

The level of corporate risk taking and the secondary allocation of commercial credit: evidence from China

Ximei Liu*

School of Economics and Management, Tigong University, Tianjin, China

*Corresponding author e-mail: dantes67@foxmail.com

Abstract. The liability insurance of directors and executives has been introduced into more and more companies, and the risk-taking level of the company has been improved, which has a great impact on the allocation of commercial credit. In a complex market, the mechanisms that act under different environmental conditions are different, and the secondary allocation of commercial credit leads to the extension of the supply chain of funds, which intensifies the financial risks of the supply chain. Therefore, it is of great significance to explore the relationship between the level of corporate risk-taking and the secondary allocation of commercial credit and the mechanism of action for preventing systemic financial risks in the supply chain and promoting stable economic development. This paper took China's listed companies from 2009 to 2020 as the example, and empirically examined the impact of the improvement of the company's risk-taking level on its secondary allocation of commercial credit. The research found that: First, companies took the initiative to re-allocate commercial credit for the purposes of maintaining customer relationships, maintaining the normal operation of the supply chain, and enhancing market status. Second, enterprises used the initiative to increase mortgage loans and bank loans as a mechanism intermediary, increased cash payments to upstream and downstream of the supply chain, and reduced company accounts payable to carry out secondary allocation of commercial credit. Third, in the further analysis of heterogeneity, it was found that this behavior of secondary allocation of commercial credit was more common in state-owned enterprises and more significant when external competition was strong. The findings of this paper showed that the higher the risk-taking level of companies that purchased D&O insurance, the more inclined they were to re-allocate commercial credit, which aggravated supply chain financial risks.

Keywords: Secondary allocation of commercial credit; Corporate risk-taking; Director's liability insurance; Supply chain finance.

1. Introduction

Commercial credit refers to the customer funds occupied by enterprises in deferred payment or the funds provided to customers by early collection when selling goods. It was an important source of short-term financing for small and medium-sized enterprises (Zhang Xinmin et al., 2012). The initial allocation of funds meant that the company's financial resources were allocated through formal financial institutions, while the secondary allocation of commercial credit meant that non-financial enterprises act as financial intermediaries and provided informal financing to small and medium-sized companies in the upstream and downstream of the supply chain through commercial credit to ease their financing constraints (Petersen and Rajan, 1997; Wang Yanchao, 2014).

Under China's special financial system, the credit market was severely fragmented. Due to financial constraints and credit constraints, small and medium-sized enterprises were faced with problems such as difficult and expensive financing, and most bank credit resources flowed to large state-owned enterprises and listed companies (Wang Yongqin et al., 2015; Yu Ze et al., 2015; Chen et al., 2020; Kong Dongmin et al., 2021). Most of the large companies that were at the front end of the industrial chain and upstream of the supply chain were more favored by formal financial institutions because they had sufficient collateral and had less financing pressure; The investment projects had a low rate of return and slow capital turnover, resulting in a large amount of capital precipitation. However, most of the small and medium-sized enterprises at the end of the industrial

chain and downstream of the supply chain were difficult to obtain financing through formal financial institutions due to problems such as lack of collateral and credit discrimination.

Director and senior management liability insurance (referred to as director liability insurance) was a factor that comprehensively affected and reflected a company's risk-taking level from the perspective of the external legal system environment and the internal corporate governance mechanism. More and more large companies and listed companies have purchased director liability insurance, in order to reduce the impact of executives' decision-making mistakes and improve the company's ability to resist risks. In 2002, the "Guidelines for Corporate Governance of Listed Companies" promulgated by Chinese Securities Regulatory Commission and the State Economic and Trade Commission mentioned that "with the approval of the general meeting of shareholders, listed companies may purchase directors' liability insurance for directors". Since the emergence of D&O, some scholars have supported the hypothesis of external supervision, argued that D&O has a restrictive effect on managers' risk behavior and inhibits the level of enterprise risk taking (Baker, 2007; Core, 2000); other scholars have supported management Incentive and Moral Hazard Hypotheses, which believed that directors and liability insurance strengthened the company's risk-taking level by incentivizing managers' willingness to take risks (Lai Li et al., 2020; Hu Guoliu and Hu Jun, 2017; Jia and Tang, 2018; Jia Ning et al., 2013), director liability insurance transferred the legal costs of management, induced more risky behaviors of managers, and increased the company's operating risks. Liang Chuchu (2013) and Lai Li et al. (2019) believed that directors' liability insurance started relatively late in China, the supporting legal environment was not perfect, and the cost of individual violations was low. Based on this realistic background, directors' liability insurance was not instead of playing an active role in supervision and governance, it "relaxed" the company's risks and strengthens the company's risk-taking level. For large companies that have purchased director liability insurance, under the protection of corporate risk by director liability insurance, on the one hand, they would rely on the advantages of bank financing, on the other hand, due to the profit-seeking nature of high-investment projects, they would be more inclined to use commercial credit for the second time.

2. Literature Review

Compared with other types of companies, large companies and listed companies were more likely to obtain bank loans. Under the protection of directors' liability insurance, they were more inclined to redistribute financial funds to upstream and downstream small and medium-sized enterprises in the supply chain. Although in addition to formal financial institutions such as banks, commercial credit among enterprises played an important supplementary role in the allocation of financial resources, although the method of capital blood transfusion through the secondary allocation of commercial credit has alleviated the financing pressure of small and medium-sized enterprises to a certain extent, because of its financing cost was low, and it was prone to abuse of commercial credit. At the same time, this financing method led to the lengthening of the credit supply chain, which intensified the risk contagion between upstream and downstream enterprises in the supply chain (Buchak et al., 2018; Allen et al., 2019). From a long-term perspective, the secondary allocation of commercial credit had high concealment and leverage, caused financial risk accumulation and spillover effects between the upstream and downstream of the supply chain (Shen Hongbo et al., 2013; Li Jianjun and Han Xun, 2019), which meant that once there was a problem with a subject in the supply chain, systemic financial risks in the supply chain may be formed (He Dexu and Wang Chaoyang, 2017; Zhang Chengsi, 2019).

Difficulty and high cost of financing for SMEs further hampered economic development. The government has gradually improved and established a financing support system for SMEs. Although China's small and medium-sized enterprises accounted for 94.15 % of the total number of enterprises, the value of products and services created was equivalent to 60% of the total GDP, and has made great contributions to the improvement of the social economy, but since the outbreak of the new

crown epidemic, China's small and medium-sized enterprises living environment has declined sharply. According to statistics, the total amount of loans that small and medium-sized enterprises can borrow in banks was less than 20% of the total loan amount. Based on this practical problem, the "14th Five-Year Plan" and the outline of the long-term goals for 2035 proposed to improve the basic system of the capital market, vigorously develop institutional investors, and improve direct financing. The capital market should be further reformed, and the proportion of direct financing should be increased to establish a better investment and financing cycle. Under the background of China's special financial market economy, the function of secondary allocation of commercial credit played an important role, so it was particularly important to study in depth the conditions under which companies will increase secondary allocation of commercial credit.

