Trade Credit and Shadow Banking Activities: Evidence from China

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Abstract

This paper examines the relationship between trade credit and shadow banking activities measured by inter-corporate entrusted loans. Using a panel data of Chinese listed firms, we find that entrusted loans have a significant substitution effect on the supply of trade credit and the substitutional effects are mitigated during financial crisis periods. Propensity score matched samples and a difference-in-difference approach provide robustness to our findings. Our evidence suggests that trade credit interrelates with shadow banking activities on corporate financing.

JEL classification: G31, G32

Keywords: Trade credit, Shadow banking, Entrusted loans, Financial crisis

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1. Introduction

Trade credit works as an important short-term channel in corporate financing. Petersen and Rajan (1997) point that it is "the single most important source of short-term external finance for firms in the United States". A strand of literature discusses the substitution and complementary effect between trade credit and bank credit in different environments. From the financing motives, non-financial firms can play a role in intermediating funds from financial institutions to less privileged firms, especially in the backgrounds of misallocating credit (Petersen and Rajan, 1997; Fisman and love, 2003; Demirgüç-Kunt and Maksimovic, 2001). Regarding international evidence, Fisman and Love (2003) indicate that in poorly developed financial markets, those industries that use more trade credit achieve higher growth rates. Demirguc-Kunt and Maksimovic (2001) find that the efficient legal system and financial institutions predict a lower use of trade credit.

Shadow banking, or credit intermediations outside the formal banking system, acts as another important informal financing method. Unlike US shadow banking system with highly leveraged, securitized and derivatized transaction design, Chinese shadow banking system is more like a disguised form of lending. The underlying reasons are mainly evading from bank regulations and covering the financing gaps caused by financial repression (Dang et al., 2014). It has a rapid growth since 2007-2009 global financial crisis. According to the Aggregate Financing to the Real Economy (AFRE) statistics by the People's Bank of China (PBOC), the shadow banking sector has grown 10 times from 2.5 trillion RMB in 2007 to 25 trillion RMB in 2017. Regulations are vague on how and to what extent to this sector. Empirical analysis from Gabrieli et al (2018) shows that the shadow banking sector can contribute to economic growth but are not sure the magnitude of this effect.

Moreover, in contrast to shadow banking systems in developed economies, shadow banking in China includes much more credit intermediaries (CI) among nonfinancial entities

(Dang et al, 2017). There exists little literature on the roles of CI in China. This paper focuses on non-financial firms' participation in shadow banking activities, as they have been more and more important credit intermediaries through shadow banking channels or trade credit channel. According to Du et al. (2017), three forms of borrowing and lending happen between two industrial firms in China, which are related-party loans, entrusted loans and re-lending business. In this paper, we focus on entrusted loans, which is the fastest growing and largest part in Chinese shadow banking systems.

Qian and Li (2013) find that 74.6% transactions of the entrusted loan have equity affiliations. Listed companies can use surplus funds or financing facilities to provide entrusted loans for their subsidiaries or other affiliates. Flexible arrangement of funds among enterprises can improve the efficiency of capital allocation and cut down the group's financial expenses. They also find that entrusted loans have extended the company's disposal options of short-term surplus funds, which can provide enterprises with higher investment returns and help improve interest rate liberalization.

Yuan (2016) points out that entrusted loans have certain corrective effects on the mismatch of financial resources caused by credit discrimination, but they may increase the allocation costs of social resources. Qian et al. (2017) argues that for enterprises with financing advantages, entrusted loans provide them with opportunities to offer financing and meet the capital needs of small and medium-sized enterprises (SMEs), private firms, restrictive industries, and enterprises in the regions with lagging financial development.

The existing studies focus on the important role of trade credit in the secondary allocation of credit resources, especially in countries where financial markets are underdeveloped (Biais and Gollier, 1997; Fisman and Love, 2003, Giannetti et al., 2011). However, the existing literature rarely studies the role of enterprises participating in shadow

banking activities (such as entrusted loans) in the secondary distribution of credit resources and fails to consider the impacts of this behaviors on the intensity of trade credit redistribution.

In fact, the process of credit redistribution by enterprises is not only the transfer of funds from traditional bank credits to trade credits, but also the transfer from bank credits to shadow bank credits. As companies participate in the shadow banking activities in depth, understanding the interaction between formal finance, entrusted loans, and trade credits helps us better understand how the non-financial enterprises adopt different approaches to redeploy their credit resources. It makes clear the decision making process and influencing factors of joining in shadow banking activities or providing trade credit, and help distinguish the financing and business motivations of trade credit.

This paper firstly studies the overall influences of entrusted lending on the provision of trade credit. Lin and Chou (2015) prove the substitution effect of bank loans and trade credit demand using Chinese data. Similarly, this paper finds that there is a significant substitution effect of entrusted lending on the trade credit supply. The reason is that the abilities for non-financial firms in China of providing financing are mostly limited, both ways are their outflows to extend financing. This substitution effect shows that firms provide trade credit mainly for financing motivations rather than business motivations.

Secondly, we test how the relationship changes in the financial crisis. 2007-2009 financial crisis induced a huge turbulence in China. High unemployment and low growth of industries pulled GDP growth rate down from 14.2% in 2007 to 9.7% in 2008. Firms were facing with weak demands and poor financing conditions. we find during this period, the sample firms generally decrease their supply of both trade credit and entrusted loans, together with an increased ageing of accounts receivable. At the same time, the substitution effect of entrusted lending on trade credit supply mitigates. It may show that listed firms meet a liquidity shock from the tightening external financing, with reduced financing motivations for

providing trade credit. This result confirms that redistribution theory applies in the financial crisis.

This paper also studies the influence of firm heterogeneity on the relationships between shadow banking activities and trade credit during the financial crisis. It reveals the practical reasons for the redistribution of financial resources. In view of the existence of "discrimination on ownership" and "discrimination on scale" of bank loans (Zhang et al., 2013), this paper further discusses the redistribution behaviors through subgroups (state-owned and private enterprises, large and small enterprises, financing-constrained companies and less financing-constrained companies). Combining with the previous literature about the diversity of financing difficulty for different firms, this paper conducts a differential analysis to the financial intermediary role of non-financial companies. The results show that during the crisis, credit rationing is more severe, and companies with weak financing capabilities are more negatively affected. They increased accounts payable and reduced accounts receivable. However, both the supply of trade credit and shadow banking have been significantly reduced. Those two informal channels can only play a buffer role but cannot replace the role of formal financing.

This study overcomes lack of data and precedents, uses comprehensive Chinese data and combines the influence of financial crisis and several regulation changes, thus contributing to new evidence in the emerging markets. Using novel methods to relieve concerns for endogenous problem, this study sheds light on understanding a Chinese outstanding phenomenon, the rapid growth of shadow banking and active participation of non-financial firms. It links the development of the real economy to financial markets, and has crucial policy implications.

This study contributes to the literature in several ways. Firstly, we enrich the existing studies on the provision of trade credit. Prior literature mainly analyses how firms' trade credit

determine with the demand side information of their financing, treating those firms as financing demanders. Instead, we stand by the supply side of trade credit. Chinese non-financial companies play a more and more important role as surrogate financial intermediaries. The rapid growth of the shadow banking credit they provide might have an important influence on the supply of trade credit. It also provides a new perspective of distinguishing the financing motivation and business motivation of trade credit supply.

Secondly, a strand of studies emphasizes the importance of an informal mechanism such as trade credit or shadow banking in emerging markets. Most literature pays attention to how the formal financial intermediaries (bank credit) influencing the trade credit. From a different angle, this paper provide evidence on the links of shadow banking activities to trade credit. Similarly, this paper finds a substitution effect between shadow banking and trade credit in different periods and it changes along with firm characteristics. This article provides with evidence of distortions in the credit distribution by classifying and discussing the heterogeneous firm responses during the financial crisis. Our findings provide a new perspective of studying informal finance, and also introduce some policy implications for the financial crisis.

