Research on the Impact of Supply Chain Finance on Private Enterprises

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Abstract: As an active subject of the current market economy, private enterprises play an important role in the national economy. However, due to factors such as insufficient self-construction and the inherent characteristics of the credit mechanism of financial institutions, private enterprises generally have financing difficulties and expensive external financing Constraint issues. The application of supply chain finance reduces the information asymmetry of the credit market, effectively compensates for the lack of credit of private enterprises, and promotes its financing constraint dilemma to be eased to a certain extent. Taking the supply chain finance application of some private listed companies from 2007 to 2017 as an example, the investment-cash flow sensitivity model (FHP model) is used for empirical verification. The results show that private companies do have relatively strong investment-cash flow sensitivity. However, supply chain finance provides financing support for private enterprises, which eases their financing constraints to a certain extent. In the future, supply chain finance should innovate and promote and comprehensively promote the application of "big data+" support, the construction of the entire chain ecosystem, and the construction of enterprises on the chain.

1. Introduction

Private enterprises are the most active economic entities in the current market economy in my country, and they are an important force that effectively promotes the rapid development of the national economy; but for a long time, the level of available resources that private enterprises can use to support their credit ratings is low, resulting in high financing costs. Commercial banks and other financial investment institutions are unwilling to provide them with financing services. In recent years, under the influence of systemic factors such as the continuous increase in inflationary pressure and tight liquidity, the profitability of some private enterprises has further shrunk, and the capital tension has also become more and more intense; in addition to the superposition of traditional factors such as raw material prices and labor costs, silver The problem of information asymmetry between enterprises has also become one of the financing bottlenecks. According to statistics in 2018, the current private economy accounts for more than 60% of the national economy,

but the loan balance of various financial institutions to private enterprises only accounts for 25% of the total loan balance; it can be seen that private enterprises receive financial assistance from banks and other financial institutions. The financial support received by the institution is seriously mismatched with its share of economic contribution. Private enterprises have been stuck with financing constraints such as "difficult financing and expensive financing" during their development. The financing dilemma of private enterprises has become the focus again.

Since the emergence of supply chain finance in the 1980s, it has provided a new way to solve the financing difficulties of private enterprises and ease the financing constraints of small and medium-sized enterprises. Supply chain financing is often mixed with supply chain finance in conceptual understanding and practical application[1]. Supply chain finance is also based on the innovation of financial services in the industry or the industrial value chain. The key point of supply chain finance is to supply The large-scale and high-credit enterprises in the chain are the core enterprises, and their credit advantages are introduced into the entire chain to provide financing services for upstream and downstream enterprises to meet the financing needs of members on the chain. When the scale of commodity production expands to various enterprises in the upstream and downstream of the value chain, the real competition is not limited to the individual competition between enterprises, but the core enterprise as the center of the supply chain dispute. In the value-added chain of supply chain, supply chain finance came into being. Supply chain finance is an innovative financial product that provides credit guarantees for upstream and downstream companies in supply chain finance, reduces information asymmetry, and provides financial support based on the real trade of supply chain companies. This new financing model focuses on the management and operation of the entire supply chain. It goes beyond the limitation of focusing on a single enterprise and conducts comprehensive risk control over the entire supply chain. To a certain extent, the credit risk is dispersed, thereby improving the enforceability of credit. Therefore, supply chain finance is a special financing mode for small and medium-sized private enterprises with the problem of "financing difficult and expensive", which helps to alleviate the financing difficulties of private enterprises.

There is no need to discuss the application advantages of supply chain finance, but what is the actual effect? Does it really play a role in alleviating the financing dilemma of private enterprises, or what can be improved in supply chain finance in helping private enterprises improve the availability of financing? Where, these need to be further tested and discussed. Based on this, this article considers investment-cash flow sensitivity as an entry point, and focuses on verifying the mitigation effect of supply chain finance, a new financing model, on the financing difficulties of private enterprises. Specific use of current private listed companies' data samples from 2007 to 2017, using the investment-cash flow sensitivity model (FHP model) for empirical analysis, to explore the degree of financing constraints that private companies face in the development, and the application of supply chain financing models. Whether the financing of private enterprises has obvious and effective effects in solving the difficulties of private enterprises, so as to be further improved and promoted in the comprehensive application of supply chain finance in the future.

