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Exporter Dynamics and Information Spillovers through the Main Bank

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Abstract

This paper studies how the decision of firms to start exporting is affected by the availability of information on export markets. Unlike the extant studies which focus on the information sharing among firms, we are interested in the information provided by lender banks. A unique dataset containing both the firms' export dynamics and their lender banks' experience in transacting with other exporting firms allows us to study whether banks work as a conduit of information on export markets. We find that firms' decision to start exporting (extensive margin) is affected by the degree of lender banks' loan provision to the client firms already exporting to a destination region. We could not, however, confirm such a mechanism for the determination of export volume (intensive margin). These results imply the importance of considering multiple sources of information for potential exporter firms.

Key words: Export Decision; Lender Bank; Information Spillover; General and Specific Information.
JEL Classification: F10, F14, G21, L25

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1. Introduction

Although a large body of literature has already investigated and uncovered the various positive relationships between globalization and the performance of firms, researchers' knowledge on the dynamic behavior of firms in a globalized economic environment is still far from sufficient to propose appropriate policies to support firms' growth in a globalized economy. For example, although the theoretical prediction that firms with higher productivity are more likely to become exporters has been widely supported by empirical studies, a growing number of studies is producing results suggesting that productivity advantages alone do not sufficiently explain the self-selection of firms into exporting. For example, Bernard et al. (2003), Mayer and Ottaviano (2008), and Todo (2011) have pointed out that the size of the impact of productivity advantages is economically negligible. This implies that our knowledge about the determinants of the export decision remains very limited and no conclusive answer has been found as to what factors are important for firms to become an exporter and grow through exporting.

It is argued in international trade literature that firms have to incur sunk fixed costs to start exporting because firms are initially uncertain about their export profitability and they have to collect a lot of relevant information on export markets. Moreover, firms need to modify products to fit local tastes and set up distribution networks. From a theoretical perspective, Melitz (2003) suggests that only firms which are productive enough to cover such fixed costs can be exporters. The above-listed empirical studies conducted based on this view, however, imply other important factors which affect firms' decision to export. In other words, firms can be exporters when other critical conditions are satisfied even though their productivity is not very high.

Several potential factors which affect firms' export decision have been

investigated in the extant literature. One important research strand in this context focuses on the export spillovers. The idea is that information exchange with other exporting firms reduces the individual fixed cost associated with exporting, and that such information exchange therefore increases the probability that a firm will export (e.g., Krautheim 2008).[1] Having access to the information on foreign markets substantially reduces uncertainty and encourages firms to participate in export markets. Koenig et al. (2010) confirm this view by finding that presence of other exporters influences positively the export decision of other firms. However, empirical studies to date have produced at best weak support for such export spillovers (e.g., Aitken et al. 1997, Barrios et al. 2003, Bernard and Jensen 2004), which naturally stipulates the search for other channels of information spillovers.

Following this line, this paper focuses on another source of information spillovers: information provided by lender banks. Most existing empirical studies examining information spillovers from other exporting firms assume that firms in the same region and/or industry are likely to exchange information with each other, but do not explicitly discuss the channel through which such information exchange takes place. The hypothesis we examine here is that lender banks work as a conduit for such information. Suppose a bank is very knowledgeable about overseas business opportunities either through its own banking activities or transactions with client firms with experience in exporting. Potential exporter firms would find it helpful to consult with such a bank. Some recent studies suggest that financial institutions play

[1] Other strands in the literature examine the relationship between firms' export status and their innovative capacity, the price and/or quality of their product, various country characteristics, and institutional factors such as free trade agreements, economic diplomacy, and so on. Moreover, especially since the 2008 global financial crisis, the impact of credit constraints on firms' export decision has gained growing attention among researchers and policy makers. Because exporting involves higher entry costs than selling in the domestic market and most entry costs must be paid up front, only firms with sufficient liquidity can meet them. Based on this line of reasoning, Chaney (2005) augmented a Melitz-type model with liquidity constraints and suggests that financial frictions affect the selection of firms into exporting. Several studies, such as Bellone et al. (2010), Muûls (2008), Manova et al. (2011), Feenstra et al. (2011), and Minetti and Zhu (2011), have produced evidence indicating that credit constraints severely restrict firms' export capacity.

an important role in client firms' export dynamics.[2] Inui et al. (2011), using a measure of banks' efficiency[3] as a proxy for their ability to screen, monitor, and advise client firms, find that bank efficiency has a positive effect on the export decision and overseas sales ratio for client firms. One shortcoming of their study is the lack of direct measure for banks' ability to produce information, which prevents them from explicitly analyzing the role of banks as information providers.

The central theme of this paper is to explore the role of banks as information providers by explicitly quantifying the banks' ability to provide information on export markets using the unique panel data where firms are matched to lender banks. In fact, Japanese Bankers Association (2011) reports various episodes in which banks provide supporting services to firms when the firms export to a new foreign market and/or open affiliates or branches overseas. According to the report, banks not only provide financial support to firms but also actively introduce them to foreign firms that are potential business partners or providers of business supporting services. We therefore conjecture that banks play a crucial role in substantially reducing the fixed entry costs incurred by client firms when starting to export. We hypothesize that the provision of information by lender banks helps firms to start exporting based on the same mechanisms that information exchange with other exporting firms helps potential export starters. Thus, our study sheds light on the potentially important channel of the information flows from main banks to client firms[4].

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[2] Although there are not many studies which focus on the role of financial institutions in this context, notable exceptions are studies by Amiti and Weinstein (2011) and Paravisini et al. (2011). These studies suggest that banks' financial health affects their client firms' export behavior.

[3] The bank efficiency measure is calculated as the ratio of risk-adjusted output to operating cost for each bank, and the bank efficiency variable used in the empirical analysis is the relative efficiency of each bank to the average efficiency of all banks. For details, see Inui et al. (2011).

[4] Of course, there are several other sources from which firms obtain information on export markets. Although economic diplomacy such as a chamber of commerce in a destination country (Creusen and Lejour 2011), we do not address the role of economic diplomacy due to constraints of our data. As described below, information on the destination of exports is only available at region level, such as North America or Asia, and not available at country level. Moreover, trading companies or wholesalers must be playing an important role as a conduit for information on export markets. Unfortunately, we cannot identify transaction relationships between exporter firms and trading companies.

The organization of this paper is as follows. Section 2 briefly explains roles of main banks in Japan and presents the empirical strategy. Section 3 describes the dataset used in this paper and shows some descriptive statistics on exporters and banks. In Section 4 we present estimation results. Finally, Section 5 discusses the policy implications and concludes.