Thirdly, this study provides with convincing evidence with less concern with endogenous problems using a natural experiment. In methodology, this paper adopts the most suitable models in econometric significance to process different kinds of data. To some extent it mitigates the potential endogenous problem and gets more reliable estimations, so that it expands our understanding of the role of non-financial firms in Chinese shadow banking systems.

The reminder of the paper is organized as follows. Section 2 provides an overview of institutional backgrounds about Chinese shadow banking system. Section 3 presents the relevant literature and the hypotheses. Section 4 explains the sample selection and describes

research design. Section 5 presents the empirical results and Section 6 provides the robust checks. Section 7 concludes the paper.

2. Institutional Background

2.1. Shadow Banking System of China

The definition of shadow banking by the Financial Stability Board (FSB) is divided into broad and narrow senses. In a broader view, it refers to "credit intermediaries and businesses outside the traditional banking system"; in a narrower view, it refers to the outside of the formal banking system, which easily leads to systemic risks and regulatory arbitrage, especially those credit intermediary institutions and business that contains maturity or liquidity transformation, easy to cause incomplete credit risk transfer or a certain degree of leverage accumulated.

Different from the highly securitized and derivatized business model of shadow banking in the United States, China's shadow banking is bank-centric (Dang et al., 2014). It is in essence a disguised form of lending. The People's Bank of China (PBOC) define "China's shadow banking [system] as credit intermediation involving entities and activities outside the regular banking system" that serves to provide "liquidity and credit transformation" and "which could potentially" be a source of "systemic risk or regulatory arbitrage".

The Aggregate Financing to the Real Economy (AFRE) statistics published by People's Bank of China (PBOC) reports different finance channels to the real economy (domestic non-financial enterprises and households). AFRE reflects the financing support to the real economy. There are three sources composing the shadow banking sector: entrusted loans, trust loans and undiscounted banker's acceptances. ureEntrusted loan is a typical shadow banking business, full of Chines characteristics.

Dang et al. (2014) point that shadow banking contributes to the liberalization process. Shadow banking complements traditional bank credit by serving borrowers who are hard to get enough financing from banking system or capital markets. They conclude some structural and cyclical factors behind the rapid development of Chinese shadow banking. Interest rate controls create financial repression. Regulations to control bank lending hit small businesses in the private sector disproportionally hard. Increased Residents' wealth and investment requirements cause strong demands for shadow banking products. Circumventing bank regulations and desiring for higher returns are main structural reasons from the supply and demand side of the rise of shadow banking in China. In order to circumvent regulations (such as loan-to-deposit ratios, banking capital adequacy ratios, and industry investment restrictions) and increase profits, banks participate in shadow banking. They shift the internal business to off-balance-sheet channels or investment projects in real estate, local government city investment platform, and "two high and one surplus" industries. Cyclically, regulatory endorsement for financial liberalization, financial deregulation and massive economic stimulus following the global financial crisis helped increase shadow banking activities.

2.2. Entrusted Loans

In China, large non-financial corporate sector began to act as financial intermediaries. They provide credit to other firms and become part of the shadow banking (Wang et al., 2015). Those non-financial firms raise low-cost funds through diversified financing channels such as internal retention, equity, bank loans, or bond issuance. Then they invest in shadow credit markets through entrusted loans, private equity funds, private lendings, etc., in order to obtain high financial returns (Liu et al., 2014). This trend of shadow banking is becoming increasingly prominent in China.

State owned enterprises and large listed firms in China are more likely to obtain financing from banks and securities markets because of government guarantees and high collateral value. They have a large amount of funds are idle within the company if facing less investment opportunities (Du et al., 2016). Liu et al. (2014) find the financing needs of the capital scarce parties and the investing needs of the capital surplus parties have contributed to the shadow banking trend of non-financial corporations. Under the background of economic growth slowdown and lack of investment opportunities, the phenomenon of shadow banking has increased apparently (Song and Lu, 2015).

The shadow banking behavior of non-financial companies is different from the investment behavior of general financial assets. It is actually a kind of lending with high-risk, high-hiding, and regulatory arbitrage. Inadequate supervision and unclear information disclosure leave room for shadow banking activities in the corporate sector. Listed Company Securities Issuance Management Measures clearly stipulates that funds raised by enterprises cannot be used for funds lending activities among enterprises. However, the lack of supervision has made it very easy for listed firms to move over-raised funds by supplementing liquidity, and then engage in shadow banking business to achieve regulatory arbitrage (Zhang et al., 2015).

As an independent entity, the corporate sector's participation in the shadow banking business is more complex and diverse. Non-financial enterprises in China mainly participate in the shadow banking business through three methods, "entrusted agency" "trade credit" and "equity innovation" (Han et al., 2017). According to Du et al. (2017), three ways of borrowing and lending happened between two non-financial Chinese firms, which is related-party loans, entrusted loans and re-lending business.

An entrusted loan is a firm-to-firm loan that it is legally required to have a trustee bank to administer and serve the loan. It is the largest part of shadow banking in the AFRE

statistics. Its' financing function is like trade credit but it is not tied to specific transactions of goods. According to Allen, et al. (2018), firms with privileged access to cheap financing are willing to provide credit to less privileged firms (such as SMEs) through entrusted loans, especially during the credit tightening. China's binding banking regulation and regional development imbalance provide incentives for privileged firms to play the role of credit intermediaries.

Entrusted loans are one of the shadow banking activities with Chinese characteristics and have grown rapidly after the financial crisis. According to relevant laws and regulations, non-financial companies are prohibited to involve in lending activities directly, unless through the channel of banks or financial institutions. That is to say, entrusted loans are a legal way to lend between non-financial firms. The interest rate, maturity, amount, etc. are all determined by the borrower and lender. The bank or financial institution only acts as a middleman to collect intermediary costs and cannot participate in the decision. Usually, banks only need to supervise the issuance and recovery of loans, and do not assume the risk of default. The entrusted loan stays off the bank's balance sheet. There are some mixes in definitions between entrusted loans and trust loans. They both have three participating parties, which are lender, borrower and financial institution. But in trust loan, the lender gives surplus funds to the trustee, the trustee decides how to use the funds and bears the risk of default as a fund manager.

The lender usually has sufficient cash and wants to lend surplus funds to other companies. The funds are deposited into an entrusted bank or financial institution, and then transferred by the bank to the borrower's account. A large firm with better access to bank credit recycles the loan by granting an entrusted loan to another firm - typically a smaller firm with restricted access to bank lending, or a related party. From this diagram, the lending firm may borrow from the bank first and then make the entrusted loan, simultaneously borrowing and

lending like a financial intermediary (Shin and Zhao, 2013). The bank acts as a delegated manager of the loan contract.

There is a regulation change of entrusted loans in January 2015. It may cause a decrease of entrusted loans because the regulation strictly limited the source and uses of entrusted loans. China Banking Regulatory Commission (CBRC) published the Administrative Measures for Entrusted Loans of Commercial Banks (Consultation Draft), prohibiting firms from re-lending bank loans and prohibiting the borrowers from investing in such financial assets as Wealth Management Products (WMPs), bonds and equities.

The regulation stipulates that commercial banks shall strictly prohibit the granting of entrusted loans using the following funds: funds raised by issuance of bonds; funds raised from other people; or funds raised from other unclear sources. Commercial banks cannot add new credits to the trustees who offer entrusted loans. The funds should not be put in the products and projects prohibited by the government, or invested in bonds, futures, financial derivatives, wealth management products, equity, etc.; should not be used as registered capital, registered capital verification or increase capital and expand stocks. Commercial banks are strictly prohibited in participating in the client's loan decision and taking risks.

3. Literature Review and Hypothesis Development

According to previous studies, trade credit and shadow banking can provide financing for credit-deficient companies and support their growth. Compared with formal bank credit, shadow bank credit is more inclined to SMEs, that is, to some extent, to supplement the unbalanced distribution and insufficiency of formal finance (Dang et al., 2014).

