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Redistributional View of Trade Credit Revisited: Evidence from Micro Data of Japanese Small Firms

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Abstract

This paper investigates the redistributional view of trade credit from the demand side, based on a unique micro data of Japanese small firms where information on transactions of intermediate goods between firms of different size is available. The redistributional hypothesis is tested in two steps. In the first step we examine the relationship of customer dependence on bank loans with a higher proportion of purchases from large suppliers. In the second step we examine the effect of a dependence on large suppliers on trade credit. We find evidence supporting the redistributional hypothesis for solvent customers, but not for debt-overhang customers.

JEL Classification Number: D21, L14
Keywords: Trade credit, Bank loans, Redistribution of credit

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1. Introduction

It has been asserted that trade credit is a substitute for bank loans. This is especially so for small and medium-sized enterprises (hereafter as SMEs) that have few alternative credit sources and are most likely to face credit rationing during a tight monetary regime. The substitution mechanism premises that suppliers with better access to credit will redistribute the credit they receive to SME customers by way of trade credit. This is the so-called redistributional view of trade credit. Appealing as this assertion is, very few tests of this hypothesis have been conducted using micro data, to the best of the authors' knowledge. This is probably due to the paucity of firm-level transaction and relationship data between suppliers and customers.

The aim of this study is to test the redistributional hypothesis of trade credit from the corporate demand side of trade credit by using unique cross-sectional data of Japanese SMEs. The data set is the *Basis Survey of Small and Medium-sized Enterprises,* conducted by the Small and Medium Enterprise (SME) Agency. It is a comprehensive survey that was started in the 2004 fiscal year to investigate financial and managerial aspects of SMEs as well as business investment trends. The survey includes information on transactions between firms (the firms to which goods are sold and the firms from whom goods are purchased) in addition to balance sheets and profit and loss statements of individual SMEs.

This data set is ideal for examining the redistributional role of trade credit from the demand side, since the customers that benefit most from credit redistribution are SMEs and our data set contains rich information about the suppliers of trade credit to SMEs. The redistributional hypothesis of trade credit can be rigorously tested in two steps. The first step is an examination of the relationship of dependence on bank credit by SMEs that make transactions with large suppliers. The second step is to examine the amount of accounts payable extended to the SMEs by large suppliers. Consider an SME that has limited access to bank credit and is likely to be borrowing-constrained. If the SME increases transactions with large suppliers and they extend trade credit to the SME customer, then we can say that the redistributional hypothesis is supported. Our

estimation results show that the redistributional hypothesis is indeed supported for solvent firms, but not for firms with a debt overhang.

Furthermore, we find that bank loans and trade credit are substitutes even for debt-overhang firms, but substitutability is independent of the extent to which purchases are made from large suppliers.

The paper is organized as follows. Section 2 surveys the past studies on the redistributional hypothesis of trade credit and states precisely the redistributional hypothesis in a testable form. Section 3 explains the data set we use and gives the descriptive statistics on trade credit of the Japanese SMEs in our data set. Section 4 presents the empirical evidence on the redistributional hypothesis of trade credit. Section 5 concludes the study.

2. Redistributional View of Trade Credit: Literature Survey and Empirical Strategy

2.1 Literature Survey

Meltzer (1960) first emphasized the redistributional role of trade credit. He hypothesized that firms with easy access to bank credit can increase credit in the form of trade credit more than those firms that are constrained in the bank loans market. In general the firms with easy access to bank credit are large firms and those constrained in the bank loan market are small firms, so that this is redistribution of credit among firms by size. He finds evidence for this redistributional view in the time series data, especially in periods of tight money. Following his study, Jaffee (1971), Ramey (1992) and Nilsen (2002) obtained similar evidence supporting the redistributional view from time series data.[1]

Petersen and Rajan (1997) is the first study, based on U.S. firm-level data, of the redistributional role of credit. Based on the National Survey of Small Business Finance, they find that a firm's access to external finance has a significantly positive effect on the amount of accounts receivable. They also find that firms with large unused lines of credit demand less trade credit. Furthermore, they find that a longer relationship with a

[1] Gertler and Gilchrist (1993), on the other hand, find that trade credit does not increase during a period of tight money.

financial institutional is negatively correlated with demand for trade credit. Thus they conclude that trade credit is used mainly by firms that are constrained by their institutional lenders. Nilsen (2002) extends the Petersen and Rajan (1997) study for listed firms and finds that even large firms without a bond rating increase demand for trade credit in periods of tight money. De Haan and Sterken (2006) use a pan-European dataset of both listed and unlisted firms and find that a monetary contraction affects private firms' trade credit more negatively than the trade credit positions of public firms.

Love et al. (2007) is an interesting study on the redistributional role of trade credit based on international micro data. They show that the redistributional channel shuts down during financial crises when all sources of finance available to large firms dry up. Using data of firms operating in the 1994 Peso devaluation in Mexico and the 1997 Asian crisis, they find that accounts receivable drop sharply in the post-crisis period. They conclude that firms' lack of access to bank loans forces them to reduce the supply of trade credit to their customers.

McMillan and Woodruff (1999) use unique survey data of Vietnamese firms that contains detailed information on individual firms' relationships with their customers. By estimating the supply equation of trade credit, they find no relationship between offering credit to customers and receiving bank loans. However, they find that receiving credit from suppliers significantly increases the likelihood of offering credit to customers.

As for the Japanese evidence, there is a growing number of studies dealing with this issue. Ono (2001) and Ogawa (2003) are two recent studies based on time series data. Ono uses the interest differential between the bank loan rate and the bill discount rate as one of the determinants of accounts payable, and finds that on the whole this interest differential exerts a significantly positive effect on accounts payable, indicating that trade credit and bank loans are substitutes. Ogawa (2003) includes the lending attitude of financial institutions as one of the explanatory variables in a trade credit regression and finds that when the lending attitude becomes more severe, accounts payable of medium-sized firms increase significantly, supporting the redistributional view. On the

other hand, Taketa and Udell (2006) find some evidence that trade credit and financial institution lending are complements during periods of financial crisis.

Takehiro and Ohkusa (1995) is the first study based on micro data of Japanese firms. Using the panel data of listed firms over 26 years (1967-1992), they find that an increasing severity in lending attitude of financial institutions reduces trade credit significantly. Their evidence indicates that bank credit and trade credit are complements rather than substitutes. Uchida et al. (2006) investigate the relationship between bank loans and trade credit by using a variable to represent the strength of the buyer-seller relationship in a bank loan regression. Their results are favorable to the view that bank loans and trade credit are complements, although statistically insignificant.

Other studies based on micro data are generally favorable to the redistributional view. Tsuruta (2006), using the Credit Risk Database (CRD), finds that when the bank loan rate increases, borrowers increase trade payable. Tsuruta (2007) also finds evidence of trade credit problems during the Asian financial turmoil in 1997/1998 using the same dataset. Using the data of large trading companies that supply both loans and trade credit, Uesugi and Yamashiro (2004) find that large trading companies increase accounts receivable when banks are unwilling to lend.