2. Empirical Strategy

2.1 The Main Bank System in Japan

The Japanese banking system has a long history to be characterized as “main bank system”. Main banks are defined as banks which provide bank loans to their client firms, and they usually have a long-term relationship with the firms. Many previous studies claim that main banks not only financially support the client firms but also play a consulting role by providing relevant business information. They tend to get involved with the firms’ management if necessary. As one prominent work, Aoki and Patrick eds. (1994) state that under the asymmetric information about firm characteristics between firms and their potential financiers, main banks keeping intimate and continuous transactions with client firms are in a better position to evaluate and monitor the firms, because the long-term relationship enables main banks to gain access to "soft-information" which is not obtainable in an instant manner. Main banks also play an important role in cases where firms confront with financial difficulties. Main banks are responsible for supporting the firm in restoring its financial soundness under such environments. Although the degree or form of the main bank’s participation in the firms’ management has been changing over the several decades, main banks are still perceived to play an important role. As a classical view, Fama (1985) considers the renewal of bank loan as a creation of two

positive externalities. First, it enables other providers of financing to avoid duplicating the evaluation process of the bank. Second, it also provides accreditation to the public that the firm will be able to produce enough cash flows in the future to meet its fixed obligation. Even in the recent studies such as Degryse et al. (2009) support the view that the repeated bank loan relations lead to the accumulation of soft-information about their client firms.

Among many dimensions where such main bank relations exert the value, main banks could help their client firms when the firms try to expand their market overseas or set up their affiliates in foreign countries. Particularly in recent years, banks have been promoting such supporting services for the client firms' international activities, being aware of the fact that prospects of the Japanese domestic market do not look good due to the aging population combined with the diminishing number of children. Japanese Bankers Association (2011) reports various cases where banks provide supporting services to firms' international activities. For example, main banks provide usual loan business, deposit service, payment services, lease and leaseback deal, or the issue of stand-by L/C.

Other than these traditional banking services, main banks often provide client firms with information on the potential business partners in foreign countries and advice on recruiting employees, advertising, various taxes, and administrative issues including accounting system, law and regulations. These examples imply that banks provide not only financial transactions but also information services. A survey study conducted by the Japanese Bankers Association (2011) reports that 38 out of 43 Japanese banks which expand their business area to Asian countries provide services other than loan, deposit, and payment service. More precisely, 32 out of the 38 banks provide information related to investment (i.e., tax and accounting system etc.), while 31 banks provide the opportunity of business matching (e.g., setting up matching

events for Japanese firms and their potential local business partners). In addition, Japanese banks provide the information of firms located in destination regions (14 banks), a guarantee (12 banks), support of export-and-import procedure (8 banks). In this paper, we intend to examine the importance of such information provided by main banks.

2.2 The Empirical Model

This section explains the empirical strategy to investigate the determinants of export decision and export volume. We are particularly interested in the role of information provided by main banks on the probability that a firm starts exporting (i.e., the extensive margin) and the export volume (i.e., the intensive margin). Following previous empirical studies on the determinants of the extensive and intensive margin (e.g., Koenig et al. 2010, Minetti and Zhu 2011), we assume that a firm i starts exporting if its profits are larger when exporting than its profits when not exporting. Let Π_{ijt}^* represent the difference between the profits of firm i when it starts exporting to a destination j at time t and its profits when it does not start exporting to the destination j at time t. The difference is determined by firm characteristics (e.g., size, productivity, and skill level of workers), the firm's financial conditions (e.g., leverage ratio, liquidity ratio, and short-term loan ratio), and the amount of information on the export market available to the firm. The availability of information on the export market is assumed to substantially lower the uncertainty of profits from exporting and hence, to lower either the variable or the fixed cost of exporting. While export spillovers are also taken into account, we are particularly interested in information provided through the main bank of the firm. Therefore, we parameterize Π_{ijt}^* as:

$$\pi^{*}_{ijt} = \alpha_1 + Z_{it}\beta_1 + I_{ijt}\gamma_1 + \varepsilon_{ijt}$$

where Z_{it} is a vector of controls for firm characteristics and the firm's financial conditions that may affect firm i's differential profits π_{ijt}^{*}; I_{ijt} is a vector of variables representing information available to the firm; and ε_{ijt} captures the unobserved firm characteristics and other unknown factors that may also affect the differential profits.

We assume that firm i start exporting if the differential profits $\pi_{ijt}^{*}>0$. Under the assumption that ε_{ijt} is a normally distributed random error with zero mean and unit variance, the probability that firm i starts exporting can be written as:

$$\text{Prob}_{ijt} = \text{Prob}\left(\alpha_1 + Z_{it}\beta_1 + I_{ijt}\gamma_1 + \varepsilon_{ijt} > 0\right) \quad (1)$$

In the first instance, we estimate the equation (1) with a random effect panel probit procedure or a probit procedure.[5] Taking account of the endogeneity problem, we lag all right-hand side variables one year.[6] The dependent variable $Prob_{ijt}$ denotes the change of export status at the firm- or firm-destination level, which takes the value 1 if a firm exports for the first time or first to destination j at time t. We define the export starter if the firm did not export over the last three years from t-3 to t-1. $Prob_{ijt}$ takes the value 0 if a firm did not export to destination j for the last three years prior to year t and does not export in year t. Always exporters to destination j are not included in our analysis. As for the control variables for firm characteristics and the firm's financial conditions (Z_{it}), we include the firm size (the log of the number of employees of firm i), the TFP level of the firm, and average wage rate of the firm as a proxy for the skill level of workers. As already shown in a lot of theoretical and

[5] For details of the variables and their basic statistics, see Table 1.

[6] As we will detail later, we also condition the sample on the firms which have not exported during the last three years prior to the analyzed period so that we could focus on the firm-bank relation which is predetermined as of export decision.

empirical papers, we expect that these firm characteristics will positively affect the firms' export decision. Taking account of the importance of liquidity constraints in the firms' export behavior, we include variables representing the firm's financial conditions, such as leverage ratio, liquidity ratio, and the share of short-term loan in the total loan for the firm. As intensively examined in the literature (see the papers referred in Section 1), firms' financial constraints should restrict firms' export capacity because firms need sufficient liquidity to pay high entry costs to start exporting. Therefore, we expect that firms with more sufficient liquidity are more likely to start exporting.

The explanatory variable of main interest is amount of information on export markets available to the firm (I_{ijt}). As a proxy for the amount of information on destination j accumulated by the main lender bank for firm i, we include the ratio of the number of the main bank's client firms that are exporting to destination j to the total number of the main bank's client firms. In other words, the variable representing the possibility of information spillovers through the main bank is measured as the intensity of each bank's dealings with exporting firms. We also include variables representing the firm's overseas activities, such as the share of overseas employees and the share of overseas investment, taking account of information accumulated by the firm itself through their own international activities. In addition, there may be some spillovers from nearby exporters discussed in previous studies. Controlling for the export spillovers and any other region specific factors, we include region dummy variables for the region where the firm's headquarter is located.[7] Demand and other destination-specific factors are controlled for by including destination dummy variables. Industry dummies and time dummies are also included in order to control for the industry-specific and time-specific fixed effects,

[7] The current version of estimation does not include this region dummy since it is confirmed that the inclusion of such prefecture-level region dummy does not improve the estimation at all. Employing finer location dummy is our future task to be done.

respectively.