Abdulla et al., (2017) finds that listed companies have more diversified financing channels and stronger financing capabilities than non-listed companies, so that they can be as funding providers in shadow banking. From the view of providing financing, entrusted lending

represents the firm's ability to finance other companies through the shadow banking system, the same as the extension of trade credit from financing motivations. Then, is the supply of trade credit based on the profit-driven financing motivation or the business competitive motivation under the buyer's market? This paper studies the relationship between entrusted loans and trade credits to verify which micro motivation is the leading cause.

Although the scale of entrusted loans is not large at present, its rapid growth reflects the high degree of credit rationing in China and the extent to which companies participate in shadow banking activities. Due to the hidden nature of corporate shadow banking behavior, we have reasons to believe that the actual amount of firms' participation in shadow banking activities is much greater than the amount of entrusted loans (Wang et al., 2015). Therefore, the impacts of shadow banking activities on trade credit supply are a question worthy of exploring in the context of China.

Since most companies have limited financing capacities, companies with financing advantages will make secondary allocations from bank loans and other financial resources through shadow banking or trade credit channels. Thus, we expect to see a negative relationship between shadow banking and trade credit supply, if firms provide trade credit from the financing motivation. The analysis leads to the following hypothesis:

Hypothesis 1: *In general, there is a substitution effect between shadow banking and the supply of trade credit (accounts receivable) and also the net supply of trade credit (accounts receivable minus accounts payables).*

However, if the dominant reason for the provision of trade credit is from the business motivation, that is, in order to enhance the competitiveness of the product market under the buyer's market, the relationship between the supply of entrusted loans and trade credit may be insignificant.

Another possibility is whether firms have a preference for these two investment channels. According to the existing literature (Qian and Li, 2013; Allen et al., 2018), most entrusted loans occur between subsidiaries and affiliates, charged low interest rates as a method of inter-group financing. According to the study by Buchuk et al., (2014), intra-group loans can make a full use of their financing advantages, allowing borrowing companies to perform better with cheap financial support. On the other hand, non-affiliated entrusted loans often charge high interest rates, and are considered to be a high-return investment method by companies with a slow development in their main businesses. Therefore, if a firm has a main business with limited development but sufficient funds, the financing motives for the provision of trade credits are dominant. At that time, it may consider entrusted loans as a preferred investment choice, and then consider providing more trade credit. The supply of entrusted loans and trade credits would show a positive relationship.

Prior literature points that the relationship between trade credit and bank loan can change in different periods, such as steady period or financial crisis period. Comparing the performance of enterprises in the period of economic stability with that in the financial crisis can help us understand the issue of credit rationing and explain the changes in corporate trade credit. 2007-2009 financial crisis caused dilemma of lots of firms, especially export-oriented firms and severe financial constrained firms. The economic shock may also cause the deterioration of enterprise operation, and increase the cost of providing trade credit. If firms provide trade credit mainly for the profit-driven motivation under the financing comparative advantages, then from the redistribution theory, firms would decrease the supply of shadow banking and trade credit. Because at that time, they have problems to obtain bank loans and suffer liquidity shocks. On the other hand, in the crisis, bank credit tightened along with a deeper credit rationing, the demands for alternative financing such as trade credit and shadow

banking would increase. But generally speaking, in this period the influence of supply side would be prominent, so we make the following hypotheses:

Hypothesis 2a: *During the financial crisis, firms decrease the supply of trade credit.*

Hypothesis 2b: *During the financial crisis, firms decrease the supply of entrusted loans.*

As trade credit has financing motivations, it also has business motivations. When companies are faced with financial constraints, the financing incentives for trade credit are reduced, and the substitute relationship between entrusted loans and trade credits is likely to be weakened. From this analysis we propose the third hypothesis:

Hypothesis 3: *In the financial crisis, the relationship between shadow banking and trade credit maybe different than that in the normal periods.*

Before the full outbreak of financial crisis, China started to implement a tightening monetary policy since 2007. At the beginning of 2007, the subprime crisis in the United States began to appear; the bankruptcy of Lehman Brothers, the Wall Street investment company, in September 2008 marked the outbreak and rapid proliferation worldwide. Although China's financial market is not very open, Chinese economy such as import and export trade, foreign exchange assets, and GDP, has been hit hard.

Chinese government launched a 4 trillion economic stimulus plan in November 2008, but this also caused serious resource mismatches in terms of fund allocation and investment projects. Due to policy support, large enterprises, state owned enterprises, or companies with strong financing capabilities are less influenced by the global financial crisis. According to research on the heterogeneity of companies by Love et al. (2007) and Lin and Chou (2015), firms in more fragile financial position are more likey to be negatively influenced by the crisis. These companies may increase their accounts payable and reduce the accounts receivable. In order to better discuss the changes in the behavior of companies during the crisis, we divide

the companies into two groups with strong financing capabilities and weak financing capabilities, and propose the following hypothesis:

Hypothesis 4: *In the financial crisis, credit rationing would be more serious, so companies with weaker financing capabilities are more negatively affected.*

4. Data and Empirical Methods

4.1. Data

The sample consists of all the non-financial firms listed on the Shanghai and Shenzhen stock exchanges from 2003 to 2016 (according to the industry classification of China Securities Regulatory Commission). To ensure the accuracy and reliability of data, we process the data by the following steps:

(1) excluding ST, *ST or delisted companies from 2003 to 2016, because such firms often have abnormal business activities;

(2) excluding companies with key variables missing;

(3) excluding observations before and in the IPO year;

(4) winsorizing the continuous variables in the quantile 1% and 99%, to avoid the influence of extreme values.

This paper gets 23,881 firm-year observations in total. There are 1,031 observations in 2003, 1,090 observations in 2004, 1,188 observations in 2005, 1,202 observations in 2006, 1,261 observations in 2007, 1,372 observations in 2008, 1,447 observations in 2009, 1,538 observations in 2010, 1,881 observations in 2011, 2,157 observations in 2012, 2,311 observations in 2013, 2,312 observations in 2014, 2,436 observations in 2015 and 2,655 observations in 2016.

The financial data of listed companies used in this study are from China Securities Market and Accounting Research database (CSMAR), one main databases providing Chinese

market data for domestic and international journals. I double-check those data from WIND Financial Terminal to verify the data quality.

4.2. Measurements of the Key Variables

4.2.1. Shadow Banking Activities

According to the study of Dang et al. (2017), due to the nature of shadow banking activities, the publicly disclosed information of the company may not fully reveal the extent to which it actually participates in credit intermediary activities. However, researchers still find some identification methods to trace it from the annual reports. Although firms can participate in shadow banking through lots of methods, this paper mainly focuses on entrusted loans. The reason is that entrusted loan is one direct and legal way for non-financial firms lending to another non-financial firm, and also the largest part in the shadow banking system in AFRE.

In the annual report, the balance of entrusted loans is non-standardly disclosed in different places, such as other non-current assets, non-current assets matured within a year, and other liquid assets. Some of them are not stated clearly and only disclosed in the announcements. Allen et al. (2018) and Ruan (2017) manually collect mass of data from the footnotes of annual reports and check them with company announcements to get the exact amount of entrusted loans. Considering the data availability and error-prone manual collection, we follow Han et al. (2017) to use the ratio of (other current assets+ Non-current assets matured within a year + other non-current assets) to total assets as the proxy of the ratio of entrusted loans.

Another measure we use is the interest income from entrusted lending, according to the research of Ruan (2017). According to CSRC Document 2008-43, listed companies are required to disclosure interest income from entrusted lending in the part of non-regular profit

and loss. It is equal to the interest income net of any commission fee expenses or losses from write-downs. we use the standardly disclosed data as a dummy variable to represent whether a firm choose entrusted lending. If a firm disclosure interest income from making entrusted loans, its entrusted loans dummy variable equal to one in that firm-year observation, otherwise equal to zero.

4.2.2. Trade Credits

According to prior research (Petersen and Rajan, 1997; Fisman and Love, 2003; Giannetti et al., 2011; Lin and Chou, 2015), the dependent variables, *tcrec* is measured as the is the ratio of (accounts receivable + notes receivable+ prepayment) to the total assets, representing the supply of trade credit. *tcpay* is measure as the ratio of (accounts payable+ notes payable+ advances received) to the total assets, representing the demand of trade credit. Normally accounts receivable are larger than accounts payable for listed firms, so the net supply of trade credit (*tcnet*) is measured as the ratio of (accounts receivable+ notes receivable+ prepayment- (accounts payable+ notes payable+ advances received)) to total assets.