On the other hand, Uesugi (2005), using micro data of SMEs for the period of 2001 to 2003, finds that trade credit and bank loans are complements. Fukuda et al. (2006) show that substitution between bank loans and trade credit is observed when the banking sector is healthy, but during financial crises in the late 1990s to the early 2000s bank loans and trade credit contracted at the same time. This evidence is in line with Love et al. (2007). To summarize the Japanese evidence, the redistributional view is as a whole supported by both time series and micro data, but the complementary relationship between bank lending and trade credit is also observed during the periods of financial crisis.[2]

2.2 Empirical Strategy

[2] Japan's Small Business Research Institute (2005) also states that trade credit is a substitute for bank loans for small firms with less liquidity. Their analysis is based on descriptive statistics of firm-level data.

The essential problem of finding evidence of substitution of bank loans and trade credit is the identification of supply and demand effects. Does a monetary contraction lead to a lower supply of loans by banks or is it a drop in demand for loans? Do firms ask for more trade credit or do firms increase the supply of trade credit because of higher implicit interest rates? The identification problems can be relieved if institutional information on credit rationing and other informational asymmetries can be used. This type of information can be found in information on past performance of firms in applying for loans, credit lines with main banks, and/or information on the provision of goods in exchange for credit. Here we use two sets of indicators: first, the size of the firms, because smaller firms are more likely to receive trade credit from large firms than the other way round and second, we have information on the status of loan applications by small firms.

What has been lacking in past empirical studies examining the redistributional view of trade credit is that the channel of the increase in the trade credit is not taken into account explicitly when bank credit becomes hard to obtain. The redistributional view states that *large* firms that have easy access to bank loans increase the supply of trade credit to the *small and medium-sized* customers constrained in the bank loan market. To test this view rigorously, we need transaction data of trade credit between firms. Fortunately our micro data set, to be explained in detail in the next section, has information on the fraction of SMEs that purchase from large suppliers, which enables us to shed light on the redistributional view from the demand side along this line.

Given this information, the redistributional hypothesis is tested in the following two steps. The first step is to examine the relationship between SMEs' bank dependence and their transactions with large suppliers. According to the redistributional view, when SMEs have weaker relationships with banks, they cannot raise funds easily from banks at a lower price, so they will increase purchases from large suppliers for the purpose of obtaining trade credit.

The second step is to examine the link between dependence on large suppliers and the amount of trade credit given to the SME customers. It is expected that the more reliant on large suppliers, the more credit will be provided in the form of accounts

payable to the SME customers. Testable equations corresponding to the two steps above will be formalized in Section 4. Should the assertions in the two steps both be supported by the data, we might conclude that the redistributional hypothesis of trade credit is valid.

3. Data Characteristics and Descriptive Statistics of SME Trade Credit

The Small and Medium Enterprise Basic Law in Japan stipulates that rigorous statistical investigation should be made to understand the actual conditions of SMEs. To attain this goal, the SME Agency has conducted the Basic Survey of Small and Medium-sized Enterprises (BSSME) since the fiscal year of 2004. The BSSME is a comprehensive survey to investigate all aspects of SMEs, such as financial conditions, managerial information and the trend of business investment.[3]

The survey includes important information on transactions of intermediate goods between firms in addition to the basic balance sheets (B/S) and profit and loss (P/L) statements of individual SMEs. Specifically, it has information on the fraction of goods purchased from large and small suppliers, as well as the fraction of intermediate goods sold to large and small enterprises and individual consumers. This information can be used to shed light on the pattern of trade credit between firms of different size.

In this study we use the BSSME from fiscal year 2004. One hundred thousand firms are randomly chosen from the population of 4.35 million SMEs. In this survey the number of firms available for our statistical purpose is 41,807, but the information on accounts payable and related statistics is available only for the subset of 1,659 firms on which our study is based.[4] Table 1 shows the distribution of sampled firms across

[3] In the survey the SME is defined as an enterprise with equity capital less than 300 million yen or total employees less than 300 persons for construction, transportation, manufacturing and some of the real estate and service industries. For the other industries, the SME is defined as an enterprise with an even smaller amount of equity capital and/or smaller number of employees.

[4] In 41,807 sample firms, depending on the characteristics of the questionnaire, 12,603 firms have full information on B/S and P/L statements, but for the remains, mainly proprietary sampled firms, only limited information is available. In addition, since our main concern is on bank-firm relationships, firms with no responses to the questions on bank-firm relations, which amounts to 6,256 out of 12,603 firms, are excluded from the sample. The information on the buyer of intermediate inputs is also indispensable in this study, which is available for 3,265

industries. The wholesale industry has the largest share (35.7%) followed by the retail industry (24.5%) and the manufacturing industry (18.4%). The first column of Table 2 shows the distribution of sampled firms by employees. About one-fourth of the firms have less than 5 employees, while one-third have more than 50 employees. The first column of Table 3 shows the distribution of sampled firms by equity capital. Surprisingly about half of sampled firms have less than 10 million yen equity capital.

The virtue of the BSSME is that it contains rich information on the main bank relationship. A main bank is a bank with which a firm has the closest relationship in terms of not only loans but also other financial services, such as deposits, discounting bills and professional services on financial and managerial affairs. The first column of Table 4 shows what type of main bank the sample firms are affiliated with. The main bank of about half of the sampled firms is a regional bank that has its banking business mainly in the prefecture of the firms' headquarters. City banks are the second most represented group of banks, and are large banks with both domestic and foreign operations. About 27% of the sampled firms chose their main bank as a city bank. Shinkin banks and credit cooperatives, financial institutions that exclusively lend to SMEs, were chosen as the main bank by 22% of the sampled firms.

The information on the type of collateral or personal guarantee and the response of the main bank to a loan application are also summarized in the first column of Tables 5 and 6, respectively. As is seen in the tables, more than 60% of the firms in the sample pledged collateral or personal guarantees to their main banks. Actually, it turns out that 18.2% of firms pledged both collateral and personal guarantees.

As for the response of the main bank to a loan application, in nearly half of the cases, the loan application was accepted as is. A loan application was turned down or reduced for only 7.1% of the sampled firms. It should be noted that for more than one-fourth of the firms, the main bank offered loans above the amount or with looser lending conditions than in the original applications.

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firms. After excluding firms with inconsistent items in B/S and P/L statements, together with the data screening stated above, the number of firms in the final sample is reduced to 1,659.

Table 7 shows the mean, median and standard deviation of major items of the balance sheet and profit and loss statements as well as variables related to trade credit. The mean of total assets and sales are 1,385 and 1,860 million yen, while the corresponding medians are 369 and 584 million yen, respectively. Mean values far exceed median values, indicating that their frequency distributions are skewed to the right. The mean (median) of the number of employees is 58 (31). The average ratio of borrowing from financial institutions to total debt and that of short-term borrowing from financial institutions to current liabilities, proxies of bank dependence, are 0.52 and 0.30, respectively.

The mean of accounts receivable and accounts payable are 304 and 271 million yen, while the corresponding medians are 52 and 45 million yen, respectively. The mean ratio of accounts receivable and accounts payable to sales are 0.150 and 0.118, respectively.[5] These ratios are much higher than those of small firms in the 1988-1989 National Survey of Small Business Finance (NSSBF) and are comparable to Compustat data on large firms in the U.S.[6] The mean ratio of purchases from large suppliers and small suppliers are 32.2% and 67.8%, respectively.[7, 8] Figure 1 shows the frequency distribution of the ratio of purchases from large suppliers. About half of the sample firms make no purchase from large suppliers, while one-tenth of the sample firms exclusively purchase from large suppliers. It should be also noted that the ratio of purchases from large suppliers exhibits considerable variations across industries. Table 8 shows the mean and median ratio of purchases from large suppliers and borrowing to total debt as well as other important variables across industries. The mean ratio of purchases from large suppliers is highest in information and communications (64.4%) and lowest in hotels and restaurants (4.4%).