We also examine the role of information spillovers through the main bank on the intensive margin of export, i.e., export volume after starting exporting. In practice, we replace the above specification (Equation (1)) with the following equation.

$$EXP_{ijt} = \alpha_2 + Z_{it}\beta_2 + I_{ijt}\Upsilon_2 + \varepsilon_{ijt} \quad (2)$$

Where EXP_{ijt} is the log of firm i's exports to destination j at time t or the first-difference of the log of exports. We include various explanatory variables that are same as those in equation (1). Again, we are particularly interested in the variables representing amount of information on export markets available to the firm (I_{ijt}). Rauch and Watson (2003) theoretically analyze the relationship between search costs to form new partnerships and export volumes. They show that the higher the cost of searching for a new supplier, smaller orders a buyer tends to place with the supplier. On the other hand, the buyer tends to place larger orders with the supplier after the former finds that the latter is able to fulfill the larger order successfully. Their analysis suggests that exchange of information is important for the intensive margin of exports. If main banks effectively help business matching in overseas markets, information provided through the banks should substantially reduce uncertainty for both the buyer and the supplier on the quality of the both parties. Therefore, we expect that information spillovers through main banks positively affect the intensive margin of exports. We examine the effect of information spillovers through main banks on the export volumes by estimating equation (2). As widely recognized, we had better estimate the two equations (1) and (2) in a Heckman selection model because positive exports implies that non-exporters are excluded from the sample of analysis. However, we estimate the two equations separately, not employing the Heckman

model, since same explanatory variables are used in the both equations and we cannot find any valid excluded variable for the selection equation.[8] Therefore, for the estimation of equation (2), we employ ordinary least squares regression and dynamic panel regression.

Thus, we focus on banks' ability as an information provider and banks' knowledge on export markets accumulated directly through their overseas operations and/or indirectly through other exporting firms with which the banks have transaction relationships. At the same time, we examine the effects of firms' knowledge on export markets obtained through their own international experience as well as credit constraints for both firms and banks.

3. Data and Descriptive Statistics

3.1 Data Description

The data that are used for this study are the firm-level panel data underlying the *Basic Survey on Business Structure and Activities (BSBSA)* collected annually by Ministry of Economy, Trade and Industry (METI) for the period 1997-2008. The survey covers all firms with at least 50 employees or 30 million yen of paid-in capital in the Japanese manufacturing, mining, and commerce sectors and several other service sectors. The survey contains detailed information on firm-level business activities such as the 3-digit industry in which the firm operates, its number of employees, sales, purchases, exports, and imports (including a breakdown of the destination of sales and exports and the origin of purchases and imports).[9,10] It also

[8] Although some studies employ a Heckman model (e.g., Bellone et al. 2010), more studies seem to estimate the extensive margin equation and the intensive margin equation separately (e.g., Koenig et al. 2010, Minetti and Zhu 2011, Paravisini et al. 2011, Manova 2008, Manova et al. 2011). Moreover, for our data, finding a valid excluded variable for the selection equation is extremely difficult, because destination country information is not available and available information is only on broadly categorized destination regions.

[9] The survey asks for the amount as well as the destination or origin of exports and imports broken

contains R&D and patents, the number of domestic and overseas subsidiaries, and various other financial data such as costs, profits, investment, debt and assets. In addition, the panel data are available for the relatively long time period (12 years), which allows us to calculate the duration of exporting activity for each sample firm.

As mentioned above, a key feature of our analysis is to investigate the importance of information on destination markets and advice provided by lender banks to their client firms. To do so, we combine the firm-level data with information on firms' main bank and examine the relationships between firm characteristics, banks' ability to provide advice, and firms' export status. We augment the firm-level panel data taken from the BSBSA with information on firm characteristics stored in the Development Bank of Japan Corporate Financial Databank. We then merge the dataset with information on the main lender banks for each firm using the loan relation information stored in the NEEDS Financial Quest database. This database also includes various types of information on lender banks.

Since we hypothesize that information on overseas markets provided by main banks plays an important role in the export decision of borrower firms, we construct several variables that represent banks' ability to collect and analyze information on export markets. For example, banks' experience in transacting with other exporting firms is measured using the Financial Quest database. Moreover, whether a bank has branches or subsidiaries abroad and how long these overseas branches or subsidiaries have been in operation are used as proxies for the bank's stock of information on overseas markets. We utilize this information in order to examine the role of banks as information provider. In addition, we take account of shocks to banks' balance sheets

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down into seven regions (Asia, Middle East, Europe, North America, Latin America, Africa, and Oceania). Unfortunately, more detailed information on the destination of exports and origin of imports is not available.

[10] Although the survey also asks non-manufacturing firms for information on exports and imports, they are required to provide the amount of trade in goods only. The survey does not cover international transactions in services.

as well as firms' credit constraints.[11]

Even though we limit our sample to listed companies so that we can match firms to their lender banks, our dataset nevertheless includes a considerable number of relatively small firms, which are listed on the stock exchange markets for start-up companies, and some of them are first-time exporters. Moreover, once firms have started exporting, many of them expand the range of destinations they export to, so that when we examine the determinants of whether firms start exporting to a new destination, we can include more observations in our analysis.

Our unbalanced panel data currently contain approximately 300 - 400 listed firms per year, approximately 5% of which are identified as export starters.[12] Although the number of pure first-time exporters, which appears to be smaller than this number, is limited, a substantial number of exporters expand or reduce the number of destinations to which they export.

3.2 Variables

For the estimation of the extensive margin, we construct a dummy variable accounting for the start-up of exports. As a first dependent variable, *Fresh_Export* takes 1 if the sample firm did not export to any regions considered in our analysis (i.e., Asia, U.S., South and Central America, Africa, and Oceania) in year *t-3* to *t-1* but exported in year *t*.[13] Note that we condition the variable on the three years during which firms have not exported. This intends to identify the export-starter as clear as possible. As an alternative dependent variable, *Fresh_Export_Somewhere* takes 1 if the sample firm did not export to one of the regions in our sample (i.e., Asia, U.S.,

[11] The current version of our paper only uses the metric based on the loan relation. It is our future task to study the impact of the metric based on the other information (e.g., branches).
[12] This corresponds to the number of firms that start exporting in year *t* and did not export in year *t-1*. Therefore, this number includes firms that are not first-time exporters (i.e., firms that start exporting in year *t* and have never exported in the past).
[13] BSBSA data also specifies other destination regions such as Russia and Europe. We ignore these regions due to the small number of export starters to the regions.

South and Central America, Africa, and/or Oceania) in year *t-3* to *t-1* but exported to the region in year *t*. In the same manner, we can define the dummy for each region. We label those variables as *Fresh_Export_Asia*, *Fresh_Export_NAMERICA*, *Fresh_Export_CSAmerica*, *Fresh_Export_Africa*, and *Fresh_Export_Oceania*. As apparent from the way to construct the variables, we use three-year absence of exports before starting exporting in order to identify a "fresh" exporter. Obviously, we could set longer periods of the absence of exports to identify the fresh exporter in more stringent ways. We leave this to our future task.