2. Theoretical Analysis and Research Hypothesis

(1) Analysis of financing constraints of private enterprises

Compared with large state-owned enterprises, due to internal reasons such as small scale, low management ability, and small market influence of private enterprises, most private enterprises are still on the line of survival[2]. In actual production and operation, it is difficult for private enterprises to obtain financing from banks and other financial institutions, and they are faced with financing constraints. At the same time, due to the limitation of the size of private enterprises, there are few

sources of collateral and pledges that can be guaranteed, and the profitability is unstable and the operating risk is high. Suffered unfair treatment in China. The internal financing of private enterprises cannot meet the demand, and the external financing is difficult to obtain, which causes the private enterprises to be forced to slow down the speed of enterprise expansion, which hinders the enterprise from reaching the optimal investment level[3].

Domestic research on financing constraints of supply chain finance mainly focuses on the analysis of the effectiveness of alleviating financing constraints for SMEs. Generally, cash-cash flow models and investment-cash flow models are used for empirical testing. Among them, Zhang Weibin and Liu Ke (2012)[4] and Liu Ke and Miao Hongwei (2013)[5] from the perspective of the cash-cash flow sensitivity model, verify that supply chain financing can alleviate SME financing to a certain extent Constraint issues; at the same time, reasonable suggestions are put forward for alleviating the financing constraints of SMEs from the perspective of the government and financial institutions. Xue Wenguang and Zhang Yingming (2015)[6] conducted an empirical study through the investment-cash flow model, and selected cross-sectional data of listed companies on the small and medium-sized board as samples to verify the effectiveness of supply chain finance in alleviating financing constraints, and concluded that supply chain finance was listed on the small and medium board. Enterprises have obvious financing restraint effects. Han Min and Gao Xuxu (2017)[7] classified SMEs into industry-finance companies and non-industry-finance companies, and conducted empirical tests and comparative analyses of financing constraints on them. The results show that supply chain finance can effectively alleviate financing. The restraint phenomenon has a more significant mitigation effect on industry and finance enterprises. Zhang Dan (2017)[8] conducted a research on the mitigation effect of different companies on the financing constraints of supply chain finance, and the results showed that for small-scale enterprises with low equity concentration, the mitigation effect of financing constraints is weak. Based on the above analysis, the following hypotheses are proposed:

H1: Private enterprises have financing constraints, that is, they have significant investment-cash flow model sensitivity

(2) The mitigation effect of financing constraints of supply chain finance

If the enterprise has financing constraints, it will cause it to bear higher financing costs when it conducts external financing, resulting in a disproportionate proportion of investment income and financing costs, limiting enterprise investment opportunities and hindering the healthy development of enterprises. On the basis of the theory of "financing priority", due to the information asymmetry between enterprises and investors, leading to a premium on corporate financing risks, Xiong Xiong et al. (2009)[9] believe that companies in the supply chain are long-term, multiple and stable Partnership. Li Juan et al. (2007)[10] believe that in the traditional financial financing model, banks and other financial institutions act as both "lenders" and "credit supervisors", while supply chain finance introduces upstream and downstream enterprises to reduce the collection of credit by financial institutions. Information workload. When verifying corporate credit, commercial banks and other financial institutions incorporate borrowing companies into the entire supply chain framework, making full use of upstream and downstream companies to obtain information in the context of real trade, reducing the credit risk of information asymmetry, and strengthening the upstream and downstream of the chain. To build a credit system of the whole chain, so as to improve the credibility of the enterprise and obtain financial access[11-12]. If a company in the supply chain has a credit default, not only will it not be able to apply for financing needs, but it will also face withdrawing from the entire supply chain and even the entire industry. Therefore, supply chain finance, an innovative financing product, can provide commercial banks and other financial institutions with more true and comprehensive corporate credit information, reduce information asymmetry, and increase the "credit" of financial institutions[13], thereby alleviating corporate

financing constraints. Based on the above analysis, the following hypotheses are proposed:

H2: Supply chain finance can reduce the sensitivity of private enterprise investment-cash flow and ease financing difficulties.