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[5] 3.7% of firms recorded zero balance of accounts payable.

[6] Petersen and Rajan (1997) report that the mean ratio of accounts receivable and accounts payable to sales is 0.073 and 0.044, respectively, for the NSSBF samples, while the corresponding ratios are 0.185 and 0.116 for the Compustat firms.

[7] The denominator of the ratio of purchases from large and small suppliers is purchases from domestic suppliers, excluding purchases from foreign suppliers. Hence the ratios of purchases from large and small suppliers sum up to unity.

[8] The median proportion of purchases from large suppliers is only 5% and its frequency distribution is heavily skewed to the right.

4. Empirical Examination of the Redistributional View of Trade Credit

4.1 Specification of the Redistributional Hypothesis of Trade Credit

As stated in Section 2, the redistributional role of trade credit is tested from the firms' demand side in two steps. The first step is to investigate the relationship of a customer's dependence on bank loans with the extent to which the customer purchases from large suppliers. We formalize this step as follows.

$$LPURC_i = \alpha_0 + \alpha_1 \log SALES_i + \alpha_2 PROFIT_i + \alpha_3 DEBTR_i + \alpha_4 BDEPEND_i + \sum_{J=2}^{7} \beta_j DBANKJ_i + \sum_{J=1, J\neq 2}^{30} \gamma_j DINDJ_i + \varepsilon_i \quad (1)$$

where

$LPURC_i$: proportion of intermediate goods purchased from large suppliers,

$SALES_i$: sales,

$PROFIT_i$: ratio of operating profit to sales,

$DEBTR_i$: debt-asset ratio,

$BDEPEND_i$: customer's dependence on bank loans,

$DBANKJ_i$: dummies for the type of main bank,

$DINDJ_i$: industry dummies, and

ε_i: i.i.d. error term.[9]

The dependent variable, $LPURC_i$, is the fraction of intermediate goods purchased by firm i from large suppliers. A customer's dependence on bank loans is measured by two variables: the ratio of borrowing from financial institutions to total debt, expressed by $BLOAN_i$, and the ratio of short-term borrowing from financial institutions to current liabilities, $SBLOAN_i$. The former captures the total relationship between the customer and financial institution, while the latter lays stress on the short-term relationship. Incidentally, the correlation coefficient between $BLOAN_i$ and $SBLOAN_i$ is 0.5732. According to the redistributional view of trade credit, less dependence on bank loans

[9] The subscript *i* represents the *i*-th firm.

makes customers more dependent on large suppliers to obtain credit by way of accounts payable. Thus we expect α_4 to be negative.

A firm's attributes are controlled by the following variables. First firm size is measured by the logarithm of sales, or log $SALES_i$. A firm's profitability is measured by the ratio of operating profit to sales, or $PROFIT_i$. We include the debt-asset ratio or $DEBTR_i$ to measure the debt burden of the firm. The *DBANKJ* variable is a dummy for the type of a customer's main bank. Main bank dummies consist of six dummies, each of which corresponds to one type of bank in rows (1) to (7) in Table 4, that is to say, *DBANK*2 takes unity if the main bank is a regional bank, *DBANK*3 takes unity if the main bank is a Shinkin bank and credit cooperative, and so on. Since we choose as the base the case where the main bank is a city bank, *DBANK*1 is omitted and the number of main bank dummies is 6 in all, from *DBANK*2 to *DBANK*7. We also include 29 industry dummies, $DINDJ_i$.[10]

The second step is to investigate the relationship between a customer's dependence on large supplies and the amount of its accounts payable. We estimate the following reduced form equation for accounts payable.

$$\begin{aligned} ACPAY_i = {} & \delta_0 + \delta_1 ASSET_i + \delta_2 PROFIT_i + \delta_3 BDEPEND_i + \delta_4 LPURC_i \\ & + \sum_{J=1}^{4} \phi_j COLLAJ_i + \sum_{j=1, J\neq 2}^{5} \eta_j BATTIJ_i + \sum_{J=2}^{7} \mu_j DBANKJ_i \\ & + \sum_{j=1, J\neq 2}^{30} \vartheta_j DINDJ_i + \xi_i \end{aligned} \tag{2}$$

where

$ACPAY_i$: ratio of balance of accounts payable to sales,

$ASSET_i$: ratio of total assets to sales,

$COLLAJ_i$: terms of a loan contract with main bank,

$BATTIJ_i$: lending attitude of the main bank, and

[10] For a detailed industry classification see Table 1. In the estimation, the second industry, food products, is taken as the base industry. Accordingly, we incorporate 29 constant dummy variables corresponding to the industry number (1) to (30) in the table, *DIND*1 to *DIND*30 except for *DIND*2.

ξ_i: i.i.d. error term.

When the redistributional hypothesis of trade credit is valid, the customer more dependent on large suppliers will receive larger amounts of accounts payable. In other words, we expect δ_4 to be positive. The effects of a firm's wealth and profitability on accounts payable are measured by the ratio of total assets to sales, $ASSET_i$, and profits to sales, $PROFIT_i$, respectively. The variable $BDEPEND_i$ measures the direct effect of bank dependence on accounts payable, taking a customer's dependence on large suppliers as constant. Even if the dependence on large suppliers remains unchanged, increasing availability of bank loans will reduce demand for accounts payable as long as bank loans are a cheaper source of funds than trade credit.

We measure the effect of the main bank relationship on accounts payable by three different variables. One is the dummy variable for the type of main bank, $DBANKJ_i$, which was also used in the first step. Another is the terms of the loan contract with the main bank, or $COLLAJ_i$. The variables $COLLAJ_i$ are the dummy variables, each of which correspond to the loan contract shown in rows (1) to (5) in Table 5, that is to say, $COLLA1_i$ takes unity if the firm pledges physical collateral to its main bank, $COLLA2_i$ takes unity if the firm owner guarantees to repay the principal in case of default, and so on. The base is the case of neither collateral nor personal guarantee, so that the number of dummies is 4 in total, *COLLA*1 to *COLLA*4.

The other relational variable with a main bank is the lending attitude of the main bank, or $BATTIJ_i$. The $BATTIJ_i$ variable consists of the following four dummy variables, corresponding to the lending attitude of rows (1) to (5) in Table 6: $BATTI1_i$ taking unity if a loan application to its main bank was turned down or reduced, $BATTI3_i$ taking unity if the lending attitude of a main bank increases in severity, $BATTI4_i$ taking unity if the lending attitude of a main bank gets easier and $BATTI5_i$ taking unity if the firm is asked to borrow more than it applied for. Since the base is where the loan application is accepted as is, we incorporate 4 dummies, $BATTI1_i$ to $BATTI5_i$, except for $BATTI2_i$. The 29 industry dummies are also included as explanatory variables.

Taking the first and second steps together, we can say that the redistributional hypothesis of trade credit is valid only for the case where $\alpha_4<0$ in equation (1) and $\delta_4>0$ in equation (2) are supported simultaneously.

