

Research on the Impact of Digital Finance Development on Commercial Credit Financing Between Enterprises

Zhuoran Zhao *

The National University of Malaysia FEP, Bangi, Malaysia

* Corresponding Author Email: a192221@siswa.ukm.edu.my

Abstract. Digital finance has effectively solved the financial exclusion dilemma and eased the financing constraints of enterprises, but its impact on business-to-business commercial credit financing remains to be tested. Taking China's A-share non-financial listed companies from 2011 to 2019 as the research object, we empirically test the impact of digital finance development on inter-firm commercial credit financing. The results show that the development of digital finance inhibits inter-firm commercial credit financing behavior. The lower the degree of industry competition, the higher the supplier concentration, and the higher the customer concentration, the stronger the inhibitory effect of digital finance on inter-enterprise commercial credit financing. Bank credit based on supply chain plays a partial intermediary role in the process of digital financial development affecting inter-enterprise commercial credit financing; digital financial technology promotes the development of supply chain financial services of banks, inhibits the demand for inter-enterprise financing through commercial credit, and is able to alleviate the problem of inter-enterprise occupancy.

Keywords: Digital financial development; commercial credit finance; supply chain finance; supplier concentration; customer concentration.

1. Introduction

Commercial credit refers to enterprises in the normal course of business activities and commodity transactions, based on deferred payment, advance receipts and other ways to form a common credit relationship between enterprises, the nature of commercial credit is the provider of commercial credit for the demand side of commercial credit to provide short-term credit. Due to information asymmetry and bank discrimination against loan customers, problems such as difficult and expensive financing have been restricting the development of enterprises. As a useful supplement to traditional financing methods, commercial credit plays an important role in supporting enterprise development [1,2]. In the daily operation of enterprises, commercial credit financing activities between upstream and downstream enterprises are conducive to guaranteeing the supply of enterprise products and expanding the scale of sales, which can enhance the competitive advantage of enterprises and stabilise their position in the industry. As an important supplement to short-term inter-enterprise financing outside of bank credit funds, commercial credit, while solving the problem of short-term inter-enterprise financing, also raises the risk of credit default and long-term inter-enterprise loans. Currently, there are relatively few studies on the impact of digital financial development on enterprise commercial credit financing, and no unified opinion has been formed [3,4]. This paper intends to conduct a mechanism test from the perspective of supply chain financing to verify the relationship between bank credit and commercial credit in enterprise supply chain financing under the influence of financial technology, with a view to providing new empirical evidence for enterprises' supply chain financing decisions.

2. Literature Review

In the credit business, commercial banks often have 'ownership discrimination' and 'size discrimination', most of the commercial bank loans are flowing to state-owned enterprises and larger companies, non-state-owned enterprises and small and medium-sized companies have less access to



commercial bank loans and greater difficulty in obtaining them [5]. In this case, commercial credit, as a substitute for bank credit, has become a useful supplement to the formal financial system. As a supplement and extension of traditional finance, digital finance plays an important role in solving the problem of enterprise financing, easing the financing constraints of enterprises and influencing the financing behaviour of commercial credit among enterprises.

The development of digital finance has broadened the scope of financial services and increased the sources of funds. There are a large number of dispersed small-scale investors in the financial market, and the traditional financial market is difficult to fully and efficiently absorb these small-scale investors due to high costs, technical difficulties in meeting standards and other issues [6]. The development of digital finance has broadened financial channels and constructed a new platform, making the threshold and cost of financial services greatly reduced; at the same time, it acts as an intermediary for financial information matching, directly connecting the lending and borrowing needs between individuals, improving the efficiency of financial services, better utilising the long-tail effect, providing more sources of funds for enterprises in need of financing, and reducing their reliance on commercial credit. The development of innovative technologies such as big data and information technology has supplemented and improved the traditional credit collection system. For enterprises with incomplete credit records and little information, in the past, financial institutions tended to raise the threshold and cost of their lending due to credit risk considerations; under digital finance, problems such as information asymmetry and lack of information have been mitigated, and banks and other financial institutions are able to provide financial services to enterprises more efficiently according to their specific circumstances, leading to a reduction in their demand for commercial credit [7]. In addition, alternative theory suggests that the supply side is in a strong position in commercial credit relationships, which may lead to high commercial credit costs and cause the demand side to suffer higher credit default costs [8,9]. The increasing level of digital finance development allows banks and other financial institutions to provide lower-cost and diversified financial services to small and medium-sized suppliers and customers, which also leads to a reduction in the demand for higher-cost commercial credit by enterprises, and thus weakens the incentive for business-to-business commercial credit financing behaviours [10], i.e., the development of digital finance inhibits business-to-business commercial credit financing behaviours and alleviates the problem of inter-business loan-taking.

