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Ex Ante Bargaining and Ex Post Enforcement in Trade Credit Supply: Theory and Evidence from China

Noiryuki YANAGAWA and Mariko WATANABE*
May, 2013**

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Keywords: trade credit, enforcement power, bargaining power, cash constraint, competition in product market

JEL classification: O5, K0, G2, P31, E41

* Comments welcome. Research fellow, Area Studies Centre, IDE (mariko.wt@gmail.com)

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INSTITUTE OF DEVELOPING ECONOMIES (IDE), JETRO
3-2-2, WAKABA, MIHAMA-KU, CHIBA-SHI
CHIBA 261-8545, JAPAN

Ex Ante Bargaining and Ex Post Enforcement in Trade Credit Supply: Theory and Evidence from China*

Mariko Watanabe† Noriyuki Yanagawa ‡

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†Institute of Developing Economies, 3-2-2 Wakaba, Mihama, Chiba 261-8545, Japan. Phone: +81-3-299-9579, Fax: +81-3-299-9763, E-mail: mariko.wt@gmail.com

‡University of Tokyo, Faculty of Economics, 3-7-1 Hongo, Tokyo, E-mail: yanagawa@e.u-tokyo.ac.jp

1 Introduction

1.1 What mechanism governs transaction with trade credit?

In real world, trade credit is an important facility to realize economic transactions. Recently both empirical and theoretical research have tried to unveil a mechanism on how trade credit is supplied, and how it contributes to economic growth. This paper distinguished bargaining power and enforcement power as different factors that govern transaction contract with trade credit. This perspective is necessary to answer several puzzles in the related literatures. First, law and economics literature claims that high economic growth is accomplished by the economy with good enforcement institutions. But the literature did not demonstrate a micro structure behind the relationship. Not only to this limit, but also the real world give a counter-fact against the claim. China, whose enforcement institution is considered to be poor and biased, has kept rapid and drastic economic growth since the 1990s to the 2000s. In addition to this big puzzle from the real world, recent empirical works present another puzzle. They found a fact that bargaining power and trade credit ratio in a transaction are negatively correlated. This is puzzling as it runs against the intuition that a supplier with stronger monopolistic power should be able to exercise the power to enforce a buyer repayment.

1.2 Summary of Findings

First, a contribution of this paper is to be able to empirically distinguish factor the enforcement power that determines transaction and trade credit in survey data. This is unique because preceding empirical literature did not distinguish bargaining power and enforcement power. But, our original survey revealed information on experience of default in trade credit and contents of the trade default. The survey allow us to observe the exact profile of transaction, then allow us to identify the factors of enforcement power and bargaining power for exact transaction between exact seller and buyer.

Secondly, facts found in this survey are as follows: (1) Trade credit is not a negligible instrument for firms to facilitate transactions. For a substantial share of firms, the cash stock in the hand of the buyer is much smaller than the size of a transaction with his partners (Table 1). Furthermore, (2) trade credit is given by the seller who has weaker bargaining power. This result is robust even after necessary remedy to econometric endogeneity prob-

lem. On the other hand, however, (3) monopolistic suppliers do not necessarily request cash payment. A monopolistic supplier sells the non-negligible share of his products 100 per cent on credit (Figure 1).

Figure 1 shows distribution of trade credit ratio by the number of competitors. Density of zero trade credit is the highest for the monopolist supplier. However, it is a very interesting fact that density of full trade credit ratio is also as much high as zero trade credit for the monopolist supplier. We can see here that monopoly power is utilized for two polar cases: zero trade credit or full credit. This means that "bargaining power" between seller and buyer is important but cannot fully explain how trade credit is given. "Enforcement power" is also important for trade credit supply mechanism, and also has a "non-linear" nature. If the seller offers some trade credit, his trade credit ratio increase along with his enforcement power. However, if the seller offers zero trade credit, his enforcement power can be interpreted as the maximum as well. Because he has power to enforce payment in whole cash, and remained no credit. The non-linear relationship between competitive environment and trade credit provision could be complementally explained by the enforcement power of seller and the cash holdings of the buyer.

Thirdly, theoretical model attempted to organize the facts above found following relationships: When default of payment is expected, seller will exercise his bargaining power to reduce credit to buyer to avoid the default risk or to ask for cash payment. Buyer will accept the offer to pay on cash if his profit is bigger than profit when he commits default of trade credit. In this situation, bargaining power is correlated with enforcement power, then trade credit supply is determined not only by enforcement power but also by ex ante bargaining power of the seller. In addition to ex ant bargaining and ex post enforcement power, cash constraint of the buyer is also the essential factor to determine transaction and trade credit size. If cash in hand of buyer is sufficiently large, transaction will be realized even under poor enforcement environment.

As a whole, the mechanism of governing trade credit supply is different from ordinary debt contract in the following sense. An ordinary debt contract is determined by profitability and risk of a project. But trade credit is also determined by bargaining power of the seller or position in the product market competition, in addition to risk/enforcement probability of contract and profitability of project or the trade. Hence, trade credit has an inter-linked

nature as a joint of financial market and product market. Existence of the interlinked nature is consistent with a theoretical prediction of Dixit (2003a, 2003b, 2009): trade can be implemented by negotiation with two party to some extent, but it needs the third party's enforcement to support economic transaction when it outgrows a critical size.

Fifth, empirical study here supported that structure from theoretical prediction exist. It is clear from the comparison between reduced form regression to structural estimation that bargaining power and enforcement power shows substantial explanatory power on trade amount and trade credit.

Finally, because of the structural relationship between product market competition, risk and trade size with trade credit presented here, policy simulation or experimental study on institutional arrangement and economic activity become feasible. This paper attempted a policy simulation on the impact of improved enforcement institution on economic transaction size.

Table 1: Cash in hand of firm and Size of Transaction

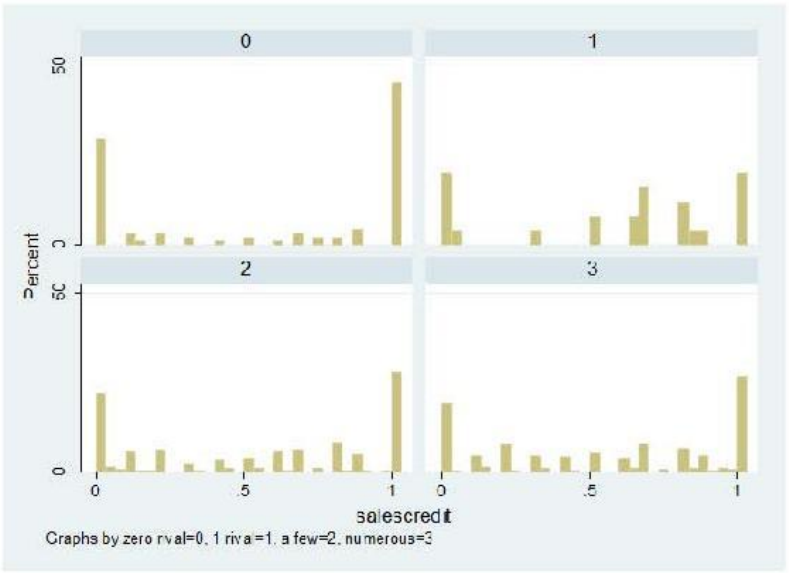
Cash/Transaction size	N	Min	Mean	Max
with supplier				
Cash stock < transaction size with a supplier	615	0.0001	0.28	1
Cash stock >= transaction size with a supplier	219	1	127	9,155
with customer				
Cash stock < transaction size with a customer	643	0.0004	0.23	1
Cash stock >= transaction size with a customer	177	1	234	18,708

Source: IDE-DRC survey and JICA survey.