3. Research Design

3.1 Sample data description

The empirical analysis sample data of this article includes the basic situation data of domestic supply chain finance and the data of private enterprises. Among them, the basic information of supply chain finance comes from the Xenophon database (CCER), and the financial data of private enterprises in Shanghai comes from the Guotaian database (CSMAR). Take some private enterprises from 2007 to 2017 as the sample research objects, and carry out the following conditions to screen: (1) Only keep the samples that issued A shares; (2) Exclude the samples that have undergone special treatment or special transfer processing (ST/PT) . After screening, 175 private enterprises were finally selected.

3.2 Empirical model construction

In order to test the previous analysis and hypothesis, from the perspective of investment-cash flow sensitivity[14-15], the empirical model is constructed as follows:

$$INVEST_{i,t} = \alpha_0 + \alpha_1 CFLOW_{i,t} + \alpha_2 SCF_t \times CFLOW_{i,t} + \alpha_3 SCF_t$$

$$+ \sum_{k=1}^{p} \gamma_k \times ControlVar_{i,t} + \vartheta_i + \xi_{i,t}$$

In the formula, $INVEST_{i,t}$ is the current investment ratio; $CFLOW_{i,t}$ is the current cash flow ratio; SCF_t is the supply chain financial development measurement indicator; $SCF \times CFLOW_{i,t}$ is the cross product of the supply chain finance and the current cash flow ratio. Measure the impact of supply chain financial development on financing constraints; δ_i is the individual effect, $\xi_{i,t}$ are the error terms. According to the basic hypotheses H1 and H2, the corresponding tests $\alpha_1 > 0$ and $\alpha_2 < 0$ respectively.

3.3 Variable Selection Setting

1) Cash flow (CFLOW)

There are three indicators closely related to cash flow in corporate finance, which are the cash flow from business activities, the cash flow from investment activities and the cash flow from financing activities. Among them, the data reflected by the cash flow generated by business activities is more continuous and stable, which can more accurately reflect the dynamic trend of cash in the process of business operations. Based on this, this paper chooses the ratio of the cash flow generated by the current operating activities of the company to the total assets of the current period as the main explanatory variable for empirical research.

2) Supply Chain Finance Index (SCF)

At present, the financial data of private enterprises does not directly list the relevant data of supply chain finance. We consider selecting the three macro data of national short-term loans, national commercial bills and national discounts to replace the supply chain financing status of

sample enterprises (Liu Ke and Miao Hongwei ,2013)[5]. Among them, financing with accounts receivable as pledge is one of the typical modes of supply chain finance, and it is manifested as short-term loans in corporate financing; in addition, the other two types of financial instruments most frequently used in supply chain financing business are discount and commercial Bills of exchange; therefore, on the whole, short-term loans, commercial bills of exchange and discounts can be used as suitable substitute variables. For the accuracy and rigor of the empirical results, five supply chain financial metrics will be formed on the basis of these three variables in the specific analysis, including the national short-term loan (amount) SCF_{1t}, the national commercial bill (amount) SCF_{2t}, and the national Discount (amount incurred) SCF_{3t}, national commercial draft (amount not due at the end of the period) SCF_{4t} and national discount (end balance) SCF_{5t}. At the same time, the cross product of these five metrics and cash flow is selected to further intuitively analyze the relationship between the application of supply chain finance and corporate financing constraints. In addition, due to my country's special national conditions and the share-trading reform (2006), the stock market situation is not completely equivalent to that of developed countries; therefore, Tobin Q value cannot accurately reflect corporate investment opportunities. In view of this, we use the total growth rate of assets $TAGER_i$, t to control and estimate corporate investment opportunities.

The names, expected symbols and definitions of the above-mentioned main variables and other variables are shown in Table 1.