This paper took the A-share listed companies from 2009 to 2020 as the research object, and examined the relationship between the company's risk-taking level and the secondary allocation of commercial credit. The research of this paper found that directors and liability insurance was in the bottom line of the company's risk behavior, resulting in a risk "unbinding" effect, and the risk-taking ability of listed companies that purchased directors' liability insurance has been significantly improved. It would actively increase mortgage loans and bank loans for secondary allocation of commercial credit. This behavior was reflected in the company's increase in cash payments to the upstream and downstream of the supply chain and a reduction in the company's accounts payable. In further analysis, this paper found that the behavior of secondary allocation of commercial credit was more common in large non-state-owned enterprises, and it was more significant when external competition was strong. The practical significance of this paper was to recognize that the lack of funds and financing difficulties in China were one of the main reasons for the limited development of many small and medium-sized enterprises. Effectively solving the problem of difficult and expensive financing for enterprises was of great significance to the development of the real economy. In a lot of research and enterprise practice, the commercial credit between enterprises was one of the important sources of short-term financing. Based on the perspective of supply chain, this paper explored the mechanism of the secondary configuration of the company's commercial credit, and provided theoretical guidance and risk warning for enterprise practice. The conclusion of this paper was of practical significance. The study affirmed the importance of supply chain construction in the context of the layout of the "dual circulation" and the "14th Five-Year Plan". It had a reference for decision-makers to further improve the supply chain financial policy and increase the entity's ability to resist risk shocks. It also provided reference suggestions for commercial banks to expand supply chain financial services.

Compared with the existing literature, the main contributions of this paper include: First, it provided evidence that the increase in the level of corporate risk-taking after purchasing D&O insurance will intensify the secondary allocation of commercial credit, which enriched the research. At present, scholars' research on directors and liability insurance and corporate risk-taking levels mainly focused on the exploration of the relationship between the two, or discussed the secondary allocation of commercial credit as a topic in the financial field. There were few literatures on corporate risk-taking levels and commercial credit. Second, it enriched relevant literatures in the field of commercial credit. Through empirical methods, this paper proved that the intermediary of the impact mechanism on the secondary allocation of commercial credit after the level of corporate risk-taking increased was achieved by increasing excessive borrowing. This paper explored the influence mechanism of the level of corporate risk taking and the secondary allocation of commercial credit. Third, based on the perspective of supply chain, this paper provided evidence for the motivation of large companies and listed companies to carry out more commercial credit secondary allocation. At present, scholars had mainly obtained the financial motivation and operational motivation of commercial credit. This paper analyzed the motivation It confirmed the business motive of the enterprise, and in further analysis, it was found that when the external competition is strong, the non-state-owned company would make more secondary allocation of commercial credit to the upstream and downstream of the supply chain after the level of risk-taking is improved, which would aggravate

the risk of commercial credit. With the increasing complexity of economic globalization and the competitive environment of companies, the rapid development of supply chain production models, the production cooperation between core companies and suppliers was unprecedentedly close, and the study of its impact on business credit from the perspective of supply chain has attracted increasing attention from scholars. The business motive theory of commercial credit held that commercial credit can reduce operating costs, expand sales and occupy the market. Ferris (1981) proposed the transaction cost motivation theory, and Murfin and Njoroge (2015) empirically confirmed that commercial credit can reduce the reserve of emergency funds, thereby reducing the transaction cost of product payment. Uchida et al. (2013) found that when the market was in relatively fierce product market competition, suppliers were more inclined to increase the competitive advantage of products by providing commercial credit, so as to achieved the effect of facilitating transactions, expanding product sales and occupying the market.

For the purpose of maintaining the supply chain and enhancing their own development, companies with higher risk-taking levels often took the initiative to increase mortgage loans and bank loans for secondary allocation of commercial credit. This behavior was reflected in the company's increase in cash payments to the upstream and downstream of the supply chain, increasing the company's accounts receivable and reducing accounts payable. Good supply chain governance was an important guarantee for promoting information sharing among companies on the chain and suppressing opportunistic behaviors. However, few literatures analyzed the impact of corporate risk-taking levels on the secondary allocation of business credit based on the perspective of supply chain governance theory.

The research on the influencing factors of enterprise risk-taking on business decision-making usually included two aspects: the company's internal and external environment. The internal influencing factors of the company mainly included company characteristics, ownership structure, corporate governance mechanism and managerial characteristics, etc.; external environmental influencing factors mainly included factors such as macro economy, legal system, capital market, investor protection, creditor protection and cultural traditions (Chen Xiaohui, Zhang Hongwei, 2021).

Listed companies and large companies had strong risk-taking ability and low difficulty in bank lending. Whether it was for the purpose of optimizing resource allocation or maintaining the normal operation of the supply chain, they would provide their own excess funds in the form of commercial credit. Downstream small and medium-sized enterprises, which led to the lengthening of the capital transmission chain and exacerbates the systemic risks of the supply chain. Considering that listed companies with a higher commitment level were more likely to obtain bank credit resources through formal financial institutions, the existing research on commercial credit in academia mainly focuses on the "resource reallocation theory" (Wang Yanchao, 2014; Shenoy and Williams, 2017; Altunok et al., 2020) and "buyer's market theory" (Davis and Hyndman, 2018; Chen Shenglan and Liu Xiaoling, 2019). Some listed companies and large companies were willing to re-allocate the obtained bank credit funds to small and medium-sized enterprises in the upstream and downstream of the supply chain in the form of commercial credit for the motives of making investment profits or maintaining customer relationships and consolidating supply chains (Harford et al., 2014; Wang Yanchao, 2014; Duchin et al, 2017; Zhang Chengsi and Liu Guanchun, 2018). The financing theory put forward by Schwartz (1974) revealed that the bank loans of large enterprises and commercial credit were complementary from the perspective of credit providers, and from the perspective of receivers, it was revealed that because commercial credit was short-term financing, the cost was lower, so the two were mutual substitution relationship. The research of Shi Xiaojun and Li Jie (2009) further confirmed that in China, an alternative relationship between commercial credit and bank borrowing was established, and commercial credit was a cheap short-term financing source in China, which meant that as long as upstream suppliers were willing to provide commercial Credit, downstream small and medium-sized enterprises would accept the secondary allocation of commercial credit. For enterprises, upstream and downstream enterprises in the supply chain were an alliance of interests. When faced with partners who have difficulties in business, upstream enterprises were often willing

to increase cash payments and reduce accounts payable to provide business credit to help customers transition overcome difficulties, not give up cooperation. For company executives, for the sake of maximizing personal interests and performance pressure, managers were more inclined to abandon projects with longer investment return cycles and higher risks, and chose financial investments with higher returns. They were motivated to use idle funds for secondary allocation of commercial credit for upstream and downstream SMEs, so as to obtain excess financial returns (Harford et al., 2014; Duchin et al., 2017) to meet the requirements of personal interests and their own short-term performance.

From the analysis of the factors affecting the secondary allocation of commercial credit, scholars believed that the market environment and system were the key factors affecting the secondary allocation of commercial credit. Fisman and Love (2003) and others have confirmed the promoting effect of financial repression, especially in some countries with relatively lagging financial markets, informal finance such as commercial credit played an important role in economic development. Wang Yanchao et al. (2014) believed that the degree of financial repression was an important institutional factor affecting the secondary allocation of commercial credit. In areas with a higher degree of financial repression, the secondary allocation function of commercial credit was stronger. Chen Bin et al. (2016) believed that monetary policy will significantly affect the transmission of commercial credit financing funds. During the period of monetary tightening, large companies and listed companies with low financing costs would reduce liquidity to small and medium-sized enterprises. At the same time, private enterprises were facing more intense market competition. In order to pursue profit maximization, the tendency of secondary allocation of commercial credit is more significant. The less developed the digital inclusive finance area was, the more serious the secondary allocation of commercial credit would be. Most of the existing literature analyzed the influencing factors of the secondary allocation of commercial credit from the external environment, and few literatures discussed the influence of internal factors of the company. This paper mainly explored the relationship between the company's own risk-taking level and its relationship, and found that the higher the company's risk-taking level was, the more likely the secondary allocation of commercial credit would occur.