3. Research Design

3.1. Sample selection and data sources

Considering the availability of data and trying to avoid the possible impact of the major event of the epidemic on the results of the analysis, this paper selects 2011-2019 as the sample period, and takes China's A-share listed companies as the research object, and does the following screening of the sample companies: ST listed companies are excluded; considering the special accounting treatment of financial enterprises, financial listed companies are excluded; in order to ensure the quality and completeness of the data, samples with missing relevant data indicators during the period are excluded. Finally, 6615 observations of 735 companies were obtained. The provincial related data of Digital Finance Index and its sub-indexes are from 'Peking University Digital Inclusive Finance Index (2011-2020)', and all other data are from China Stock Market & Accounting Research Database.

3.2. Variable definitions and descriptions

3.2.1. Explained variable: commercial credit financing (TC).

3.2.2. The difference between commercial credit occupancy and commercial credit support, i.e., net commercial credit, is used to define the net commercial credit financing received by the firm. In order to exclude the effect of size difference, the ratio of net commercial credit financing to total assets is used to express commercial credit financing, which is calculated as: (accounts receivable + notes receivable + prepayment - accounts payable - notes payable - advance receipts) / total assets.

3.2.3. Explanatory variables: Digital Finance Index (INDEX).

The explanatory variables in this paper use the provincial-level statistics of the Digital Finance Index from the Peking University Digital Inclusive Finance Index (2011-2020) and match them with the place of business registration. To make the empirical results more intuitive, the natural logarithm is taken.

3.2.4. Control variables.

Considering other factors that may affect business credit financing behaviour, this paper selects the following control variables: growth capacity (*GROW*), firm size (*SIZE*), gearing ratio (*LEV*), interest-bearing liabilities (*LOAN*), firm age (*AGE*), profitability (*ROE*), cash flow from operating activities (*CF*), collateralisation capacity of assets (*PPE*), and firm value (*TobinQ*).

3.3. Model

In order to test the relationship between the development of digital finance and business-to-business commercial credit financing behaviour, this paper constructs the following regression model:

$$TC_{it} = \alpha_0 + \alpha_1 INDEX_{mt} + \sum CONTROL S_{it} + \mu_i + \gamma_t + \varepsilon_{it} \quad (1)$$

where TC_{it} is the net commercial credit financing of firm i in year t , $INDEX_{mt}$ is the digital finance index of province m in year t , $\sum CONTROL S_{it}$ are control variables, μ_i is firm fixed effect, and γ_t is year fixed effect.

4. Result

The regression results of the impact of the development of digital finance on commercial credit financing behaviour are shown in Table 1, where column (1) is the result of controlling only for year fixed effects, column (2) is the result of controlling for both individual and year fixed effects. The regression results show that the coefficient on the digital finance index is -0.0349 and significant at the 1 percent level when controlling for year fixed effects only, and -0.0243 and significant at the 1 percent level when controlling for both individual and year fixed effects. In order to avoid possible heteroskedasticity problems, this paper adds enterprise-level cluster to rerun the regression, and the results are shown in column (3), the coefficients of each variable basically remain unchanged except for the change of t-value. The above results show that the development of digital finance is significantly negatively correlated with the net amount of commercial credit financing provided by enterprises, confirming that the development of digital finance inhibits inter-enterprise commercial credit financing behaviours and alleviates the problem of inter-enterprise take-up.

