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TRADING COMPANIES AS FINANCIAL INTERMEDIARIES IN JAPAN

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Abstract

This paper explores a financial role of Japanese general trading companies (GTCs), which act as a central point in a distribution network among group firms. I examine Meltzer's conjecture, which holds that financially strong companies like GTCs increase trade receivables and reduce trade payables to shield their trading partners from a monetary squeeze. First, I investigate the trade credit granted to each other by GTCs and all its trade partners.The panel estimation demonstrates that both trade receivables and trade payables decrease during periods of monetary tightness and increase during those of monetary ease. In response to a change in a bank-lending indicator, there is little difference between trade receivables and payables. Thus GTCs become neither net-credit providers nor net-credit takers from this behavior. In other words, interfirm financing passing through a GTC's balance sheet positively correlates with banking financing. Therefore, the Meltzer hypothesis does not hold for transactions between GTCs and all their trade partners. Instead, gross trade credit functions as a complement to macroeconomic bank lending. Second, I examine trade credit by dividing GTCs ’trading partners into related companies (i.e., subsidiaries and associate firms) and non-related companies. In terms of the reactions of trade credit to market financial indicators, I did not find statistically significant evidence that the Meltzer hypothesis works in either case. No matter with whom a GTC trades, interfirm financing passing through the GTC's balance sheet moves positively in concert with banking financing. A major difference between related and non-related companies lies in the way in which trade receivables react to a GTC's individual financial situation (that is, a firm's individual interest expense rate minus a market's interest rate). An increase in the interest gap induces a GTC to incur extra expenses over the market rate. In this situation, a GTC reduces trade receivables to non-related firms, but not those to related firms. This behavior eventually works as a shield, protecting their related companies from sharing the parent company ’s interest costs.

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This paper explores a financial role of Japanese general trading companies (GTCs), which act as a central point in a distribution network among group firms. I examine Meltzer's conjecture, which holds that financially strong companies like GTCs increase trade receivables and reduce trade payables to shield their trading partners from a monetary squeeze. First, I investigate the trade credit granted to each other by GTCs and all its trade partners. The panel estimation demonstrates that both trade receivables and trade payables decrease during periods of monetary tightness and increase during those of monetary ease. In response to a change in a bank-lending indicator, there is little difference between trade receivables and payables. Thus GTCs become neither net-credit providers nor net-credit takers from this behavior. In other words, interfirm financing passing through a GTC's balance sheet positively correlates with banking financing. Therefore, the Meltzer hypothesis does not hold for transactions between GTCs and all their trade partners. Instead, gross trade credit functions as a *complement* to macroeconomic bank lending.

Second, I examine trade credit by dividing GTCs' trading partners into related companies (i.e., subsidiaries and associate firms) and non-related companies. In terms of the reactions of trade credit to market financial indicators, I did not find statistically significant evidence that the Meltzer hypothesis works in either case. No matter with whom a GTC trades, interfirm financing passing through the GTC's balance sheet moves positively in concert with banking financing. A major difference between related and non-related companies lies in the way in which trade receivables react to a GTC's individual financial situation (that is, a firm's individual interest expense rate minus a market's interest rate). An increase in the interest gap induces a GTC to incur extra expenses over the market rate. In this situation, a GTC reduces trade receivables to non-related firms, but not those to related firms. This behavior eventually works as a shield, protecting their related companies from sharing the parent company's interest costs.

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1. Introduction

The purpose of this paper is to explore a financial role of Japanese general trading companies (GTCs), called *sogo shosha* in Japanese, which act as a central point of a distribution network among group firms. For example, Flath (2000, p. 351) defines "general trading companies" as "[t]he nine large Japanese companies that broker a significant amount of Japan's international trade, extend a substantial amount of trade credit within Japan itself, and act as intermediaries in a wide variety of business ventures."

Table 1 reports the number of GTCs that existed each year during the period from March 1976 to March 2008.[1] Up to around the 1990s, the following nine companies were generally recognized as GTCs: Mitsui, Itochu, Kanematsu, Sumitomo, Marubeni, Mitsubishi, Nissho-Iwai, Nichimen, and Tomen. However, some GTCs have recently merged to form a new company. Specifically, the Nissho-Iwai and Nichimen companies merged in 2005 to form a new company called Sojitz; the Toyota-Tsusho Corporation, which had been seen as a trading company specializing in exporting and importing goods for the Toyota Motor Company, had enjoyed years of sales growth and merged with the Tomen Corporation in 2007. During the fiscal year ending in March 2008, therefore, the Toyota-Tsusho Corporation achieved the sixth largest sales among Japanese trading companies, directly below Itochu's (see Table 2). On the other hand, the Kanematsu Corporation carried out a "structural reform" to downsize the firm's business activities around 2000.

Therefore, one may see the Toyota-Tsusho Corporation replacing the Kanematu

[1] Japan's fiscal year starts at the beginning of April and ends at the end of March; therefore, in their financial statements Japanese companies report their income throughout the fiscal year and their balance sheet as of the end of March.

Corporation as the 2000s' version of a GTC. Throughout this paper, however, I include both companies in my dataset as embraced by a broad definition of GTCs (that is, the nine GTCs plus the Toyota-Tsusho Corporation), because the sample period starts at the second half of the 1970s and ends in 2008. However, using a narrow definition of GTCs I also perform estimations using data excluding the Kanematsu and Toyota-Tsusho corporations from the broad definition throughout the entire time period. Estimations in Sections 4 and 5 will display the results from both definitions, although they do not reveal a distinct difference between the two definitions. Hereafter, in my references to "GTCs" I am referring to the broad definition unless I specify otherwise.

Figure 1 illustrates GTCs' total sales to all their trading partners and their total purchases from them during the time period. Both variables move up and down together through almost every year in the period.[2] This movement in concert indicates that GTCs act as a central point of a distribution network from sellers to buyers. The figure also depicts GTC's trade receivables and trade payables. Net trade credit (= the amount obtained by subtracting trade payables from trade receivables) had been positive for all these years. The average for the period was 2.3 billion yen: the maximum and the minimum were 3.8 billion yen in 1985 and 1.2 billion yen in 1979, respectively. Hence GTCs function as net-trade creditors who hold other assets less than the sum of other liabilities and capital. In other words, GTCs act as credit providers thorough their sales and purchases by taking advantage of their strong financial credibility over liquidity-constrained companies of a size smaller than GTCs. In this paper, I define Japanese GTCs as large firms with access to nonbank funds.

Sheard (1989, p. 319) argues that "trading companies are functioning as quasi-banks

[2] Here I define these terms as follows: trade receivables = accounts and notes receivables; trade payables = accounts and notes payables.

and quasi-insurance agencies in facilitating the provision of trade credit and the diversification of default risks associated with that trade credit."[3] In general, sellers' ability to collect information about buyers' business conditions can mitigate the costs of extending trade credit. In addition, Ono (2001) points out that transactions with buyers enable sellers to more accurately and more promptly assess buyers' default risk than buyers' financial institutions are able to do. Although his paper focuses on the trade credit of manufacturing firms, Ono also suggests that it would be interesting to analyze the trade credit of trading companies.