The definition and basic statistics of each explanatory variable are summarized in Table 1. Our special interest is the variable representing the ability of banks to provide business information about destination regions. First, *NUM_EXPORTER* denotes the number of exporting client firms for banks which are the lenders for the firm in question. In other words, this variable measures how many firms, which could be working as a source of overseas information, are having relations with a firm's top lender (i.e., main bank). In Koenig et al. (2010), the number of closely located firms in the same industry is used to proxy for the possibility of information spillovers. We use the bank loan relations to measure the potential information spillovers. Note that we could also include the location dummy variable for each firm at the level of prefectures in order to control for exporter spillovers within a regional agglomeration. We do not employ this information as one of our explanatory variables simply because such a prefecture-level location dummy variables do not have any explanatory power in our empirical study.[14] Considering that *NUM_EXPORTER* is highly correlated with the size of banks, we define a variable called *BANKINFO*. It denotes the ratio of *NUM_EXPORTER* to the total number of client firms of each bank (*Num_CLIENT*). To compute this number, we use

[14] Since our dataset contains the headquarters' postal code of each firm, we could refine the location information as in Koenig et al. (2010). We leave this to our future tasks.

all the information about the loan relations between firms and banks, which include not only the top-lender but all the lender information in Financial Quest database. In this sense, we implicitly assume that all the loan exposure to firms could contribute to the accumulation of overseas information in each bank.[15] Through this metric, we intend to measure the intensity of each bank's exposure to exporting firms. Since we have the information about which regions each firm exports to, we can also define these two variables for each region. We assume that *BANKINFO* measured regardless of destination regions is a proxy for information held by banks on foreign markets in general, while *BANKINFO* measured for each destination region is a proxy for region-specific information held by banks. In order to control the size of top lender, we also include the *Num_CLIENT* in our explanatory variables. We could also set longer periods to focus on the predetermined firm-bank relations in more stringent ways. We leave this to our future task.[16]

Considering that it is plausible to have a reverse causality from the initiation of exporting to the matching with banks with high BANKINFO, which could generate the simultaneous equation bias to our estimation, we limit the sample to the firms which have kept the same bank as their top lender from *t-3* to *t*. This intends to focus on the sample firm-bank match for which the relation is predetermined as of exporting.

As for firm's productivity, which is considered as an important determinant of export decision in the literature, we use the firm-level TFP data provided in the East

[15] Precisely speaking, we bring the information about export dynamics stored in BSBSA to the firm-bank match-level data constructed from Financial Quest database. Then, we sum up the numbers of each bank's client firm and exporter client in each year to construct *Num_CLIENT* and *NUM_EXPORTER*, which we could use to compute *BANKINFO*. Finally, we bring the information to the firm-level BSBSA again to construct the data we use for our empirical analysis. An alternative way to construct *BANKINFO* is to focus on the top lender relation. We prefer the former way since it allows us to extract the large variation among banks in terms of *BANKINFO*.

[16] Another way to avoid the potential bias from the reverse causality mentioned above is to employ appropriate instruments for *BANKINFO*. It is natural to use the lagged term of *BANKINFO* as our instrument. We are also planning to use some bank specific event which could affect BANKINFOR but not for firms' choice of their top lender (e.g., M&A among banks).

Asian Listed Companies Database (EALC) 2010 compiled by Japan Center for Economic Research (JCER), Center for Economic Institutions (IER, Hitotsubashi University), Center for China and Asian Studies (CCAS, Nihon University), and Center for National Competitiveness (Seoul National University). As detailed in Fukao et al. (2011), the TFP level of firm *i*, industry *j* in year *t*, $TFP_{i,j,t}$ is defined in comparison with the TFP level of a hypothetical representative firm in the benchmark year t_0 in industry *j*. The TFP level is calculated using the multilateral TFP index method developed by Good et al. (1997).

$$\mathrm{LN}(\mathrm{TFP}_{i,j,t}) = \left\{\mathrm{LN}(\mathrm{Q}_{i,j,t}) - \overline{\mathrm{LN}(\mathrm{Q}_{J,t})}\right\} - \sum_{k=1}^{n}\left(\mathrm{S}_{i,k,j,t} + \overline{\mathrm{S}_{I,J,t}}\right)\left\{\mathrm{LN}(\mathrm{X}_{i,k,j,t}) - \overline{\mathrm{LN}(\mathrm{X}_{k,J,t})}\right\}$$

for $t = t_0$

$$\mathrm{LN}(\mathrm{TFP}_{i,j,t}) = \left\{\mathrm{LN}(\mathrm{Q}_{i,j,t}) - \overline{\mathrm{LN}(\mathrm{Q}_{J,t})}\right\} - \frac{1}{2}\sum_{k=1}^{n}\left(\mathrm{S}_{i,k,j,t} + \overline{\mathrm{S}_{k,J,t}}\right)\left\{\mathrm{LN}(\mathrm{X}_{i,k,j,t}) - \overline{\mathrm{LN}(\mathrm{X}_{k,J,t})}\right\}$$
$$+ \sum_{s=t_0+1}^{t}\left\{\overline{\mathrm{LN}(\mathrm{Q}_{J,s})} - \overline{\mathrm{LN}(\mathrm{Q}_{J,s-1})}\right\}$$
$$- \sum_{s=t_0+1}^{t}\sum_{k=1}^{n}\frac{1}{2}\left(\overline{\mathrm{S}_{k,J,s}} + \overline{\mathrm{S}_{k,J,s-1}}\right)\left\{\overline{\mathrm{LN}(\mathrm{X}_{k,J,s})} - \overline{\mathrm{LN}(\mathrm{X}_{k,J,s-1})}\right\}$$

for $t > t_0$

$$\mathrm{LN}(\mathrm{TFP}_{i,j,t}) = \left\{\mathrm{LN}(\mathrm{Q}_{i,j,t}) - \overline{\mathrm{LN}(\mathrm{Q}_{J,t})}\right\} - \frac{1}{2}\sum_{k=1}^{n}\left(\mathrm{S}_{i,k,j,t} + \overline{\mathrm{S}_{k,J,t}}\right)\left\{\mathrm{LN}(\mathrm{X}_{i,k,j,t}) - \overline{\mathrm{LN}(\mathrm{X}_{k,J,t})}\right\}$$
$$- \sum_{s=t+1}^{t_0}\left\{\overline{\mathrm{LN}(\mathrm{Q}_{J,s})} - \overline{\mathrm{LN}(\mathrm{Q}_{J,s-1})}\right\} + \sum_{s=t+1}^{t_0}\sum_{k=1}^{n}\frac{1}{2}\left(\overline{\mathrm{S}_{k,J,s}} + \overline{\mathrm{S}_{k,J,s-1}}\right)\left\{\overline{\mathrm{LN}(\mathrm{X}_{k,J,s})} - \overline{\mathrm{LN}(\mathrm{X}_{k,J,s-1})}\right\}$$

for $t < t_0$

where $Q_{i,j,t}$ stands for the real output (real sales) of firm *i* in year *t*, $X_{i,k,j,t}$ represents the real input of production factor *k* of firm *i* in year *t*, and $S_{i,j,k,t}$ is the

cost share of production factor k at firm i in year t. $\overline{LN(Q_{J,t})}$ denotes the arithmetic average of the log value of the output, in year t, of all firms in industry j to which firm i belongs, while $\overline{LN(X_{k,J,t})}$ stands for the arithmetic average of the log value of the input of production factor k, in year t, of all firms in industry j to which firm i belongs. Finally, $\overline{S_{k,J,t}}$ is the arithmetic average of the cost share of the input of production factor k, in year t, of all firms in industry j to which firm i belongs.