4.2 Micro Data Evidence on the Redistributional Hypothesis of Trade Credit

The estimation results of equation (1) are shown in the first and second columns of Table 9. Since $LPURC_i$ is below unity and must be at least zero, we use a two-limit Tobit regression. When $BLOAN_i$ is used as a measure of a customer's dependence on financial institutions, the coefficient estimate of $BLOAN_i$ is significantly negative, which implies that the customer more dependent on bank loans will purchase less from large suppliers. This is consistent with the redistributional hypothesis of trade credit. On the other hand, when $SBLOAN_i$ is used instead of $BLOAN_i$, its coefficient is negative but not significant. We also find that the customer with a higher debt-asset ratio tends to purchase more from large suppliers, irrespective of the customer-bank relationship variable. It might reflect increasing difficulties for the customer burdened with heavy debt to borrow from banks.

We turn to the estimation results of equation (2), which are shown in the first and second column of Table 10. Since accounts payable are zero for some firms, we estimate equation (2) by a Tobit-estimator. We find that the customer with large assets relative to sales who is less dependent on banks has more accounts payable. Furthermore, the coefficient estimate of $LPURC_i$ exerts a significantly positive effect on accounts payable, irrespective of the customer-bank relationship variable. In other words, when a purchase is made from large suppliers, more credit is provided in the form of trade credit. This is also consistent with the redistributional hypothesis. To combine the evidence obtained from the two steps above, we confirm the redistributional role of trade credit for Japanese SMEs. When a firm does not have close ties with financial institutions, it tends to purchase from large suppliers to secure credit, which in turn leads to an increase in accounts payable.

To see the quantitative importance of the redistributional role of trade credit, we compute the difference in the ratio of accounts payable to sales across industries coming

from the difference in $LPURC_i$. As was shown in the previous section, the $LPURC_i$ variable exhibits wide variations across industries. The variable takes its maximum (0.644) for information and communications and its minimum (0.044) for hotels and restaurants. Thus the difference in the ratio of purchases from large suppliers makes a 1.4 percentage point to 1.7 percentage point difference in the ratio of accounts payable to sales at the maximum.

4.3 Does the Redistributional Hypothesis Hold for All Firms?

To see whether the redistributional role of trade credit is prevalent across firms, we reestimate equations (1) and (2) by classifying firms into two different groups. One group consists of firms whose debt exceeds total assets, or debt-overhang firms, and the other group consists of solvent firms whose debt is smaller than total assets. Before examining the estimation results, we compare firm characteristics between solvent and debt-overhang firms. The second and third columns of Tables 2 to 6 show firm size in terms of number of employees and equity capital, type of main bank, terms of loan contract and lending attitude of the main bank, for both solvent firms and debt-overhang firms. Debt-overhang firms are in general smaller in terms of number of employees and equity capital. The main banks of debt-overhang firms are also smaller in size since 17% (29%) of main banks for debt-overhang (solvent) firms are city banks, long-term credit banks and trust banks, while 33% (20%) are shinkin banks and credit cooperatives.

Table 11 compares the descriptive statistics of major variables between solvent and debt-overhang firms. Debt-overhang firms earn much less operating profit than solvent firms. Debt-overhang firms are less dependent on bank loans in terms of total and short-term borrowing and less dependent on large suppliers. As for the ratio of accounts payable to sales, there is no difference between solvent and debt-overhang firms, although the ratio of accounts receivable to sales is lower for debt-overhang firms.

The estimation results of equations (1) and (2) for solvent firms are shown in the third and fourth columns of Tables 9 and 10, respectively. In the first stage the $BLOAN_i$ variable exerts a significantly negative effect on $LPURC_i$, which in turn affects accounts

payable in a significantly positive manner in the second-stage regression. When the $SBLOAN_i$ variable is used, its coefficient is negative and barely significant at the 10% level in the first-stage regression. It implies that the redistributional role of trade credit is valid for solvent Japanese SMEs.

On the other hand, the estimation results of equations (1) and (2) for debt-overhang firms are shown in the fifth and sixth columns of Tables 9 and 10, respectively. In the first stage, the coefficient estimates of $BLOAN_i$ and $SBLOAN_i$ are insignificantly positive. Furthermore, the debt-asset ratio is also positive and insignificant. In the second stage, the coefficient estimate of $LPURC_i$ is positive but insignificant. Thus even if the debt-overhang firm increases its purchases from large suppliers, accounts payable are not necessarily extended to the insolvent firms.

To sum things up, the redistributional hypothesis of trade credit is only applicable for solvent SMEs, not for debt-overhang SMEs. The effect of $PROFIT_i$ on accounts payable also deserves some attention. For solvent firms the coefficient estimate of $PROFIT_i$ is significantly negative, while it is significantly positive for debt-overhang firms, irrespective of the customer-bank relationship variable. A negative coefficient of profits means that internal funds and accounts payable are substitutes.[11] However, a positive coefficient might indicate that the level of profit plays a signaling role in the health of debt-overhang customers. Suppliers of trade credit might consider higher profitability to guarantee repayment of accounts payable by the debt-overhang firms, which would thereby induce suppliers to increase accounts payable to the debt-overhang firms.

4.4 Substitutability between Bank Loans and Trade Credit

Note that the coefficient estimate of $BATTI1_i$, which indicates that the loan application is rejected or reduced by the main bank, is significantly positive for debt-overhang firms in Table 10, while it is not significant for solvent firms. When a loan application submitted to a main bank by debt-overhang firm is rejected or reduced,

[11] Fukuda et al. (2006) also observes that internal funds and trade credit are substitutes for one another.

it is accompanied by an increase in accounts payable. It suggests that accounts payable are a substitute for bank loans for debt-overhang firms. This appears a bit contradictory to the evidence above that the redistributional role of trade credit is not supported for debt-overhang firms. We can interpret this puzzling evidence as follows. When a loan application is rejected by the main bank, the debt-overhang firm tries to secure credit in the form of trade credit. Trade credit is not necessarily supplied by large suppliers, but by small and medium-sized suppliers that do not in general have easy access to other sources of funds.[12]

This implies that substitutability between bank loans and trade credit for debt-overhang firms is independent of the redistributional hypothesis. For further investigation, we added the cross term of the lending attitude variables $BATTI1_i$ and $BATTI3_i$ with $LPURC_i$ in equation (2). When this cross term is positive, substitutability between bank loans and trade credit does depend on the extent to which purchases are made from large suppliers. In other words, when a loan application to the main bank is turned down, reduced or made more severe, more credit can be raised by way of accounts payable by the customer more dependent on large suppliers. Table 12 shows the estimation results with cross terms for all firms, solvent firms and debt-overhang firms, respectively. The coefficient estimate of $BATTI1_i$ remains significantly positive for debt-overhang firms, but none of the cross terms are significant. On the other hand, the cross term of $LPURC_i$ with $BATTI3_i$ is significantly positive for solvent firms. This suggests that substitutability between bank loans and trade credit for solvent firms crucially hinges upon the extent to which purchases are made from large suppliers, but not for debt-overhang firms.