Using the data for U.S. firms, Meltzer (1960, p. 429) argues, "when money was tightened, firms with relatively large cash balances increased the average length of time for which credit was extended. And this extension of trade credit appears to have favored those against whom credit rationing is said to discriminate." In other words, the adaptive reaction of trade credit extended by large firms could shield small liquidity-constrained firms from a monetary squeeze and then hinder the restrictive monetary policy. Here I call this "the Meltzer conjecture," following Marotta (1997), who tested for the effect on trade credit between Italian firms. If the Meltzer effect works during monetary contractions, it indicates that trade receivables increase at financially unconstrained firms (e.g., large and/or quoted firms) and decrease at financially constrained firms (e.g., small and/or unquoted firms), and that trade payables decrease at the former firms and increase at the latter firms.

Table 3 reports recent empirical studies using microdata or semiaggregated data.[4] The conjecture is not widely accepted. The results from testing for the hypothesis depend on

[3] Similar arguments can be found in the literature on business studies; for example, Sasago (1979) and Furuyama (1998).

[4] Not every article explicitly refers to the Meltzer effect. But all the papers listed focus on the relationship between trade credit and monetary policy (or bank lending) .

the country, the time period, or the criterion used to differentiate between liquidity-constrained firms and unconstrained ones.

For the U.K., Kohler *et al.* (2000) and Mateut *et al.* (2006) report evidence that is consistent with the Meltzer conjecture. For Italy, however, Marotta (1997) and Rondi *et al.* (1998) find evidence that contradicts the conjecture. For other countries, investigations reveal mixed conclusions.

Kohler *et al.* (2000) demonstrate that net trade credit (= trade receivables minus payables) falls at U.K.-quoted firms when monetary conditions are tighter. However, Choi and Kim (2005) report that large U.S. firms do not necessarily actively increase net trade credit more than smaller firms. Furthermore, Nielsen (2002) divides large U.S. firms into those with a bond rating and those without. He then reports evidence that large firms without a bond rating use trade payables as an alternative to bank loans. This implies that only large firms having a bond rating are free from credit constraints.

Regarding Japanese data, Ogawa (2003) reports that when monetary contraction occurs, large-sized firms grant trade credit to medium-sized firms but not to smaller firms.[5] Uesugi and Yamashiro (2006) examine the aggregation data of Japanese large-sized wholesalers, which include GTCs. They examine synchronous movement between trade receivables and bank lending. Figure 7 in their paper reveals strong negative correlations in the early 1970s: namely, wholesalers' trade receivables function as a substitute for bank loans to their customers. Afterward, however, a positive correlation (trade credit's complementary function to bank loans for the customers) has frequently appeared up to and beyond the year 2000.

Many researchers have investigated the Japanese main-bank lending system, which

[5] His evidence somewhat resembles Cunningham's (2005), in which medium-wealth firms substitute bank loans for trade credit but low-wealth firms use trade credit as a complement to bank loans.

serves as a center of financial *keiretsu* (corporate networks) in Japan.[6] However, there is another type of *keiretsu*, such as corporate distribution networks among nonfinancial companies. Like main banks, the GTCs hold significant shares of many nonfinancial firms whose businesses are closely related to the GTCs' transactions.[7]

Figure 2 illustrates all GTCs' sales to and their purchases from their own related companies (= their subsidiaries and associate companies)[8] and non-related companies (the balance of trading partners). Both sales and purchases for related companies have exhibited more stable movement than have sales and purchases for non-related companies. On average, 14.2% of total sales are sales to related companies, and 19.2% of total purchases are from related companies. We cannot neglect those volumes, although those with non-related companies are much larger.

Figure 3 depicts all GTCs' trade receivables and payables for related companies and those for non-related companies. In accordance with sales and purchases in Figure 2, trade receivables and payables for related companies have exhibited more stable movement than have those for non-related companies. For related companies, net trade credit (trade receivables minus payables) became a negative value in 1976, 1977, and 1979. However, in all other years the numbers have been positive. In 2008, the net credit for related companies was 880,931 million yen, which is greater than that for non-related companies: 641,138 million yen. We should pay more attention to trade credit for related firms.

To my knowledge, few researchers[9] have paid attention to the financial aspect of

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[6] For example, see Hoshi, Kashyap, and Scharfstein (1991) and Hoshi (1994).
[7] See Toyokeizai Data Bank (1996).
[8] With some exceptional cases, a firm's subsidiary is usually a company in which the firm owns more than fifty percent of voting shares. Similarly, a firm's associate company is usually a company in which the firm owns between 20% and 50% of voting shares.
[9] Uesugi (2004), and Uesugi and Yamashiro (2006) examine a wide variety of GTCs' financial roles,

Japanese GTCs. Recall that GTCs serve as a central point of corporate distribution networks.[10, 11] This paper sheds light on this aspect from a view of trade credit practices *a la* Meltzer, not only on trade receivables but also on trade payables. The examination of trade credit on the asset and liability sides simultaneously allows us to evaluate how a GTC passes trade credit from trade payables to receivables as interfirm financing corresponding to bank lending. I will then use micro data to capture an individual firm's behavior and examine the data with and without the Kanematsu and Toyota-Tsusho corporations, which during the past thirty years have made more dramatic structural changes than any other GTC. In addition, I examine GTCs' ties with their trade partners by separating those partners into related and non-related companies.

Section 2 introduces my data and specifies estimation equations. Section 3 performs unit root tests for variables used in the regressions. Section 4 reports the empirical results for trade credit given to and received from all of the GTCs' trading partners. Section 5 divides trading partners into related and non-related companies and examines trade credit given to and received from the two different types of partners. Finally, Section 6 concludes the paper with a suggestion for future research.

2. The Data and the Specification

This section specifies a regression form and introduces the data that I use. Because I focus on the individual level of corporate financing behavior, it is best to examine

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including trade credit, stock investments, loans, and loan guarantees.

[10] Strictly speaking, investigation of the Meltzer effect on trade credit must focus on the relationship between firms that are financially constrained and those that are not. Although the two types of firm are not separable in the data, it is natural to presume that most of the GTCs' trade partners are not as financially *unconstrained* as the GTCs.

[11] For example, Deloof and Jegers (1996) examine trade credit used within European corporate groups and discover a financial factor in determining the amount of trade credit.

financial statements reported by each GTC. The following estimation therefore uses the Nikkei Needs CD-ROM database for firms' annual financial statements.[12] The Japanese accounting rule defines "related companies (*Kanren* firms)" as those including subsidiaries (*Kogaisha*) and associate companies (*Kankei* firms). Since 1976, all firms have reported sales to and purchases from companies related to the firms. Therefore, the sample period starts in March 1976 and ends in March 2008.

In fact, the terms of trade credit vary with each transaction. In each case, they depend on the type of commodity, the trade partners, and the business conditions at the micro and macro levels.[13] However, the financial statements do not break down a firm's trade credit by individual contracts. Thus, at best, I explore determinants of trade credit for their related and non-related companies.

As illustrated in Table 1, the panel data is unbalanced. In addition, some GTCs do not report information for transaction with related companies at some years. In the end, I cannot obtain information for non-related companies, either, because I calculate the numbers by subtracting those for related companies from those for all trade partners. Therefore, panel data sets for related and non-related companies become more unbalanced than the data set for all trade partners.