Judging from the existing literature, more and more large companies and listed companies in China were accepting the purchase of director liability insurance. Under the role of its risk bottom line, there were few literatures discussing the impact of company internal factors on the secondary allocation of commercial credit. At the same time, the mechanism of how the increase in the company's risk-taking level will affect the secondary allocation of commercial credit was still unclear. The secondary allocation of commercial credit will bring financial risks to the company. Then the large companies and listed companies located in the upstream of the supply chain, after the company's risk-taking level was improved, as for what were the motivations for the secondary allocation of commercial credit? Existing literature Less discussed.

3. Theoretical Analysis and Research Hypotheses

Differences in corporate risk-taking levels would affect the secondary allocation function of commercial credit. Most of the large companies and listed companies in the upper reaches of the supply chain had less financing pressure. Due to the large scale of enterprises, high market status and sufficient collateral, it was easier for formal financial institutions such as banks to obtain credit funds through credit loans and mortgage loans. Through the data, it was found that commercial credit accounts for a relatively high proportion of the operating income of listed companies, which to a certain extent indicates that listed companies may tend to use commercial credit to provide informal financing to companies in the upstream and downstream of the supply chain (Wang Yanchao, 2014). This type of company was often willing to transfer funds to small and medium-sized enterprises with financial difficulties in the upstream and downstream of the supply chain through secondary allocation of commercial credit due to business or investment purposes, so as to expand product sales

and consolidate market positions. In addition, some large companies and listed companies consider that the secondary allocation of commercial credit was prone to financial risks. Due to risk aversion motives, some risk-averse but decision makers were not inclined to secondary allocation of commercial credit to the upstream and downstream financial managers of the supply chain. However, with the application of director liability insurance by more and more large companies and listed companies, its risk-relaxing effect made risk-averse decision-makers not reject trying investment projects with good returns but high risks, in order to maximize the interests of shareholders and the value of the company Hua (Hu Guoliu and Hu Jun, 2017; Hwang and Kim, 2018). This meant that the improvement of the company's risk-taking level will significantly and positively affect the secondary allocation function of commercial credit. Therefore, this paper proposed Hypothesis 1.

Hypothesis 1: The improvement of the company's risk-taking level will promote the secondary allocation of the company's commercial credit.

Over-borrowing was a credit or mortgage loan that exceeded the business and financial needs of a business. From the perspective of transmission mechanism, first, large companies and listed companies in China were more likely to obtain bank loans than other types of companies because of their company size, market position, policy advantages, good credit and sufficient collateral. Due to the principal-agent problem, managers had self-interested considerations such as performance and income, and under the risk-taking effect of director liability insurance, the company's risk-taking level has increased, motivating them to continue to make additional loans to banks. Shenoy and Williams (2017) research found that when faced with financially distressed customers, suppliers would not give up cooperation at this time, but improve business credit lines and accounts receivable to help customers through the crisis. This meant that large companies and listed companies would increase cash payments downstream and increase accounts receivable through excessive borrowing, so as to implement the secondary allocation function of commercial credit, and ultimately lead to excessive borrowing; in contrast, SMEs do not have comparative advantages in the above aspects. In theory, how would this commercial credit unfold? In the competition mechanism of the upstream and downstream markets, it was difficult for small and medium-sized enterprises with high financial pressure and weak bargaining power to obtain bank credit financing, while companies with higher risk-taking levels were a community of interests with them, in order to maintain customer relationships and maintain the normal operation of the entire supply chain. The purpose was to reduce accounts payable only by increasing bank financing, increasing cash payments to upstream enterprises. Hu Yuefei and Huang Shaoqing (2009) believed that supply chain finance business including accounts receivable reduces supply chain management costs, increases product sales, and increases market share. Second, commercial credit can lastingly maintain the cooperative relationship between upstream and downstream enterprises in the supply chain. This explains why some companies were still willing to re-allocate commercial credit when excessive borrowing was prone to financial risks. Therefore, this paper proposed Hypothesis 2.

Hypothesis 2: Excessive borrowing is the medium through which the level of corporate risk-taking affects the secondary allocation of commercial credit.

4. Research Design

4.1 Sample Selection and Data Sources

Took China's A-share listed companies from 2009 to 2020 as the research object, this paper empirically examined the impact of corporate risk-taking levels on the secondary allocation of commercial credit. The sample of listed companies mainly came from the CSMAR database, and was screened as follows: (1) Due to the particularity of the financial reporting structure of the financial industry, the financial industry was excluded; (2) The companies with missing relevant data during the research period were excluded; (3) ST was excluded, PT companies; (4) In order to eliminate the influence of outliers, the continuous variables were abbreviated at the level of 1% to 99%. 31,166 company-year observations were finally obtained.

4.2 Variable Definition

(1) The company's risk-taking. Used director liability insurance to measure a company's risk-taking level. Considering the late emergence of director liability insurance in China's market, the imperfect legal environment and the low cost of individual violations, director liability insurance has played a "basic role" in the performance risk of executives (Lai Li et al., 2019). Director liability insurance reduced managers' legal liability, reduced shareholders' litigation costs, induced executives' opportunistic behavior and risk decision-making, and improved the level of corporate risk-taking (Chalmers et al., 2002; Chung and Wynn, 2008; Zou et al., 2008).

(2) Secondary allocation of commercial credit. Referring to the definition of commercial credit by Chen Shenglan and Liu Xiaoling (2018), this paper used two methods to define commercial credit: one was defined based on operating costs, and the calculation method is: (accounts receivable + bills receivable + prepaid accounts) / Operating cost; Second, it was defined on the basis of operating income, and the calculation method was: (accounts receivable + bills receivable + prepaid accounts) / operating income. In addition, this paper also drew on the practice of Sun Changling et al. (2021) and further adopted the measurement of net commercial credit to enhance the robustness of the results. The calculation formulas were: (accounts receivable + bills receivable + prepaid accounts - accounts payable - Notes payable - accounts payable in advance) / operating income, (accounts receivable + notes receivable + accounts payable in advance - accounts payable - notes payable - accounts payable in advance) / operating costs.

4.3 Empirical Model

Examined the impact of the company's risk-taking level on the secondary allocation of the company's commercial credit through model (1). The model was set as follows:

$$TCC_income_{i,t} = \beta_0 + \beta_1 LINSUR_{i,t} + \beta_2 CONTROL_{i,t} + \sum YEAR + \sum Industry + \varepsilon_{i,t} \quad (1)$$

Among them, it $TCC_income_{i,t}$ represented the degree of secondary allocation of the company's commercial credit and the level of $LINSUR_{i,t}$ risk-taking of the company. In this paper, it was measured by whether to purchase directors' liability insurance, accounts receivable and bank loans, which $CONTROL_{i,t}$ represented the control variable. According to references (Zhang Xinmin et al., 2012; Wang Yanchao, 2014, Zhong Kai et al., 2022), considering that there may be other factors affecting the company's business credit allocation, this paper added the following control variables : net profit margin of total assets (roa), financial leverage (lev), audit by the four major international accounting firms (IsBig4), total assets (Asset), TobinQ value (TobinQ), fixed asset ratio (tang_ratio), equity concentration index (Shrcr1), proportion of independent directors (indir), company growth (grow), cash flow from operating activities (ocf), and industry and year, etc. The detailed variable description is shown in Table 1.