5. Concluding Remarks

This paper investigates the redistributional role of trade credit from the demand side based on unique micro data of Japanese SMEs where information on transactions between firms of different size is available. The redistributional hypothesis is tested in

[12] In this case insolvency might be propagated to other SME suppliers that extend credit to debt-overhang firms, since their balance sheets also deteriorate.

two steps. In the first step we examine the relationship of bank dependence, measured by the ratio of borrowing from financial institutions to total debt, and the ratio of short-term borrowing from financial institutions to current liabilities, with dependence on large suppliers. In the second step we examine the effect of a dependence on large suppliers on the amount of accounts payable. We find evidence supporting the redistributional hypothesis for solvent firms. In other words, less dependence on bank loans will make customers more dependent on large suppliers, which in turn leads to an increase in accounts payable.

However, the redistributional hypothesis is not supported for firms with a debt overhang. It is true that substitutability is observed between bank loans and trade credit even for debt-overhang firms, but substitutability is independent of the extent to which purchases are made from large suppliers.

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Table 1. Sample distribution by industry

		(1) Number of firms	(2) Percentage
(1)	Construction	66	(4.0)
	Manufacturing: (2) to (23)	306	(18.4)
(2)	Food products	58	(3.5)
(3)	Beverage, tabacco, and fodder	11	(0.7)
(4)	Textiles	8	(0.5)
(5)	Wearing apparel	14	(0.8)
(6)	Wood products except furniture	16	(1.0)
(7)	Furnitures	3	(0.2)
(8)	Paper and paper products	7	(0.4)
(9)	Printing and publishing	9	(0.5)
(10)	Chemicals and chemical products	15	(0.9)
(11)	Coal and oil products	1	(0.1)
(12)	Plastic products	25	(1.5)
(13)	Rubber products	4	(0.2)
(14)	Leather and leather products	3	(0.2)
(15)	Stone, clay, and glasses	19	(1.1)
(16)	Iron and steel	12	(0.7)
(17)	Non-ferrous metal products	4	(0.2)
(18)	Metal products	24	(1.4)
(19)	General machinery	33	(2.0)
(20)	Electrical machinery	25	(1.5)
(21)	Transportation equipment	6	(0.4)
(22)	Precision instrument	5	(0.3)
(23)	Miscellaneous manufacturing	4	(0.2)
(24)	Information and communication	49	(3.0)
(25)	Transportation	59	(3.6)
(26)	Wholesale	593	(35.7)
(27)	Real estate	34	(2.0)
(28)	Hotels and restaurants	29	(1.7)
(29)	Service	117	(7.1)
(30)	Retail	406	(24.5)
	Total	1,659	(100.0)

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 2. Sample distribution by number of employees

		(1) Whole sample firms	(2) Solvent firms	(3) Debt-over-hang firms
(1)	5 or less	393	262	131
		(23.7)	(18.6)	(52.6)
(2)	6 to 20	334	276	58
		(20.1)	(19.6)	(23.3)
(3)	21 to 50	410	375	35
		(24.7)	(26.6)	(14.1)
(4)	more than 50	522	497	25
		(31.5)	(35.2)	(10.0)
	Total	1,659	1,410	249

The figures in parentheses are the percentage of the number of corresponding firms in the sub samples.
Data source: Basic Survey of Small and Medium-sized Enterprises

Table 3. Sample distribution by equity capital

		(1) Whole sample firms	(2) Solvent firms	(3) Debt-over-hang firms
(1)	10 million yen or less	815	633	182
		(49.1)	(44.9)	(73.1)
(2)	more than 10 million yen to 30 million yen	402	363	39
		(24.2)	(25.7)	(15.7)
(3)	more than 30 million yen to 50 million yen	221	205	16
		(13.3)	(14.5)	(6.4)
(4)	more than 50 million yen to 100 million yen	160	153	7
		(9.6)	(10.9)	(2.8)
(5)	more than 100 million yen to 300 million yen	45	41	4
		(2.7)	(2.9)	(1.6)
(6)	more than 300 million yen	16	15	1
		(1.0)	(1.1)	(0.4)
	Total	1,659	1,410	249

See the notes in Table 2.
Data source: Basic Survey of Small and Medium-sized Enterprises

Table 4. Sample distribution by type of main bank

		(1) Whole sample firms	(2) Solvent firms	(3) Debt-over-hang firms
(1)	City banks, long-term credit banks, and trust banks	447	404	43
		(26.9)	(28.7)	(17.3)
(2)	Regional and second-tier regional banks	791	678	113
		(47.7)	(48.1)	(45.4)
(3)	Shinkin banks and credit cooperatives	362	281	81
		(21.8)	(19.9)	(32.5)
(4)	Government financial institutions for SME	42	33	9
		(2.5)	(2.3)	(3.6)
(5)	Other government financial institutions	4	3	1
		(0.2)	(0.2)	(0.4)
(6)	Financial institutions for agriculture	8	8	0
		(0.5)	(0.6)	(0.0)
(7)	No main bank	5	3	2
		(0.3)	(0.2)	(0.8)
	Total	1,659	1,410	249

See the notes in Table 2.

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 5. Terms of loan contract

		(1) Whole sample firms	(2) Solvent firms	(3) Debt-over-hang firms
(1)	Physical collateral	1,049	906	143
		(63.2)	(64.3)	(57.4)
(2)	Personal guarantee	1143	979	164
		(68.9)	(69.4)	(65.9)
(3)	Third party guarantee	256	208	48
		(15.4)	(14.8)	(19.3)
(4)	Public guarantee	746	613	133
		(45.0)	(43.5)	(53.4)
(5)	Neither collateral nor guarantee	103	93	10
		(6.2)	(6.6)	(4.0)
	Total	1,659	1,410	249

Since the respondents can make more than two choices, the percentages of five choices do not sum up to 100.
See the notes in Table 2.

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 6. Lending attitude of the main bank

		(1) whole sample firms	(2) solvent firms	(3) debt-over-hang firms
(1)	Loan application was rejected or reduced	118	63	55
		(7.1)	(4.5)	(22.1)
(2)	Loan application was accepted as it was	739	648	91
		(44.5)	(46.0)	(36.5)
(3)	The lending condition became severe	354	271	83
		(21.3)	(19.2)	(33.3)
(4)	The lending condition was loosened	138	130	8
		(8.3)	(9.2)	(3.2)
(5)	Additional loan was offered by the main bank	310	298	12
		(18.7)	(21.1)	(4.8)
	Total	1,659	1,410	249

See the notes in Table 2.

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 7. Descriptive statistics of major variables in the sample

		(1) Mean	(2) Median	(3) Standard deviation
(1)	Account receivable	304	52	746
(2)	Account payable	271	45	765
(3)	Total assets	1,385	369	4,421
(4)	Total debt	1,081	278	4,042
(5)	Total sales, *SALES*	1,860	584	4,088
(6)	Number of employees (person)	58	31	84
(7)	Operating profit	40	6	183
(8)	Borrowing from financial institutions	583	132	2,739
(9)	Ratio of purchase from small supplier	0.678	0.950	0.390
(10)	Ratio of purchase from large supplier, *LPURC*	0.322	0.050	0.390
(11)	Account receivable / total sales	0.150	0.122	0.148
(12)	Account payable / total sales, *ACPAY*	0.118	0.087	0.115
(13)	Total asset / total sales, *ASSET*	0.904	0.640	1.146
(14)	Operating profit / total sales, *PROFIT*	0.012	0.013	0.105
(15)	Borrowing from financial institutions / total debt, *BLOAN*	0.520	0.545	0.258
(16)	Short-term borrowing from financial institutions / current liabilities, *SBLOAN*	0.300	0.250	0.278
(17)	Total debt / total asset, *DEBTR*	0.858	0.830	0.450

Unit of the variables except for ratios and the number of employees is millions of yen. The capital letters after the variable definitions are the abbreviated variable names used in the regression analysis.