Table 1. Benchmark regression results

0	(1)	(2)	(3)
<i>INDEX</i>	-0.0349*** (-5.2878)	-0.0243*** (-4.2232)	-0.0243*** (-2.7288)
<i>GROW</i>	0.0084* (1.6993)	0.0014 (0.5138)	0.0014 (0.4733)
<i>SIZE</i>	-0.0073*** (-5.1123)	-0.0189*** (-7.0627)	-0.0189*** (-2.8436)
<i>LEV</i>	-0.5668*** (-50.9095)	-0.4784*** (-37.1298)	-0.4784*** (-15.2199)
<i>LOAN</i>	0.5034*** (42.2595)	0.4397*** (34.7462)	0.4397*** (14.5130)
<i>AGE</i>	-0.0231*** (-10.2823)	0.0105*** (3.1457)	0.0105* (1.7868)
<i>ROE</i>	0.1744*** (9.0311)	0.0690*** (5.9625)	0.0690*** (3.0679)
<i>CF</i>	-0.2928*** (-11.7236)	-0.2192*** (-14.7290)	-0.2192*** (-10.4232)
<i>PPE</i>	-0.1156*** (-12.3500)	-0.0176 (-1.5751)	-0.0176 (-0.8718)
<i>TobinQ</i>	0.0090*** (5.4049)	0.0023* (1.8950)	0.0023 (1.5055)
<i>Constant</i>	0.4844*** (12.1498)	0.6097*** (9.5498)	0.6097*** (4.1065)
<i>Firm</i>	No	Yes	Yes
<i>Year</i>	Yes	Yes	Yes
<i>N</i>	6615	665	6615
<i>Adj_R²</i>	0.391	0.176	0.268

Note: t-value tests for the coefficients are in parentheses; ***, **, and * denote 1%, 5%, and 10% significance levels, respectively.

5. Discussion

5.1. The moderating role of the degree of industry competition

Commercial credit is a financing channel, but also the objective needs of enterprise sales. In an intensely competitive industry environment, in order to obtain more customer resources from the market and gain a sales advantage, enterprises usually take the initiative to provide customers with more commercial credit. The more competitive the market, the easier it is for customers to find substitutes, and the more passive the enterprise is in the transaction process and the enterprise has to

provide more commercial credit to attract and maintain customers. In this case, commercial credit is seen as a sales tool. In an environment with a low degree of competition in the industry, the number of substitutes or competing products in the market is relatively small, and it is easy to sell the enterprise's products or services. At this time, the effect of the enterprise's efforts to increase customers and expand sales through the provision of commercial credit is usually not significant, so the enterprise's willingness to use and the scale of the use of commercial credit will decline. If the enterprise chooses to provide commercial credit at this time, it is more for its upstream and downstream customer enterprises to provide financing support to alleviate their financial pressure [10]. With the development of digital finance, upstream and downstream enterprises use more ways and channels for financing, the convenience of obtaining funds increases, the dependence on and demand for commercial credit financing decreases, and the necessity and motivation of enterprises to provide commercial credit support and conduct inter-enterprise commercial credit financing behaviour decreases. Therefore, when the degree of competition in the industry is low, the inhibitory effect of the development of digital finance on business-to-business commercial credit financing behaviour increases.

5.2. The moderating role of supplier concentration

Supplier concentration reflects to some extent the bargaining power of firms with their suppliers. When the supplier concentration is low, the degree of dependence of an enterprise on a specific supplier is small, the supplier will provide more commercial credit in order to maintain customers, and the enterprise will use deferred payment, extend the repayment period and other means to obtain more commercial credit financing from the supplier, which makes the enterprise's capital pressure is small, and there is room for more commercial credit support to its downstream customer enterprises. On the contrary, when the concentration of suppliers is relatively high, the degree of dependence of enterprises on specific suppliers is large, and the suppliers are in a dominant position in the negotiation, the suppliers will adopt such behaviours as shortening the payback period and reducing credit sales to reduce the commercial credit provided by them [11], and the commercial credit obtained by the enterprises will decrease, and the cost of using commercial credit will increase. At this time, enterprises are facing relatively greater financial pressure, the motivation and ability to provide commercial credit for inter-enterprise commercial credit financing behaviour will be reduced, and the commercial credit provided by the amount of small, short-term and other issues. With the development of digital finance, enterprises with higher supplier concentration and their downstream customer enterprises will be more inclined to use other financing methods with lower capital costs, alleviating the urgent need for business-to-business commercial credit financing behaviour. Therefore, the higher the supplier concentration, the more obvious the mitigating effect of digital finance development on inter-enterprise commercial credit financing behaviour.