Our firm-bank matched data cover the period from fiscal 1997 to 2008. In order to control for the potential influence of outliers, we excluded observations in the tails for each variable.[17] Tables 1 and 2 present basic statistics and correlation matrix for the variables used in our empirical analysis, respectively.

Table 3 shows the distribution of our sample firms by industry, location (prefecture), and year. It is clear that the sample firms are concentrated in a limited number of industries (e.g., food and kindred products, chemicals, non-electrical machinery, electrical and electronic machinery, motor vehicles, transportation equipment and ordnance) and that the location of their headquarters is also concentrated in a limited number of prefectures (e.g., Tokyo, Osaka, Hyogo) with a certain time variation.[18]

4. Estimation Results

4.1 Decision to enter specific markets

We first examine the determinants of firms' decision to participate in a new export market by estimating equation (1). The estimation is conducted using the

[17] We drop firms for which the absolute levels of each explanatory variable fall over 99th percentile and below 1st percentile.
[18] We will check the distribution of fresh exporters and compare it with that of the whole sample, which will help us interpret the empirical results more precisely and in more detail.

observations for firms which do not export during years *t-3* to *t* ("never" exporters) and the observations for firms which did not export during years *t-3* to *t-1* but exported in year *t* ("fresh" exporters). Thus, the observations for firms which exported in at least one year during years *t-3* to *t-1 as well as t* are excluded in the estimation.[19] The results of the random effect probit estimation are shown in Table 4 (1). At the second row of each column, the dependent variable is indicated. For the first three columns, we use *FRESH_EXPORT* with or without *BANKINFO* and *TFP×BANKINFO*. The second three columns repeat the same regression with *FRESH_EXPORT_Somewhere* as the dependent variables. The first three columns of Table 4 (2) apply the panel logit estimation with population average mode (PA), fixed-effect model (FE), and random-effect model (RE). Since we do not distinguish the destination regions in Table 4 (1) and these three estimation in Table 4 (2), *BANKINFO* in these estimations is computed as the intensity of general exposure to client firms' export activities (i.e., not taking into account the destination regions). In the last two columns of Table 4 (2), we use region-specific *BANKINFO* variable which corresponds to the region to which firms start exporting.[20] Each case in Table 4 (3) corresponds to the estimation for the sub-samples by destination region.

According to the results shown in Tables 4 (1), first of all, we find that *BANKINFO* has positive coefficients. The results based on the panel logit estimation summarized in Table 4 (2) also imply that the positive contribution of *BANINFO* is obtained for *FRESH_EXPORT_Somewhere* with region-specific *BANKINFO* even when we control the firm specific fixed-effect (see the fifth column in Table 4 (2)).[21] These results are consistent with our prediction that information spillovers through

[19] For robustness checks, we will estimate the equation using an alternative definition of "fresh" exporters. Moreover, we should take account of a firm's "export experience" in the past.
[20] In the case where firms start exporting to more than one region at a time, we randomly assign the region-specific *BANKINFO*. Alternative way is to use the average of *BANKINFO* among those regions.
[21] Precisely speaking, the result of likelihood ratio test presented at the bottom of the table imply that it is not necessary to employ the fixed-effect panel logit estimation (i.e., rho0=0 is not rejected even in 10% significant level).

main banks should positively affect their client firms' export decision. Specifically, the results suggest that *BANKINFO* has a significant positive effect on firms' export decision when they start exporting to developing regions (*ASIA*, see Table 4 (3)), while *BANKINFO* does not have a significant coefficient when the export destinations are developed regions (e.g., Northern America and Oceania). These results might imply that information accumulated in main banks are more important for firms starting exporting to the regions with a larger uncertainty, which is consistent with the previous theoretical studies claiming that having access to the information on export markets substantially reduces uncertainty about destination regions. Second, firm size, liquidity and firms' own overseas activities (e.g., overseas employees ratio) contribute to the higher probability of starting to export.

We should note that the level of TFP has almost no impact on the export decision. Considering the fact that the correlation between TFP and the interaction term between TFP and *BANKINFO* (*TFPxBANKINFO*) is very high for the whole sample, we run the same regressions without the interaction term (i.e., the second and the fifth columns in Table 4 (1). The results remained unchanged. This is somewhat consistent with the finding in the previous study such as Todo (2011) that TFP does not have a power to explain export decision.

4.2 Export volume and its growth rate

Table 5 reports the estimation results of equation (2). First, Table 5 (1) shows the results of the fixed-effect model using the log of exports as the dependent variable. The size and the firms' own overseas activities contribute to higher exports while the impact of *BANKINFO* is ambiguous. The sole term of *BANKINFO* has a negative coefficient in many cases (i.e., whole samples, Asia, and Oceania) while it takes sometimes has a positive coefficient (Africa). In the case of using the first difference of

log exports (i.e., the growth rate of exports from year *t* to year *t+1*) as a dependent variable (i.e., Table 5 (2)), the negative sign associated with *BANKINFO* is obtained for the whole samples while the interaction term *TFP×BANKINFO* sometimes show the positive sign. Therefore, our preliminary results for the impact of information spillovers on intensive margin are mixed. It would be worth mentioning that Koenig et al. (2010) do not find a significant impact of export spillovers on intensive margin. Although our results are consistent with their results, which factors affect intensive margin of exports is an issue that deserves to be further scrutinized.

5. Concluding Remarks

In this paper, we study to what extent the information spillovers through main banks affect client firms' export behaviors (i.e., the extensive and intensive margins). We find that information spillovers through main banks positively affect client firms' export decision. This implies that information on destination markets provided by lender banks substantially reduce the fixed entry cost of exporting and encourage firms to become exporters. On the other hand, we did not find evidence that information spillovers through lender banks have an effect on the export volume and the growth rate of exports. This is somewhat consistent with the finding in Koenig et al. (2010).