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 8. Means and medians of major variables

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		LPURC		*ACPAY*		*PROFIT*		*ASSET*		*BLOAN*		*SBLOAN*		*DEBTR*	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
(1)	Construction	0.242	0.000	0.126	0.103	0.017	0.014	0.809	0.692	0.454	0.460	0.303	0.289	0.731	0.765
	Manufacturing: (2) o (23)	0.215	0.000	0.137	0.116	0.021	0.019	1.001	0.897	0.568	0.603	0.369	0.338	0.754	0.776
(2)	Food products	0.176	0.000	0.086	0.066	0.013	0.012	0.898	0.830	0.650	0.738	0.455	0.442	0.797	0.813
(3)	Beverage, tabacco, and fodder	0.140	0.000	0.061	0.064	0.050	0.011	1.072	0.814	0.450	0.468	0.360	0.492	0.566	0.530
(4)	Textiles	0.361	0.250	0.135	0.120	-0.008	0.002	1.036	1.064	0.720	0.722	0.507	0.585	0.851	0.887
(5)	Wearing apparel	0.359	0.100	0.091	0.089	0.004	0.001	1.063	0.918	0.700	0.764	0.560	0.657	0.727	0.732
(6)	Wood products except furniture	0.181	0.000	0.131	0.099	-0.007	0.015	1.101	1.011	0.689	0.737	0.537	0.628	0.883	0.882
(7)	Furnitures	0.067	0.000	0.066	0.062	0.005	0.028	0.616	0.435	0.477	0.524	0.350	0.258	0.632	0.722
(8)	Paper and paper products	0.279	0.000	0.178	0.179	-0.074	0.005	0.809	0.881	0.367	0.396	0.230	0.222	1.078	1.142
(9)	Printing and publishing	0.053	0.000	0.135	0.125	0.021	-0.007	0.677	0.623	0.502	0.552	0.127	0.090	0.790	0.795
(10)	Chemicals and chemical products	0.363	0.250	0.174	0.187	0.055	0.043	1.080	1.269	0.523	0.464	0.342	0.269	0.693	0.705
(11)	Coal and oil products	0.150	0.150	0.266	0.266	-0.033	-0.033	0.816	0.816	0.094	0.094	0.094	0.094	0.640	0.640
(12)	Plastic products	0.108	0.000	0.158	0.161	-0.003	0.016	0.897	0.823	0.459	0.507	0.236	0.137	0.759	0.797
(13)	Rubber products	0.353	0.222	0.116	0.131	0.030	0.036	1.118	1.123	0.457	0.445	0.360	0.401	0.421	0.486
(14)	Leather and leather products	0.195	0.000	0.139	0.106	0.024	0.013	0.936	0.867	0.478	0.523	0.327	0.250	0.708	0.683
(15)	Stone, clay, and glasses	0.077	0.000	0.180	0.127	0.021	0.020	1.412	1.205	0.581	0.679	0.437	0.496	0.813	0.835
(16)	Iron and steel	0.349	0.150	0.198	0.178	0.028	0.019	0.851	0.870	0.520	0.574	0.399	0.411	0.761	0.757
(17)	Non-ferrous metal products	0.525	0.550	0.109	0.069	0.083	0.054	0.668	0.666	0.632	0.716	0.242	0.075	0.825	0.870
(18)	Metal products	0.192	0.000	0.132	0.136	0.042	0.043	1.135	1.001	0.537	0.606	0.288	0.286	0.641	0.619
(19)	General machinery	0.176	0.060	0.172	0.177	0.022	0.024	1.075	1.067	0.593	0.645	0.320	0.262	0.719	0.740
(20)	Electrical machinery	0.257	0.280	0.156	0.153	0.042	0.025	0.893	0.826	0.522	0.501	0.294	0.270	0.808	0.844
(21)	Transportation equipment	0.366	0.307	0.130	0.148	0.062	0.047	0.959	0.935	0.510	0.513	0.419	0.377	0.638	0.673
(22)	Precision instrument	0.520	0.400	0.247	0.208	0.061	0.042	1.241	1.360	0.483	0.299	0.287	0.266	0.627	0.570
(23)	Miscellaneous manufacturing	0.225	0.000	0.092	0.078	0.033	0.039	1.157	1.072	0.648	0.736	0.462	0.527	0.673	0.695
(24)	Information and communication	0.644	0.750	0.054	0.039	0.013	0.009	0.654	0.577	0.537	0.622	0.302	0.212	0.762	0.773
(25)	Transportation	0.238	0.000	0.081	0.049	-0.009	0.015	0.824	0.765	0.562	0.641	0.279	0.204	0.853	0.828
(26)	Wholesale	0.318	0.100	0.154	0.121	0.011	0.011	0.713	0.556	0.479	0.483	0.279	0.234	0.900	0.845
(27)	Real estate	0.339	0.000	0.042	0.030	0.123	0.096	4.194	3.621	0.575	0.611	0.317	0.254	0.852	0.872
(28)	Restaurant and hotels	0.044	0.000	0.034	0.023	-0.017	0.031	1.427	1.359	0.597	0.719	0.290	0.204	0.885	0.890
(29)	Service	0.275	0.000	0.075	0.051	0.011	0.017	1.093	0.700	0.519	0.520	0.260	0.239	0.833	0.819
(30)	Retail	0.425	0.300	0.090	0.067	0.003	0.008	0.798	0.528	0.537	0.580	0.292	0.240	0.915	0.863
	Total	0.322	0.050	0.118	0.087	0.012	0.013	0.904	0.640	0.520	0.545	0.300	0.250	0.858	0.830

For the abbreviation of the variables, see the notes in Table 7.

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 9. Determinant of ratio of purchase from large firms

	(1)		(2)		(3)		(4)		(5)		(6)	
	Whole sample firms				Solvent firms				Debt-overhang firms			
*DBANK*2	0.0371		0.0353		0.0268		0.0269		0.1248		0.1278	
	(0.77)		(0.73)		(0.54)		(0.54)		(0.71)		(0.73)	
*DBANK*3	0.0392		0.0369		0.0257		0.0266		0.1215		0.1191	
	(0.63)		(0.59)		(0.39)		(0.40)		(0.63)		(0.61)	
*DBANK*4	-0.0572		-0.0695		-0.0015		-0.0026		-0.3937		-0.3864	
	(0.43)		(0.52)		(0.01)		(0.02)		(0.74)		(0.73)	
*DBANK*5	-0.3666		-0.3838		-0.2586		-0.2730					
	(0.87)		(0.91)		(0.58)		(0.61)					
*DBANK*6	-0.5536		-0.5502		-0.5530		-0.5315					
	(1.34)		(1.31)		(1.38)		(1.30)					
DBANK7	0.2591		0.2819		-0.1554		-0.1044		1.0862		1.0662	
	(0.76)		(0.83)		(0.36)		(0.24)		(1.53)		(1.50)	
Log *SALES*	0.1670	**	0.1711	**	0.1618	**	0.1708	**	0.1298	*	0.1291	*
	(11.6)		(11.8)		(10.5)		(11.0)		(2.40)		(2.39)	
PROFIT	-0.2006		-0.2188		-0.3325		-0.3430		0.3115		0.3064	
	(0.97)		(1.05)		(1.44)		(1.48)		(0.62)		(0.61)	
DEBTR	0.1076	*	0.1115	*	0.2943	*	0.2117		0.0756		0.0747	
	(2.32)		(2.39)		(2.48)		(1.81)		(0.95)		(0.95)	
BLOAN	-0.2411	**			-0.3411	**			0.0499			
	(3.05)				(3.91)				(0.21)			
SBLOAN			-0.1047				-0.1514				0.0763	
			(1.41)				(1.88)				(0.35)	
CONST.	-2.1905	**	-2.3481	**	-2.2438	**	-2.4348	**	-1.6501	*	-1.6344	*
	(9.39)		(10.3)		(9.13)		(10.0)		(2.09)		(2.12)	
σ	0.7123		0.7145		0.6878		0.6915		0.8159		0.8152	
Number of observations	1,659		1,658		1,410		1,409		234		234	