2-A. Trade Credit for All Trading Partners

At the firm level, I investigate the way in which the amount of trade credit is influenced by both transactional and financial factors. The following are the specifications for a GTC (= firm *i*) to supply trade credit to all its customers, (1), and to

[12] For some portion of my data, I referred directly to the GTCs' annual financial statements, from which the Nikkei Needs database collects.
[13] See Kinyu-Zaisei (1996) for the terms standardized in each industrial sector. See Emery and Ariga (1996) for a survey, conducted by mail, of managers at Japanese trading companies.

demand trade credit from all its vendors, (2):

$$(1)\ dlnTR_{i,t} = \alpha_0 + \alpha_1\, dlnS_{i,t} + \alpha_2\,(lnTR_{i,t-1} - lnS_{i,t-1}) + \alpha_3\, IGAP_{i,t-1} + \alpha_4\, M_t + v_i + e_{it}$$

$$(+) \qquad (-) \qquad (-) \qquad (-)$$

$$(2)\ dlnTP_{i,t} = \beta_0 + \beta_1\, dlnP_{i,t} + \beta_2\,(lnTP_{i,t-1} - lnP_{i,t-1}) + \beta_3\, IGAP_{i,t-1} + \beta_4\, M_t + v_i + e_{it}.$$

$$(+) \qquad (-) \qquad (?) \qquad (+)$$

Expected signs are in parentheses. Table 4 describes all the variables used in this paper.

In equations (1) and (2), the coefficients α_1 and β_1 indicate the transactional factors that are expected to be positive. The terms $(lnTR_{i,t-1} - lnS_{i,t-1})$ and $(lnTP_{i,t-1} - lnP_{i,t-1})$ incorporate long-term adjustments toward a desired ratio of trade receivables to sales and of trade payables to purchases, respectively. Both coefficients, α_2 and β_2, are expected to be minus. Regarding this error correction format, I follow Guariglia and Mateut (2006), who estimate an inventory function by using as one of the explanatory variables the value of subtracting a logarithm of lagged sales from a logarithm of lagged inventory.[14] Considering the fundamental nature of the way in which trade credit originates from transactional activities, it is natural to suppose that a long-term adjustment process lies in a relationship between trade receivables and sales and between trade payables and purchases. The coefficients α_3 and β_3 capture a financial factor at an individual firm level. For a firm's individual financial factor, $IGAP_{i,t-1}$ denotes a interest gap obtained by subtracting a market interest rate from firm *i*'s interest expense rate. I use the lagged variable to evaluate the exogenous effect on trade credit. Here, I presume α_3 to be negative, although the strong financial credibility of a firm like a GTC does not seem to make the short-term finances such as trade credit very

[14] Guariglia and Mateut (2006) estimate inventory investment equations for U.K. quoted companies. They report that financially constrained firms can finance inventory investment with trade payables when tight monetary policy makes it harder for those firms to obtain bank loans.

responsive to its own financial situation. However, a sign of β_3 is indeterminate. It becomes a positive number if firm *i* substitutes trade payables for bank borrowing as $IGAP_{i,t-1}$ increases. On the other hand, it could be negative if firm *i* wants to reduce the outstanding debts, including trade payables, as $IGAP_{i,t-1}$ increases.

Finally, α_4 and β_4 demonstrate the effect of a macroeconomic bank-lending indicator, M_t. If $\alpha_4 < 0 < \beta_4$, a GTC increases trade receivables and decreases trade payables when bank lending conditions become restrictive at the macroeconomic level (i.e., M_t decreases). This behavior will be consistent with the Meltzer conjecture. Even if $0 < \alpha_4 < \beta_4$ or $\alpha_4 < \beta_4 < 0$, however, a GTC behaves in accordance with the hypothesis. If $0 < \alpha_4 < \beta_4$, a GTC decreases trade receivables less than it does trade payables during tight monetary markets. If $\alpha_4 < \beta_4 < 0$, a GTC increases trade receivables more than it does trade payables during monetary contraction. Net trade credit (trade receivables minus payables) increases in either scenario. Hence, I conclude that the Meltzer hypothesis holds in terms of *absolute* change if $\alpha_4 < 0 < \beta_4$, and that it holds in terms of *relative* change if $0 < \alpha_4 < \beta_4$ or $\alpha_4 < \beta_4 < 0$. Although I expect the signs in (1) and (2) in terms of *absolute* change, this classification is quite important. This is so because interfirm financing passing from a GTC's trade payables to receivables is indeterminate, negative, or positive, if $\alpha_4 < 0 < \beta_4$, $0 < \alpha_4 < \beta_4$, or $\alpha_4 < \beta_4 < 0$, respectively.[15]

2-B. Trade Credit for Related and Non-Related Companies

Here I separate the trade receivables of (1) into those granted to related companies and those given to non-related companies. Similarly, I divide the trade payables of (2) into those received from related companies and those given by non-related companies.

[15] Apart from the Meltzer effect, there is also a debate about how the aggregate quantity of gross trade credit reacts to a monetary shock. See Ramey (1992) and Choi and Kim (2005), for example.

Because GTCs hold significant shares of the related companies, they have an economic incentive to ease their related firms' financial constraints through granting them more trade credit and expecting less trade credit from them when the financial market situation tightens.

Therefore I specify a GTC's (= firm *i*'s) supply of trade credit to its related companies who are customers as (3) and its demand for trade credit from its related companies who are vendors as (4):

(3) $dlnTR^{R}_{i,t} = \gamma_0 + \gamma_1\, dlnS^{R}_{i,t} + \gamma_2\, (lnTR^{R}_{i,t-1} - lnS^{R}_{i,t-1}) + \gamma_3\, IGAP_{i,t-1} + \gamma_4\, M_t + v_i + e_{it}$

(+) (–) (–) (–)

(4) $dlnTP^{R}_{i,t} = \delta_0 + \delta_1\, dlnP^{R}_{i,t} + \delta_2\, (lnTP^{R}_{i,t-1} - lnP^{R}_{i,t-1}) + \delta_3\, IGAP_{i,t-1} + \delta_4\, M_t + v_i + e_{it}.$

(+) (–) (?) (+)

Moreover, (5) illustrates a GTC's (= firm *i*'s) supply of trade credit to its non-related companies who are customers, and (6) describes its demand for trade credit from its non-related companies who are vendors:

(5) $dlnTR^{N}_{i,t} = \zeta_0 + \zeta_1\, dlnS^{N}_{i,t} + \zeta_2\, (lnTR^{N}_{i,t-1} - lnS^{N}_{i,t-1}) + \zeta_3\, IGAP_{i,t-1} + \zeta_4\, M_t + v_i + e_{it}$

(+) (–) (–) (–)

(6) $dlnTP^{N}_{i,t} = \eta_0 + \eta_1\, dlnP^{N}_{i,t} + \eta_2\, (lnTP^{N}_{i,t-1} - lnP^{N}_{i,t-1}) + \eta_3\, IGAP_{i,t-1} + \eta_4\, M_t + v_i + e_{it}.$

(+) (–) (?) (+)

Expected signs are in parentheses. I presume signs of all coefficients to be the same as (1) and (2). Concerning related firms, however, I expect γ_3 to become less significantly different from zero than that in (1). In addition,γ_4 and δ_4 are expected to become more significantly different from zero than those in (1) and (2). Regarding non-related firms, I predict that ζ_3 will become more significantly different from zero than that in (1). In addition, ζ_4 and η_4 are expected to become less significantly different from zero than

those in (1) and (2).

3. Unit Root Tests

Before estimating the determinants of trade credit, I test to determine whether a panel-based variable has a unit root process. To aid in determining the nature of this process, Table 5 reports the Levin, Lin, and Chu (LLC) statistic and the Im, Pesaran, and Shin (IPS) statistic.[16] The LLC test sets up a null hypothesis of a common unit root process across cross-sections; then a rejection of the null reaches the conclusion that there is no unit root in the panel-based variable. The IPS test allows for individual unit root processes across cross-sections; then a rejection of the null demonstrates that there are some cross-sections without a unit root.