4.3. Regression Model and Control Variables

Following the method from prior studies (e.g, Cull et al., 2009; Lin and Chou, 2015), we use the panel data to explore the relationship between trade credit and shadow banking. An individual-fixed effect model can capture the unseen heterogeneity in the firm-specific levels of trade credit, such as time-invariant. According to Cull et al. (2009), one most important factor of firm heterogeneity is the implicit interest rate for the delay in payment of trade credit. Controlling for firm and year fixed effects allows us to hold constant the hidden costs of trade credit. To mitigate the endogeneity due to the simultaneity, we also use main variables at lag

one periods. Furthermore, to test the influence of financial crisis periods, we add a financial crisis dummy variable and the interaction term between the dummy variable and shadow banking variables.

Based on previous studies (Petersen and Rajan, 1997; Wu et al., 2012; Ge and Qiu, 2007; Xu et al., 2017), control variables include the short-term bank loan divided by total assets (bkloan), firm size(size), a state-owned enterprise dummy variable (state), liquidation costs (inventory), cash holding ratio (cash), sales growth rate (salesgrowth), net working capital ratio (liquid), fixed assets ratio (fix), and capital expenditure (capex).

4.4. Descriptive Statistics

Table 1 shows detailed descriptive statistics for the full sample. The mean ratio of the supply of trade credit is 16.8%, slightly larger than the demand of trade credit 16.4%, indicating that the sample firms are suppliers of net trade credit. The short-term bank loan ratio is 12.7%, lower than tcrec and tcpay. This shows the crucial role of trade credit as an alternative short-term financing method. The summary statistics of other variables are generally consistent with previous research.

5. Empirical Results

5.1. Baseline Results

Table 2 provides the empirical results of hypothesis H1. we run an individual and time fixed-effect panel data on the provision of trade credit (accounts receivable and net accounts receivable). The dependent variable in columns (1) and (3) is the supply of trade credit (*tcrec*), while the dependent variable in columns (2) and (4) is net supply of trade credit (*tcnet*); both are used to measure the firm's trade-credit offering. According to the results in columns (1) and (3), the estimated coefficients associated with entrusted loans are all negative

(-0.293 and -0.130) and significant at 1% level, suggesting that entrusted lending decrease firm's trade credit offering. In columns (2) and (4), we use net trade credit supply as the dependent variable instead, and the results are also significant. We can see the coefficients of entrusted loan in column (2) and (4) are -0.234 and -0.113, and significant at the 1% level. The increased entrusted loans cause a decrease in both accounts receivable and net trade credit. Both the lag one period variables and simultaneous variables show similar evidence for the results. Thus, there is a substitution effect between entrusted loans and trade credit. The results in Table 2 support H1.

For control variables, Table 2 shows that the positive relationship between bank loan and trade credit, which fit in with the existing literature (Lin and Chou, 2015). The relations between size and trade credit supply is insignificant except for the lag one size and *tcrec*.

5.2. Propensity Score Matching Sample

Abdulla et al. (2017) consider the potential endogenous problem of a firm's entrusted lending decision and we adopt the method of propensity score matching to control for sample selection problems. Since there are more observations for firms making no entrusted lending, we consider firms making entrusted lending as the treated group and other firms the control group. we use one-to-one matching to the nearest neighborhoods. To be specific, based on all of the control variables used the baseline regression (bkloan, size, state, inventory, cash, salesgrowth, liquid, fix, capex), and the industry and year effects, we take a logit regression for the entrusted loan dummy variable and we use a propensity score to match each firm-year observation with entrusted loans with a firm-year observation without entrusted loans. It is for ensuring that in our propensity score matched sample, the control and treatment groups are roughly similar in terms of the matching dimensions.

Table 3 presents the results that we re-do baseline regression of the propensity score matched samples. In the regression (1), we use the entrust dummy as the independent variable. The results keep robust, showing a strong negative relationship between entrusted loan dummy variable and trade credit supply (*tcrec* and *tcnet*). Expect for the coefficients of size showing different signs from before results, other coefficients give us similar evidence with the previous ones. In the regression (2), we use the entrust as independent variables to run a fixed effect model. The results keep similar with our previous results in Table 2 (full sample), showing that there is a strongly negative relationship between the entrusted loan proxies and the provision of trade credit (*tcrec* and *tcnet*).

5.3. Difference-in-Difference Approach

The policy tightening in the beginning of 2015 provides an exogenous shock for firms who make entrusted lending. We use Kernel Propensity Score DID method to capture the net influence of the change of entrusted loans on the supply of trade credit. For the balance of data, we only include the 2014 and 2015 data. In accordance with all the control variables in Table 2, we first do Kernel Propensity Score Match to determine the control group, and then do double difference with the treated group along with the control group. Table 4 reports the DID test for the trade credit supply ratio change. It shows that before the policy issued, the mean value of trade credit supply ratio for the control group and treated group are 17.1% and 13.5%; after the policy issued, the mean value of trade credit supply ratio for the control group and treated group are 16.2% and 14.1%. The coefficient of treatment effect is 1.5% at 5% significance. It shows that the change of entrusted loans policy caused 1.5% net increase of the supply of trade credit. The result provides further evidence to show the substitution effect of entrusted lending to trade credit supply.

5.4. Financial Crisis Periods

Since our time period is from 2003 to 2016, including financial crisis periods. The financial crisis periods caused a systematic credit crunch in China. To capture how trade credit changes in this period, we add a crisis dummy variable and an interaction term. We define financial crisis dummy variable equal to one if it is from 2007 to 2009, otherwise equal to zero (Abdulla et al, 2017).

Table 5 reports the empirical results after considering the impacts of financial crisis on the provision of trade credit. The coefficients of crisis dummy variables are all negative and significant, which means that the sample firms generally decrease 3 percent of the supply of trade credit during financial crisis, consistent with the redistribution theory. Overall, the results of Table 5 support H2a.

It should be noticed that the coefficient of interaction term of entrusted loans and financial crisis is significantly positive, showing that the substitution effect between entrusted loan and trade credit mitigates during the financial crisis period. Thus, H3 is supported, too. Those firms who have difficulties to get formal finance try to get alternative source, both trade credit and shadow banking. In regular time, trade credit and shadow banking show substitution, but in crisis periods, they are not in competition. Firms lean to any informal financing.

To better understand the behaviors of firms in financial crisis, we examine how the accounts receivable ageing changes during the crisis. *longar* is measured to the ratio of those accounts receivable whose ageing is more than one year to the total accounts receivable. we implement a test on the determinants of the ratio of long term accounts receivable (*longar*), as Column (1) in Table 6 reports. The coefficient on financial crisis dummy variable is positive and significant at 1% level, indicating that firms are forced to increase the length of trade credit supply. Then we test how the entrusted loans changes during financial crisis. We use the balance of entrusted loans as the dependent variable, the financial crisis dummy variable as

the independent variable as model (3). Column (2) of Table 6 reports the results on the determinants of entrusted lending. The coefficient on financial crisis dummy variable is negative and significant at the 1% level, indicating that firms decrease 1.4 percent of the supply of entrusted loans during the crisis. Thus, H2b is supported.

According to this evidence, we can infer that during the crisis customers face with more severe financing constraints, they tend to delay the payment of trade credit. Firms are forced to provide longer trade credit and fail to increase the amount of trade credit and entrusted loans. In that case, the substitution effect between entrusted loan and trade credit supply is weakened.