1.3 Literature

The literature on trade credit started by exploring the determinants of usage of trade credit compared to other financing channels. The first comprehensive survey of theories and empirical tests on trade credit is done by Petersen and Rajan (1997). It used the Small and Medium-sized Enterprizes data in the United States, then found that suppliers are inclined to lend to financially constrained customers. Their survey extended various possible theories to explain why the trade credit is given. They interpreted this is because suppliers have advantages in getting information on buyers, and firms with better access to information offer more trade credit. Mian and Smith (1992), and Ng, Smith and Smith (1999) explored

Figure 1: Trade Credit Ratio and Number of Competitor



Source: IDE-DRC survey and JICA Survey.

how payment contracts are determined amongst a choice of net trade credit supply, cash payment, or two-part payment, based on a survey of 2538 firms drawn from COMPUSTAT files in the United States. The result showed that the more the number of customers, i.e., the bargaining power of the seller/lender is stronger, they receives more credit. Or when the seller firm is an OEM manufacture or wholesaler, that firm will offer credit to its customers.

Following the availability of firm-level data improved, focus of the research began shifting to trade credit in developing or transition economies, where presumably the institutional enforcement mechanism works poorly. Demirguc-Kunt and Maksimmovic (2001), Fisman and Love (2003), Allen et al. (2004) showed that trade credit is a substantial source of financing and a substitute for bank credit for small and medium-sized firms. Fafchamp (1996, 1997) and MacMillan and Woorduff (1999) tried to capture how the enforcement mechanism of trade credit works; the former documented ethnic relationship mattered. Theoretical works also start to focus on enforcement and economic transactions. Dixit (2003a; 2003b; 2009), for example, demonstrated economic transactions can be realized even via only two party's negotiation, without enforcement by a third party. But third

party intervention or institutional support become necessary when transaction may expand beyond a critical point.

The theoretical literature expanded into two directions since then: a financial motivation approach and product market competition approach. The former has explored the motives of the "lender" and "borrower" of trade credit compared to other financial sources. It has focused on the problem of why a lender gives credit to a buyer, and why a buyer chose to "borrow" trade credit instead of some other financial instrument. This approach implicitly assumes that financial motivation leads to trade credit provision. Bukart and Ellingsen (2004) theorized that trade credit and bank loans can be both complements and substitutes, and presented a model for entrepreneurs to choose bank loans or trade credit. Fabbri and Menichini (2009) theorized that informational advantages of the supplier to other financing sources allows them to provide credit. Cunat (2007) set up a model to show that the supplier has a comparative advantage over banks in lending under limited enforceability of contracts, and the supplier also acts as a lender of last resort. Petersen and Rajan (1995) focused on competition in credit market, not on product competition as this paper.

The other strand of literature discussed the impact of product-market competition on trade credit provision. This approach sheds light on impact of competition in the product market that leads to trade credit provision. Their results were conflicting each other at early stage. Regarding the relationship between competition and trade credit provision, MacMillan and Woodruff (1999) indicated that the presence and number of competitors within a 1-km area lowers trade credit provision to customers. Johnson, MacMillan and Woodruff (2002) also showed that trade credit provision is lowered when there exists more than 5 rivals within 1 km. Their results show that competition prevents suppliers from giving credit so as to avoid risk. However, their survey design might have failed to capture a full picture of competition, as they limited their information to survey to within a very limited area.

Subsequent studies found an opposite result from the above: the less monopolistic the supplier, the more trade credit is given to the buyers. Fisman and Raturi (2004) showed that the monopoly power of the supplier is negatively associated with credit provision, which countered the assertions of previous studies who claims monopoly power facilitated

the provision of credit because monopolists are better able to enforce payment. Fabbri and Klapper (2008) documented that (1) the stronger bargaining power of the buyer (borrower), the more trade credit offered, and (2) period matching between trade credit received and offered exists. The more trade credit received, the larger trade credit a firm will extend. At the same time, (3) access to bank financing and profitability is irrelevant to trade credit provision based on a 2003 World Bank Enterprise Survey in China. Van Horen (2007) also documented that market power of buyer is strongly correlated with trade credit provision based on data of Eastern Europe and Central Asia. They dicussed that buyer can extract surplus by demanding to buy goods on credit. Van Horen (2007) argues that this gain in customer surplus increases with asymmetric information on product quality that the seller knows but buyer might not. Hyndman and Serio (2009) showed that the relationship between trade credit provision and supplier's market power is not linear but inverted-U shaped. A monopolist supplier often prefers to sell on cash only, which is zero trade credit. Once competition starts, trade credit grows with the number of competitors. Hyndman and Serio (2009) argued that this happens as Bertrand price competition in the cash market pushes up the price of cash, i.e., payment in cash to marginal costs, thus new entrants can only offer trade credit given the product market competition. With the intensification of competition, problems of commitment on trade credit repayment and decisions on credit provision become irrelevant. However, enforcement becomes constrained as the number of competitors increases and outgrows a certain limit. Recent empirical investigation using micro data reports following phenomenon: trade credit is given by less monopolistic supplier to more monopolistic buyer. However, there is no common agreement on the mechanism behind this phenomenon. This paper also tries to explain the phenomenon.

This paper goes as follows: Section 2 describes our original data and shows findings from its descriptive data. Section 3 set theoretical model on trade credit supply and trade volume decision in the presence of strategic default. Section 4 shows estimation and identification strategy. Section 5 discuss the results and Section 6 conclude the paper.

2 Data and descriptive statistics

2.1 Data Source

The data we used in this paper was obtained from two surveys based on a structurally very similar questionnaire[1]. The questionnaire was designed to capture information on characteristics of transactions between firms and related enforcement mechanism (See Figure 2). In order to obtain effective variances in the sample, the surveyed firms were asked to provide the information on transactions with following four types of transaction partners: (1) a customer who is located inside the home city of the surveyed firm; (2) a customer who is outside the home city of the surveyed firm; (3) a supplier who is located inside the home city of the surveyed firm; and (4) a supplier who is outside the home town of the surveyed firm. The survey was designed to sample transactions both inside and outside of the hometown.

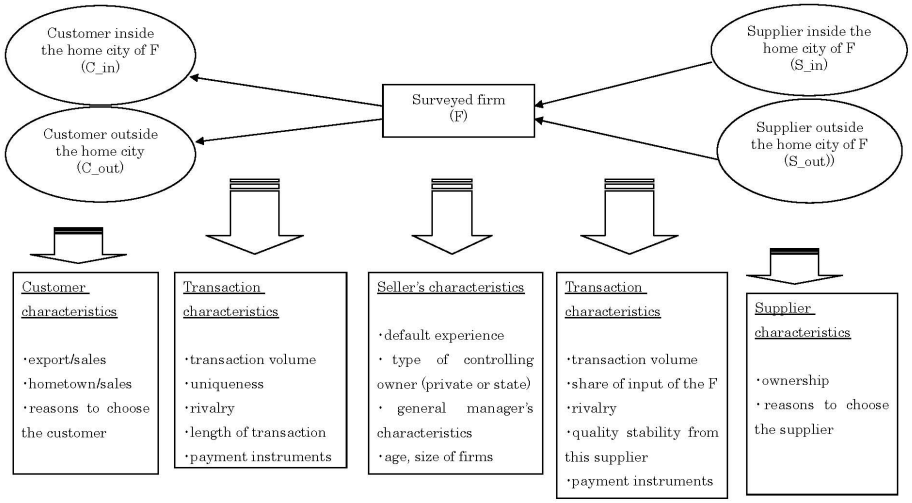
To understand mechanism of determining transaction with trade credit provision, we are concerned with the ex post enforcement power of the trade credit contract in addition to the bargaining power that the literature has been concerned with so far. We regarded that enforcement is implemented through several timings. The first step is commitment between two parties. The two parties may offer mechanisms and negotiate to enforce the contract according to their bargaining power. However, the commitment may not work under some situation, and intervention by a third party, the second-step mechanism, become necessary. Usually, a court is regarded as the third party enforcer. However, in China, the lack of a legal enforcement mechanism has been criticized. Hence, we regard here the power of the government or administrative entity as an arbitrary substituting for the law. Cluster sampling both from inside and outside of the hometown allows us to capture differences in enforcement impact across and inside of administrative borders.