In panel (a), the first-differenced logarithms reveal a stationary process in all cases of both tests. In panel (b), a null of unit root is rejected in all four cases for ($\ln TP^{R}_{i,t-1} - \ln P^{R}_{i,t-1}$); in three cases for ($\ln TR^{R}_{i,t-1} - \ln S^{R}_{i,t-1}$), ($\ln TP^{N}_{i,t-1} - \ln P^{N}_{i,t-1}$), and ($\ln TP_{i,t-1} - \ln P_{i,t-1}$); in two cases for ($\ln TR_{i,t-1} - \ln S_{i,t-1}$); and in one case for ($\ln TR^{N}_{i,t-1} - \ln S^{N}_{i,t-1}$). Panel (c) reports that the financial variables $IGAP_{i,t}$ and M_t have no unit root process in all cases of both tests. Hence I proceed to the following estimation by concluding that a unit root problem does not occur in the variables used in the specifications.

4. Trade Credit Granted Between GTCs and All the Trading Partners

In the panel data set, the sample period (T) runs from 1977 to 2008 (=32 years) and the number of firms (N) is 13 for each equation. Given the small number of firms, I estimate the model with fixed effects. When T goes to infinity for fixed N, Arellano

[16] See Levin, Lin, and Chu (2002), and Im, Pesaran, and Shin (2003), respectively.

(2003) suggests applying Newey and West's standard error corrections to a fixed-effect panel-data estimation. Hence, Table 6-A reports the least squares estimations with fixed effects and Newey and West's standard errors, which are robust to cross-sectional dependence, heteroskedasticity, and serial correlation of arbitrary forms. I specify the truncation lag as 3 (=floor($4(T/100)^{2/9}$, where T=32 in this paper) by following Newey and West (1994).

In equation (1), the estimated coefficient on $dlnS_{i,t}$ and that on ($lnTR_{i,t-1}$– $lnS_{i,t-1}$) have expected signs at the 1% level of statistical significance. As transactional factors, therefore, we can say that the sales and the long-term adjustment of trade receivables to sales are critical determinants of trade receivables. In addition, the estimate for $IGAP_{i,t-1}$ demonstrates a negative coefficient, as expected, at the 1% statistical significance level. Even though the financial credibility of a GTC may be strong, a change in its own individual financial situation relative to financial markets does influence trade receivables. The estimated coefficient on M_t has an *unexpected* sign with the 1% level of statistical significance. Contrary to expectations, a GTC's trade receivables decrease as bank lending becomes restrictive at the macroeconomic level. In other words, the trade credit granted by a GTC serves as a *complement* to bank loans for the GTC's customers. This evidence concurs with Uesugi and Yamashiro (2006), who demonstrate that the aggregate amount of trade receivables of large-sized wholesalers behaves as a complement to bank loans.

For estimated coefficients in equation (2), the estimated signs and statistical significance appear to be the same as in equation (1) except for that of $IGAP_{i,t-1}$. For $IGAP_{i,t-1}$, the statistical insignificance of the coefficient close to zero may indicate offsetting results from the positive and negative effects that an increase in $IGAP_{i,t-1}$ has

on trade payables. A positive effect will appear if, as $IGAP_{i,t-1}$ increases, a GTC switches its financial source from bank borrowing to trade payables. A negative effect will emerge as $IGAP_{i,t-1}$ increases if this motivates a GTC to reduce its outstanding debts, including trade payables.

As expected, M_t's coefficient has a positive sign. Hence a GTC refrains from receiving as much trade payables from its vendors when bank loans become less available to borrowers in general. In other words, as a GTC's payments reduce its trade payables, this functions as a *substitute* for bank loans to those who sell goods to the GTC.

Finally, I perform the Wald test, the null hypothesis of which is no difference between equations (1) and (2) in the estimated coefficients on M_t. To conduct this test, I follow Blackwell (2005) to estimate (1) and (2) simultaneously as a system of the SUR (Seemingly Unrelated Regressions).[17] At the bottom of the table, the system regression reports that the p-value of the Wald statistic is 0.9618, by which I concludes that M_t's effect on trade receivables is equal to its effect on trade payables. Net trade credit (= trade receivables – trade payables) at a GTC does not respond to a change in M_t. In terms of either *absolute* or *relative* change, the Meltzer effect does not emerge from this behavior. In addition, a decrease in M_t (i.e., monetary tightening) induces a decrease in trade receivables and payables. The reduction in trade credit on both sides suggests that interfirm financing moves in tandem with banking financing.[18] One may say that trade credit at the gross level (=min[trade receivables, trade payables]) functions as a

[17] The results from system regressions are almost identical to single-equation regression except for minor changes in standard errors. In the table, I report the estimated coefficient and standard errors for M_t only. The entire results for this multiple equation regression are available from the author on request.

[18] This evidence contradicts Choi and Kim (2005), who report that U.S. firms increase accounts receivable and accounts payable when the financial market tightens.

complement to macroeconomic bank lending.

Table 6-B applies the same estimation methods as those in Table 6-A to the data, as narrowly defined—excluding the Kanematsu and the Toyota-Tsusho corporations from the GTCs. The statistical significance level for the coefficients on ($\ln TR_{i,t-1} - \ln S_{i,t-1}$) and on $IGAP_{i,t-1}$ changed from 1% to 5% in equation (1). However, other major results are not influenced even by dropping the two companies that had undergone greater structural changes than any other GTC during the sample period.

5. Trade Credit Granted Between GTCs and the Related Companies

In the preceding section, I examined trade credit granted to all of the GTCs' customers and received from all their vendors. This section investigates trade credit by dividing their trading partners into related firms and non-related firms. As demonstrated in the previous section, the Meltzer hypothesis does not hold for trade credit with all trade partners. Here I offer a new hypothesis that GTCs may financially help their related companies when banking loans become restrictive (i.e., γ_4 in (3) < δ_4 in (4)).

Tables 7-A and 8-A illustrate the LS fixed-effects estimation with Newey and West's standard errors for (3), (4), (5), and (6). First, estimated signs and their statistical significance in (5) and (6) in Table 8-A are identical to those in (1) and (2) in Table 6-A. Second, estimated signs and their statistical significance in (3) and (4) in Table 7-A are almost the same as those in (1) and (2) in Table 6-A. A prominent exception is that the coefficient on $IGAP_{i,t-1}$ in (3) is statistically insignificant. Regarding this coefficient, the 1% significance level with a negative sign is for non-related firms in Table 8-A; the statistical insignificance is for related firms in Table 7-A. The difference indicates that a GTC directs an increase in its own financial costs toward non-related companies by

granting less trade credit to them. On the other hand, related companies do not have to share in the increase in the GTC's financial costs, as there is no change in the trade credit they receive from the GTC.

As detailed in the previous section, I use the Wald test to compare the response of trade receivables with that of trade payables when M_t changes. The test statistic (p-value = 0.9127) results in an acceptance of the null hypothesis, under which the coefficient on M_t in (5) is equal to that in (6). As concluded in trade credit for all trade partners, the Meltzer hypothesis for non-related companies is not borne out in terms of either *absolute* or *relative* change.