A key contribution of this paper is that it proposes an additional channel of information spillovers ignored in previous studies. While previous studies, such as Koenig et al. (2010), concentrate on information spillovers from other exporting firms in the same region and/or industry, this study focuses on the importance of information provided directly by main lender banks in firms' decision to start exporting. If we look at our results in terms of the argument put forward by Chaney

(2008) that a change in fixed costs only affects the extensive margin of trade, while a change in variable costs affects both the intensive and the extensive margin, they suggest that information provided by banks contributes to a reduction in the fixed costs but not the variable costs associated with exporting. On the other hand, Paravisini et al. (2011) suggest that credit frictions, by affecting the cost of working capital, affect the variable costs of exporting and hence the volume of exports. This result suggests that banks may play an important part in affecting the intensive margin of trade in their role as suppliers of funds. Thus, banks' role as suppliers of funds and as providers of information may affect fixed and variable costs and hence the extensive and the intensive margin differently. Untangling these two roles of banks and their impact on exporting is a topic we aim to address in future research.[22]

To conclude, we list several future research questions. First, specificity of information can be defined at a more detailed level, taking into account of industry specificity as well as destination specificity. Moreover, as in Koenig et al. (2010), more detailed information about firm location can be utilized. Although we have not provided a detailed discussion about the difference between the impacts of general and region-specific information, it will be also interesting to compare these two types of information. Second, our relatively long-panel dataset allows us to conduct a survival analysis-type study on the status of exporting firms. More precisely, we are interested in how the duration of staying in export markets is determined. While a few studies have analyzed the determinants of the duration of imports, the determinants of "always exporters" have been studied only at an aggregate level (e.g., Besedes and Prusa 2006a, 2006b, Nitsch 2009, Besedes and Blyde 2010). We believe that all of these extensions provide further evidence for better understanding of the

[22] Additional discussion could be found in, for example, the perspective that financial constraints of firms do not affect their export intensity (Bellone et al. 2010).

firm's overseas activities and the role of banks.[23]

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[23] Other task to be done are as follows. First, there are several reasons why many observations are dropped from our firm-bank-matched panel dataset. For example, data for the year 2008 are not used because of the lack of TFP data. However, the firm-level TFP data for 2008 will be available in the near future and we will include the 2008 data in our dataset. Second, the results in Paravisini et al. (2011) imply that firms match with banks that have developed an expertise on certain export destinations, which other lenders may not have. Firms and banks are not randomly matched. In order to quantify banks' ability of providing advice, we could have employed the number of overseas branches for each bank as well as banks' exposure to client firms that already have experience in exporting, which is obtainable in our dataset. The robustness check for our results by using these alternative proxies will be our task in near future. Third, the loan share of the top lender for each firm can be taken into account when constructing the *BANKINFO*. We believe that it is a promising refinement to precisely measure not only the information accumulated in a main bank but also how smoothly or frequently the information could be transmitted to client firms. If the closer relationships a non-exporting firm has with banks which have a larger exposure to exporting firms, the more the non-exporting firm would benefit from the information accumulated by the banks. Moreover, as mentioned in Conclusion, we can refine the *BANKINFO* variable utilizing detailed location information as well as industry information. Fourth, we are interested in how exporters expand/reduce their number of export destinations, how exporters increase/decrease the volume of exports, how long exporters stay in the export market, and how exporters grow and become steady exporters that always stay in the export market.

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Table 1: Summary Statistics

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
EXPORT_DUMMY	1 if export in the year	3220	0.61	0.49	0	1
FRESH_EXPORT_DUMMY	1 if export in the year and not export in the previous year	3220	0.05	0.22	0	1
FRESH_EXPORT_DUMMY_some	1 if in some region export in the year and not export in the previous year	3220	0.22	0.42	0	1
EXPORT_DUMMY_ASIA	1 if export to ASIA in the year	3220	0.57	0.50	0	1
EXPORT_DUMMY_US	1 if export to the U.S. in the year	3220	0.43	0.50	0	1
EXPORT_DUMMY_CSAMERICA	1 if export to Central and South America in the year	3220	0.18	0.38	0	1
EXPORT_DUMMY_OCEANIA	1 if export to Oceania in the year	3220	0.17	0.37	0	1
FRESH_EXPORT_DUMMY_ASIA	1 if export to ASIA in the year not in the previous year	3220	0.06	0.23	0	1
FRESH_EXPORT_DUMMY_NAM	1 if export to the Northern America in the year not in the previous year	3220	0.08	0.28	0	1
FRESH_EXPORT_DUMMY_CSA	1 if export to Central and South America in the year not in the previous year	3220	0.09	0.28	0	1
FRESH_EXPORT_DUMMY_OCE	1 if export to Oceania in the year not in the previous year	3220	0.06	0.24	0	1
LN_NUMWORKER	Log of the number of workers	2914	7.02	1.11	4.03	10.59
FLEV	Total liability / Total Asset	3205	0.52	0.18	0.05	0.96
FBDEP	Borrowing from Bank / Total Liability	3209	0.31	0.21	0.00	0.89
FLIQ	Liquidity asset / Liquidity liability	3215	1.56	0.85	0.26	8.46
STtoTOTAL	Short-term bank borrowing / Total bank borrowing	2948	0.53	0.32	0	1
wageperworker	Total wage payment / Total number of workers	2903	6.49	1.78	0.46	12.72
overseas_cite_ratio_total	Number of overseas cites / Total cites	3206	0.05	0.11	0.00	0.68
overseas_employee_ratio_total	Number of overseas employees / Total employees	3206	0.00	0.01	0.00	0.07
overseas_investment_ratio_total	Total overseas investment / Total investment	3201	0.25	0.44	0.00	3.36
overseas_LLOAN_ratio_total	Total overseas lending / Total lending	3220	0.11	0.26	0	1
TFP	TFP standardized by using the industry average in Japan	2780	0.02	0.11	-0.97	0.59
NUM_EXPORTER	Number of exporter clients for the top lender for firm	3190	182.90	92.41	1	371