Furthermore, we group the firms with their financial conditions, such as SA index (measuring financial constrained), firm size and the nature of property (SOEs or non SOEs). we also test the differences in the coefficients between groups after the regression. The results are in Table 7 to 9. Column (1), (3), (4), and (6) in each Table show that financially-vulnerable firms (more financial constrained firms, smaller firms and non-stated owned firms) decrease the supply of trade credit more than their counterparts (less financial constrained firms, larger firms and state-owned firms) during the financial crisis. In the groups of firms with financing advantages, the coefficients of the cross terms are insignificant. In the financially-vulnerable firms, the coefficients of the cross terms are positive and significant. Those results show that firms with less financing advantages suffer more in the crisis and change their supply of trade credit and shadow banking more. Financial crisis doesn't have a significant impact on the substitution effect of entrusted loan on the trade credit supply for firms with advantages to get finance.

Column (2) and (5) show that all the firms increase the use of trade credit (account payable) in the crisis, while the financially-vulnerable firms received more trade credit than their counterparts.

6. Robustness Checks

6.1. Different Forms of Model

For the robustness test, we use the logarithmic forms of the balance of entrust loans, trade credit, and cash holding, adjusted to constant year 2003 RMBs. The logarithm transformation is used to make the data more normal distributed. From Table 10, we can see that after changing the functional forms, the independent variables we are interested in are still significantly negative. Other variables also show similar results with the previous one. However, the coefficients of size become more significantly positive with trade credit.

Table 11 reports the results adding financial crisis dummy variable and interaction terms in this functional form. The entrusted loan remains significantly negative with trade credit. The coefficients of financial crisis dummy variable are significantly negative simultaneously, and in the lag one period. The coefficients of interaction terms keep significantly positive, showing that in the financial crisis, the substitution effect of entrusted loans on trade credit is mitigated obviously. This method proves that my results are robust in different forms of model.

6.2. Changes in Trade Credit

Following Abdulla et al. (2017), we take the change of trade credit as another robustness test. In the left side of our equation, we take the change of the trade credit supply (*D.tcnet* and *D.tcrec*); while in the right side of the equation, we also take the change of main variables such as inventory and cash (*D.inventory* and *D.cash*). From Table 12, the column (1) reports the regression results for the full sample, we see similar results with our baseline model. That is to say, the change of entrust loans contributes to the decrease of the change of trade

credit supply ratio. The column (2) reports the results for the propensity score matched sample. In general, the results are corresponding with column (1).

7. Conclusion

This paper analyzes the influence of entrusted lending on the supply of trade credit. Using data of all A-share companies from the CSMAR and WIND database from 2003 to 2016, we find strong evidence to support the hypothesis that non-financial firms decrease the provision of trade credit (e.g. accounts receivable, notes receivable and prepayments) if they increase entrusted lending to related parties or unrelated parties. It provides new evidence to verify firms provide trade credit with the profit-driven motivation under the financing comparative advantages. To mitigate sample selection and endogenous concerns, the paper uses several robustness tests and identification strategies. The results are persistent.

We also find that in the financial crisis, the negative effect of entrusted lending on trade credit supply is less pronounced during the financial crisis. The sample firms are prone to decrease the provision of trade credits and entrusted loans, while they are forced to increase the length of trade credit, which is in line with redistribution theory. The results show during the crisis, the financing motivations for providing trade credit have been weakened and business motivations have increased. From the demand side, firms lean to informal finance when lack of formal finance.

Through analyses of heterogenous firm responses in the crisis, this paper finds that firms with weaker financing capabilities were more negatively affected. They decrease trade credit supply and increase demand of trade credit more than firms with financing advantages. Those results infer credit rationing is more severe in the crisis. The credit intermediary roles of non-financial firms have a buffer effect but should not be viewed as a substitute by policymakers during the financial crisis.

This study adopts a micro-level perspective by linking two activities that non-financial firms would like to join in as credit intermediaries: trade credit and entrusted lending. By discussing their dynamic relationships in different periods, the paper provides a different angle to test the financing motivations and business motivations of trade credit supply. This study not only complements previous studies on trade credit, but also extends the literature on shadow banking.

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Table 1: Statistics for all the variables

This table reports summary statistics of data in this paper. Data sources are CSMAR and WIND database. Continuous variables are winsorized at 1% and 99%.

variable	N	mean	sd	min	max	p25	p50	p75
tcrec	23881	0.168	0.120	0.002	0.537	0.072	0.148	0.241
tcpay	23881	0.164	0.123	0.005	0.574	0.072	0.133	0.227
tcnet	23881	0.004	0.140	-0.420	0.360	-0.067	0.010	0.087
entrust	23881	0.025	0.061	-0.005	0.910	0.000	0.002	0.021
bkloan	23881	0.127	0.125	0.000	0.570	0.018	0.097	0.199
size	23881	21.797	1.261	19.057	25.679	20.918	21.655	22.512
state	23881	0.507	0.500	0.000	1.000	0.000	1.000	1.000
inventory	23881	0.162	0.150	0.000	0.748	0.063	0.124	0.208
cash	23881	0.176	0.133	0.000	1.000	0.085	0.141	0.230
salesgrowth	23881	0.174	0.410	-0.649	2.451	-0.027	0.116	0.285
liquid	23881	-0.116	0.723	-3.917	1.912	-0.310	0.001	0.224
fix	23881	0.257	0.185	0.002	0.818	0.113	0.222	0.367
capex	23881	0.129	0.184	0.001	1.144	0.025	0.067	0.154

Table 2: Multivariate regression results

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit supply. The sample includes the 23881 observations. Variable definitions are stated in Table 5.1. Robust standard errors in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)		(3)	(4)
Simultaneous	tcrec	tcnet	Lag one period	tcrec	tcnet
entrust	-0.293***	-0.234***	L.entrust	-0.130***	-0.113***
	(0.016)	(0.016)		(0.018)	(0.020)
bkloan	0.098***	0.162***	L.bkloan	0.062***	0.097***
	(0.014)	(0.019)		(0.013)	(0.016)
size	0.003	-0.004	L.size	0.005**	0.002
	(0.002)	(0.003)		(0.002)	(0.003)
state	0.001	-0.014**	state	-0.001	-0.015**
	(0.005)	(0.006)		(0.006)	(0.007)
inventory	-0.285***	-0.483***	L.inventory	-0.172***	-0.321***
	(0.016)	(0.018)		(0.016)	(0.017)
cash	-0.246***	-0.192***	L.cash	-0.094***	-0.064***
	(0.011)	(0.013)		(0.011)	(0.013)
salesgrowth	0.004***	-0.010***	L.salesgrowth	0.004**	-0.004*
	(0.002)	(0.002)		(0.002)	(0.002)
liquid	0.019***	0.038***	L.liquid	0.012***	0.022***
	(0.002)	(0.003)		(0.002)	(0.003)
fix	-0.198***	-0.161***	L.fix	-0.098***	-0.069***
	(0.013)	(0.014)		(0.010)	(0.012)
capex	-0.077***	-0.042***	L.capex	-0.064***	-0.045***
	(0.006)	(0.006)		(0.006)	(0.007)
Constant	0.308***	0.304***	Constant	0.194***	0.124**
	(0.050)	(0.058)		(0.049)	(0.058)
Year effects	Yes	Yes	Year effects	Yes	Yes
Firm effects	Yes	Yes	Firm effects	Yes	Yes

Observations	23,881	23,881	Observations	21,204	21,204
Adj. R^2	0.303	0.337	Adj. R^2	0.164	0.186
Number of stock	2,655	2,655	Number of stock	2,436	2,436

Table3: Propensity score matching analysis

This table reports the results of the propensity score matching. Panel A presents the pairwise differences between the average trade credit ratios of the matched samples. Bootstrapped standard errors (Std. error) based on 50 replications are reported too. Panel B reports the baseline regression results for the matched samples. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