For related companies, estimated γ_4 in (3)[=0.00118] < [0.002209=] estimated δ_4 in (4), as I expected, and the Meltzer effect seems to work in terms of *relative* change. However, the p-value of the Wald statistic is 0.3474. It is much lower than in the test for non-related companies, but not statistically significant enough to reject the equality hypothesis. Here again, the Meltzer hypothesis does not hold in coefficients on M_t.

Tables 7-B and 8-B display the estimation results from using the data excluding the Kanematsu and the Toyota-Tsusho corporations. However, the main results are virtually the same for both the broad definition of GTCs and the narrow one.

6. Concluding Remarks

This paper raised the question: do GTCs make any adjustment in their use of trade credit in response to micro- or macroeconomic changes in financial conditions? Because the answer was found to be yes, it further examined whether their behavior is consistent with the Meltzer conjecture. Our panel estimation demonstrates that during periods of monetary contraction a GTC reduces both the amount of trade receivables and the

amount of trade payables. In terms of absolute change, one may say that trade credit granted from a GTC serves as a complement to bank loans for those who purchase from the GTC. On the other hand, a GTC's payments, by reducing its trade payables, function as a substitute for bank loans to those who sell to the GTC. If you look at the trade receivables, the complementary relation to bank loans disproves the Meltzer hypothesis. Looking at trade payables, however, their serving as a substitute for bank loans lends support to the hypothesis.

To clarify these mixed results, I examined the conjecture in terms of *relative* change. It demonstrated that trade receivables and payables move together tightly in response to a bank-lending indicator. In conclusion, a decrease in trade credit on both sides during a monetary squeeze suggests that interfirm financing moves in concert with banking financing. Hence trade credit at the gross level functions as a *complement* to macroeconomic bank lending.

Second, I examined trade credit by dividing GTCs' trading partners into related companies and non-related companies. The GTCs' response to financial market indicators—in terms of altering trade credit for non-related companies—was the same as their alteration of trade credit for all trade partners. For related companies, the way in which trade credit reacts to a change in bank lending appeared to be consistent with the Meltzer hypothesis in terms of *relative* change. However, it was not statistically significant enough to confirm the hypothesis.

A major difference between related and non-related companies lies in the way in which trade receivables react to a GTC's individual financial situation. When a GTC must incur its own additional interest expenses over market interest rates, the GTC reduces trade receivables to non-related firms but not to related firms. This behavior

eventually works as a shield, protecting its related companies from sharing the parent company's interest costs.

One should remember that a GTC's trade credit for its related companies represents only one of the financial relationships between the GTC and those companies. GTCs provide related companies with financial assistances such as loans, loan guarantees, or corporate bonds. Although it is not easy to obtain such financial data separated into related and non-related companies, further research should be devoted to investigating the financial relationship between GTCs and related companies. In financial measures other than trade credit, one may observe Meltzer-like behavior during periods of monetary tightness. I leave this exploration to future research.

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Table 1. The Number of General Trading Companies

Company	Mitsui	Itochu	Itochu+ Ataka	Kanematsu	Sumitomo	Marubeni	Mitsubishi	Nissho-Iwai	Nichimen	Sojitz	Tomen	Toyota-Tsusho(2)	Toyota-Tsusho(1)	Total firms
F.Y. ending in March	A	B(1)	B(2)	C	D	E	F	G	H	I (=G+H)	J	K	L (=J+K)	
1976	1	1		1	1	1	1	1	1		1	1		10
1977	1	1		1	1	1	1	1	1		1	1		10
1978	1		1	1	1	1	1	1	1		1	1		10
1979	1		1	1	1	1	1	1	1		1	1		10
1980	1		1	1	1	1	1	1	1		1	1		10
1981	1		1	1	1	1	1	1	1		1	1		10
1982	1		1	1	1	1	1	1	1		1	1		10
1983	1		1	1	1	1	1	1	1		1	1		10
1984	1		1	1	1	1	1	1	1		1	1		10
1985	1		1	1	1	1	1	1	1		1	1		10
1986	1		1	1	1	1	1	1	1		1	1		10
1987	1		1	1	1	1	1	1	1		1	1		10
1988	1		1	1	1	1	1	1	1		1	1		10
1989	1		1	1	1	1	1	1	1		1	1		10
1990	1		1	1	1	1	1	1	1		1	1		10
1991	1		1	1	1	1	1	1	1		1	1		10
1992	1		1	1	1	1	1	1	1		1	1		10
1993	1		1	1	1	1	1	1	1		1	1		10
1994	1		1	1	1	1	1	1	1		1	1		10
1995	1		1	1	1	1	1	1	1		1	1		10
1996	1		1	1	1	1	1	1	1		1	1		10
1997	1		1	1	1	1	1	1	1		1	1		10
1998	1		1	1	1	1	1	1	1		1	1		10
1999	1		1	1	1	1	1	1	1		1	1		10
2000	1		1	1	1	1	1	1	1		1	1		10
2001	1		1	1	1	1	1	1	1		1	1		10
2002	1		1	1	1	1	1	1	1		1	1		10
2003	1		1	1	1	1	1	1	1		1	1		10
2004	1		1	1	1	1	1	1	1		1	1		10
2005	1		1	1	1	1	1			1	1	1		9
2006	1		1	1	1	1	1			1	1	1		9
2007	1		1	1	1	1	1			1			1	8
2008	1		1	1	1	1	1			1			1	8

Table 2. Companies in Sales Order (mill. yen)

1979Apl-1980Mar			1989Apl-1990Mar			1999Apl-2000Mar			2007Apl-2008Mar		
	Company	Sales		Company	Sales		Company	Sales		Company	Sales
1	Mitsubishi	12,066,794	1	Sumitomo	21,403,613	1	Mitsui	10,658,978	1	Mitsui	12,291,218
2	Mitsui	11,208,181	2	Itochu	20,532,742	2	Mitsubishi	10,485,212	2	Mitsubishi	10,832,868
3	Itochu	8,862,034	3	Mitsui	20,300,091	3	Itochu	10,252,007	3	Sumitomo	6,388,976
4	Marubeni	8,388,063	4	Marubeni	18,248,246	4	Sumitomo	9,660,105	4	Marubeni	6,193,597
5	Sumitomo	7,600,605	5	Mitsubishi	16,614,012	5	Marubeni	8,858,836	5	Itochu	5,625,287
6	Nissho-Iwai	5,769,756	6	Nissho-Iwai	15,047,507	6	Nissho-Iwai	5,996,546	6	Toyota-Tsusho	4,862,155
7	Tomen	2,789,789	7	Tomen	6,324,318	7	Tomen	2,388,588	7	Sojitz	3,480,490
8	Kanematsu	2,760,184	8	Nichimen	5,893,718	8	Nichimen	2,227,117	8	Kanematsu	564,100
9	Nichimen	2,289,780	9	Kanematsu	5,501,768	9	Toyota-Tsusho	1,550,897			
10	Toyota-Tsusho	865,870	10	Toyota-Tsusho	1,957,314	10	Kanematsu	947,443			