Table 1. Variable Definition Table

variable name	variable abbreviation	variable description
1. Explained variable		
business credit variables	TC c_cost	(Accounts Receivable + Notes Receivable + Prepaid Accounts) / Operating Cost
	TC c_income	(Accounts Receivable + Notes Receivable + Prepaid Accounts) / Operating Income
	TC c_n cost	(Accounts Receivable + Notes Receivable + Accounts Payable - Accounts Payable in Advance) / Operating Cost
	TC c_n income _	(Accounts Receivable + Notes Receivable + Accounts Payable - Accounts Payable in Advance) / Operating Income
2. Explanatory variables		
corporate risk taking	issue	The company has purchased director and executive liability insurance this year = 1, no = 0

3. Control variables		
Net profit margin on total assets	roa	The ratio of net profit to total assets at the end of the period
financial leverage	lev	The ratio of the liabilities at the end of the period to the total assets at the end of the period
Fixed asset ratio	Tang_ratio	The ratio of net fixed assets at the end of the period to the total assets at the end of the period
total assets	Asset	The natural logarithm of total assets at the end of the period
cash ratio	Cash_ratio	Net cash flow from operating activities divided by period-end non-cash assets
cash flow from operating activities	ocf	The ratio of cash flow from operating activities to total assets at the beginning of the period
company growth	grow	The ratio of the increase in operating income for the current year to the operating income at the beginning of the period
Proportion of independent directors	indir	The ratio of the number of independent directors to the size of directors
Big Four Accounting Firms	IsBig4 _	Auditor from the Big Four Value =1, otherwise =0
Shareholding ratio of the largest shareholder	Shrcr 1	Institutional investors (top 1%) shareholding ratio
company age	lnage	1 to the logarithm of the time from the company's establishment year to the current year
Tobin 's Q	TobinQ	total assets of the company
industry	industry	Industry dummy variable
years	year	year dummy variable
province	province province	Province dummy variable

5. Empirical Results

5.1 Descriptive Statistics

Table 2. Descriptive Statistics of The Main Variables

variable	sample size	mean	standard deviation	minimum	Median	maximum value
TCc_income	31166	0.332	0.323	0.016	0.240	2.137
loan_Res	31166	0.000	0.473	-3.417	0.071	1.255
issue	31166	0.067	0.251	0.000	0.000	1.000
roa	31166	0.034	0.068	-0.360	0.035	0.214
LEV	31166	0.442	0.207	0.050	0.438	1.045
IsBig4	31166	0.060	0.237	0.000	0.000	1.000
Asset	31166	22.145	1.312	19.173	21.968	27.052
cash_ratio	31166	0.177	0.127	0.006	0.143	0.703
TobinQ	31166	2.049	1.861	0.160	1.499	10.698
Tang_ratio	31166	0.222	0.167	0.001	0.188	0.719
Shrcr1	31166	34.690	14.961	8.500	32.592	74.824
Indir	31166	0.374	0.054	0.300	0.333	0.571
Grow	31166	0.183	0.506	-0.677	0.106	3.996
OCF	31166	0.046	0.073	-0.208	0.046	0.262
lnage	31166	2.751	0.396	1.099	2.833	3.434

Table 2 presented the descriptive statistics of the main variables. It can be seen that the average value of the company's purchase of directors' liability insurance was 0.067, indicating that the proportion of China's A-share listed companies purchasing director's liability insurance is relatively small. The average value of commercial credit allocation defined by operating income was 0.332,

indicating that the proportion of commercial credit to operating income was about 33%, indicating that the commercial credit provided by Chinese A-share listed companies had a certain scale and was an important part of the company. It reflected the significance of studying the impact of the company's risk-taking ability on the secondary allocation of commercial credit. Table 2 also listed the statistical descriptions of other variables, which were all within the normal range, indicating that the continuous variables were not affected by extreme values after the tail reduction treatment.

5.2 Correlation Coefficient Analysis

Table 3 analyzed the correlation coefficient, it can be seen that whether the company conducts secondary allocation of commercial credit in the upstream of its supply chain was positively related to LM_tonel, growth capability and company growth, and was related to the net profit margin of total assets, financial leverage, four major audits, cash ratio, fixed asset ratio, equity concentration index, cash from operating activities and company age were negatively correlated.

Table 3. Variable Correlation Analysis

	<i>TCs_in come</i>	<i>LM_T one1</i>	<i>roa</i>	<i>LEV</i>	<i>IsBig4</i>	<i>Asset</i>	<i>cash_ratio</i>	<i>TobinQ</i>	<i>Tang_ratio</i>	<i>Shrcr1</i>	<i>Indir</i>	<i>Grow</i>	<i>OCF</i>	<i>lnage</i>
<i>TCs_in come</i>	1	0.109*	0.108*	0.098*	0.127*	0.169*	0.025*	0.134*	0.235*	0.148*	0.034*	0.006	0.308*	0.113*
<i>LM_T one1</i>	0.068*	1	0.249*	0.188*	0.057*	0.177*	0.115*	0.224*	0.010*	-	0.004	0.092*	0.064*	0.330*
<i>roa</i>	-0.157*	0.235*	1	0.412*	0.039*	0.036*	0.274*	0.375*	-0.076*	0.124*	0.028*	0.325*	0.405*	0.107*
<i>LEV</i>	-0.072*	-0.197*	0.344*	1	0.099*	0.461*	-0.310*	0.574*	0.032*	0.058*	0.022*	0.014*	0.154*	0.111*
<i>IsBig4</i>	-0.112*	0.066*	0.046*	0.096*	1	0.280*	-0.046*	0.141*	0.031*	0.130*	0.017*	-0.002	0.080*	0.022*
<i>Asset</i>	-0.158*	-0.147*	0.033*	0.450*	0.358*	1	-0.179*	0.615*	0.010*	0.172*	-0.002	0.045*	0.050*	0.206*
<i>cash_ratio</i>	-0.058*	0.119*	0.228*	0.349*	0.041*	0.195*	1	0.260*	-0.290*	0.018*	0.009*	0.061*	0.138*	0.090*
<i>TobinQ</i>	0.072*	0.131*	0.217*	0.424*	0.094*	0.479*	0.253*	1	-0.084*	0.092*	0.035*	0.110*	0.124*	0.180*
<i>Tang_ratio</i>	-0.261*	-0.003	0.058*	0.076*	0.052*	0.073*	-0.314*	0.127*	1	0.074*	0.066*	0.057*	0.264*	0.082*
<i>Shrcr1</i>	-0.140*	0.003	0.143*	0.060*	0.141*	0.217*	0.023*	0.077*	0.087*	1	0.018*	0.020*	0.092*	0.119*
<i>Indir</i>	0.045*	0.006	0.031*	0.014*	0.030*	0.024*	0.005	0.052*	-0.063*	0.031*	1	-0.001	0.025*	0.017*
<i>Grow</i>	-0.043*	0.076*	0.198*	0.034*	0.012*	0.042*	0.015*	0.070*	-0.062*	0.025*	-0.000	1	0.061*	0.136*
<i>OCF</i>	-0.284*	0.069*	0.350*	0.162*	0.073*	0.050*	0.152*	0.125*	0.241*	0.085*	0.023*	0.016*	1	0.008
<i>lnage</i>	-0.073*	-0.324*	0.093*	0.126*	0.013*	0.073*	-0.135*	0.102*	-0.049*	0.126*	0.007	0.052*	-0.004	1