Panel B: regression results for the propensity score matched sample

(1) Using entrustdummy as independent variables			(2) Using entrust as independent variables		
	tcrec	**tcnet**		**tcrec**	**tcnet**
entrustdummy	-0.028***	-0.017***	entrust	-0.229***	-0.207***
	(0.004)	(0.004)		(0.045)	(0.057)
bkloan	0.141***	0.383***	bkloan	0.013	0.274***
	(0.030)	(0.051)		(0.044)	(0.076)
size	0.005**	-0.011***	size	0.019**	-0.004
	(0.002)	(0.002)		(0.008)	(0.012)
state	0.007	-0.020***	state	-0.002	0.002
	(0.005)	(0.005)		(0.015)	(0.025)
inventory	-0.186***	-0.516***	inventory	-0.236***	-0.491***
	(0.027)	(0.030)		(0.049)	(0.061)
cash	-0.159***	-0.129***	cash	-0.194***	-0.181***
	(0.025)	(0.028)		(0.035)	(0.038)
salesgrowth	0.025***	0.003	salesgrowth	0.023***	0.003
	(0.008)	(0.007)		(0.005)	(0.006)
liquid	0.047**	0.115***	liquid	0.018**	0.068***
	(0.006)	(0.011)		(0.009)	(0.016)
fix	-0.211***	-0.090***	fix	-0.131***	-0.074**
	(0.018)	(0.017)		(0.039)	(0.030)
capex	-0.117***	-0.016	capex	-0.017	-0.010
	(0.012)	(0.010)		(0.014)	(0.015)
Constant	0.127***	0.373***	Constant	-0.143	0.203

	(0.045)	(0.048)		(0.186)	(0.247)
year effects	Yes	Yes	year effects	Yes	Yes
industry effects	Yes	Yes	firm effects	Yes	Yes
Observations	2,100	2,100	Observations	2,100	2,100
Adj. R^2	0.368	0.496	Adj. R^2	0.183	0.295
			Number of stock	1,038	1,038

Table 4: Kernel Propensity Score DID test for tcrec

This table reports the DID test for the trade credit supply ratio change. The first row lists the mean value of tcrec for the control group and treated group. The second row lists the standard errors for the group difference. The third row states T statistics for DID estimates. The fourth row states the P value. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	tcrec	S. Err.	|t|	P>|t|
Before				
Control	0.171			
Treated	0.135			
Diff (T-C)	-0.037	0.005	-7.13	0.000***
After				
Control	0.162			
Treated	0.141			
Diff (T-C)	-0.022	0.005	4.17	0.000***
Diff-in-Diff	0.015	0.007	2.01	0.045**

Table 5: Multivariate regression results (considering the financial crisis)

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, adding financial crisis dummy variable and interaction terms. Variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)		(3)	(4)
Simultaneous	tcrec	tcnet	Lag one period	tcrec	tcnet
entrust	-0.331***	-0.265***	L.entrust	-0.172***	-0.140***
	(0.017)	(0.017)		(0.019)	(0.020)
crisis	-0.029***	-0.036***	crisis	-0.029***	-0.033***
	(0.002)	(0.002)		(0.002)	(0.002)
entrust*crisis	0.151**	0.200***	L.entrust*crisis	0.163***	0.168***
	(0.059)	(0.062)		(0.049)	(0.052)
bkloan	0.147***	0.217***	L.bkloan	0.115***	0.152***
	(0.014)	(0.019)		(0.014)	(0.017)
size	-0.016***	-0.023***	L.size	-0.015***	-0.017***
	(0.002)	(0.002)		(0.002)	(0.002)
state	0.013**	-0.000	state	0.012*	-0.002
	(0.006)	(0.006)		(0.007)	(0.007)
inventory	-0.276***	-0.481***	L.inventory	-0.169***	-0.324***
	(0.016)	(0.018)		(0.016)	(0.018)
cash	-0.241***	-0.191***	L.cash	-0.087***	-0.063***
	(0.011)	(0.013)		(0.011)	(0.013)
salesgrowth	0.010***	-0.004**	L.salesgrowth	0.012***	0.004**
	(0.002)	(0.002)		(0.002)	(0.002)
liquid	0.021***	0.041***	L.liquid	0.0138***	0.0249***
	(0.002)	(0.003)		(0.002)	(0.003)
fix	-0.179***	-0.142***	L.fix	-0.080***	-0.052***
	(0.013)	(0.014)		(0.011)	(0.013)

capex	-0.059***	-0.023***	L.capex	-0.045***	-0.027***
	(0.006)	(0.006)		(0.006)	(0.006)
Constant	0.645***	0.636***	Constant	0.540***	0.442***
	(0.040)	(0.045)		(0.039)	(0.045)
Firm effects	Yes	Yes	Firm effects	Yes	Yes
Observations	23,881	23,881	Observations	21,204	21,204
Adj. R^2	0.262	0.304	Adj. R^2	0.113	0.145
Number of stock	2,655	2,655	Number of stock	2,436	2,436

Table 6: Changes of accounts receivable ageing and entrusted loans in the financial crisis

This table reports the changes of accounts receivable ageing and entrusted loans during financial crisis. longar is the ratio of those accounts receivable whose ageing is more than one year to total accounts receivable. Entrust is the ratio of the balance of entrusted loan to total assets. Other variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	longar	entrust
crisis	0.133***	-0.014***
	(0.007)	(0.001)
tcrec	-0.389***	-0.167***
	(0.044)	(0.012)
tcpay	0.129***	0.009
	(0.043)	(0.008)
bkloan	0.093***	-0.022***
	(0.035)	(0.006)
size	-0.006	0.007***
	(0.005)	(0.001)
state	0.011	-0.005*
	(0.016)	(0.003)
inventory	-0.181***	-0.168***
	(0.040)	(0.011)
cash	-0.188***	-0.179***
	(0.026)	(0.010)
salesgrowth	-0.067***	-0.001
	(0.005)	(0.001)
liquid	0.007	0.008***
	(0.005)	(0.001)
fix	-0.139***	-0.108***

	(0.032)	(0.008)
capex	-0.089***	-0.020***
	(0.018)	(0.003)
Constant	0.561***	-0.006
	(0.116)	(0.021)
Firm effects	Yes	Yes
Observations	23,881	23,881
Adj. R^2	0.073	0.200
Number of stock	2,655	2,655

Table 7: Changes of trade credit in the financial crisis (financial unconstrained firms versus less financial constrained firms)

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, adding financial crisis dummy variables and interaction terms. SA index is calculated by the equation of -0.737*Size+0.04*Size²-0.04Age, measuring the level of financial constrains (Hadlock and Pierce, 2010). If SA index is above the median, the firms are less financial constrained, otherwise more financial constrained. Variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	less financial constrained			more financial constrained		
	(1)	(2)	(3)	(4)	(5)	(6)
	tcrec	tcpay	tcnet	tcrec	tcpay	tcnet
entrust	-0.303***	-0.084***	-0.216***	-0.332***	-0.038**	-0.277***
	(0.029)	(0.028)	(0.026)	(0.022)	(0.016)	(0.024)
crisis	-0.016***	0.005**	-0.020***	-0.040***	0.011***	-0.050***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Entrust*crisis	0.142	0.074	0.079	0.127	-0.076	0.201**
	(0.090)	(0.050)	(0.089)	(0.111)	(0.065)	(0.099)
bkloan	0.117***	-0.163***	0.272***	0.148***	-0.046**	0.186***
	(0.019)	(0.022)	(0.026)	(0.020)	(0.018)	(0.027)
size	-0.012***	0.008***	-0.019***	-0.010**	0.014***	-0.022***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
state	0.012*	0.019***	-0.007	0.015*	-0.009	0.022**
	(0.007)	(0.007)	(0.009)	(0.008)	(0.006)	(0.009)
inventory	-0.246***	0.234***	-0.477***	-0.248***	0.208***	-0.446***
	(0.021)	(0.022)	(0.026)	(0.024)	(0.020)	(0.026)
cash	-0.218***	0.004	-0.216***	-0.247***	-0.043***	-0.190***
	(0.018)	(0.018)	(0.021)	(0.015)	(0.012)	(0.018)
salesgrowth	0.012***	0.018***	-0.006**	0.010***	0.012***	-0.002
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
liquid	0.022***	-0.033***	0.054***	0.014***	-0.008***	0.023***
	(0.003)	(0.004)	(0.005)	(0.003)	(0.002)	(0.004)

fix	-0.131***	-0.023	-0.105***	-0.210***	-0.011	-0.187***
	(0.015)	(0.016)	(0.015)	(0.021)	(0.013)	(0.022)
capex	-0.040***	-0.018***	-0.022***	-0.056***	-0.023***	-0.030***
	(0.008)	(0.006)	(0.008)	(0.008)	(0.005)	(0.008)
Constant	0.525***	-0.031	0.530***	0.522***	-0.160**	0.635***
	(0.056)	(0.066)	(0.066)	(0.090)	(0.076)	(0.109)
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,943	11,943	11,943	11,938	11,938	11,938
Adj. R^2	0.207	0.161	0.312	0.250	0.115	0.244
Number of stock	1,728	1,728	1,728	2,237	2,237	2,237
Chi2 Test:	**(1)-(4)**	**tcrec**	**(2)-(5)**	**tcpay**	**(3)-(6)**	**tcnet**
crisis		0.024***		-0.006**		0.029***
Two-tailed P-value		(0.000)		(0.015)		(0.000)
entrust*crisis		0.015		0.150		-0.122
Two-tailed P-value		(0.671)		(0.105)		(0.116)