Source: Financial Statements

Table 3. Empirical Studies on the Meltzer Conjecture

Article	Country	Data Frequency	Time Period	Data Type and Grouping	Evidence to the Meltzer conjecure
Cunningham(2005)	Canada	annual	1988-1998	microdata for public and private firms	partly favorable
Marotta (1997)	Italy	annual	1982-1993	aggregation by size and sector	unfavorable
Rondi *et al.* (1998)	Italy	annual	1968-1991	aggregation by size	unfavorable
Ogawa (2003)	Japan	quarterly	1975:Q1-1998:Q1	aggregation by size	partly favorable
Uesugi and Yamashiro (2006)	Japan	quarterly	1967:Q1-2003:Q3	aggregation of large-sized wholsalers	unfavorable since the 1980s
Kohler *et al.* (2000)	U.K.	annual	1983-1996	microdata for quoted firms	favorable
Mateut *et al.* (2006)	U.K.	annual	1990-1999	microdata from the FAME database	favorable
Oliner and Rudebusch (1996)	USA	Quarterly	1976:Q1-1991:Q2	aggregation by size	unfavorable
Nielsen (2002)	USA	quarterly annual	1959-1992 1973-1992	aggregation by size aggregation by bond	favorable
Choi and Kim (2005)	USA	quarterly	1975:Q4-1997:Q4	microdata from Compustat files (S&P500, Non-S&P	unfavorable

Table 4. Notation and Data Description

Variable	Description	Original Data Sources
$TR_{i,t}$	Firm i's trade receivables (= accounts and notes receivables) granted to all its buyers outstanding at the end of March of year *t*	financial statements
$TR^{R}_{i,t}$	Firm i's trade receivables (= accounts and notes receivables) granted to its related firms (buyers) outstanding at the end of March of year *t*	financial statements
$TR^{N}_{i,t}$	Firm i's Trade receivables (= accounts and notes receivables) granted to its non-related firms (buyers) outstanding at the end of March of year *t*	financial statements
$TP_{i,t}$	Firm i's trade payables (= accounts and notes payables) received from all its sellers outstanding at the end of March of year *t*	financial statements
$TP^{R}_{i,t}$	Firm i's trade payables (= accounts and notes payables) received from its related firms (sellers) outstanding at the end of March of year *t*	financial statements
$TP^{N}_{i,t}$	Firm i's Trade payables (= accounts and notes payables) received from its non-related firms (sellers) outstanding at the end of March of year *t*	financial statements
$S_{i,t}$	The total amount sold by firm *i* from April of year *t-1* to March of year *t*	financial statements
$S^{R}_{i,t}$	The amount sold by firm *i* to its related firms from April of year *t-1* to March of year *t*	financial statements
$S^{N}_{i,t}$	The amount sold by firm *i* to its non-related firms from April of year *t-1* to March of year *t*	financial statements
$P_{i,t}$	The total amount purchased by firm *i* from April of year *t-1* to March of year *t*	financial statements
$P^{R}_{i,t}$	The amount purchased by firm *i* from its related firms from April of year *t-1* to March of year *t*	financial statements
$P^{N}_{i,t}$	The amount purchased by firm *i* from its non-related firms from April of year *t-1* to March of year *t*	financial statements
$IGAP_{i,t}$	firm i's interest expenses to interest-bearing debts ratio at year t - Call rate(collateralized overnight)'s fiscal yearly (from April of year *t-1* to March of year *t*) average	Bank of Japan for call rate
	where firm *i*'s interest expenses to interest-bearing debts ratio at year *t* = (firm *i*'s interest expenses from April of yeat *t-1* to March of year *t*)*2/ (firms *i*'s interest-bearing debts at the end of March of year *t-1* + interest-bearing debts at the end of March of year *t*)	financial statements
M_{t}	Monetary policy indicator at year *t*. An increase in Mt indicates an ease-money policy. The Bank of Japan asks the sample firms if banks are willing (X1), normally ready (X2), or unwilling (X3) to lend to them. Then, it reports the index calculated as: (the number of firms answering (X1) − the number of firms answering (X3))/the number of respondents. The data are a percentage index ranging from +100 to -100. As a representative indicator for GTCs' trading partners on an annual basis, I use the index for manufacturing firms at the forth quarter of year t-1.	TANKAN (by Bank of Japan)

Table 5. Panel Unit Root Test

	Levin, Lin & Chu (2002) t* [a, b, c]				Im, Pesaran and Shin (2003) W-stat [a, d]			
	No trend		Individual trend		No trend		Individual trend	
(a)								
dlnTR	-4.77781	***	-6.55466	***	-4.53828	***	-7.26487	***
$dlnTR^R$	-8.41858	***	-8.25497	***	-8.48172	***	-8.65678	***
$dlnTR^N$	-4.60394	***	-6.55466	***	-4.38464	***	-6.44762	***
dlnTP	-9.12079	***	-7.42291	***	-8.07723	***	-7.0416	***
$dlnTP^R$	-14.999	***	-11.9423	***	-14.2791	***	-12.3444	***
$dlnTP^N$	-9.62639	***	-8.96354	***	-8.54772	***	-7.89726	***
dlnS	-8.57219	***	-9.92704	***	-6.84099	***	-8.07193	***
$dlnS^R$	-8.20503	***	-8.42682	***	-7.33753	***	-7.87036	***
$dlnS^N$	-8.58075	***	-9.26552	***	-7.53198	***	-8.1733	***
dlnP	-8.58222	***	-9.74263	***	-6.93239	***	-8.07636	***
$dlnP^R$	-11.4931	***	-12.0595	***	-10.0881	***	-10.3532	***
$dlnP^N$	-8.91797	***	-9.7396	***	-7.56375	***	-8.20183	***
(b)								
lnTR-lnS	-1.54535	*	-0.90624		-1.38314	*	-0.20345	
$lnTR^R$-lnS^R	-0.96727		-3.02092	***	-1.48647	*	-2.51459	***
$lnTR^N$-lnS^N	-1.99657	**	0.25599		-1.18227		0.21591	
lnTP-lnP	-3.17321	***	-1.98774	**	-2.40432	***	0.8329	
$lnTP^R$-lnP^R	-4.22075	***	-3.21601	***	-4.08106	***	-2.79793	***
$lnTP^N$-lnP^N	-3.69106	***	-2.33746	***	-2.43813	***	0.05689	
(c)								
igap	-6.6036	***	-5.27116	***	-4.98809	***	-5.38187	***
M	-10.025	***	-9.98865	***	-9.1557	***	-7.3382	***

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

[a] Individual intercepts are included. All the lag lengths are chosen with SIC

[b] The Newey-West bandwidth selection method based the Bartlett kernel are used in the test procedure.

[c] H_0 :Unit root, H_1: No unit root.

[d] H_0 :Unit root, H_1: Some-cross sections without unit root.

Table 6-A Trade Credit granted to and received from a GTC's all trading partner
(GTCs including the Kanematsu and the Toyota-Tsusho corporations)

Eq. (1)

Dep. var.	$dlnTR_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnS_{i,t}$	0.5670297	0.038828	***
$lnTR_{i,t-1}$-$lnS_{i,t-1}$	-0.066469	0.017871	***
$IGAP_{i,t-1}$	-0.014698	0.005293	***
M_t	0.0020152	0.000404	***
Obs.	308		
Time-period	1977-2008		
Num. of firms	13		
R^2	0.4915		

Eq. (2)

Dep. var.	$dlnTP_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnP_{i,t}$	0.6764345	0.052279	***
$lnTP_{i,t-1}$-$lnP_{i,t-1}$	-0.088665	0.221786	***
$IGAP_{i,t-1}$	-0.000832	0.006696	
M_t	0.002043	0.000417	***
Obs.	309		
Time-period	1977-2008		
Num. of firms	13		
R^2	0.468		

System Regression of eqs. (1) and (2).