Note: Spearman test in the lower left corner, Pearson test in the lower right corner

5.3 Benchmark Regression Results

Table 4 listed the test results of the causal relationship between the level of corporate risk taking and the secondary allocation of commercial credit. The dependent variables in columns (1) - (4) were the effects of different risk-bearing capacities on the secondary allocation of commercial credit under different control variables. The results showed that in the first row (issue). The configured regression

coefficients were all significantly negative at the 1% level. The above conclusions preliminarily show that the company's risk-taking level, which was measured by directors' liability insurance, had a significant positive impact on the secondary allocation of commercial credit. Column (1) had no control variables, and the regression coefficient was -0.0183, which was significant at the 1% level. After adding a series of control variables in columns (2) - (4), the regression coefficients would change slightly, but the overall results were still significant, and the results remained significantly negative at the 1% level. It was proved that the higher the level of risk-taking, the listed companies would make more secondary allocation of commercial credit, that was, the company will pay more cash to the upstream and downstream companies in the supply chain to consolidate the supply chain and carry out better production and operation activities. This conclusion supported the hypothesis of this paper.

Table 4. Basic Test Results

	(1) TCc_income	(2) TCc_income	(3) TCc_income	(4) TCc_income
issue	-0.0183*** (-2.9330)	-0.0463*** (-7.5045)	-0.0470*** (-7.6046)	-0.0457*** (-7.3921)
roa		-0.4410*** (-13.7973)	-0.4520*** (-13.2680)	-0.3702*** (-10.1840)
LEV		0.4413*** (39.6145)	0.4421*** (38.1820)	0.4587*** (39.1594)
IsBig4		-0.0454*** (-6.3146)	-0.0425*** (-5.9103)	-0.0450*** (-6.2754)
Asset		0.0043** (2.1832)	0.0021 (1.0671)	0.0028 (1.4295)
cash_ratio			-0.0262* (-1.8260)	-0.0263* (-1.8069)
TobinQ			-0.0039*** (-3.2720)	-0.0030** (-2.4666)
Tang_ratio			-0.2286*** (-17.0041)	-0.2260*** (-15.7331)
Shrcr1			0.0000 (0.1697)	-0.0001 (-0.4739)
Indir				-0.0104 (-0.3850)
Grow				-0.0374*** (-7.9241)
OCF				-0.0574* (-1.9470)
lnage				-0.0234*** (-5.8234)
_cons	0.3333*** (205.0558)	0.0626 (1.5174)	0.1741*** (4.0722)	0.2256*** (5.0968)
N	31165	31165	31165	31165
r2	0.2940	0.3857	0.3934	0.3971

Note: *, **, and *** represent the significance levels of 10%, 5%, and 1%, respectively. The t-value test of the coefficient is in the brackets, and the tables are the same.

6. Robustness Check

Considering the potential endogeneity problem, this paper adopted the method of replacing independent variables and dynamic models, using PSM and multi-period differential DID model, to verify the main assumptions of this paper again and enhance the robustness of the results.

6.1 Substitute Arguments

Considering that the above results may be established by chance due to the measurement of variables, this paper used a variety of measurement methods to carry out substitution tests to exclude the accidental factors of the results. There were two calculation methods in the commercial credit variable, namely (accounts receivable + notes receivable + prepaid accounts) / operating cost; (accounts receivable + notes receivable + prepaid accounts) / operating income. This paper chose the former to replace the latter measurement method for further testing. The regression coefficient of column (1) of Table 5 was -0.0573, and the result was significantly negative at the 1% level, which proved that after replacing the independent variable with the operating cost calculation method, the results we got were consistent with the above conclusions, that was, the improvement of the company's risk-taking level will significantly and positively affect the secondary allocation of commercial credit.

6.2 Multi-Phase DID Model

The second step was multi-period difference (DID). An important premise of using the multiple difference model was to assume that the experimental and control groups have parallel trends before the experiment. That was, there was no significant difference in the value trend of the explained variable between the two groups of samples before the experiment. Therefore, this paper used the practice of Luong et al. (2017) and Lu Dong et al. (2019) to test the parallel trend hypothesis of matched samples. As can be seen from Table 5, in the year before the company first purchased director liability insurance, there were some differences in key indicators such as accounts receivable and payable between the experimental group and the control group. Let the dummy variable $Treated_i = 1$, and for the control group companies obtained after PSM processing, let the dummy variable $Treated_i = 0$. At the same time, set the time dummy variable $After_{i,t}$, $After_{i,t} = 1$ to indicate the year after the purchase of the director's liability insurance, $After_{i,t} = 0$ to indicate the year before the purchase of the director's liability insurance. We developed the following model:

$$Y_{i,t} = \alpha + \beta_1 Treated_i \times After_{i,t} + \beta_2 Treated_i + \beta_3 \times After_{i,t} + \rho \sum CONTROL_{i,t} + \sum Industry + Year + \varepsilon_{i,t} \quad (2)$$

In model (2), the explained variables and control variables were consistent with model (1). In order to reduce the influence of unobservable factors on the results, this paper limited the observation window to one year before and after the company purchases D&O insurance. This part focused on the interaction term in model (2) $Treated_i \times After_{i,t}$, which measured the change in the secondary allocation level of commercial credit before and after the company purchases D&O insurance relative to other companies. The results of directors and liability insurance before the issuance were -0.0165, there was no significant difference, the results at the time of issuance were -0.0225*, there was a significant difference, and the results after the issuance were 0.0172. Column (3) of Table 5 showed the DID re-test, and the result was significant at the 1% level, indicating that the matched samples used in this paper satisfy the parallel trend assumption, and the PSM and multi-period difference DID models were effective.

6.3 PSM Model

Considering the problem of sample self-selection, in order to solve the potential endogeneity problem of enterprises, this paper used the PSM model to test and draw on the research methods of Chen et al. (2018) and Lai Li et al. (2019). Propensity matching was performed to mark the year before the company first purchased D&O insurance, and then a one-to-one nearest-neighbor matching method was used to match companies that have not purchased D&O insurance in all years. After PSM processing, 3638 experimental group companies and control group companies were finally obtained. From the (4) column of Table 5, the regression coefficient can be obtained as -0.0417, and the result was significantly negative at the 1% level, which was basically consistent with the main results of this paper.