Table 8: Changes of trade credit in the financial crisis (big firms versus small firms)

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, adding financial crisis dummy and interaction terms. Large firms are those above the median of size, others are divided into small firms. Variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	Big firms			Small firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	tcrec	tcpay	tcnet	tcrec	tcpay	tcnet
entrust	-0.297***	-0.054**	-0.242***	-0.339***	-0.049***	-0.272***
	(0.027)	(0.026)	(0.025)	(0.022)	(0.018)	(0.025)
crisis	-0.016***	0.005**	-0.021***	-0.040***	0.010***	-0.049***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Entrust*crisis	0.096	0.073*	0.021	0.190*	-0.081	0.279***
	(0.071)	(0.040)	(0.078)	(0.097)	(0.072)	(0.094)
bkloan	0.094***	-0.181***	0.271***	0.173***	-0.035**	0.200***
	(0.019)	(0.022)	(0.028)	(0.019)	(0.018)	(0.026)
size	-0.013***	0.007***	-0.019***	-0.010**	0.016***	-0.024***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
state	0.010	0.018***	-0.008	0.0185**	-0.000	0.018**
	(0.007)	(0.007)	(0.008)	(0.008)	(0.006)	(0.009)
inventory	-0.247***	0.261***	-0.509***	-0.253***	0.197***	-0.439***
	(0.022)	(0.021)	(0.026)	(0.023)	(0.021)	(0.026)
cash	-0.210***	-0.025	-0.183***	-0.254***	-0.038***	-0.201***
	(0.017)	(0.016)	(0.019)	(0.015)	(0.013)	(0.018)
salesgrowth	0.011***	0.020***	-0.009***	0.009***	0.012***	-0.004
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
liquid	0.023***	-0.037***	0.060***	0.014***	-0.010***	0.0243***
	(0.003)	(0.005)	(0.006)	(0.003)	(0.002)	(0.004)
fix	-0.130***	-0.024	-0.106***	-0.220***	-0.019	-0.187***

	(0.014)	(0.016)	(0.014)	(0.020)	(0.014)	(0.022)
capex	-0.039***	-0.014**	-0.024***	-0.057***	-0.032***	-0.024**
	(0.007)	(0.006)	(0.007)	(0.008)	(0.007)	(0.009)
Constant	0.551***	-0.017	0.555***	0.529***	-0.192**	0.681***
	(0.052)	(0.065)	(0.066)	(0.093)	(0.087)	(0.106)
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,939	11,939	11,939	11,942	11,942	11,942
Adj. R^2	0.201	0.177	0.319	0.268	0.106	0.249
Number of stock	1,879	1,879	1,879	2,060	2,060	2,060
Chi2 Test:	**(1)-(4)**	**tcrec**	**(2)-(5)**	**tcpay**	**(3)-(6)**	**tcnet**
crisis		0.025***		-0.0047*		0.029***
Two-tailed P-value		(0.000)		(0.097)		(0.000)
entrust*crisis		-0.094		0.154**		-0.258**
Two-tailed P-value		(0.582)		(0.015)		(0.017)

Table 9: Changes of trade credit in the financial crisis (SOEs versus non-SOEs)

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, adding financial crisis dummy variables and interaction terms. According to the nature of property rights is state owned or non-state owned, I divide all the firms into two groups. Variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	State owned firms			Non-state owned firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	tcrec	tcpay	tcnet	tcrec	tcpay	tcnet
entrust	-0.312***	-0.055*	-0.252***	-0.317***	-0.050***	-0.259***
	(0.033)	(0.030)	(0.028)	(0.018)	(0.016)	(0.020)
crisis	-0.026***	0.003*	-0.029***	-0.033***	0.014***	-0.045***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Entrust*crisis	0.120	-0.007	0.135*	0.235**	-0.043	0.304***
	(0.075)	(0.057)	(0.072)	(0.116)	(0.098)	(0.113)
bkloan	0.141***	-0.115***	0.249***	0.145***	-0.042*	0.181***
	(0.020)	(0.022)	(0.026)	(0.020)	(0.023)	(0.027)
size	-0.010***	0.012***	-0.022***	-0.023***	0.003	-0.025***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
inventory	-0.276***	0.208***	-0.480***	-0.259***	0.213***	-0.464***
	(0.027)	(0.026)	(0.027)	(0.022)	(0.025)	(0.027)
cash	-0.251***	-0.014	-0.226***	-0.233***	-0.063***	-0.163***
	(0.018)	(0.018)	(0.021)	(0.013)	(0.013)	(0.016)
salesgrowth	0.012***	0.015***	-0.004	0.010***	0.014***	-0.004
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
liquid	0.020***	-0.024***	0.044***	0.022***	-0.017***	0.039***
	(0.003)	(0.003)	(0.005)	(0.003)	(0.004)	(0.005)
fix	-0.179***	-0.040***	-0.134***	-0.169***	-0.008	-0.155***
	(0.018)	(0.014)	(0.016)	(0.018)	(0.020)	(0.026)
capex	-0.055***	-0.026***	-0.029***	-0.062***	-0.032***	-0.0301***

	(0.008)	(0.006)	(0.008)	(0.008)	(0.007)	(0.010)
Constant	0.524***	-0.092*	0.600***	0.811***	0.072	0.699***
	(0.054)	(0.056)	(0.055)	(0.055)	(0.071)	(0.072)
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,113	12,113	12,113	11,768	11,768	11,768
Adj. R^2	0.238	0.133	0.302	0.264	0.128	0.274
Number of stock	1,169	1,169	1,169	1,808	1,808	1,808
Chi2 Test:	**(1)-(4)**	**tcrec**	**(2)-(5)**	**tcpay**	**(3)-(6)**	**tcnet**
crisis		0.007*		-0.010***		0.016***
Two-tailed P-value		(0.079)		(0.000)		(0.000)
entrust*crisis		-0.115		0.0363*		-0.169
Two-tailed P-value		(0.101)		(0.075)		(0.702)

Table 10: Logarithmic forms for main variables

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, using logarithmic forms for main variables. lnentrust is the logarithm of (other current assets+non-current assets matured within a year+ other non-current assets); lnbkloan is the logarithm of short-term bank loans; lncash is the logarithm of cash and cash equivalent. All RMB values are adjusted to constant year 2003 RMBS. Other variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)		(3)	(4)
Simultaneous	lnar	lnnetar	Lag one period	lnar	lnnetar
lnentrust	-0.017***	-0.023***	L.lnentrust	-0.009	-0.021***
	(0.006)	(0.006)		(0.006)	(0.006)
lnbkloan	0.017***	0.012***	L.lnbkloan	0.007***	0.009***
	(0.002)	(0.002)		(0.002)	(0.002)
size	1.193***	0.149***	L.size	0.908***	0.007
	(0.050)	(0.045)		(0.050)	(.0538)
state	0.080	-0.097	state	0.073	-0.108
	(0.072)	(0.078)		(0.089)	(0.099)
inventory	-1.387***	-3.485***	L.inventory	-0.875***	-2.755***
	(0.251)	(0.259)		(0.249)	(0.269)
lncash	-0.091***	-0.129***	L.lncash	0.080**	0.019
	(0.026)	(0.030)		(0.038)	(0.036)
salesgrowth	-0.016	-0.123***	L.salesgrowth	0.035	-0.113***
	(0.033)	(0.035)		(0.048)	(0.037)
liquid	0.094***	0.241***	L.liquid	0.066*	0.138***
	(0.028)	(0.028)		(0.039)	(0.028)
fix	-0.474***	-0.737***	L.fix	-0.102	-0.093
	(0.152)	(0.176)		(0.158)	(0.187)
capex	-0.656***	-0.383***	L.capex	-0.435***	-0.534***
	(0.093)	(0.112)		(0.117)	(0.113)
Constant	-3.569***	0.999	Constant	-0.963	0.844