(1)	Coef.	Std. Err.		(2)	Coef.	Std. Err.	
M_t	0.002015	0.000404	***	M_t	0.002043	0.000417	***
Wald test: H_0: Coef.of M in (1) = Coef of M in (2)							
F(1, 583) = 0.00 Prob > F = 0.9618							

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.
1) Fixed effects are not reported.

Table 6-B. Trade Credit granted to and received from a GTC's all trading partner
(GTCs excluding the Kanematsu and the Toyota-Tsusho corporations)

Eq. (1)

Dep. var.	$dlnTR_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnS_{i,t}$	0.5337442	0.045684	***
$lnTR_{i,t-1}$-$lnS_{i,t-1}$	-0.053186	0.021507	**
$IGAP_{i,t-1}$	-0.015792	0.006424	**
M_t	0.0021799	0.000475	***
Obs.	245		
Time-period	1977-2008		
Num. of firms	10		
R^2	0.442		

Eq. (2)

Dep. var.	$dlnTP_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnP_{i,t}$	0.6143163	0.06319	***
$lnTP_{i,t-1}$-$lnP_{i,t-1}$	-0.068077	0.023809	***
$IGAP_{i,t-1}$	0.0003655	0.007621	
M_t	0.0021671	0.000421	***
Obs.	246		
Time-period	1977-2008		
Num. of firms	10		
R^2	0.4189		

System Regression of eqs. (1) and (2).

(1)	Coef.	Std. Err.		(2)	Coef.	Std. Err.	
M_t	0.0021799	0.000475	***	M_t	0.0021671	0.000421	***
Wald test: H_0: Coef.of M in (1) = Coef of M in (2)							
F(1, 463) = 0.00 Prob > F = 0.9839							

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.
1) Fixed effects are not reported.

Table 7-A. Trade Credit granted to and received from a GTC's related companies
(GTCs including the Kanematsu and the Toyota-Tsusho corporations)

Eq. (3)

Dep. var.	$dlnTR^R_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnS^R_{i,t}$	0.3289683	0.076071	***
$lnTR^R_{i,t-1}$-$lnS^R_{i,t-1}$	-0.068232	0.033223	**
$IGAP_{i,t-1}$	0.009151	0.008701	
M_t	0.0011799	0.000574	**
Obs.	278		
Time-period	1977-2008		
Num. of firms	12		
R^2	0.2067		

Eq. (4)

Dep. var.	$dlnTP^R_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnP^R_{i,t}$	0.4178538	0.079704	***
$lnTP^R_{i,t-1}$-$lnP^R_{i,t-1}$	-0.176423	0.042933	***
$IGAP_{i,t-1}$	-0.005388	0.012578	
M_t	0.0022087	0.000931	**
Obs.	280		
Time-period	1977-2008		
Num. of firms	11		
R^2	0.1944		

System Regression of eqs. (3) and (4).

(3)	Coef.	Std. Err.		(4)	Coef.	Std. Err.	
M_t	0.0011799	0.000573	**	M_t	0.0022087	0.000932	**
Wald test: H_0: Coef.of M in (1) = Coef of M in (2)							
F(1, 407) = 0.88 Prob > F = 0.3474							

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.
1) Fixed effects are not reported.

Table 7-B. Trade Credit granted to and received from GTCs' related companies
(GTCs excluding the Kanematsu and the Toyota-Tsusho corporations)

Eq. (3)

Dep. var.	$dlnTR^R_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnS^R_{i,t}$	0.3474306	0.084453	***
$lnTR^R_{i,t-1}$-$lnS^R_{i,t-1}$	-0.080475	0.036776	**
$IGAP_{i,t-1}$	0.0059214	0.0101	
M_t	0.0013342	0.000631	**
Obs.	215		
Time-period	1977-2008		
Num. of firms	9		
R^2	0.2427		

Eq. (4)

Dep. var.	$dlnTP^R_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnP^R_{i,t}$	0.3421041	0.075857	***
$lnTP^R_{i,t-1}$-$lnP^R_{i,t-1}$	-0.140708	0.041808	***
$IGAP_{i,t-1}$	-0.01865	0.011735	
M_t	0.0027727	0.000994	***
Obs.	217		
Time-period	1977-2008		
Num. of firms	8		
R^2	0.1641		

System Regression of eqs. (3) and (4).

(3)	Coef.	Std. Err.		(4)	Coef.	Std. Err.	
M_t	0.0013342	0.00063	**	M_t	0.0027727	0.000995	***
Wald test: H_0: Coef.of M in (1) = Coef of M in (2)							
F(1, 407) = 1.49 Prob > F = 0.2227							

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.
1) Fixed effects are not reported.

Table 8-A. Trade Credit granted to and received from a GTC's non-related comp
(GTCs including the Kanematsu and the Toyota-Tsusho corporations)

Eq. (5)

Dep. var.	$dlnTR^N_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnS^N_{i,t}$	0.5394249	0.042093	***
$lnTR^N_{i,t-1}$-$lnS^N_{i,t-1}$	-0.084381	0.019154	***
$IGAP_{i,t-1}$	-0.01973	0.005246	***
M_t	0.0019977	0.000409	***
Obs.	278		
Time-period	1977-2008		
Num. of firms	12		
R^2	0.4818		

Eq. (6)

Dep. var.	$dlnTP^N_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnP^N_{i,t}$	0.6997541	0.066639	***
$lnTP^N_{i,t-1}$-$lnP^N_{i,t-1}$	-0.113722	0.027667	***
$IGAP_{i,t-1}$	-0.000457	0.008125	
M_t	0.0020719	0.000539	***
Obs.	280		
Time-period	1977-2008		
Num. of firms	11		
R^2	0.4409		

System Regression of eqs. (5) and (6).

(5)	Coef.	Std. Err.		(6)	Coef.	Std. Err.	
M_t	0.0019977	0.000408	***	M_t	0.0020719	0.00054	***
Wald test: H_0: Coef.of M in (1) = Coef of M in (2)							
F(1, 527) = 0.01 Prob > F = 0.9127							

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.
1) Fixed effects are not reported.

Table 8-B. Trade Credit granted to and received from GTCs' non-related compar
(GTCs excluding the Kanematsu and the Toyota-Tsusho corporations)

Eq. (5)

Dep. var.	$dlnTR^N_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnS^N_{i,t}$	0.4924934	0.044331	***
$lnTR^N_{i,t-1}$-$lnS^N_{i,t-1}$	-0.571413	0.021023	***
$IGAP_{i,t-1}$	-0.018783	0.006451	***
M_t	0.0019856	0.000474	***
Obs.	215		
Time-period	1977-2008		
Num. of firms	9		
R^2	0.4008		

Eq. (6)

Dep. var.	$dlnTP^N_{i,t}$		
Exp. var.	Coef.	Std. Err.	
$dlnP^N_{i,t}$	0.6759139	0.075883	***
$lnTP^N_{i,t-1}$-$lnP^N_{i,t-1}$	-0.097426	0.030686	***
$IGAP_{i,t-1}$	0.003608	0.00899	
M_t	0.0019373	0.000545	***
Obs.	217		
Time-period	1977-2008		
Num. of firms	8		
R^2	0.4036		

System Regression of eqs. (5) and (6).

(5)	Coef.	Std. Err.		(6)	Coef.	Std. Err.	
M_t	0.0019856	0.000473	***	M_t	0.0019373	0.000546	***
Wald test: H_0: Coef.of M in (1) = Coef of M in (2)							
F(1, 527) = 0.00 Prob > F = 0.9466							

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.
1) Fixed effects are not reported.