5.3. Moderating effect of customer concentration

Higher customer concentration means that the products sold by the firm are concentrated in the hands of a few important customers. For the purpose of improving performance and expanding sales, enterprises in the selection of customers, often more willing to choose the stronger, higher market position of the enterprise, and such customers are often able to rely on their own advantages and market position, in the signing of the contract in the negotiations dominant, able to maximise their own interests through a variety of means [12]. Enterprises are under pressure to provide more commercial credit support, and downstream customers are more likely to obtain commercial credit as a means of financing. With the development of digital finance, customers reduce their dependence on this financing method, and the willingness and scale of enterprises to provide commercial credit support and conduct commercial credit financing behaviours will also be reduced. At the same time, the development of digital finance will reduce the degree of information asymmetry between enterprises and customers, strengthen the ability of upstream and downstream enterprises to share information, commercial credit does not have to be used as a guarantee or to convey product quality information to customers [13]. With the increase of customer concentration, the relationship between

enterprises and customers further deepens, and the interests of both sides gradually converge. At this time, for the consideration of long-term cooperation, customers will be 'sympathetic' to the upstream suppliers, reduce the occupation of its commercial credit, suppliers will not have to provide excessive commercial credit to customers, which eases the inter-firm commercial credit financing behaviour [14]. Therefore, the higher the customer concentration, the more obvious the mitigating effect of digital finance development on inter-firm commercial credit financing behaviour.

5.4. Intermediation of banks' supply chain financial services

In order to solve the problem of financing difficulties of SMEs, commercial banks have provided supply chain finance (SCF) services and received widespread attention. Based on the supply chain formed between enterprises, SCF service regards the core enterprise and its upstream and downstream SMEs with business connection as a whole, takes the business contract between enterprises as the guarantee for financing, and obtains funds from banks and other financial institutions, which strengthens the stable cooperation relationship between banks and enterprises [15]. In recent years, the booming development of digital finance has provided greater development space for the supply chain financial services provided by commercial banks and greatly promoted their model innovation. At the same time, the Internet of Things, big data and other emerging digital technologies have built a new financial technology platform, which can control transaction risks by reducing information asymmetry, help bridge the lack of trust between borrowers and lenders, and then build a stable supply chain financial network of trust between commercial banks and enterprises, with SMEs in the supply chain having more transparent operating data, stronger credit evaluability and asset liquidity, and more effective financial institutions and commercial banks. Financial institutions and commercial banks can more effectively and reliably carry out financial services for enterprises in need. With the supply chain relationship formed with core enterprises, the commercial credit support provided by core enterprises is an important financing channel for their upstream and downstream enterprises. However, the development of digital finance has greatly facilitated the development of the supply chain finance business of banks and enterprises, providing more convenient means of financing for upstream and downstream enterprises with financing needs, which will, to a certain extent, reduce the demand for commercial credit financing among enterprises. Therefore, this paper predicts that the development of digital finance will promote the supply chain financial services provided by commercial banks and inhibit the commercial credit financing between enterprises, that is, there is a 'digital finance → bank supply chain financial services → inter-enterprise commercial credit financing' influence path.

6. Summary

Taking China's A-share non-financial listed companies from 2011-2019 as the research object, this paper empirically studies the impact of digital finance development on inter-enterprise commercial credit financing behaviour, and analyses the intermediary effect of supply chain financial services provided by commercial banks and other financial institutions therein, and arrives at the following research conclusions:(1) The development of digital finance inhibits inter-enterprise commercial credit financing behaviour, and the lower the degree of industry competition, the higher the concentration of suppliers and the higher the concentration of customers, the stronger the inhibitory effect of digital finance on the provision of commercial credit support to enterprises; (2) supply chain-based bank credit plays a partly intermediary role in the process of the development of digital finance affecting the financing of inter-enterprise commercial credit, and digital finance promotes the development of supply chain financial services of banks and inhibits the development of commercial credit financing. demand for financing through commercial credit, and can alleviate the problem of inter-enterprise occupancy.