Table 1 Variable names, symbols and definitions

Variable type	Variable symbol	Variable definitions
Explained variable	$INVEST_{i,t}$	Current investment ratio: $INVEST_{i,t}$ =(the sum of the three items of net fixed assets, net construction in progress, and engineering materials)/net fixed assets at the beginning of the period; $INVEST_{2i,t}$ =(payment for the purchase and construction of fixed assets, intangible assets and other long-term assets Cash)/beginning of net fixed assets
Explanatory variables	$CFLOW_{i,t}$	Cash flow = net cash flow from operating activities in the current period / total assets in the current period
	SCF_i	Supply chain finance development measurement indicators: SCF_{1t} = national short-term loan (amount); SCF_{2t} = national commercial bill (amount); SCF_{3t} = national discount (amount); SCF_{4t} = national commercial bill (amount not due at the end of the period); SCF_{5t} = National discount (balance at the end of the period)
	$CFLOW_{i,t} \times SCF_i$	Cross multiplication of cash flow and supply chain financial development indicators
Control variable	$GROWTH_{i,t}$	Investment opportunities at the beginning of the period: $TAGR_{i,t}$ = growth rate of total assets
	$CASH_{i,t-1}$	Total monetary funds /assets at the beginning of the period
	$SIZE_{i,t}$	Enterprise size: the natural logarithm of the total assets at the end of the period

	Annual variable	Annual dummy variables in the event window period to control the influence of different time effects

4. Empirical Analysis

4.1 Descriptive statistical results

The descriptive statistics of all variables in the empirical analysis are shown in Table 2. From the data in the table, we can see that the maximum and minimum values of the investment ratio INVEST are quite different, which shows that the investment ratios of the enterprises in the sample show obvious differentiation, which may hinder the profit realization of the sample enterprises to a certain extent. The average value of cash flow CFLOW is only 5.62%, the minimum value is -108.0%, and the standard deviation is 7.86%, indicating that the cash flow of the sample companies is relatively small and stable; however, the cash flow of most companies is negative, indicating that there is More serious financing constraints are troubled. At the same time, we found that in the observed sample companies, the average value of cash flow is less than the average value of corporate cash or cash equivalents. This difference indicates that there is indeed a phenomenon that cash flow cannot meet the investment needs of positive NPV projects. There is also a large gap between the maximum and minimum values of the five different supply chain financial metrics, indicating that different companies have a large difference in the use of supply chain finance. This may be because the supply chain finance started late, and most Based on their own practical experience, enterprises do not realize that supply chain finance can bring considerable benefits to them, so there are differences in their use. In addition, we also found that in the cross product of supply chain financial metrics and cash flow, the average value is mostly greater than the average cash flow, indicating that the use of supply chain finance can revitalize the internal cash flow of the enterprise to a certain extent. Among the control variables, the total growth rate of assets $TAGR_{i,t}$, which is a measure of investment opportunities, has a standard deviation of approximately 2 times the mean (0.321/0.137), indicating that the total growth rate of corporate assets fluctuates greatly, and the future investment opportunities of companies hold cash. Changes have a more obvious impact. On the whole, because the development of supply chain financial innovation business is still in the exploratory stage, it lacks a complete and mature financing system, and the entry barrier for borrowers is high; therefore, the mitigation effect of supply chain financing is relatively limited, and there is still much room for development .

Table 2 Descriptive statistics of sample data

Variable	Average Value	Standard Deviation	Minimum	Max
$INVEST_1$	1.446	1.089	0.0398	23.11
$INVEST_2$	0.211	0.285	0.0027	6.162
$SCFT_1$	2.453	0.995	1.145	3.904
$SCFT_2$	1.388	0.604	0.543	2.207
$SCFT_3$	3.908	3.113	0.849	10.21
$SCFT_4$	0.645	0.309	0.221	1.041
$SCFT_5$	0.243	0.137	0.121	0.547
CASH	0.118	0.069	0.0011	0.517
TAGR	0.137	0.321	-0.793	7.523
SIZE	22.82	1.334	19.07	26.58
CFLOW	0.0562	0.0786	-1.08	0.423
$CFLOW_1 \times SCF_1$	0.137	0.137	-0.159	0.325
$CFLOW_2 \times SCF_2$	0.073	0.0776	-0.0967	0.2
$CFLOW_3 \times SCF_3$	0.208	0.225	-0.161	0.63

CFLOW$_4$×SCF$_4$	0.0344	0.0362	-0.0427	0.0935
CFLOW$_5$×SCF$_5$	0.0147	0.0142	-0.00971	0.0408
YEAR	2012	3.164	2007	2017

4.2 Regression results and analysis

We choose CFLOW$_1$×SCF$_{1t}$, CFLOW$_2$×SCF$_{2t}$, CFLOW$_3$×SCF$_{3t}$, CFLOW$_4$×SCF$_{4t}$, and CFLOW$_5$×SCF$_{5t}$ to represent the cross-products of five different supply chain finance and cash flow, and add $TAGR_{i,t}$ as the investment opportunity measure. The model is subjected to regression analysis, and the results are summarized as follows.