The data consists of responses from a total of 638 firms with a maximum of four samples for each. The sampled firms were 465 private enterprises, 124 government enterprises, and

[1]The first survey was administrated in Yibin City, Sichuan Province, in January 2003 by the Development Research Center and Institute of Developing Economies (DRC-IDE Survey). The second was administered by the People's Bank of China (PBOC) and commissioned by the Japan International Cooperation Agency in Beijing City, Dongguan City in Guangdong Province and Xi'an City in Shaanxi Province in December 2003 (PBOC-JICA Survey). The two surveys were implemented using very similarly structured questionnaires in the sections concerning inter-firm transactions, and we were therefore able to pool the two surveys for this paper to analyze firms' trade credit behavior.

49 FDI firms (Table2). These firms were randomly sampled from lists of firms that were supervised by the local branches of the People's Bank of China in Beijing, Xi'an, and Dongguang, and the Yibin City Government [2].

Figure 2: Structure of Information in the Survey



Source:Author.

[2]The sample selection mechanisms were as follows: For the DRC-IDE Survey at Yibin, the surveyed firms were selected mainly based on tax and dividend payment lists held by the commercial and economic department of the Yibin City Government. In the case of Yibin, the sampled firms covered around half of the firms in the city, and we were therefore able to regard it as more or less the same as a city census. For the PBOC-JICA Survey, the respective branches of the PBOC kept ledgers, called the Daikuanzheng (Qualification for Loan Application), on the transactions of all bank branches with local firms. The sample firms here were primarily selected based on the list of "Qualification for Loan Application" holders, but this list contained a substantial share of inactive firms, so if we had sampled directly from this list we would have had an extremely low survey collection rate. Therefore, we also sampled firms based on lists held by the commercial and industrial departments of the respective local governments, which was similar to what we did in Yibin City.

Table 2: Location and Ownership of Surveyed Firms

Ownership type	Beijing	Dongguang	Xi'an	Yibin	Total
Number of firms					
FDI	26	7	16	0	49
G	41	8	56	19	124
P	133	91	150	91	465
Total	200	106	222	110	638

Source: IDE-DRC survey and JICA survey.

2.2 Data Description

We are interested in the micro structure of how transaction with trade credit is determined via negotiation between firms. In order to closely look at the firm's decision mechanism, we collected information on the characteristics of transactions between particular transaction partners. After defining the variables, descriptive data will show the relationship between trade credit, the enforcement power to repaid, and the bargaining power between buyer and seller.

2.2.1 Description of Main Variables

Dependent variables of our model and estimation are trade credit ratio and transaction amount. In our survey we asked firms to pick up particular trading partner, and then to describe the annual value of transaction with them, ratios of prepayment, cash on delivery and payment after delivery (the sum of this three items being 100%). We define trade credit ratio as a ratio of payment after delivery, transaction amount as the value of a transaction, and trade credit volume as trade credit ratio multiplied by transaction amount.

The essential independent variables here are bargaining power, enforcement power and cash stock. We use two variables from the survey as bargaining power variables: the presence of potential rivals dummy and importance of seller to the buyer (evaluation by seller himself). Table 3 shows descriptive statistics of bargaining power variables.

The second essential independent variables is enforcement power index. This is an index calculated by following steps.The survey also collected information on experiences of trade credit default. The surveyed firms were asked whether in the four years prior to the survey,

the trade credit they had provided was; (1) repaid on time, (2) had payment delayed, but was eventually repaid, (3) was completely defaulted. Table 4 shows distribution of firm who ever been default. Here, Foreigner owned firms are the lowest in terms of the ratio of firm having experienced defaults on trade credit (0.20 at mean). Difference in the default probability between FDI and SOE or private firms is statistically significant compared with government owned firms (0.3111 at mean) and privately owned firms (0.264 at mean). Based on this default experience data, we calculated the enforcement probability, defined it as the enforcement power index in this paper. That is, the enforcement power is indexed by using predicted values of the trinomial (i.e., repaid, delayed and default) probit estimators. Enforcement probability of the supplier in the surveyed firm-and-customer (F to C) relationship is obtained directly from the trinomial probit. The enforcement probability of supplier in the surveyed firm-supplier (S to F) relationship is obtained by out-sample projection using the estimates of the F to C relation ship. Table 5 shows results of trinomial probit estimates by based on which the enforcement power index is calculated. Table 6 shows summary statistics of main variables.

Table 3: Bargaining Power of Supplier by ownership types

Monopoly Power of Supplier	Min	Med	Mean	S.E.	Max	N
S to F :share among all inputs of the buyer						
Foreigner Owned	0.035	0.3	0.395	0.026	1	105
Government Owned	0.01	0.31	0.406	0.016	1	321
Private Owned	0	0.3	0.353	0.014	1	393
Total	0	0.3	0.380	0.010	1	819
F to C: if goods designed for buyer=1, no=0						
Foreigner Owned	0	0	0.460	0.063	1	63
Government Owned	0	0	0.358	0.036	1	179
Private Owned	0	0	0.381	0.018	1	689
Total	0	0	0.382	0.016	1	931
Potential Rival	**Min**	**Med**	**Mean**	**S.E.**	**Max**	**N**
S to F : if rival exists=1, no=0						
Foreigner Owned	0	1	0.721	0.044	1	105
Government Owned	0	1	0.805	0.022	1	321
Private Owned	0	1	0.933	0.013	1	393
Total	0	1	0.855	0.012	1	819
F to C: if rival is zero=0, one =1, a few=1, numerous=3						
Foreigner Owned	0	2	2.03	0.094	3	63
Government Owned	0	3	2.17	0.080	3	179
Private Owned	0	2	2.26	0.033	3	689
Total	0	0	2.23	0.023	3	931

Source: IDE-DRC survey and JICA survey.

Table 4: Default Experience of Trade Credit by Ownership Types

Ownership type	Min	Median	Max	Mean	S.E.	Total
Ever default=1, No=0						
Foreigner Owned	0	0	1	0.200	0.060	45
Government Owned	0	0	1	0.311	0.042	122
Private Owned	0	0	1	0.263	0.021	449
Total	0	0	1	0.267	0.018	616

Source: IDE-DRC survey and JICA survey.

Note: T test on equality of mean default experience between Foreigner and Government owned firm is weakly rejected. Foreigner's mean default probability is lower than Government owned firm by 11.1 per cent point, t-value is -1.5158. The same test between Foreigner's and private owned firm was not rejected. Mean difference is 6.3 per cent point, t-value is 0.9846.