	(0.872)	(0.778)		(0.865)	(0.839)
Year effects	Yes	Yes	Year effects	Yes	Yes
Firm effects	Yes	Yes	Firm effects	Yes	Yes
Observations	23,881	23,881	Observations	21,202	21,202
Adj. R^2	0.401	0.222	Adj. R^2	0.279	0.158
Number of stock	2,655	2,655	Number of stock	2,436	2,436

Table 11: Logarithmic forms for main variables (considering financial crisis)

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, using logarithmic forms for main variables and adding financial crisis dummy variable and interaction terms. lnentrust is the logarithm of ((other current assets+ non-current assets matured within a year+ other non-current assets)/ CPI); lnbkloan is the logarithm of (short-term bank loans/ CPI); lncash is the logarithm of (cash and cash equivalent/ CPI). All RMB values are adjusted to constant year 2003 RMBS. Other variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)		(3)	(4)
Simultaneous	lnar	lnnetar	Lag one period	lnar	lnnetar
lnentrust	-0.063***	-0.059***	L.lnentrust	-0.042***	-0.049***
	(0.007)	(0.007)		(0.006)	(0.007)
Lnentrust*crisis	0.047***	0.051***	Llnentrust*crisis	0.053***	0.048***
	(0.009)	(0.009)		(0.011)	(0.011)
crisis	-0.676***	-0.751***	crisis	-0.678***	-0.706***
	(0.107)	(0.110)		(0.128)	(0.122)
lnbkloan	0.030***	0.022***	L.lnbkloan	0.017***	0.018***
	(0.002)	(0.003)		(0.002)	(0.003)
size	0.814***	-0.130***	L.size	0.617***	-0.251***
	(0.038)	(0.035)		(0.037)	(0.041)
state	0.288***	0.066	state	0.225**	0.032
	(0.081)	(0.082)		(0.095)	(0.101)
inventory	-1.323***	-3.478***	L.inventory	-0.941***	-2.824***
	(0.262)	(0.264)		(0.256)	(0.276)
lncash	-0.034	-0.086***	L.lncash	0.123***	0.057
	(0.026)	(0.030)		(0.037)	(0.035)
salesgrowth	0.095***	-0.040	L.salesgrowth	0.119***	-0.031
	(0.031)	(0.033)		(0.045)	(0.035)
liquid	0.117***	0.262***	L.liquid	0.091**	0.164***
	(0.029)	(0.029)		(0.040)	(0.030)

fix	-0.029	-0.424**	L.fix	0.219	0.179
	(0.169)	(0.181)		(0.172)	(0.192)
capex	-0.405***	-0.191*	L.capex	-0.256**	-0.364***
	(0.096)	(0.112)		(0.119)	(0.115)
Constant	2.931***	5.691***	Constant	4.001***	5.176***
	(0.653)	(0.609)		(0.599)	(0.631)
Firm effects	Yes	Yes	Firm effects	Yes	Yes
Observations	23,881	23,881	Observations	21,202	21,202
Adj. R^2	0.326	0.177	Adj. R^2	0.240	0.123
Number of stock	2,655	2,655	Number of stock	2,436	2,436

Table 12: Multivariate regression of the change of trade credit

This table examines the multivariate regression results of the impact of entrusted loans on the trade credit, using the change forms for main variables. D.entrust is the ratio of the balance of entrusted loans in period t minus the balance of entrusted loans in period t-1) to total asset in period t-1. D.bkloan is the ratio of the balance of short-term bank loans in period t minus the balance of short-term bank loans in period t-1) to total asset in period t-1. D.inventory is the ratio of the balance of inventory in period t minus the balance of inventory in period t-1 to total asset in period t-1. D.cash is the ratio of the balance of cash and cash equivalent in period t minus the balance of cash and cash equivalent in period t-1 to total asset in period t-1. Other variable definitions are stated in Table 5.1. Robust standard errors are in parentheses. ***, **, and * denote the difference is significant at the 1%, 5%, and 10% levels, respectively.

	(1) Full sample		(2) PSM sample	
	D.tcrec	D.tcnet	D.tcrec	D.tcnet
D.entrust	-0.251***	-0.205***	-0.244***	-0.180***
	(0.013)	(0.017)	(0.035)	(0.046)
D.bkloan	-0.004	0.024**	0.004	0.157***
	(0.007)	(0.011)	(0.032)	(0.054)
size	-0.005***	-0.005***	-0.008	-0.021**
	(0.001)	(0.001)	(0.006)	(0.009)
state	0.000	-0.005	-0.016	-0.010
	(0.003)	(0.004)	(0.014)	(0.021)
D.inventory	-0.241***	-0.418***	-0.280***	-0.411***
	(0.015)	(0.019)	(0.033)	(0.059)
D.cash	-0.241***	-0.201***	-0.206***	-0.215***
	(0.009)	(0.013)	(0.030)	(0.038)
salesgrowth	0.022***	0.008***	0.036***	0.026***
	(0.002)	(0.002)	(0.007)	(0.009)
liquid	0.006***	0.013***	0.010*	0.024**
	(0.001)	(0.002)	(0.005)	(0.010)
fix	-0.024***	-0.024***	-0.013	0.025
	(0.005)	(0.007)	(0.027)	(0.036)
capex	-0.043***	-0.042***	-0.004	-0.011

	(0.004)	(0.005)	(0.013)	(0.014)
Constant	0.104***	0.107***	0.162	0.439**
	(0.024)	(0.030)	(0.124)	(0.197)
Year effects	Yes	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes	Yes
Observations	21,202	21,202	1,978	1,978
Adj. R^2	0.189	0.148	0.240	0.177
Number of stock	2,436	2,436	986	986

Table A1: Variable definitions

This table reports all the variables definition and calculation methods.

Dependent variables	Symbols	Calculation methods
Supply of trade credit	tcrec	(Accounts receivable + notes receivable+ prepayment)/ total assets
Demand of trade credit	tcpay	(Accounts payable+ notes payable+ advances received)/ total assets
Net trade credit	tcnet	(Accounts receivable + notes receivable+ prepayment- (Accounts payable+ notes payable+ advances received))/ total assets
Independent variables		
The balance of Entrusted loans offered	entrust	(Other current assets+non-current assets matured within a year+ other non-current assets)/ total assets
Interest income from making entrusted loans	entrustdummy	A dummy variable that equals one if a firm disclosures interest income from making entrusted loans in that firm-year observation, and zero otherwise.
Financial crisis dummy variable	crisis	A dummy variable that equals one if it is in 2007-2009, and zero otherwise.
Control variables		
Short term bank credit	bkloan	Short-term bank loan/ total assets
Firm size	size	A logarithm of total assets
Nature of property rights	state	A dummy variable that equals one if the firm is ultimately controlled by the government and zero otherwise
Inventory	inventory	Inventory/total assets
Cash holding	cash	Cash and cash equivalent/ total assets
Sales growth rate	salesgrowth	(Operating income-last year's operating income)/ last year's operating income
Liquidity	liquid	The ratio of net working capital (working capital minus cash and cash equivalents) to net assets
Fixed asset ratio	fix	Fixed assets/ total assets
Capex ratio	capex	Capital expenditure/ total assets