Table 2: Correlation Matrix

	EXPORT_DUMMY	FRESH_EXPORT_DUMMY	FRESH_EXPORT_DUMMY	EXPORT_DUMMY_ASIA	EXPORT_DUMMY_US	EXPORT_DUMMY_CS	EXPORT_DUMMY_OCEA	FRESH_EXPORT_DUMMY	FRESH_EXPORT_DUMMY	FRESH_EXPORT_DUMMY	FRESH_EXPORT_DUMMY	LN_NUMWORKER	FLEV	FBDEP	FLIQ	STtoTOTAL	wageperworker	overseas_citeratio_total	overseas_employee_ratio_total	overseas_investment_ratio_total	overseas_LLOAN_ratio_total	TFP	NUM_EXPORTER	Num_CLIENT	BANKINFO	TFP×BANKINFO
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
(1)	1.00																									
(2)	0.17	1.00																								
(3)	0.37	0.41	1.00																							
(4)	0.92	0.15	0.35	1.00																						
(5)	0.65	0.05	0.28	0.60	1.00																					
(6)	0.30	0.03	0.45	0.29	0.25	1.00																				
(7)	0.32	0.02	0.29	0.32	0.42	0.27	1.00																			
(8)	0.18	0.87	0.43	0.20	0.06	0.04	0.04	1.00																		
(9)	0.23	0.38	0.55	0.22	0.35	0.08	0.06	0.36	1.00																	
(10)	0.18	0.11	0.57	0.17	0.08	0.68	0.18	0.11	0.13	1.00																
(11)	0.18	0.14	0.47	0.17	0.23	0.22	0.59	0.16	0.15	0.23	1.00															
(12)	0.13	-0.02	0.06	0.12	0.17	0.16	0.14	0.00	0.07	0.05	0.06	1.00														
(13)	-0.01	-0.01	0.03	0.00	0.01	-0.03	0.02	-0.01	0.05	0.01	0.03	0.00	1.00													
(14)	-0.09	-0.02	-0.04	-0.07	-0.08	-0.10	-0.06	-0.03	-0.01	-0.04	-0.04	-0.26	0.47	1.00												
(15)	0.12	0.03	0.03	0.10	0.02	0.10	0.00	0.04	0.00	0.05	-0.01	-0.02	-0.68	-0.45	1.00											
(16)	0.02	0.02	0.03	0.00	-0.02	-0.02	0.00	0.00	0.00	0.00	0.00	-0.12	-0.03	-0.01	-0.07	1.00										
(17)	0.15	0.00	0.06	0.16	0.13	0.12	0.10	0.01	0.04	0.06	0.07	0.18	0.02	-0.10	-0.01	-0.02	1.00									
(18)	0.16	0.00	0.07	0.15	0.19	0.11	0.08	0.03	0.06	0.06	0.05	0.16	-0.02	-0.06	0.05	0.01	0.12	1.00								
(19)	0.12	0.02	0.04	0.10	0.12	0.06	0.05	0.04	0.04	0.05	0.03	0.03	-0.06	-0.08	0.05	0.04	0.08	0.68	1.00							
(20)	0.23	-0.01	0.05	0.17	0.29	0.14	0.10	0.00	0.04	0.02	0.02	0.13	-0.12	-0.06	0.06	-0.05	0.08	0.14	0.18	1.00						
(21)	0.10	-0.01	0.02	0.11	0.17	0.11	0.07	-0.01	0.04	0.01	0.04	0.16	-0.09	-0.04	0.07	-0.05	0.05	0.06	0.07	0.19	1.00					
(22)	0.14	0.01	-0.06	0.13	0.21	0.04	0.13	0.02	-0.06	-0.02	0.01	-0.01	-0.21	-0.21	0.22	-0.04	0.13	0.04	0.04	0.20	0.04	1.00				
(23)	0.01	0.04	-0.03	0.02	-0.01	-0.03	0.03	0.04	-0.05	-0.02	0.00	0.10	-0.06	-0.06	0.03	-0.01	0.08	0.05	0.04	0.01	0.02	0.11	1.00			
(24)	0.02	0.04	-0.05	0.03	0.00	-0.03	0.03	0.03	-0.06	-0.03	-0.01	0.09	-0.06	-0.06	0.03	-0.02	0.06	0.05	0.03	0.02	0.02	0.14	0.98	1.00		
(25)	0.02	0.05	0.13	0.03	0.03	0.03	0.03	0.07	0.13	0.04	0.08	0.10	-0.01	-0.05	0.06	0.05	0.14	0.05	0.04	0.00	0.06	-0.07	0.04	-0.09	1.00	
(26)	0.13	0.01	-0.06	0.12	0.20	0.04	0.12	0.02	-0.07	-0.02	0.01	-0.01	-0.22	-0.22	0.22	-0.04	0.13	0.04	0.04	0.19	0.03	0.99	0.10	0.13	-0.06	1.00

Table 3 (1) : Distribution of the sample firms (1)

year	Food and kindred products	Textile mill products, Apparel	Lumber and wood products, Furniture and fixtures	Paper and allied products	Printing publishing and allied products	Chemicals	Petroleum and coal products	Rubber and miscellaneous plastics	Stone, clay and glass products	Metal	Nonmetallic mining	Fabricated metal	Non-electical machinery	Electrical and electronic machinery	Motor vehicles, Transportation equipment and ordnance	Instruments	Miscellaneous manufacturing	Total
2000	43	18	2	9	7	31	2	6	13	10	11	15	18	52	28	7	19	291
2001	41	23	2	9	5	30	1	4	13	12	8	15	15	45	36	8	18	285
2002	40	20	0	9	6	31	3	7	16	14	7	14	13	51	31	5	17	284
2003	32	17	0	9	5	25	2	5	15	9	6	9	12	39	28	3	19	235
2004	32	13	0	10	4	36	0	5	17	11	5	11	19	49	36	4	16	268
2005	34	18	0	8	5	41	0	5	16	9	6	10	24	62	43	3	17	301
2006	44	22	1	13	9	49	2	4	18	21	12	20	26	65	44	3	20	373
2007	44	24	1	13	9	47	1	7	21	21	12	19	35	75	46	7	21	403
2008	52	22	1	12	10	51	1	10	21	23	15	19	32	77	46	8	22	422
Total	362	177	7	92	60	341	12	53	150	130	82	132	194	515	338	48	169	2,862

Table 3 (2) : Distribution of the sample firms (2)

PREFEC	Food and kindred products	Textile mill products, Apparel	Lumber and wood products, Furniture and fixtures	Paper and allied products	Printing publishing and allied products	Chemicals	Petroleum and coal products	Rubber and miscellaneous plastics	Stone, clay and glass products	Metal	Nonmetallic mining	Fabricated metal	Non-electical machinery	Electrical and electronic machinery	Motor vehicles, Transportation equipment and ordnance	Instruments	Miscellaneous manufacturing	Total
Hokkaido	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	9
Miyagi	0	0	0	0	0	0	0	0	4	0	0	0	0	9	0	0	0	13
Fukushima	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	6
Ibaraki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
Tochigi	3	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	8
Gunnma	0	0	0	0	0	4	0	0	0	1	0	0	2	4	12	0	0	23
Saitama	9	0	0	0	0	1	0	7	0	7	0	6	4	21	20	0	3	78
Chiba	13	0	0	0	0	0	0	0	4	0	0	0	1	0	8	0	5	31
Tokyo	211	92	0	28	38	177	12	3	62	54	63	70	104	261	94	33	86	1,388
Kanagawa	29	0	0	0	0	0	0	0	9	0	8	8	8	69	49	0	7	187
Niigata	11	0	0	8	0	0	0	0	2	12	0	0	0	11	8	0	0	52
Toyama	0	2	5	8	0	1	0	0	0	0	0	0	0	8	4	0	0	28
Ishikawa	0	3	0	0	0	0	0	0	0	0	0	7	4	4	0	0	0	18
Fukui	0	9	0	0	0	1	0	0	9	0	0	0	0	0	0	0	0	19
Nagano	1	0	0	0	0	5	0	0	4	0	0	3	3	13	9	4	0	42
Gifu	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0	0	0	6
Sizuoka	6	0	0	0	0	0	0	0	2	4	0	0	2	7	16	0	4	41
Aichi	6	2	0	5	6	9	0	9	24	7	0	5	5	14	68	2	0	162
Mie	3	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	10
Kyoto	2	16	0	8	9	11	0	0	0	0	0	2	0	24	0	3	0	75
Osaka	21	37	0	20	2	86	0	8	8	35	11	15	18	35	15	4	36	351
Hyogo	18	10	0	0	0	13	0	25	2	7	0	16	27	14	24	2	9	167
Wakayama	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Okayama	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	7
Hiroshima	1	0	2	0	0	5	0	1	0	0	0	0	1	0	0	0	9	19
Yamaguchi	9	0	0	0	0	15	0	0	9	0	0	0	0	0	0	0	0	33
Kagawa	6	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7
Ehime	0	0	0	9	0	0	0	0	0	0	0	0	13	0	0	0	0	22
Kochi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Fukuoka	9	0	0	6	5	0	0	0	4	0	0	0	0	13	0	0	9	46
Saga	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
Kagoshima	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Total	362	177	7	92	60	341	12	53	150	130	82	132	194	515	338	48	169	2,862