Table 5: Estimates of Enforcement Power Probability

Dependent variables	Repaid		Delayed		Default	
	Coef.	(S.E.)	Coef.	(S.E.)	Coef.	(S.E.)
Competitiveness						
Product is unique (if yes 1, otherwise 0)	0.00	(0.13)	0.04	(0.11)	-0.07	(0.09)
Number of rival	-0.58	(0.26)**	0.20	(0.26)	0.40	(0.17)**
Administrative region dummy						
Dongguan	0.09	(0.20)	-0.16	(0.17)	-0.09	(0.13)
Beijing	-0.04	(0.24)	-0.30	(0.20)	0.39	(0.16)**
Xian	0.13	(0.22)	-0.13	(0.18)	-0.03	(0.15)
Governance factors						
Private owned	0.10	(0.18)	-0.01	(0.16)	-0.16	(0.12)
State owned	0.15	(0.19)	-0.33	(0.17)**	0.18	(0.16)
Government solves disputes	0.01	(0.14)	0.18	(0.12)	-0.22	(0.10)*
Government supply information	-0.03	(0.13)	0.01	(0.11)	0.01	(0.09)
Government help talk with bank	-0.07	(0.14)	0.21	(0.13)*	0.05	(0.10)
Government supply human resources	0.11	(0.24)	0.29	(0.21)	-0.46	(0.20)**
In-house CEO	-0.10	(0.60)	-0.32	(0.60)	0.71	(0.76)
CEO from government	0.04	(0.63)	-0.41	(0.62)	0.60	(0.75)
Year of CEO in his/her position	4.66	(21.7)	31.1	(18.3)*	-31.6	(15.5)**
Basic profile of firm						
Total annual sales(log)	0.02	(0.04)	0.35	(0.03)	-0.02	(0.03)
Established year of the firm	18.14	(14.9)	-18.21	(11.8)	7.34	(10.58)
Constant	0.25	(0.72)	0.04	(0.69)	-1.62	(0.79)**
Log likelihood	-1280.12					
Number of observation	903					

Source: IDE-DRC survey and JICA survey.
Note:* p<0.1; ** p<0.05; *** p<0.01

2.2.2 Graph

To capture relationship between the dependent variables, trade credit and trade amount, and the independent variables, bargaining power and enforcement power of the seller and cash amount of the buyer, we first take a graphical look. First, Figure 3 plots enforcement power (probability of not-default) against trade credit and trade amount shows some relationship. Trade amount looks increasing to enforcement power, but correlation between trade credit ratio and enforcement power looks ambiguous. Secondly, Figure 4 plots bar-

Table 6: Summary of Main Variables

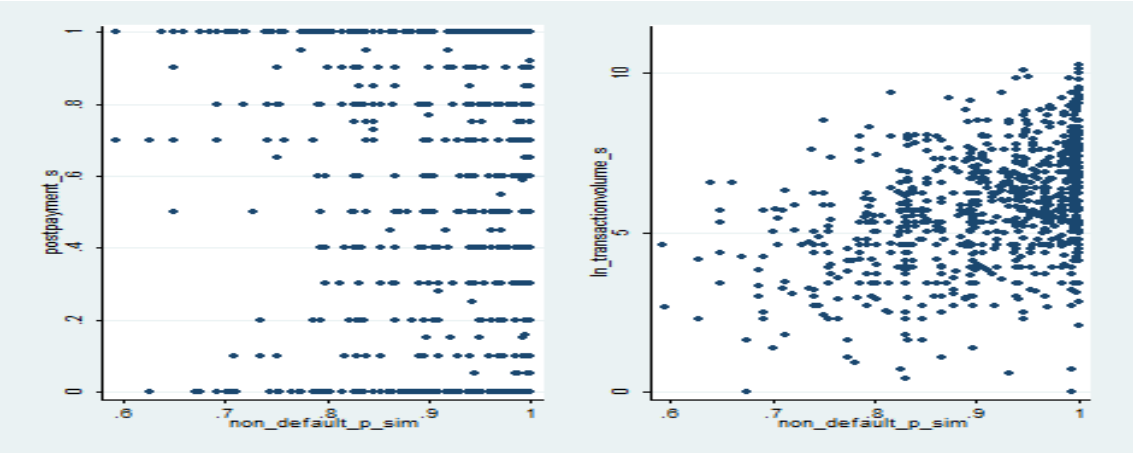
Variables	N	Mean	Std. Err.	Min	Max
Dependent Variables					
Size of transaction (0000RMB)	946	1,481	4,067	1	80,000
Ratio of post-payment	905	0.510	0.408	0	1
Whether to give trade credit? (yes=1, no=0)	905	0.731	0.443	0	1
Cash stock of buyer					
Cash stock of surveyed firm	834	41,135	824,011	0	16,800,000
Bargaining power					
Monopoly power of supplier (yes=1, no=0)	867	0.382	0.268	0	1
Potential rival (yes=1, no=0)	924	0.845	0.362	0	1
Year of starting trading (normalized between 0 to 1)	902	1997.774	5.501	1950	2006
Enforcement power					
Repaid probability	861	0.032	0.068	0.000	0.485
Delayed probability	861	0.885	0.162	0.244	1
Default probability	861	0.090	0.086	0.000	0.407
Non-default probability (repaid prob.+ delayed prob.)	861	0.910	0.086	0.593	1

Source: IDE-DRC survey and JICA survey.

Note: Number of rivals are as follows:no rival=0, one rival=1, a few =2, numerous=3.

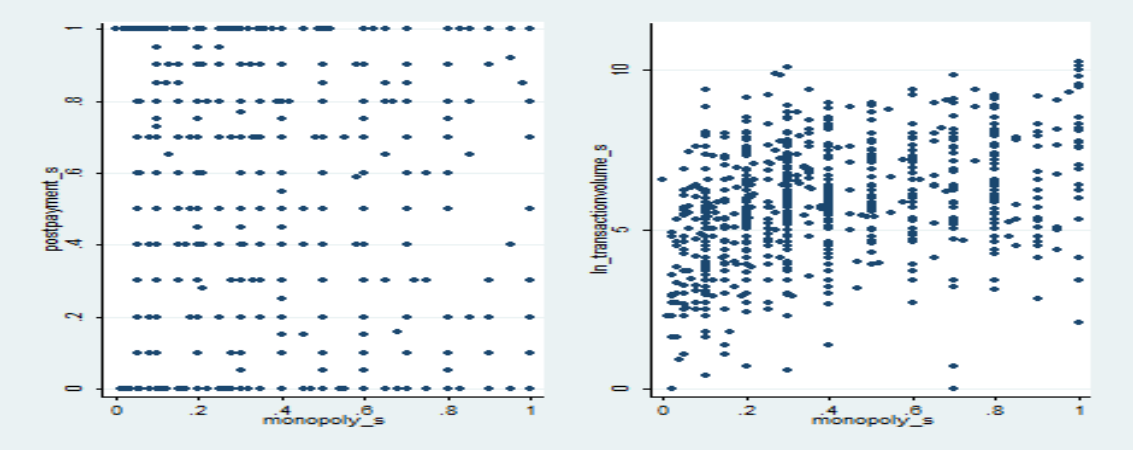
gaining power (ratio of seller's products value among all the inputs of customer) and trade credit ratio and trade amount. Here, we can observe that trade amount has a positive correlation with monopoly power, but correlation between trade credit ratio and monopoly power looks ambiguous. Thirdly, Figure 5 shows cash stock of buyer is independent to trade credit ratio, but is positively correlated with trade amount.

Figure 3: Enforcement power against Trade credit and Trade Amount



Source:IDE-DRC Survey and JICA Survey.

Figure 4: Bargaining power against Trade credit and Trade Amount

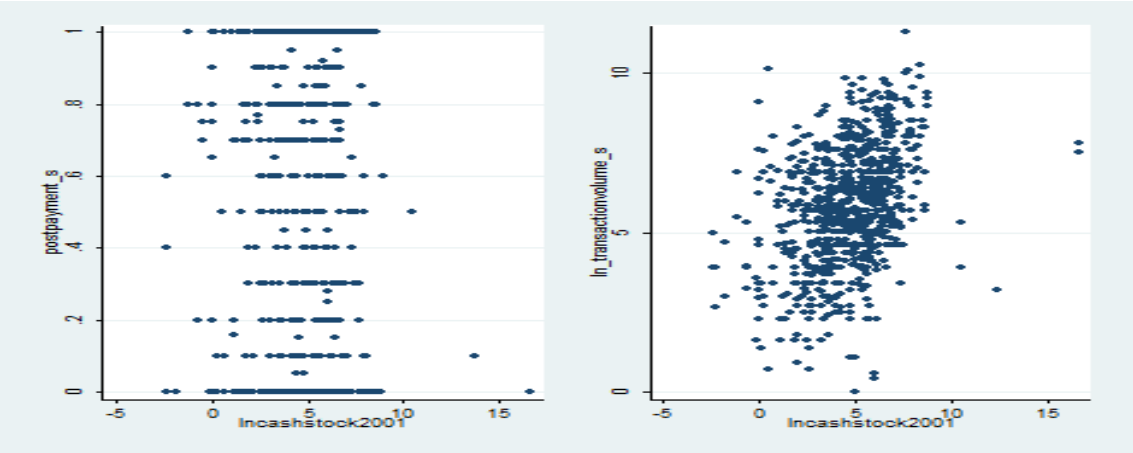


Source:IDE-DRC Survey and JICA Survey.