The figures in parentheses are the asymptotic t-values in absolute value and the symbols * and ** indicate that the corresponding coefficients are significant at the 5% and 1%. σ is the estimated standard error of the regression. In the subsample for debt-overhang firms, since there is no sample firm for some of the industries or the type of main bank, the corresponding industry dummy variables and main bank dummy variables are eliminated in the estimation. In addition, for some industries all the sample firms have truncated dependent variable, that is to say *LPURC* is zero. In such a case the corresponding sample firms do not contribute stochastically to the estimation and the coefficient of industry dummy variable has no standard error. This is also true for main bank dummy, *DBANK*6. As a result, 15 sample firms are eliminated from the sample in the subsample of debt-overhang firms. Also, for the estimation with SBLOAN, a sample firm for which current liabilities data is missing is eliminated.

Table 10. Determinant of account payable ratio

	(1)		(2)		(3)		(4)		(5)		(6)	
	Whole sample firms				Solvent firms				Debt-overhang firms			
*DBANK*2	-0.0040		-0.0040		-0.0002		0.0007		-0.0320		-0.0346	
	(0.65)		(0.64)		(0.03)		(0.10)		(1.65)		(1.80)	
*DBANK*3	-0.0272	**	-0.0297	**	-0.0243	**	-0.0277	**	-0.0380		-0.0379	
	(3.64)		(3.94)		(3.05)		(3.40)		(1.83)		(1.84)	
*DBANK*4	0.0007		-0.0076		0.0013		-0.0034		-0.0401		-0.0489	
	(0.04)		(0.45)		(0.07)		(0.19)		(0.88)		(1.07)	
*DBANK*5	-0.0524		-0.0564		-0.0919		-0.0948		-0.0139		-0.0106	
	(1.00)		(1.07)		(1.55)		(1.58)		(0.13)		(0.10)	
*DBANK*6	0.0104		0.0046		0.0130		0.0074					
	(0.27)		(0.12)		(0.35)		(0.20)					
*DBANK*7	-0.0723		-0.0642		-0.1228		-0.0990		-0.0724		-0.0597	
	(1.50)		(1.32)		(1.86)		(1.49)		(0.93)		(0.76)	
*COLLA*1	0.0249	**	0.0188	**	0.0332	**	0.0247	**	-0.0279		-0.0249	
	(4.48)		(3.39)		(5.63)		(4.16)		(1.86)		(1.66)	
*COLLA*2	0.0072		-0.0007		0.0066		-0.0029		0.0240		0.0233	
	(1.26)		(0.13)		(1.09)		(0.48)		(1.54)		(1.50)	
*COLLA*3	0.0070		0.0059		0.0122		0.0102		-0.0150		-0.0148	
	(1.00)		(0.83)		(1.62)		(1.33)		(0.82)		(0.81)	
*COLLA*4	0.0099		0.0013		0.0144	*	0.0033		-0.0074		-0.0107	
	(1.87)		(0.24)		(2.56)		(0.58)		(0.52)		(0.76)	
*BATTI*1	0.0046		0.0023		-0.0057		-0.0046		0.0511	**	0.0451	*
	(0.44)		(0.22)		(0.43)		(0.33)		(2.61)		(2.35)	
*BATTI*3	0.0125		0.0084		0.0136		0.0100		0.0255		0.0207	
	(1.85)		(1.24)		(1.86)		(1.34)		(1.50)		(1.24)	
*BATTI*4	-0.0089		-0.0118		-0.0090		-0.0107		-0.0306		-0.0351	
	(0.94)		(1.24)		(0.95)		(1.11)		(0.76)		(0.89)	
*BATTI*5	-0.0129		-0.0137	*	-0.0137	*	-0.0144	*	0.0118		0.0177	
	(1.85)		(1.96)		(1.97)		(2.02)		(0.35)		(0.53)	
PROFIT	-0.0039		-0.0071		-0.0586	*	-0.0582	*	0.1263	*	0.1263	*
	(0.16)		(0.28)		(2.09)		(2.03)		(2.38)		(2.41)	
ASSET	0.0297	**	0.0292	**	0.0325	**	0.0322	**	0.0267	**	0.0258	**
	(11.8)		(11.5)		(11.5)		(11.1)		(4.97)		(4.83)	
BLOAN	-0.1255	**			-0.1501	**			-0.0535	*		
	(11.8)				(13.1)				(1.98)			
SBLOAN			-0.0953	**			-0.1071	**			-0.0641	**
			(10.1)				(10.4)				(2.66)	
LPURC	0.0345	**	0.0411	**	0.0337	**	0.0428	**	0.0255		0.0267	
	(5.14)		(6.07)		(4.75)		(5.93)		(1.39)		(1.46)	
CONST.	0.1117	**	0.0895	**	0.1036	**	0.0763	**	0.2069	**	0.1939	**
	(6.95)		(5.64)		(6.21)		(4.58)		(4.34)		(4.25)	
σ	0.1001		0.1012		0.0968		0.0988		0.1018		0.1011	
Number of observations	1,659		1,658		1,410		1,409		249		249	

See the notes in Table 9 for the definition of the symbols.

Table 11. Descriptive statistics of major variables in the sub-sample

	(1)	(2)	(3)	(4)
	Solvent firms		Debt-overhang firms	
	Mean	Median	Mean	Median
(1) Account receivable	349	69	53	12
(2) Account payable	309	59	55	10
(3) Total assets	1,571	524	329	74
(4) Total debt	1,203	347	391	99
(5) Total sales, *SALES*	2,114	744	419	133
(6) Number of employees(person)	64	36	22	8
(7) Operating profit	47	9	-1	0
(8) Borrowing from financial institutions	645	169	228	43
(9) Ratio of purchase from small supplier	0.671	0.900	0.721	1.000
(10) Ratio of purchase from large supplier, *LPURC*	0.329	0.100	0.279	0.000
(11) Account receivable / total sales	0.155	0.126	0.119	0.089
(12) Account payable / total sales, *ACPAY*	0.119	0.088	0.114	0.082
(13) Total asset / total sales, *ASSET*	0.907	0.662	0.887	0.499
(14) Operating profit / total sales, *PROFIT*	0.018	0.014	-0.021	0.000
(15) Borrowing from financial institutions / total debt, *BLOAN*	0.525	0.556	0.495	0.492
(16) Short-term borrowing from financial institutions / Current liabilities, *SLOAN*	0.306	0.263	0.266	0.148
(17) Total debt / total asset, *DEBTR*	0.746	0.792	1.496	1.221

See the notes in Table 7.

