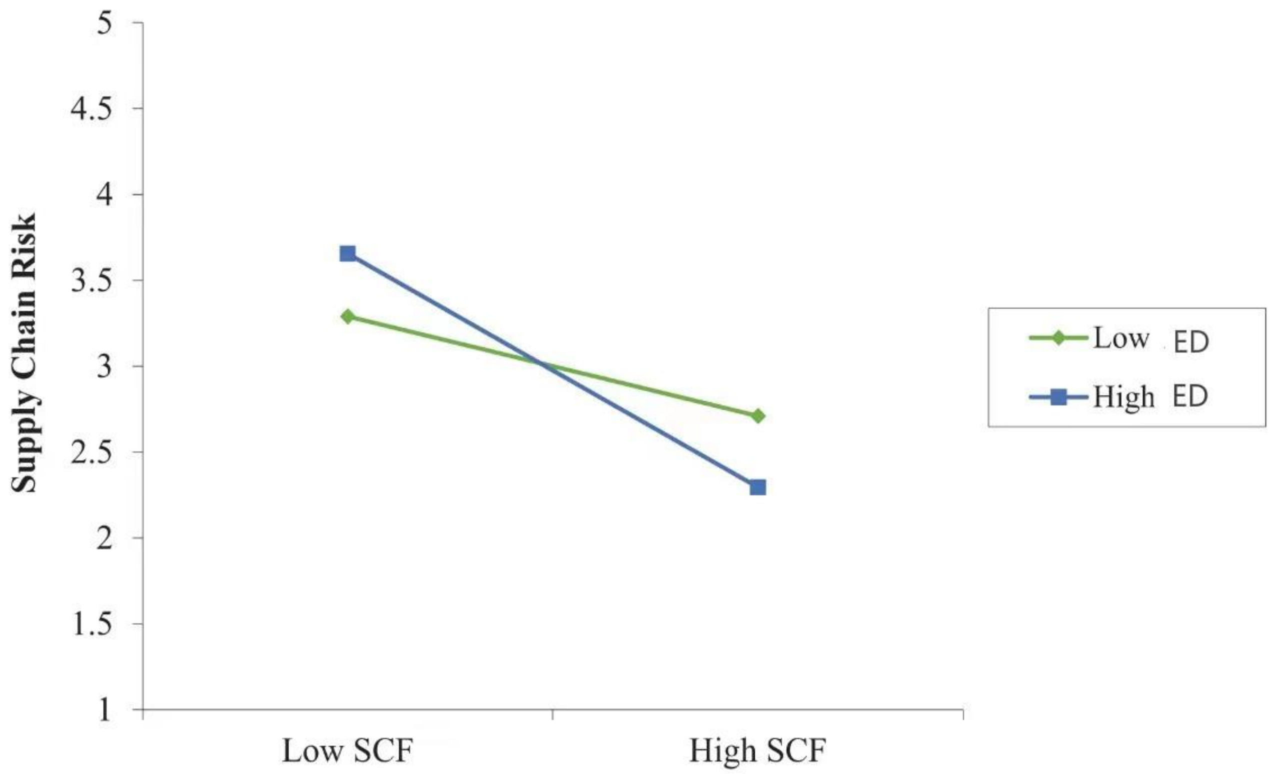


Figure 3. Interaction effect of environmental dynamism on the relationship between supply chain finance and supply chain risk