2.2.3 Simple regression

Table 7 shows the results of a regression test on cash and the enforcement and bargaining power on trade credit and trade volume. Here, our survey data indicates the following direction of relationship: the greater the bargaining power of the supplier, the smaller the

Figure 5: Cash to Trade credit and Trade Amount



Source:IDE-DRC Survey and JICA Survey.

size of trade credit and trade itself; the greater the enforcement power, the larger the size of trade credit and trade itself. The more cash in the hand of the buyer, the larger the trading volume, but the smaller the trade credit ratio. This implies that the cash in hand of the buyer dominantly binds trading between buyer and seller in our data.

Table 7: Regression of bargaining and enforcement powers and cash on trade credit and trade amount

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	Ratio OLS	Ratio OLS	Ratio IV	Amount OLS	Amount OLS
	Coef(S.E.)	Coef(S.E.)	Coef(S.E.)	Coef(S.E.)	Coef(S.E.)
Cash stock of buyer					
Cash in hand of buyer (log)	-	-	-	0.33***	0.32***
				(0.03)	(0.03)
Cash in hand of buyer	-.00	-.00	-.00***	-	-
	(0.00)	(0.00)	(0.00)	-	-
Bargaining power					
Monopoly power of supplier (+)	-0.31	-0.26	0.58	-0.85	1.47
	(0.25)	(0.12)	(1.39)	(1.89)	(1.88)
Potential rival (-)	0.41	0.40	0.43	10.24	14.2
	(0.12)	(0.12)	(0.22)	(8.97)	(8.9)
Year of starting trading (+)	-0.30	-0.23	1.63	-1.87	-2.34
	(0.47)	(0.48)	(2.53)	(1.21)	(1.22)
Enforcement power					
Repaid probability	-4.03***	-	-	-3.27	-
	(1.93)	-	-	(2.29)	-
Delayed probability	-2.98***	-	-	-0.42	-
	(1.25)	-	-	(1.66)	
Default probability	-2.50***	-	-	-4.31	-
	(1.54)	-	-	(2.13)	
Non-default probability	-0.47	-	-	-	5.69***
	(0.47)	-	-	-	(1.08)
Constant	3.1**	0.45	0.24	-15.67	-29.6
	(1.40)	(0.74)	(0.90)	(18.4)	(-29.6)
ProbR square	-	-	-	0.328	0.323
N	730	730	730	729	729

Source: IDE-DRC survey and JICA survey.
Note: * p<0.1; ** p<0.05; *** p<0.01: IV estimator is instrumented by the variables as explained in the section on the instrumental variables.

3 Model

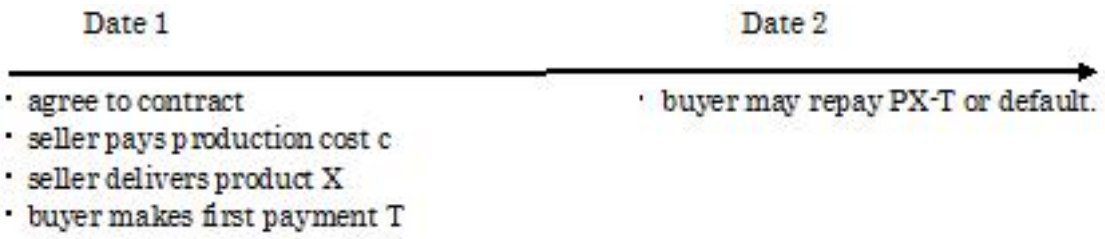
In order to explain a mechanism that governs transaction with trade credit, we consider a simple buyer-seller model. We assume here that the value function of a buyer is $V(X) = vX$, and the cost function of a seller is $C(X) = cX$, where X is the trade volume that is endogenously determined in the negotiation process of the buyer and the seller. By assuming

that v and c are exogenously given $v > c$, the first best trade volume is infinite. However, if there is an imperfect enforcement problem as we will explain below, it is not optimal for the seller to provide the first best trade volume.

The imperfect enforcement problem we are thinking about is as follows. Usually the trading price P is determined to be between v and c in order to realize a trade transaction. Even if it is impossible for the buyer to pay the whole amount of the price immediately, the seller can provide trade credit and an efficient transaction can be realized, as long as the seller has a sufficient amount of cash. However, we assume here that enforcement of the payment contract is imperfect. Even if buyers promise to pay the contracted price, they may not pay the total promised payment by the promised date. In such a situation, desirable trade may not be realized if the seller refused to give credit.

Our model goes as follows. At date 1, buyer and seller agree to trade a product and specify a payment schedule. In order to deliver the product at date 1, the seller incurs the cost for production cX and plans to receive payment sufficient for the cost. Conversely, the buyer receives the product at date 1 but will get profit from the product $V(X)$ only at date 2. It is assumed here that the buyer can only pay T at date 1 and will borrow at least $(PX - T)$ from the seller. Also, for simplicity, no time discount is assumed (See Figure 6 for time line).

Figure 6: Timing of Events



Source: Author.

There are at least two possibilities that the buyer cannot get sufficient trade credit. The first possibility is the seller not having a sufficient amount of cash. Since the seller has to pay the cost for production at date 1, it is difficult to wait until date 2 for payment $(PX-T)$ if the seller does not have a sufficient amount of cash at date 1. The second possibility is

the strategic default of the buyer. If the enforcement for contracts is imperfect, however, the seller has an incentive not to pay $(PX - T)$ at date 2. This paper focuses on the second possibility, and we assume that the seller has a sufficient amount of cash at date 1. To formulate the strategic default incentive by the buyer, we assume that the seller can seize only a part of the buyer's benefit, svX when the default occurs. We call s the enforcement technology of the seller, and we assume $0 < s < 1$. This means that the buyer need not repay $(1 - s)vX$. In this situation, the contracted price P is almost meaningless. Even if both the buyer and seller have agreed to pay a very high price, they can expect that the buyer will default and the seller gets only svX. Hence, the seller can expect to receive,

$$\min[PX - T, svX]. \tag{1}$$

Suppose the seller has bargaining power θ $(0 < \theta < 1)$ toward the buyer, and the total amount of cash that the buyer holds is A. Through negotiation, the seller and buyer come to divide their economic benefit according to a ratio of $\theta : 1 - \theta$ ex ante, but its total size is affected by ex post enforcement power. Under this situation, the profits of the seller and the buyer through this trade can be describe as follows; Seller's profit is,

$$\theta(v - c)X = T + \min[PX - T, svX] - cX. \tag{2}$$

Buyer's profit is,

$$(1 - \theta)(v - c)X = vX - \min[PX - T, svX] - T. \tag{3}$$

The problem of the buyer becomes as follows:

$$\begin{aligned} \max_{(X,T)} \quad & vX - T - \min\left[PX - T, svX\right] \\ & s.t.\ T \leq A : \textit{Cash constraint of the buyer} \end{aligned} \tag{4}$$