Data source: Basic Survey of Small and Medium-sized Enterprises

Table 12 Determinant of account payable ratio

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole sample firms		Solvent firms		Debt-overhang firms	
*DBANK*2	-0.0040	-0.0040	0.0003	0.0010	-0.0323	-0.0344
	(0.64)	(0.64)	(0.04)	(0.16)	(1.66)	(1.77)
*DBANK*3	-0.0271 **	-0.0297 **	-0.0239 **	-0.0274 **	-0.0369	-0.0358
	(3.64)	(3.94)	(2.99)	(3.36)	(1.77)	(1.74)
*DBANK*4	0.0013	-0.0072	0.0023	-0.0025	-0.0401	-0.0500
	(0.08)	(0.43)	(0.13)	(0.14)	(0.88)	(1.10)
*DBANK*5	-0.0533	-0.0571	-0.0921	-0.0951	-0.0110	-0.0045
	(1.02)	(1.09)	(1.56)	(1.59)	(0.10)	(0.04)
*DBANK*6	0.0110	0.0054	0.0137	0.0083		
	(0.29)	(0.14)	(0.37)	(0.22)		
*DBANK*7	-0.0712	-0.0634	-0.1242	-0.1002	-0.0784	-0.0685
	(1.48)	(1.30)	(1.88)	(1.51)	(0.99)	(0.87)
*COLLA*1	0.0256 **	0.0195 **	0.0338 **	0.0252 **	-0.0287	-0.0258
	(4.61)	(3.51)	(5.73)	(4.26)	(1.92)	(1.73)
*COLLA*2	0.0069	-0.0009	0.0057	-0.0038	0.0245	0.0234
	(1.21)	(0.16)	(0.93)	(0.61)	(1.57)	(1.51)
*COLLA*3	0.0069	0.0058	0.0122	0.0100	-0.0132	-0.0128
	(0.99)	(0.82)	(1.62)	(1.30)	(0.72)	(0.70)
*COLLA*4	0.0100	0.0013	0.0144 *	0.0033	-0.0072	-0.0108
	(1.88)	(0.25)	(2.57)	(0.58)	(0.51)	(0.77)
*BATTI*1	0.0057	0.0078	-0.0190	-0.0114	0.0671 **	0.0646 **
	(0.44)	(0.59)	(1.07)	(0.62)	(2.86)	(2.80)
*BATTI*3	0.0014	-0.0013	0.0002	-0.0027	0.0251	0.0232
	(0.17)	(0.15)	(0.02)	(0.29)	(1.23)	(1.15)
*BATTI*4	-0.0088	-0.0118	-0.0089	-0.0106	-0.0303	-0.0343
	(0.93)	(1.24)	(0.94)	(1.10)	(0.76)	(0.87)
*BATTI*5	-0.0124	-0.0134	-0.0132	-0.0139 *	0.0097	0.0142
	(1.79)	(1.91)	(1.90)	(1.97)	(0.29)	(0.42)
*BATTI*1**LPURC*	-0.0027	-0.0163	0.0387	0.0204	-0.0550	-0.0679
	(0.11)	(0.65)	(1.20)	(0.62)	(1.23)	(1.51)
*BATTI*3**LPURC*	0.0356 *	0.0310	0.0415 *	0.0391 *	0.0044	-0.0075
	(2.22)	(1.92)	(2.39)	(2.21)	(0.10)	(0.18)
PROFIT	-0.0039	-0.0070	-0.0581 *	-0.0577 *	0.1276 *	0.1278 *
	(0.16)	(0.28)	(2.07)	(2.02)	(2.42)	(2.45)
ASSET	0.0297 **	0.0291 **	0.0327 **	0.0322 **	0.0266 **	0.0255 **
	(11.8)	(11.4)	(11.5)	(11.1)	(4.95)	(4.80)
BLOAN	-0.1261 **		-0.1511 **		-0.0563 *	
	(11.9)		(13.2)		(2.08)	
SBLOAN		-0.0957 **		-0.1074 **		-0.0693 **
		(10.1)		(10.5)		(2.85)
LPURC	0.0272 **	0.0358 **	0.0238 **	0.0342 **	0.0384	0.0468
	(3.45)	(4.51)	(2.95)	(4.17)	(1.38)	(1.68)
CONST.	0.1149 **	0.0919 **	0.1085 **	0.0805 **	0.2046 **	0.1902 **
	(7.13)	(5.77)	(6.47)	(4.81)	(4.30)	(4.18)
σ	0.1000	0.1010	0.0966	0.0986	0.1013	0.1005
Number of observations	1,659	1,658	1,410	1,409	249	249

See the notes in Table 9 for the definition of the symbols.

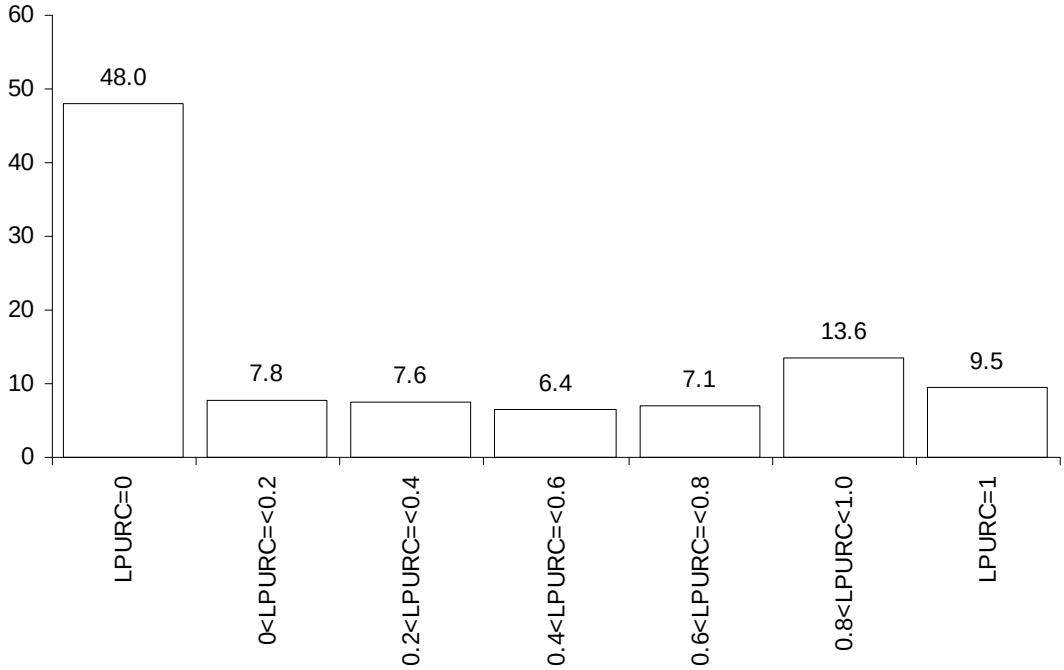

Figure 1 Frequency distribution of the ratio of purchases from large suppliers