Based on the above research findings, this paper puts forward the following policy recommendations. Firstly, further exploit the advantages of digital finance, introduce and improve support policies for digital finance, and comprehensively promote the development of core new technologies such as big

data and cloud computing, so as to provide enterprises with better and more convenient financial services, and to promote the healthy and stable development of enterprises. Secondly, the relationship with upstream and downstream enterprises in the supply chain should be handled correctly, so as to give full play to the advantages of the supply chain and prevent problems such as insufficient voice and serious capital occupation caused by excessive concentration in the supply chain, so as to achieve win-win cooperation in the supply chain. Thirdly, supply chain finance, as a new type of financing, has great potential. Improve enterprises' awareness of supply chain finance and financial institutions' participation in supply chain finance, and correctly guide enterprises to reasonably use supply chain finance as a financing method; at the same time, set up a regulatory body to standardise and supervise the operation of supply chain finance.

References

- [1] Petersen M, Rajan R. Trade Credit: Theories and Evidence. *Review of Financial Studies*, 1997, 10 (3): 661 - 691.
- [2] Giannetti M, Burkart M, Ellingsen T. What You Sell is What You Lend? Explaining Trade Credit Contracts. *Review of Financial Studies*, 2011, 24 (4): 1261 - 1298.
- [3] Li, Yongkui, Xiaokang Liu. Market force and government role: an investigation of the mechanism of digital finance for enterprise innovation. *Western Forum*, 2022, 32 (3): 46 - 62.
- [4] Chen, Lian, Lu Yi, Qiang Chen. Digital finance, SME debt financing and creditor heterogeneity. *Journal of Guizhou University of Finance and Economics*, 2021 (5): 53 - 60.
- [5] Zhang, J, Liu Yuanchun, Zhai Fuxin, et al. Bank discrimination, commercial credit and enterprise development. *World Economy*, 2013, 36 (9): 94 - 126.
- [6] Wan, Jiayu, Zhou Qin, Xiao Yi. Digital Finance, Financing Constraints and Firm Innovation. *Economic Review*, 2020 (1): 71 - 83.
- [7] Sheng, T. X., Fan, L. Fintech, optimal banking market structure and credit supply for micro and small enterprises. *Financial Research*, 2020 (6): 114 - 132.
- [8] Cunat V. Trade Credit: Suppliers as Debt Collectors and Insurance Providers. *The Review of Financial Studies*, 2007, 20 (2): 491 - 527.
- [9] Kong, Dongmin, Li Haiyang, Yang Wei. Targeted Rapid Reduction, Loan Availability and Business Credit of Micro and Small Enterprises - Empirical Evidence Based on Breakpoint Regression. *Financial Research*, 2021(3): 77-94.
- [10] Zhong, Kai, Liang Peng, Dong Xiaodan, et al. Digital inclusive finance and secondary allocation of business credit. *China Industrial Economy*, 2022 (1): 170 - 188.
- [11] Ma, Lijun, Min Zhang, Zhihong Yi. Does supplier-customer relationship affect the business credit of firms-an empirical test based on Chinese listed companies. *Economic Theory and Economic Management*, 2016 (2): 98 - 112.
- [12] Xiu, Zongfeng, Liu Ran, Yin Jingwei. Financial Fraud, Supply Chain Concentration and Corporate Business Credit Financing. *Accounting Research*, 2021 (1): 82 - 99.
- [13] Hill MD, Kelly G W, Lockhart G B. Shareholder Returns from Supplying Trade Credit. *financial management*. 2012, 41 (1): 255 - 280.
- [14] Wu, N, Yu B. Customer Concentration, Compassionate Effects and Commercial Credit Supply. *Journal of Yunnan University of Finance and Economics*, 2017, 33 (4): 141 - 152.
- [15] Hu, Yuefei, Huang Shaoqing. Supply Chain Finance: Background, Innovation and Conceptual Definition. *Research on Financial Issues*, 2009 (8): 76 - 82.