Table 3 Model regression results

variable	(1) INVEST1	(2) INVEST1	(3) INVEST1	(4) INVEST1	(5) INVEST1	(6) INVEST1
CFLOW$_1$×SCF$_1$	0.046*** (-0.16)	- -	- -	- -	- -	- -
CFLOW$_2$×SCF$_2$	- -	-0.056*** (-0.11)	- -	- -	- -	- -
CFLOW$_3$×SCF$_3$	- -	- -	-0.023*** (-0.13)	- -	- -	- -
CFLOW$_3$×SCF$_4$	- -	- -	- -	0.028*** (-0.08)	- -	- -
CFLOW$_3$×SCF$_5$	- -	- -	- -	- -	-0.16*** (-0.59)	- -
CASH	- -	- -	- -	- -	- -	1.411*** (-3.27)
TAGR	- -	- -	- -	- -	- -	1.681*** (-17.84)
SIZE	- -	- -	- -	- -	- -	0.0437** (-1.90)
CFLOW	- -	- -	- -	- -	- -	0.0252** (-0.66)
YEAR	control					
_cons	1.742** (-3.14)	1.637** (-3.04)	1.630** (-3.06)	1.648** (-3.05)	1.919*** (-3.46)	2.132*** (-4.1)
N	11	11	11	11	11	1078
Adj.R^2	14.4	14.4	13.2	14.4	11.6	23.6

The above regression results show that the cash flow coefficients are all positive, that is, $\alpha_1 > 0$ and both are significant at the level of 0.05, indicating that the cash flow of the sample enterprises is positively correlated with their current investment ratio, which is consistent with the previous expected sign; indicating that private enterprises tend to rely on self There is operating cash flow to invest, and it is necessary to hold a portion of the cash flow to meet future investment needs, that is, there are obvious financing constraints, showing strong investment-cash flow sensitivity, which verifies the validity of hypothesis H1. Generally speaking, the operating stability of private enterprises is not strong, and the risk coefficient is high. Most of the bank loan interest rates that can be obtained will also have a higher rate of increase, which has become one of the drivers of the

spiral cycle of private enterprises' financing difficulties and high costs. At the same time, private enterprises do not have the shareholder background and preferential policies similar to state-owned enterprises, and can appropriately broaden the borrowing channels. Therefore, in practice, there are often strong investment-cash flow sensitivity.

On the other hand, the empirical results show that the coefficients of the cross product of supply chain finance development indicators and cash flow are all negative, that is, $\alpha_2 < 0$ and both are significant at the level of 0.01, which is consistent with the expected sign in the previous article; it shows that my country's supply chain finance The improvement of the level of development can reduce the sensitivity of private enterprise investment-cash flow, improve corporate financing capabilities, and broaden corporate financing channels, thereby reducing the dependence on internal capital flow, thus verifying the basic hypothesis H2. Supply chain finance can help improve the transparency of information between banks and enterprises, make it easier for private enterprises to obtain bank credit or credit support, and become a new way to solve the financing dilemma.