Table 5. Robustness Test Results

	(1) TCc_cost	(2) TCc_income	(3) TCc_income	(4) TCc_income
issue	-0.0573*** (-5.3412)			-0.0417*** (-4.3586)
roa	-0.1123** (-1.9811)	-0.3700*** (-10.1773)	-0.3662*** (-10.0813)	-0.2576*** (-2.5822)
LEV	0.5789*** (29.5674)	0.4587*** (39.1532)	0.4575*** (39.0499)	0.4403*** (12.8979)
IsBig4	-0.0572*** (-4.4560)	-0.0455*** (-6.3407)	-0.0531*** (-7.4719)	-0.0271* (-1.9446)
Asset	0.0096*** (2.7785)	0.0027 (1.3827)	0.0016 (0.7907)	-0.0028 (-0.5222)
cash_ratio	-0.0292 (-1.0336)	-0.0265* (-1.8192)	-0.0274* (-1.8778)	-0.0565 (-1.2550)
TobinQ	0.0120*** (4.9002)	-0.0030** (-2.4760)	-0.0031** (-2.5532)	-0.0074* (-1.9002)
Tang_ratio	-0.3754*** (-15.1624)	-0.2261*** (-15.7350)	-0.2255*** (-15.6805)	-0.1669*** (-4.3139)
Shrcr1	-0.0004** (-2.2071)	-0.0000 (-0.4648)	-0.0000 (-0.2904)	-0.0007* (-1.7566)
Indir	0.0273 (0.5868)	-0.0105 (-0.3894)	-0.0133 (-0.4916)	0.0025 (0.0305)
Grow	-0.0581*** (-7.3217)	-0.0374*** (-7.9244)	-0.0372*** (-7.8903)	-0.0569*** (-4.1870)
OCF	0.0222 (0.4490)	-0.0574* (-1.9482)	-0.0576* (-1.9533)	-0.0974 (-0.9179)
lnage	-0.0418*** (-6.2230)	-0.0235*** (-5.8530)	-0.0255*** (-6.3604)	-0.0097 (-0.6347)
issued		-0.0425*** (-6.8207)		
pre2			-0.0165 (-0.9151)	
current			-0.0225* (-1.8389)	
after			0.0172 (1.0768)	
after2			-0.0083 (-0.5496)	
_cons	0.2289*** (2.8706)	0.2280*** (5.1533)	0.2582*** (5.8504)	0.3495*** (2.6022)
N	31165	31165	31165	3638
r2	0.3321	0.3970	0.3961	0.4660

7. Further Analysis

The above results proved that the level of corporate risk taking has a significant positive impact on the secondary allocation of commercial credit. Based on this conclusion, this paper chose excessive borrowing as the mediating effect mechanism of the impact of corporate risk-taking level on the secondary allocation of commercial credit. Drawing on the "mediation effect" test method of related literatures such as Imai et al. (2010) to design an empirical analysis strategy, the following model was obtained. Among them, loan_Res was an intermediary variable, which indicated the excessive borrowing of the company. In column (1), the dependent variable was over-borrowing and the explanatory variable was business credit allocation. The regression coefficients in columns (3)

and (4) were 0.0806 and 0.0573 respectively, and the results were all significantly positive at the 1% level, indicating that the higher the over-borrowing, the more inclined the company was to carry out secondary allocation of commercial credit. Add mediator variables in columns (5) and (6), the dependent variable in column (5) was issue, the explained variable was business credit, the regression coefficient was -0.4999, the result was significantly positive at the 1% level, the (5) and (6) when the dependent variable was excessive borrowing, the coefficients were all significantly negative at the 1% level, indicating that the level of corporate risk-taking would affect the secondary allocation of commercial credit through excessive borrowing.

Table 6. Intermediary Mechanism Test: Excessive Lending

	(1)	(2)	(3)	(4)	(5)	(6)
	TCc_income	TCc_income	loan_Res	loan_Res	TCc_income	TCc_income
loan_Res	-0.4994*** (-79.2857)	-0.5168*** (-86.0604)			-0.4999*** (-79.0958)	-0.5165*** (-85.9521)
roa		-0.3489*** (-20.0420)		0.0381 (0.6713)		-0.3506*** (-20.0998)
LEV		0.4956*** (91.3928)		0.0723*** (3.6904)		0.4960*** (91.5767)
IsBig4		-0.0186*** (-5.5515)		0.0572*** (4.4560)		-0.0155*** (-4.5385)
Asset		0.0038*** (3.8692)		0.0029 (0.8249)		0.0043*** (4.3235)
cash_ratio		-0.0116 (-1.3739)		0.0292 (1.0336)		-0.0113 (-1.3278)
TobinQ		-0.0035*** (-4.3428)		-0.0009 (-0.3597)		-0.0034*** (-4.2849)
Tang_ratio		-0.3901*** (-54.8524)		-0.3179*** (-12.8390)		-0.3902*** (-54.9937)
Shrcr1		0.0003*** (6.4181)		0.0007*** (3.7517)		0.0003*** (6.3001)
Indir		-0.0255* (-1.9513)		-0.0273 (-0.5868)		-0.0245* (-1.8759)
Grow		-0.0322*** (-17.2571)		0.0098 (1.2388)		-0.0323*** (-17.3106)
OCF		-0.1010*** (-8.0473)		-0.0842* (-1.7034)		-0.1008*** (-8.0322)
lnage		-0.0025 (-1.4770)		0.0418*** (6.2230)		-0.0018 (-1.0413)
issue			0.0806*** (7.7908)	0.0573*** (5.3412)	0.0219*** (5.6629)	-0.0161*** (-5.0809)
_cons	0.3320*** (357.8540)	0.1536*** (6.5469)	-0.0054** (-2.1004)	-0.1631** (-2.0464)	0.3305*** (348.8227)	0.1414*** (5.9562)
N	31165	31165	31165	31165	31165	31165
r2	0.7433	0.8707	0.1630	0.1738	0.7436	0.8708

In this paper, the mediating effect was used to test the mechanism, and Table 7 showed the basic results of maintaining the aforementioned control variables and fixed effects. Drawing on the research method of Lai Li et al. (2019), this paper used credit loans, mortgage loans and short-term loans to reflect the relationship between enterprises and banks that carry out lending behaviors. Through empirical research, it was found that after purchasing directors' liability insurance, the level of corporate risk-taking increases, and bank borrowings decrease, especially short-term borrowings. Yuan Chun et al. (2010) and Lai Li et al. (2016) scholars believed that if enterprises actively reduce bank loans, they would increase mortgage loans accordingly. The credit loan had less impact on the future financing ability of the enterprise, and was more beneficial to the borrowing enterprise. Qian Xianhang and Cao Chunfang (2013) believed that if banks reduce corporate loans, they would first

consider credit loans. Because secured loans reduce credit risk. However, after purchasing director liability insurance and the company's risk-taking level was improved, if the credit loan was reduced, it meant that the bank recognized the risk factor and actively reduced the credit loan. At this time, the business will increase the mortgage loan accordingly to continue to obtain loan funds. It can be observed from columns (1)-(6) of Table 7 that this paper conducted regression analysis on credit loans, mortgage loans and short-term loans respectively. The results showed that in columns (1) and (2), credit loans were not significant, while in columns (3) -(6), the regression coefficients of mortgage lending (ML_Ratio) and short-term borrowing were 0.0281 and 0.0078, respectively, the results were all significantly positive at the level of 1%, indicating that the allocation of excess commercial credit would reduce the company's accounts receivable. The above results showed that the company's risk-taking level increases after purchasing director liability insurance, and the company would carry out more active borrowing, especially mortgages and short-term borrowing.