In either type of profit is realized in ex post, the benefit of the buyer is an increasing function of X. Hence the buyer's benefit is maximized when X is maximized. If $svX < PX - T$ takes place, the profit of buyer will become $(1 - \theta)(v - c)X = vX - svX - T$. From this equation, we can get the trade amount equation $X = T/(\theta(v - c) + c - sv)$ from equation (3). Trading amount X is maximized when $T = A$ from the constraint $T \leq A$;

therefore trading amount at equilibrium $X^* = A/(\theta(v-c)+c-sv)$. Price P is set so as to hold $svX = PX - T$. Inserting trading volume at equilibrium X^* above, we can get the price at equilibrium $P^* = c + \theta(v-c)$. By solving this problem, we obtain the following results:

$$PX^* = \frac{(c+\theta(v-c))}{(\theta(v-c)+c-sv)}A \tag{5}$$

$$\frac{d(PX)}{d\theta} < 0, \frac{d}{ds}(PX) > 0$$

$$(PX-T)^* = \frac{sv}{(\theta(v-c)+c-sv)}A \tag{6}$$

$$\frac{d(PX-T)}{d\theta} < 0, \frac{d(PX-T)}{ds} > 0$$

$$\frac{(PX-T)*}{PX} = \frac{sv}{(\theta(v-c)+c)} \tag{7}$$

$$\frac{((PX-T)/PX)}{d\theta} < 0, \frac{d((PX-T)/PX)}{ds} > 0$$

The above results show that the equilibrium trade volume PX^* is an increasing function of the cash amount of buyer A and enforcement technology of seller s. Moreover, the amount and the ratio of trade credit are also increasing functions of A and s, but all are decreasing functions of the bargaining power of seller.

Proposition: The equilibrium trade volume, trade credit amount and ratio are increasing functions of the cash in hand of buyer A and enforcement technology of seller s. The trade volume, trade credit and trade credit ratio at equilibrium are a decreasing function of the bargaining power of seller θ if the buyer is expected to commit strategic default. The cash in hand of the buyer is a substitute of the enforcement power of the seller.

This proposition implies that the enforcement mechanism is important not only for the trade amount but also for the profit of the buyer. If the enforcement technology is too low (s is very low), the buyer will tend to default. Even if s is low, if A is sufficiently high, the seller's profit can still be high. Why does the buyer have to pay cash A even when he has strong bargaining power? The key point is the imperfect enforcement.

The model analysis here showed that under the risky environment, good enforcement

mechanism may enhance both trade amount trade credit and profit of the buyer. Even if bargaining power of the buyer is stronger than the seller's, the buyer will pay cash. This is because the seller strictly prefers being paid in cash to being provided credit under imperfect enforcement environment, whereas the buyer is indifferent between paying more cash or paid on credit if transaction amount remaining the same size. Nash equilibrium of negotiation between the two parties is that the buyer will give maximum payment regardless of their bargaining power.

As a whole, the mechanism of governing trade credit supply is different from ordinary debt contract in the following sense. An ordinary debt contract is determined by profitability and risk of a project. But trade credit is also determined by bargaining power of the seller or position in the product market competition, in addition to risk/enforcement probability of contract and profitability of project or the trade. Hence, trade credit has an inter-linked nature as a joint of financial market and product market.

4 Empirical studies: Goal of Estimation and Identification Strategy

4.1 Goal of empirical study

Now we have a model describing the mechanism that governs transaction between buyer and seller with trade credit. The model claims that under poor enforcement environment, the stronger the enforcement power of the seller, the more transaction amount and trade credit, and the larger profit of the buyer will be realized. It also found that cash in hand of the buyer will substitute enforcement power of the seller, and bargaining power of the seller may reduces transaction and trade credit.

Next, we will empirically confirm whether the proposition is true with real data. Now we have a structural model on a mechanism that realizes transaction with trade credit and data from our survey, we can estimate structural parameters of the mechanism. Goal of empirical exercise here is to confirm whether prediction of the model in previous sections are consistent with the data, which allow us to implement a counter-factual simulation based on the obtained structural parameters. once we get correct structural parameters, we can conduct a counter factual or policy simulation. In this paper, we attempted two simulations so that we can more clearly understand the mechanisms of transaction with

trade credit under imperfect enforcement system : first, comparing impacts of enhancing bargaining power and improving the third party institutions. Secondly quantifying the value of enforcement power by calculating substitution ratio between cash in hand of buyer and enforcement power. We can answer to a big question: why high economic growth and expansion of transaction were possible even under the poor enforcement institutions in China. Implied answer from this paper is that it is because the cash amount in the economy was sufficient enough to facilitate all possible economic transaction.

4.2 Empirical framework: structural approach

Goal of our empirical work is to obtain the structural parameters such as coefficients on bargaining power, enforcement power and cash in trade credit and trade volume functions. This will allow us to quantify the relationships between enforcement and bargaining power, cash and trade credit and trade volume, and also to simulate the impact of an improvement in enforcement probability or the amount of cash in the economy.

In order to develop empirical equations, we assume trade credit ratio $\frac{(PX-T)}{PX}$ as a probability to give trade credit, and the probability is explained by enforcement power and bargaining power. Our model predicted that the supplier will give trade credit when enforcement power is stronger and bargaining power is weaker. Following this theoretical prediction, we will specify this action as follows. The supplier has bargaining power and enforcement power s on his customer. Let ϵ represent the unobservable variable to the researcher, but assumed to be distributed logistics. The "net power" H of the supplier is defined as $\beta'_s s + \beta'_\theta \theta + \epsilon$. β'_s and β'_θ are parameters for enforcement power and bargaining power respectively. The former is presumed to be positive, and the latter to be negative from the theoretical model. The supplier will give trade credit to his customer when the value of net power H is positive. The probability to give trade credit by a firm can be

specified as following binary logit function:

$$\begin{aligned} P(give\ trade\ credit|\theta,s) &= Prob(I[H(\theta,s,\epsilon)>0]=1) \\ &= \int I[H(\theta,s,\epsilon)>0]f(\epsilon)d\epsilon \\ &= \int I[\beta_s's+\beta_\theta'\theta+\epsilon>0]f(\epsilon)d\epsilon \\ &= \int I[\epsilon>-\beta_s's-\beta_\theta'\theta]f(\epsilon)d\epsilon \\ &= \int_{-\beta_s's-\beta_\theta'\theta}^{\infty} f(\epsilon)d\epsilon \\ &= 1-F(-\beta_s's-\beta_\theta'\theta) \\ &= 1-\frac{1}{1+exp(\beta_s's+\beta_\theta'\theta)} \\ &= \frac{exp(\beta_s's+\beta_\theta'\theta)}{1+exp(\beta_s's+\beta_\theta'\theta)} \end{aligned} \tag{8}$$

We assume further that the probability is equal to the trade credit ratio predicted by the structural model set up in the previous section.

$$\begin{aligned} \frac{(PX-T)}{PX} &= \frac{exp(\beta_s's+\beta_\theta'\beta)}{1+exp(\beta_s's+\beta_\theta'\beta)} \\ &= \frac{sv}{\theta(v-c)+c} \end{aligned} \tag{9}$$

Here, we can reduce that transaction volume from equation 5 as follows:

$$\begin{aligned} PX^* &= \frac{\theta(v-c)+c}{\theta(v-c)+c-sv}A \\ &= A*exp(1+exp(\beta_s's+\beta_\theta'\theta)) \end{aligned} \tag{10}$$

By estimating 9 and 10 together with default probability and the choice to give credit in a system, we can get the structural coefficients that indicate the impact of enforcement and bargaining power on both trade credit and trade volume.

4.3 Possible sources of endogeneity

On identifying the coefficients, we need to take care of the following three possible sources of bias: one is the selection bias. The second is the endogeneity of the bargaining power

and enforcement power variables with the unobservable factor. The former is implied by the fact that bargaining power is a determinant of trade credit provision. In this case, the distribution of the ratio and the size of trade credit are truncated at zero, and a certain level of bargaining power of the supplier sets the threshold. In this case, unobservables in the trade credit equations are positively correlated with bargaining power.

$$trade\ credit = t(\theta). \tag{11}$$

The other possible endogeneity happens due to correlation between two independent variables: bargaining power and enforcement power. In a setting of modeling in the previous section, we assumed that ex ante bargaining power and ex post enforcement power are independent. However, it is more realistic to consider that the ex ante bargaining power may consist of ex post enforcement power. Ex post enforcement power is a function of power of enforcement institution, the third party enforcer, at the same time. Thus, it is natural to assume that following relationship below exits.

$$s = s(\theta, \alpha). \tag{12}$$

α stands for institutional or the third party factors to facilitate enforcement. If this relationship is not explicitly specified in estimation, structural coefficients of bargaining power and enforcement power may be biased.