Figure 1. Transactions and Trade Credit for All GTCs to All Trading Partners (mill. yen) , Source : Financial Statements

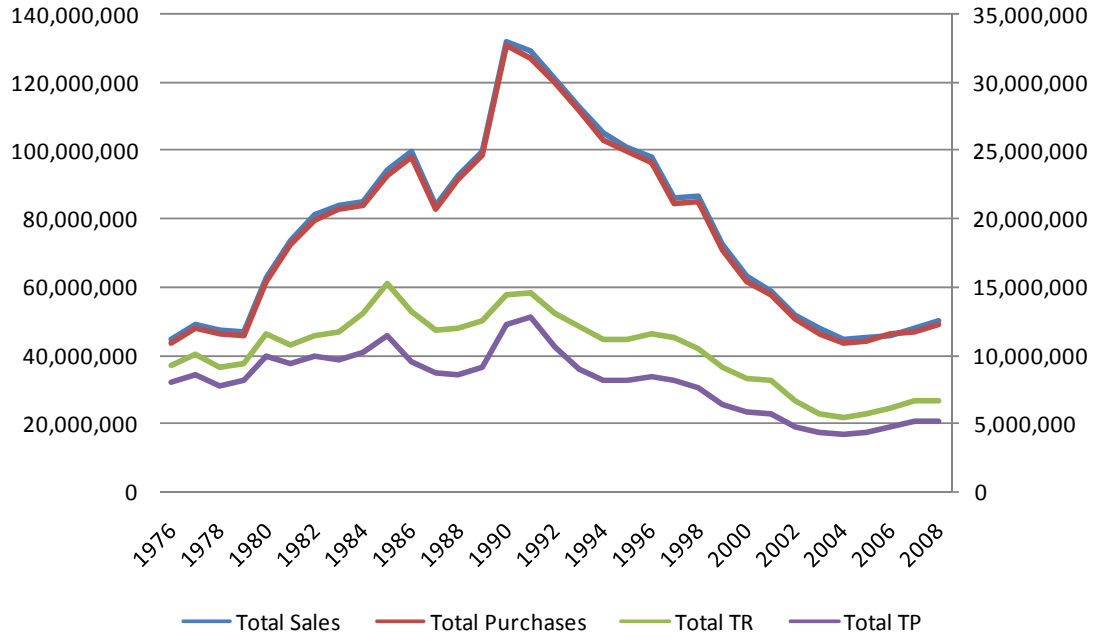
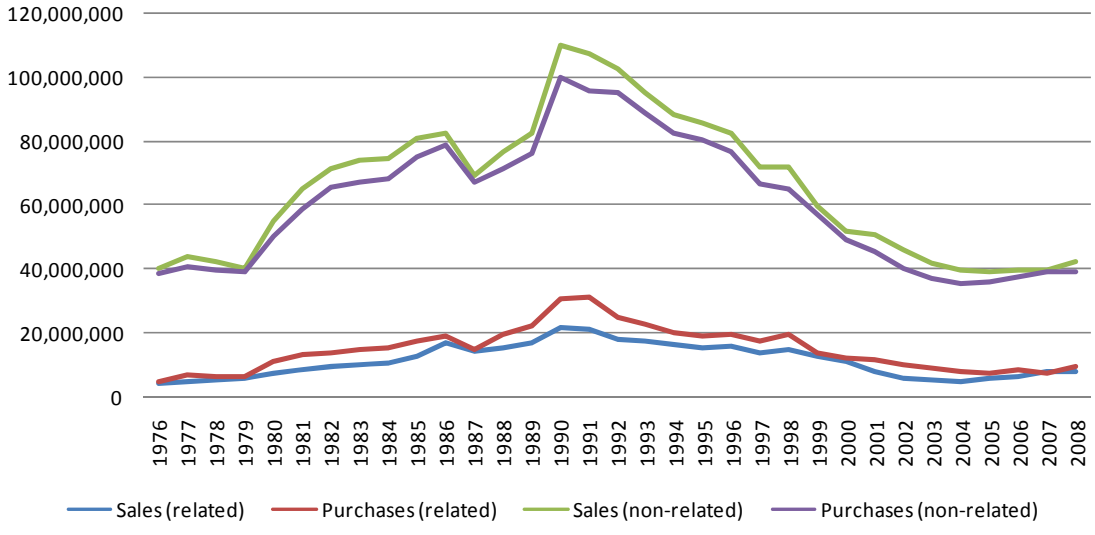


Figure 2. All GTCs' Sales to and Their Purchases from Related and Non-Related Firms (mill. yen)
Source: Financial Statements



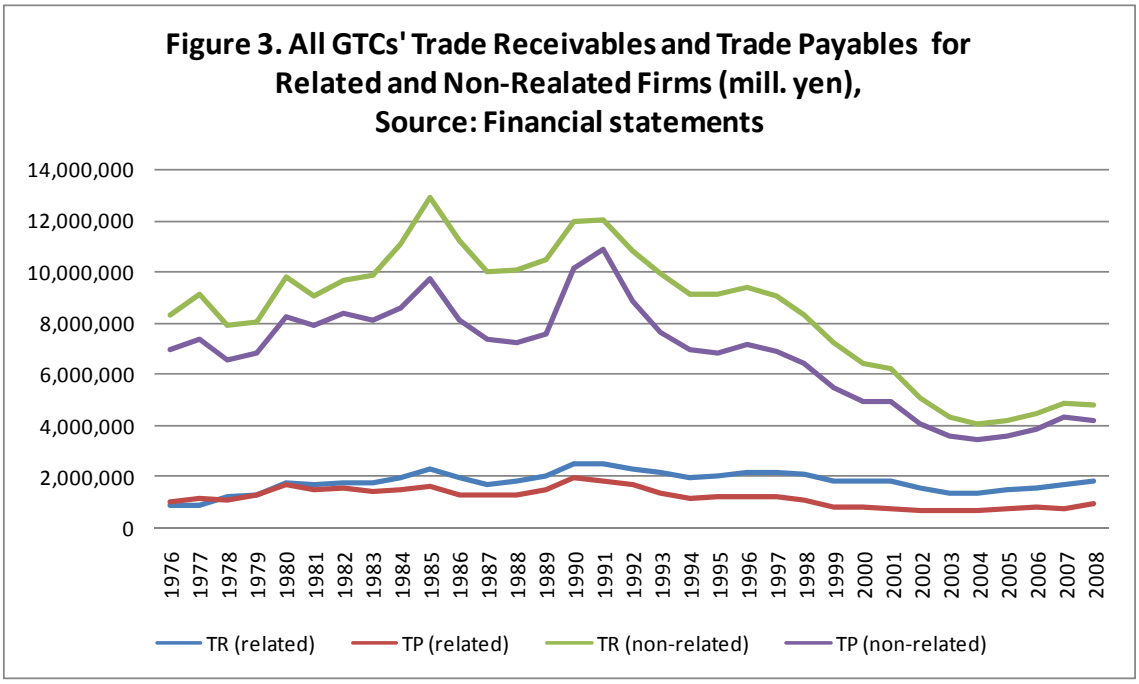


Figure 3. All GTCs' Trade Receivables and Trade Payables for Related and Non-Realated Firms (mill. yen), Source: Financial statements
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
TR (related)
TP (related)
TR (non-related)
TP (non-related)