Table 7. Corporate Risk Taking and Bank Lending Behavior

	(1) CLRatio_1	(2) CLRatio_1	(3) MLRatio_1	(4) MLRatio_1	(5) shortloan	(6) shortloan
issue	0.0081 (0.9185)	-0.0059 (-0.6961)	-0.0447*** (-5.2570)	0.0281*** (3.3646)	0.0227*** (11.9233)	0.0078*** (4.2389)
roa		0.1816*** (3.6222)		-0.2033*** (-4.8383)		0.0243*** (3.6642)
LEV		-0.4811*** (-		-0.2774*** (-		0.1147*** (41.5931)
IsBig4		25.8453) 0.0964*** (9.9997)		16.0180) 0.0446*** (4.6895)		-0.0129*** (-7.0694)
Asset		0.0231*** (8.6598)		-0.0686*** (-		0.0107*** (22.9639)
cash_ratio				27.9552) 0.0885*** (3.0408)		-0.0216*** (-7.5387)
TobinQ		0.0188*** (7.7176)		0.0205*** (8.8340)		0.0002 (0.9660)
Tang_ratio		0.0583*** (2.8620)		0.0503*** (2.6879)		0.0875*** (20.7811)
Shrcr1		0.0025*** (14.1029)		0.0002 (0.9442)		-0.0001*** (-3.9505)
Indir		-0.0355 (-0.8124)		0.1205*** (3.0849)		0.0068 (1.0090)
Grow		-0.0367*** (-7.0619)		-0.0056 (-1.2570)		0.0031*** (3.4447)
OCF		0.0697* (1.6721)		0.1041*** (2.8703)		-0.0648*** (-
lnage		0.0361*** (4.7694)		0.0558*** (8.5950)		10.7164) -0.0011 (-1.1177)
_cons	0.4745*** (180.9062)	-0.0501 (-0.7922)	0.3045*** (127.4312)	1.7149*** (29.3818)	0.0472*** (113.2209)	-0.2488*** (-
N	17699	17699	14897	14897	31165	31165
r2	0.0656	0.1604	0.1010	0.2576	0.2861	0.4305

8. Motivation and Heterogeneity Analysis

8.1 Motivation Analysis

Based on external competition motives, when external competition was more intense, enterprises were more inclined to enhance market competitiveness and build external competitive advantages through the secondary allocation of commercial credit. Li Rensi and Liu Hongxia (2016) believed that when the industry in which the company operates was more competitive, the tripartite partnership between the company and its upstream and downstream partners in the supply chain was stronger. This meant that large companies and listed companies were more inclined to use the secondary allocation of commercial credit as a meant to maintain their competitive market position in the supply chain. Chen Zhenglin (2017) believed that industry competition increased the customer pressure on the company. When the company faced fierce external competition, it was easy to force the company

to provide customers with more business credit, so as to promote product sales and stabilize market competition status. This paper used the Herfindahl index (HHI) to measure the degree of competition in the industry, and constructed a multiplication term between it and peer behavior for regression analysis. The larger the HHI index, the smaller the industry competition, and the smaller the HHI index, the greater the industry competition. Groups (1) and (2) were groups with higher HHI index, and groups (3) and (4) were groups with lower HHI index. Table 8 showed the test results, compared with groups (2) and (4) Column results, it was found that the regression coefficient of column (4) was -0.0564, and the result was significantly negative at the 1% level, indicating that when the industry in which the company was in a highly competitive industry, it would conduct business through more cash payments and secondary allocation of credit to strengthen external competitive advantage.

Table 8. Motivation Analysis: External Competitive Pressures

	(1) TCc_income	(2) TCc_income	(3) TCc_income	(4) TCc_income
issue	0.0005 (0.0557)	-0.0358*** (-3.8358)	-0.0350*** (-4.1018)	-0.0564*** (-6.8085)
roa		-0.4074*** (-7.9937)		-0.3390*** (-6.5859)
LEV		0.4700*** (29.3214)		0.4493*** (26.2090)
IsBig4		-0.0267** (-2.1408)		-0.0601*** (-6.9931)
Asset		-0.0023 (-0.7787)		0.0078*** (2.8623)
cash_ratio		-0.0578*** (-2.8858)		0.0027 (0.1259)
TobinQ		-0.0029* (-1.8394)		-0.0031 (-1.5933)
Tang_ratio		-0.2578*** (-13.6077)		-0.2078*** (-9.6917)
Shrcr1		-0.0003** (-2.2192)		0.0002 (1.0265)
Indir		-0.0274 (-0.7210)		0.0204 (0.5367)
Grow		-0.0312*** (-4.4379)		-0.0439*** (-6.9306)
OCF		-0.1072** (-2.5521)		-0.0125 (-0.3036)
lnage		-0.0318*** (-5.7034)		-0.0132** (-2.2572)
_cons	0.3318*** (150.1151)	0.3917*** (5.9073)	0.3349*** (140.2868)	0.0584 (0.9691)
N	15570	15570	15595	15595
r2	0.3071	0.4199	0.2879	0.3832

From the perspective of external market competition, this paper further examined the motivation of the company's increased risk-taking level to intensify the secondary allocation function of commercial credit. External market competition was mainly from the perspective of the supply chain, that was, the concentration of the company's top five suppliers. Results were more impactful when suppliers were more concentrated. Groups (1) and (2) in Table 9 were more concentrated supply chain groups, and groups (3) and (4) were groups with more dispersed suppliers. The results showed that suppliers in groups (1) and (2) were more In the case of concentration, the regression coefficient of column (2) was -0.0497, and the result was significantly negative at the 1% level, which indicated that when the company's suppliers were more concentrated, more cash payments were made to upstream suppliers to consolidate the supply chain.

Table 9. Motivation Analysis: Supply Chain Maintenance

	(1)	(2)	(3)	(4)
	TCc_income	TCc_income	TCc_income	TCc_income
issue	-0.0294*** (-3.3448)	-0.0497*** (-5.5921)	-0.0108 (-1.2153)	-0.0409*** (-4.7113)
roa		-0.3672*** (-7.5370)		-0.3587*** (-6.9498)
LEV		0.4504*** (30.0252)		0.4673*** (28.1155)
IsBig4		-0.0535*** (-5.8973)		-0.0337*** (-3.0098)
Asset		0.0052** (1.9729)		-0.0009 (-0.3232)
cash_ratio		-0.0023 (-0.1193)		-0.0403** (-1.9730)
TobinQ		-0.0040*** (-2.7157)		-0.0032* (-1.9300)
Tang_ratio		-0.2456*** (-13.7437)		-0.2151*** (-10.7587)
Shrcr1		0.0000 (0.3096)		-0.0000 (-0.3174)
Indir		-0.0049 (-0.1434)		0.0124 (0.3019)
Grow		-0.0382*** (-6.4688)		-0.0363*** (-5.6148)
OCF		-0.1151*** (-2.8641)		-0.0255 (-0.6384)
lnage		-0.0238*** (-4.5036)		-0.0239*** (-4.1012)
_cons	0.3482*** (164.7647)	0.1828*** (3.1350)	0.3216*** (136.1548)	0.2913*** (4.4774)
N	13775	13775	17388	17388
r2	0.3522	0.4671	0.2727	0.3668

8.2 Heterogeneity Analysis

8.2.1 Nature of Property Rights

In China, state-owned enterprises have easier access to bank credit resources. State-owned large and medium-sized enterprises not only have the advantages of high industry status, excellent credit, large scale, low cost, and policy support, but also in the supply chain, state-owned holding companies generally have a relatively higher right to speak, and their negotiating ability with customers and suppliers is relatively better. powerful. Compared with private enterprises, the role of directors and liability insurance on the bottom line of risks is less obvious to that of state-owned enterprises. At the same time, according to the theory of resource reallocation, when companies in a favorable position provide commercial credit, they were more likely to require upstream and downstream small and medium-sized companies to pay insurance premiums and default premiums (Cunat, 2007; Kong Dongmin et al., 2021) in order to obtain a certain financial rate of return, so it was more likely to conduct more commercial credit allocation behaviors, while private holding companies were the opposite. Table 9 was the group test results about the nature of property rights (soe). Columns (1) and (2) were the regression results of state-owned holding companies, and columns (3) and (4) were the regression results of private companies. The results showed that after adding control variables, in column (2), the regression coefficient of the excess business credit of state-owned holding companies was -0.0374, and the result was significantly negative at the 1% level. In column (4), The regression coefficient of the secondary allocation of commercial credit of private companies was -0.0532, which was more significant than the results of state-owned companies, indicating that when the company's

property rights were private companies, the impact of corporate risk-taking on the secondary allocation of corporate commercial credit increases was more significant.