In these cases, an option to remedy endoeneity is the so-called Heckman two step estimators (Heckit: Heckman, 1979, Maddala, 1983). But we will not employ this approach. Instead, we will put these two relationships (equations 11) and 12) directly into the GMM systems, which will be explained below, to be explicitly captured.

The third possible source of endogeneity is the unobservables that are correlated with both bargaining power and enforcement power. To understand this situation, consider the following case. There are some industry-specific or product-specific customs that can affect the trade credit provision and bargaining power of the seller. Take an example of the products of the agriculture and machinery industries. The former are usually perishable with frequent sales turnover; the latter are durable that may sell infrequently. Hence, sales in cash are very common for the produce farmer, whereas sales on credit or installments over months, even years, are popular in the machinery industry. In this case, the difference

of industry determines the trade credit size and ratio, but this is unobservable in our data. Secondly, the type of customer or transaction also affects the payment contract even within the same industry. Take vegetables for example. A farmer produces tomatoes, and sells them at the wet market. In this case, the sales are usually in cash primarily because there is no fixed relationship with the customers, even though the farmer has so many competitors. Conversely, if the farmer sells his tomatoes to a big processing company, he may sell them on credit depending on his bargaining power and/or enforcement power. The unobservable difference in the type of trading affects the decision on trade credit supply and size. In this case, we need to conduct instrumental variable estimates so as to correct the bias. We need valid instruments that must be correlated with the bargaining and enforcement powers, but not correlated with unobservable characteristics. Hence, we will do a GMM estimation below to consider the other benefits. In this paper, we will only present the GMM estimates results. Later we will discuss the instruments that we use here.

4.4 System estimation with common coefficients

From our theoretical model, we know the theoretical functional form of trade credit and related items. We are interested in the structure of a system consisting of the following four equations: (1) trade credit volume, (2) trade credit ratio, (3) decision to supply trade credit (this is from equation (11)) and (4) enforcement power (this is from equation (12)) .

$$\begin{aligned}
\ln PX_{ic} &= lnA + \ln\left(1 + exp(s_{ic}\beta_0 - \theta_{ic}\beta_1)\right) + u_{i1} \\
\left.\frac{PX - T}{PX}\right|_{ic} &= \frac{exp(s_{ic}\beta_0 - \theta_{ic}\beta_1)}{1 + exp(s_{ic}\beta_0 - \theta_{ic}\beta_1))} + u_{i2} \\
Decision\ to\ supply\ credit\ d_{ic} &= \theta_{ic}\beta_2 + u_{i3} \\
Enforcement\ probability\ s_{ic} &= \theta_{ic}\beta_3 + \beta_4 + u_{i4}
\end{aligned}$$

The empirical moment conditions of this system become as follows:

$$E[z_i 1 * (\ln PX - \ln a_0 - a \ln A - \ln\left(1 + exp(s_{ic}\beta_0 - \theta_{ic}\beta_1)\right))] = 0 \tag{13}$$

$$E[z_i 2 * (\frac{PX - T}{PX} - \frac{exp(s_{ic}\beta_0 - \theta_{ic}\beta_1)}{(1 + exp(s_{ic}\beta_0 - \theta_{ic}\beta_1)})] = 0 \tag{14}$$

$$E[z_i 3 * (Decision\ to\ supplier\ credit\ d_{ic} - \theta_{ic}\beta_2)] = 0 \tag{15}$$

$$E[z_i 3 * (s_{ic} - \theta_{ic}\beta_3 + \beta_4))] = 0 \tag{16}$$

Errors for ijth observation, $u_{i1}, u_{i2}, u_{i3}, u_{i4}$ may be correlated, therefore it would be more efficient to jointly estimate the four equations. Moreover, joint estimation would allow us to impose cross-equation restrictions on the parameters so as to be consistent with the structural model.

4.5 Instruments

In the estimation above, unobservables may affect enforcement and bargaining power and trade credit. We need instruments that are correlated with enforcement and bargaining power, but not correlated with the trade credit variables. We have data on each surveyed firms' transactions with its partner inside and outside of the hometown. Hence, we can exploit this variation in the variables of trade credit and for enforcement and bargaining power in identifying the coefficients of interest (See Figure 2). We will use the independent variables of transaction that are for an opposite-category trading partner (i.e., for the variable from inside-the-hometown sample, we use counterpart information of outside-the-hometown sample) as instruments to separate exogenous variations (due to the impact of administrative borders on transaction) and endogenous variations (due to unobservables). Industry specific differences could be captured by variables of the opposite side of transactions, but they are independently distributed to bargaining power or enforcement power of their own.

5 Results

5.1 Estimation results

Here, we presents the results of estimation. Results here are consistent with prediction of model analysis: that is, trade amount and trade credit are increasing function of enforcement power and cash in hand of buyer. On the contrary, trade credit ratio is a decreasing function of bargaining power of supplier. Structural estimation showed the more clear results.

Table 8 shows the results of the reduced form regression in the system, meaning that trade volume, trade credit ratio, default probability and whether trade credit functions are all estimated simultaneously. The reduced form estimation shows that trading volume is an increasing function of the cash in hand of the buyer and the enforcement probability of the supplier, and the trade credit ratio is a decreasing function of the bargaining power of

the supplier. Default probability is an increasing function and whether to give trade credit is a decreasing function of the bargaining power of the supplier.Though our theoretical model predicted that the trade credit ratio is an increasing function of enforcement, and a decreasing function of bargaining power, the reduced form estimation did not show a positive influence of enforcement power on trade credit ratio.

Structural parameters are presented in Table 9. It shows again consistent results with our model prediction, i.e., bargaining power (monopoly power among inputs, and potential rivalry) has negative coefficients to provide trade credit, and enforcement power has positive coefficients. The coefficient size of bargaining power is negative to transaction amount and trade credit, and is twice larger in magnitude to enforcement power. This implies that if bargaining power of the supplier enhanced, net impact on transaction amount and trade credit is negative. On the contrary, enhancing enforcement power via non-bargaining power factor will effective to expand transaction in the economy.

5.2 Simulation 1: Impact of bargaining and institutional factor on economic volume

Theoretical model predicted that improvement of bargaining power and institutional power give different impact on expanding economic activity. Here, we can quantify the difference of impact of respective factors by utilizing estimates of structural functions.