In addition, the regression results in Table 3, it shows that the growth rate of total assets $TAGR_i$ and the t-1 coefficient are both significantly positive at the level of 0.01, indicating that the initial investment opportunities of the company are positively correlated with the current investment ratio. The relationship indicates that when future investment opportunities increase, private enterprises will increase their internal retained cash to ensure that they seize future investment opportunities. The CASH coefficient of monetary funds is significantly positive at the level of 0.01, indicating that the ratio of monetary funds and current investment shows a positive correlation, which is consistent with the previous expectations. The SIZE coefficient of enterprise scale is significantly negative at the level of 0.01, indicating that the enterprise scale and the current investment ratio show an inverse relationship, which does not match the expected sign above. Normally, there is a positive correlation between the size of the enterprise and the current investment ratio. However, considering that the research object of this article is a private enterprise, due to factors such as "moral hazard" and "adverse selection", the private enterprise has a lower credit level and a higher default probability. Large, the willingness of commercial banks to extend loans to private enterprises is weak; therefore, in actual conditions, there is a reverse development of the scale of private enterprises and the current investment ratio. The overall test shows that the empirical results are consistent with the assumptions mentioned above, indicating that private enterprises do have significant financing constraints, and the innovative application of supply chain finance can effectively alleviate the credit constraints.

5. Conclusions and Recommendations

An empirical test and analysis of the data of private enterprises in Shanghai and Shenzhen from 2007 to 2017 are selected. The results show that: First, the investment and development of private enterprises mainly come from their own endogenous financing support and are bound by the dilemma of external financing constraints. That is, it has significant investment-cash flow sensitivity; secondly, supply chain finance can help private enterprises obtain more external financing support, effectively reduce the sensitivity of corporate investment-cash flow, and help private enterprises solve the financing dilemma. Therefore, in order to promote the sustained, healthy and rapid development of private enterprises, financial institutions, government functional departments and private enterprises themselves must continue to work together to introduce relevant policies and actively promote the all-round application and practice of supply chain finance.

5.1 Relying on "Big Data+" Innovative Supply Chain Finance Model

First of all, from the perspective of supply chain financing model construction, it is necessary to fully integrate the "big data +" background to optimize and upgrade the supply chain financial business of banks and other financing institutions. For example, it is necessary to fully explore the correlation between related enterprises in the industry chain, innovate the traditional supply chain financing model, actively use big data resources, and launch the supply chain online financing platform. Secondly, it is necessary to encourage and increase the innovation enthusiasm of financial institutions in their own supply chain financial products, and commercial banks should upgrade financial services and products related to the existing supply chain to attract enterprises to join the financing chain spontaneously. Third, it is necessary to establish an effective connection between big data resources and the supply chain financing model, use technological means to improve the timeliness of obtaining effective information, and optimize the supply chain finance model. Finally, it is necessary to establish a business environment suitable for the development of supply chain finance, supporting corresponding rules and regulations, improving actual operability, and effectively preventing the operational risks of supply chain finance.

5.2 Pay attention to the management and comprehensive construction of private enterprises

From the perspective of supply chain financing operation mechanism, private enterprises should focus on the improvement of their management level and the construction of a comprehensive operating system. This includes establishing a complete and standardized financial management system to ensure the efficient application of supply chain finance; a sound and effective information disclosure system, improving the transparency of information disclosure, reducing the risk of information asymmetry, mobilizing the enthusiasm of all financial institutions, and building a symbiosis and win-win situation The industrial chain model strengthens the closeness of the integration of production and marketing, improves the correlation between upstream and downstream enterprises, forms a financing system that shares benefits and risks, and makes full use of the advantages of supply chain finance. It is important to point out that core companies should continue to optimize their financial structure, build new advantageous territories, and rationally evaluate companies on the chain to ensure the smooth operation of the entire chain of financing and become the real leader of the entire supply chain finance.

5.3 Improve and standardize the entire chain of supply chain finance ecosystem

From the perspective of the future market prospects of supply chain financing, we must focus on strengthening the construction of the supply chain financial ecosystem. For example, it is necessary to establish a multi-level and all-round financing market, broaden financing channels, and use supply chain finance to develop new financial service models that differentiate between bond and equity financing and credit financing. It is necessary to fully mobilize the participation enthusiasm of credit intermediaries, establish an efficient and convenient one-stop financing information platform, provide diversified and multi-angle information disclosure services, and ensure the accuracy and timeliness of financing transactions. At the same time, we must strengthen the management of supply chain financing information security, and ensure the authenticity and credibility of data resources through technical support and institutional guarantees. A sound supply chain financing ecological environment can mobilize private enterprises to actively use supply chain finance to get rid of financing constraints.

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