Table 10. Heterogeneity Analysis: Company Attributes

	state-owned company		private company	
	(1)	(2)	(3)	(4)
	TCc_income	TCc_income	TCc_income	TCc_income
issue	-0.0103 (-1.0957)	-0.0374*** (-3.9354)	-0.0223*** (-2.6851)	-0.0532*** (-6.5901)
roa		-0.3307*** (-6.3988)		-0.4118*** (-8.7579)
LEV		0.4615*** (28.3375)		0.4413*** (28.4470)
IsBig4		-0.0537*** (-5.3202)		-0.0357*** (-3.4885)
Asset		0.0086*** (3.0049)		0.0054** (1.9857)
cash_ratio		0.0113 (0.5459)		-0.0679*** (-3.4426)
TobinQ		0.0007 (0.4387)		-0.0048*** (-2.9633)
Tang_ratio		-0.2409*** (-11.9826)		-0.2295*** (-11.8610)
Shrcr1		0.0002 (0.9849)		-0.0002 (-1.1335)
Indir		0.0268 (0.7203)		-0.0213 (-0.5588)
Grow		-0.0366*** (-4.7704)		-0.0397*** (-6.7294)
OCF		0.0993** (2.1063)		-0.1504*** (-3.9939)
lnage		-0.0054 (-0.8967)		-0.0326*** (-6.1292)
_cons	0.3286*** (137.7993)	-0.0055 (-0.0878)	0.3363*** (155.6318)	0.2335*** (3.7502)
N	12652	12652	18511	18511
r2	0.4419	0.5210	0.2026	0.3259

8.2.2 Principal-Agent Problem

In principal-agent problems, shareholders and managers had inconsistent goals and sometimes even conflict of interest. Jensen (1986) believed that under this conflict, the investment behavior of professional managers was more likely to be distorted. The manager's personal utility was an increasing function of the size of the enterprise, which meant that the manager's decision-making would deviate from the goal of maximizing shareholder value, and it was more inclined to operate out of self-interest, which meant that the manager was more likely to make cash payments for the motivation of maintaining the supply chain, resulting in excessive borrowing. Excessive borrowing can help companies hold more cash and help shareholders distribute cash dividends. The columns in Table 11 represent different degrees of principal-agent problems. The regression coefficients of columns (1) and (2) were -0.0445 and -0.0527, respectively. The results were all significantly negative at the 1 % level, but the results were more significant, meaning that when the principal-agent problem was larger, more cash payments were made to the company's upstream suppliers.

Table 11. Heterogeneity Analysis: Principal-Agent Problem

	(1)	(2)	(3)	(4)
	TCc_income	TCc_income	TCc_income	TCc_income
issue	-0.0445*** (-6.0539)	-0.0527*** (-7.0280)	-0.0038 (-0.3067)	-0.0201* (-1.7690)
roa		-0.3401*** (-6.3185)		-0.3917*** (-8.0685)
LEV		0.4799*** (26.0201)		0.4464*** (26.6821)
IsBig4		-0.0477*** (-5.7525)		-0.0221 (-1.2740)
Asset		0.0027 (0.8691)		-0.0077** (-1.9916)
cash_ratio		-0.0790*** (-2.9517)		-0.0011 (-0.0623)
TobinQ		-0.0028 (-1.3648)		-0.0038** (-2.4271)
Tang_ratio		-0.2466*** (-11.8100)		-0.2110*** (-10.4331)
Shrcr1		-0.0001 (-0.5983)		-0.0000 (-0.0068)
Indir		-0.0646 (-1.5416)		0.0520 (1.5321)
Grow		-0.0383*** (-5.9605)		-0.0366*** (-5.3176)
OCF		0.0093 (0.1981)		-0.0897** (-2.5295)
lnage		-0.0180** (-2.4880)		-0.0264*** (-5.8799)
_cons	0.3906*** (149.9722)	0.2443*** (3.3373)	0.2781*** (149.8314)	0.4212*** (4.8761)
N	15583	15583	15581	15581
r2	0.3559	0.4277	0.1984	0.3176

9. Conclusion and Implications

This paper took China's A-share non-financial listed companies from 2009 to 2020 as the research object, and explored the impact of the company's risk-taking level on the secondary allocation of listed companies' commercial credit and its mechanism. First, the results of the study showed that the company can understand the company's risk behavior after purchasing the director's liability insurance, which strengthened the company's risk-taking ability. The positive impact of the level of corporate risk taking on the secondary allocation of commercial credit was stable. Second, excessive borrowing was an intermediary for the secondary allocation of commercial credit. Enterprises would take the initiative to increase the cash payment to the upstream and downstream of the supply chain and reduce accounts payable through mortgage loans and short-term loans to realize the secondary allocation of commercial credit. Third, for the purpose of maintaining the supply chain and enhancing external competitive advantages, the company tended to actively increase mortgage loans and bank loans for secondary allocation of commercial credit. Fourth, compared with state-owned enterprises, the risk-taking level of private enterprises was more significantly improved by purchasing director and liability insurance, thereby increasing the secondary allocation of commercial credit. This paper mainly enriched the relevant theories from the perspective of corporate risk consequences, and organized the research literature in the field of commercial credit secondary allocation, enriching the theory of "commercial credit secondary allocation". At the same time, based on the perspective of supply chain, it explored the relationship between the company's risk-taking level and the secondary allocation of commercial credit. Promoted the prevention and resolution of financial risks in the

supply chain, weaken the hidden situation of financial risks, and helped the healthy and sustainable development of the real economy.

The enlightenment of this study was mainly reflected in: First, at the policy level: SMEs were faced with problems such as difficulty in financing and expensive financing, and information asymmetry was an important cause. The government should establish and improve the social credit information service system, and at the same time strengthen the implementation of digital inclusive finance, and broaden the direct financing channels for small and medium-sized companies, so as to restrain the secondary allocation of commercial credit and prevent supply chain financial risks. Secondly, at the level of financial institutions: the regulatory policies of the financial regulatory authorities were difficult to directly involve the secondary allocation of commercial credit, and it was easy to hide financial risks and hinder the healthy development of financial institutions. Therefore, financial institutions should strengthen the supervision of high-risk companies. Identifying work to avoid excessive borrowing by large companies for secondary allocation of commercial credit. Finally, at the company level: although directors and liability insurance can share part of the risk, under the principal-agent problem, decision makers such as executives were prone to make risk decisions that were not conducive to the sustainable development of the company out of self-interested motives. The company needed to improve the governance mechanism and the corresponding provisions of the director's liability insurance to prevent the negative impact of the business credit allocation caused by the self-interested motive of the executives on the company's operation.

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