By inserting

$$s_{ic} = \theta_{ic}\beta_3 + \beta_4,$$

into

$$lnPX = \ln a_0 + a \ln A + \ln\left(1 + exp(s_{ic}\beta_0 - \theta_{ic}\beta_1)\right),$$

we can get prediction function as follows,

$$lnPX^{predict} = \ln a_0 + a \ln A + \ln\left(1 + exp((\beta_0\beta_3 - \beta_1)\theta_{ic} + \beta_0\beta_4)\right). \tag{17}$$

Here, we can compare whether difference of impact of increasing bargaining power of supplier or institution's enforcement power. Table 10 is comparison of the results of following simulation: increasing bargaining power (actual data is ratio of the input by supplier to total input) by 10 per cent and institutional enforcement power by 10 per cent (here is constant term increased by 10 per cent). Here, we can see that impact of institutional enforcement

Table 8: Reduced form in system

	Coef.	(S.E.)
Dependent1: Trade amount (log)		
Cash in hand of buyer (log)	0.31	(0.03)***
Monopoly power of supplier (+)	-0.74	(3.23)
Potential rival (-)	-0.07	(0.53)
Year of starting trading (+)	-6.80	(4.80)
Enforcement probability	11.52	(6.23)*
Dependent 2: Post payment ratio		
Monopoly power of supplier (+)	0.02	(0.64)
Potential rival (-)	0.36	(0.12)***
Year of starting trading (+)	0.83	(0.98)
Enforcement probability	-0.54	(1.23)
Dependent 3: Whether to give trade credit		
Monopoly power of supplier (+)	-0.06	(0.18)
Potential rival (-)	0.43	(0.10)***
Year of starting trading (+)	0.47	(0.15)***
Dependent 4: Non default probability		
Constant	0.55	(0.24)**
Monopoly power of supplier (+)	0.30	(0.09)***
Potential rival (-)	0.01	(0.03)
Year of starting trading (+)	0.27	(0.22)
Number of observation	712	
Number of moment	18	
Test of over identification		
Hansen's J chi2(6)	5.948	p=.4290

Source: IDE-DRC survey and JICA survey.
Note: IV estimator is instrumented by the instrumental variables as explained in the text.

power increase is significantly larger than that of bargaining power improvement. This happens because increase of bargaining power can enhance enforcement power, but its impact is canceled out by reduction of credit due to risk avoiding motives. The latter's size is not clearly significantly different from the same as base line size (predicted value of the model).

Table 9: Structural estimation in system

	Coef.	(S.E.)
Dependent: Trade amount (log), post payment ratio		
Enforcement power	0.620	(0.127)***
Bargaining power	-1.297	(0.327)***
Constant		
a	13.64	(5.75)**
a0	-1.85	(1.26)
Dependent 2: Whether to give trade credit		
Constant	-0.59	(0.564)
Monopoly power of supplier	0.30	(0.22)
Potential rival	0.52	(0.09)***
Year of starting trading	0.90	(0.54)*
Dependent 4: Enforcement probability		
Constant	0.27	(0.14)*
Monopoly power of supplier	0.42	(0.06)***
Potential rival	0.04	(0.02)*
Year of starting trading	0.52	(0.14)***
Number of observation	712	
Test of over identification		
Hansen's J chi2(8)	4.85	p=.7734

Source: IDE-DRC survey and JICA survey.

Note1:* p<0.1; ** p<0.05; *** p<0.01

Note2: Bargaining power variables and enforcement power variables are instrumented by the instrument variables for monopoly power, potential rivals, start year of transaction, and repaid probability. See the text for detail.

Note3: Because data of enforcement power and bargaining power is distributed between zero to one (see Table (6)), coefficients of the variables represents size of impact on the dependent. That is, positive impact of enforcement power is cancelled out by negative impact of bargaining power on trade credit provision.

5.3 Simulation 2: Substitutive ratio of cash and enforcement power

Another implication of theoretical model is that cash can substitute enforcement power. Here we can quantify this substitutive relationship by our structural coefficients. This can be inferred by the equation which assumes that the elasticity of trading volume to

enforcement power of the seller and the elasticity to cash in hand of the buyer is the same. This equation can be obtained from calculating the partial derivatives of trade volume on enforcement power and on cash from the structural model. Partial derivatives of trade volume on enforcement power and the cash in hand of the buyer are respectively as follows:

$$\begin{aligned} \frac{(\partial PX)}{\partial s}\Delta s &= \frac{\partial PX}{\partial A}\Delta A \\ A * exp(s_{ic}\beta_0 - \theta_i c\beta_1)\Delta s &= (1 + exp(s_i\beta_0 - \theta_{ic}\beta_1)) * \Delta A \\ \frac{\Delta A}{\Delta s} &= A * \frac{exp(s_i\beta_0 - \theta_{ic}\beta_1)}{(1 + exp(s_i\beta_0 - \theta_i c\beta_1))} \end{aligned} \tag{18}$$

$\frac{\Delta A}{\Delta s}$ represents how much cash can substitute for one percentage point of enforcement probability. That is the value of enforcement power. The summary statistics of the substitutive ratio of cash and enforcement power are presented in Table 11. The value of one percentage point of enforcement power is $53'000RMB$ at median. This implies that if enforcement power is improved by some institutional reform, the economy can save 53'000 RMB while maintaining the current size of economic activity. The summary statistics show that the economic value of enforcement power is quite different for the ownership types. That for FDI and private owned firm is respectively 48'000 RMB and 53'000 RMB, but for government owned firms it is 105'000RMB, about two times that of private and FDI owned firms. Government firms are cash consuming to maintain their trading volume when enforcement power is lowered.

6 Conclusion

Early literature on trade credit has claimed that bargaining power of the supplier facilitated provision of credit. But the recent empirical literature has documented that bargaining power or monopoly power of supplier has a negative relationship with trade credit provision. This paper explored the mechanism behind this finding. This paper has clarified that improving institutional enforcement power is superior to improving bargaining power in terms of expanding size of economic activity. This happens because the bargaining power has two counteracting impacts: at ex ante negotiation, monopoly power of seller reduces size of economic transaction to avoid ex post default, but it can also enhance enforcement power. Compared to this, impact of institutional enforcement power is straightforward and

Table 10: Bargaining power improvement vs Institution power improvement

	Obs.	Mean	(S.E.)
Full sample			
Predicted	751	854,894	(342,193)
Simulated1: monopoly power increased by 10 percent	751	761,956	(311,113)
Simulated2: institutional power increased by 10 percent	751	861,742	(344,963)
Simulated 2- Predicted:		6,848	(2,772)***
Predicted - Simulated 1:		92,938	(71,299)*
Sub-sample: Predicted value's significant level (p-value) =< 0.01			
Predicted	484	15,584	(2,374)
Simulated1: monopoly power increased by 10 percent	484	15,072	(2,404)
Simulated2: institutional power increased by 10 percent	484	15,708	(2,393)
Simulated 2- Predicted:		124	(19)***
Predicted - Simulated 1:		512	(257)**

Source: IDE-DRC survey and JICA survey.
Note:* p<0.1; ** p<0.05; *** p<0.01

Table 11: Amount of Cash Substituted by One Percent Point of Enforcement Probability.

000RMB	Mean.	S.D.	Median	Obs.
Ownership type				
FDI	232	396	49	53
Government owned	114,430	1,020,032	107	161
Private owned	258	1,322	50	577
Total	23,329	459,898	55	706

Source: IDE-DRC survey and JICA survey.
Note:* p<0.1; ** p<0.05; *** p<0.01

its effect of expanding economic activity is consistently larger than impact of bargaining power improvement. The other finding is that cash can substitute enforcement power to expand economic transaction size.

Consistent with the recent literature on trade credit, this paper also has confirmed that it is the supplier with weak bargaining power who provides trade credit. In addition to bargaining power, this paper has theorized and empirically confirmed that the cash in hand of the buyer and the enforcement power of the supplier are the determinants of trade credit provision. This would help to explain why observed trade credit is so diversified by industry or the strategy of firms. The second implication concerns the literature on law, finance and development. The recent literature of the field focuses on the importance of external finance for firms, such as bank lending or issuing of securities. These financial channels can explain the investment demand for firms.

The findings here shed light on another mechanism, that of internal finance, or what could be called the mechanism of demand for working capital. The cash in hand of the buyer and a good institution to enforce repayment are substitutes for each other to facilitate economic transactions. This substitutive relationship also explains the traditional custom on bankruptcy: If the buyer cannot make payment to the supplier by the due date, the bank will announce the suspension of transaction with the buyer. This custom can be interpreted as providing exogenously a lower limit of enforcement probability so as to maintain the size of economic activity at a certain level. The third implication concerns macro-monetary policy. The substitute ratio between cash and enforcement power can explain as part of the so-called velocity of money. If the macro value of enforcement power in an economy is high, and the velocity of money is high, then less cash is demanded.

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