Table 4 (1) : Estimation results for extensive margin (1)

	Panel Probit Fresh_Export		Panel Probit Fresh_Export		Panel Probit Fresh_Export		Panel Probit Fresh_Export_Somewhere		Panel Probit Fresh_Export_Somewhere		Panel Probit Fresh_Export_Somewhere	
Extensive Margin	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.
LN_NUMWORKER	0.0594	0.0675	0.0612	0.0672	0.0753	0.0701	0.0849	0.0374 **	0.0853	0.0374 **	0.0913	0.0376 **
FLEV	0.3496	0.6523	0.3010	0.6510	0.4190	0.6769	0.3927	0.3297	0.3858	0.3290	0.3921	0.3312
FBDEP	0.8656	0.4495 *	0.7559	0.4435 *	0.7395	0.4598	0.0266	0.2334	0.0231	0.2332	0.0037	0.2344
FLIQ	0.3966	0.1466 ***	0.3785	0.1473 ***	0.3964	0.1519 ***	-0.0478	0.0734	-0.0484	0.0733	-0.0468	0.0735
STtoTOTAL	0.2612	0.2383	0.3073	0.2377	0.3531	0.2467	0.0411	0.1133	0.0447	0.1129	0.0503	0.1136
wageperworker	-0.0330	0.0416	-0.0349	0.0416	-0.0322	0.0430	0.0068	0.0218	0.0066	0.0218	0.0090	0.0219
overseas_cite_ratio_total	0.5277	1.1716	0.5627	1.1886	0.7460	1.2240	-0.6871	0.4553	-0.6884	0.4552	-0.7059	0.4579
overseas_employee_ratio_total	24.5621	15.5615	21.5684	16.1527	18.6063	16.4596	16.4349	6.5394 **	16.4852	6.5388 **	16.7443	6.5727 **
overseas_investment_ratio_total	0.2521	0.2245	0.2648	0.2179	0.2376	0.2274	-0.0238	0.0889	-0.0251	0.0888	-0.0193	0.0889
overseas_LLOAN_ratio_total	-0.5484	0.3287 *	-0.5297	0.3291	-0.4677	0.3347	0.0226	0.1218	0.0215	0.1217	0.0219	0.1225
TFP	-10.8578	5.3428 **	-0.4327	0.8626	-0.3705	0.8876	-1.2803	3.3607	0.2251	0.4695	0.3264	0.4685
BANKINFO	2.7098	0.9117 ***	2.0666	0.8510 **			1.5565	0.6591 **	1.5628	0.6597 **		
TFP×BANKINFO	19.4209	9.7683 **					2.8644	6.3235				
Num_CLIENT	0.0008	0.0005 *	0.0007	0.0005	0.0007	0.0005	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002
# Obs	1178		1178		1178		2589		2589		2589	
# Groups	304		304		304		562		562		562	
Obs per group: min	1		1		1		1		1		1	
avg	3.9		3.9		3.9		4.6		4.6		4.6	
max	10		10		10		9		9		9	
Wald chi2	56.62		54.74		48.73		232.58		232.48		229.16	
Prob > chi2	0.0265		0.0303		0.0765		0.0000		0.0000		0.0000	
Log likelihood	-313.14997		-315.26724		-318.08668		-942.19116		-942.29444		-945.11431	
Likelihood ratio test of rho0=0	5.23		5.53		7.67		1.83		1.80		2.42	
Prob >= chibar2	0.011		0.009		0.003		0.088		0.090		0.060	
Time-Dummy	yes		yes		yes		yes		yes		yes	
Industry-Dummy	yes		yes		yes		yes		yes		yes	

Note: ***:1%, **:5%, *:10%.

Table 4 (2) : Estimation results for extensive margin (2)

	Panel Logit (PA) Fresh_Export_Somewhere		Panel Logit (FE) Fresh_Export_Somewhere		Panel Logit (RE) Fresh_Export_Somewhere		Panel Probit Fresh_Export_Somewhere_POOL		Panel Logit (FE) Fresh_Export_Somewhere_POOL	
Extensive Margin	Odds Ratio	Std.	Odds Ratio	Std.	Odds Ratio	Std.	dy/dx	Std.	Odds Ratio	Std.
LN_NUMWORKER	1.1232	0.0714 *	1.2843	0.3007	1.1346	0.0779 *	0.0890	0.0369 **	1.2746	0.2972
FLEV	4.3200	2.3778 ***	8.0844	15.5052	4.5162	2.6429 ***	0.3923	0.3237	11.0653	21.3757
FBDEP	0.9486	0.3790	3.1914	3.3545	0.9595	0.4077	0.0250	0.2290	3.5039	3.6864
FLIQ	1.1388	0.1368	1.0604	0.2999	1.1401	0.1446	-0.0456	0.0725	1.0357	0.2969
STtoTOTAL	1.2091	0.2364	1.4647	0.6397	1.2230	0.2520	0.0383	0.1117	1.4673	0.6461
wageperworker	1.0447	0.0387	0.9916	0.0635	1.0486	0.0411	0.0111	0.0216	1.0125	0.0662
overseas_cite_ratio_total	0.4969	0.3790	0.0572	0.0759 **	0.4478	0.3644	-0.6460	0.4491	0.0847	0.1128 *
overseas_employee_ratio_total	4.1500E+09	4.4000E+10 **	3.1200E+29	5.7500E+30 ***	5.1600E+10	5.9500E+11 **	15.5256	6.4744 **	4.0300E+27	7.3800E+28 ***
overseas_investment_ratio_total	1.0870	0.1633	0.7765	0.2759	1.0813	0.1713	-0.0140	0.0869	0.8321	0.2890
overseas_LLOAN_ratio_total	1.1376	0.2333	1.3147	0.4694	1.1477	0.2505	0.0315	0.1203	1.2993	0.4673
TFP	0.1079	0.6546	0.0076	0.0712	0.1224	0.7748	-0.0084	0.4941	2.3192	3.6080
BANKINFO	20.8130	24.6440 ***	8.9001	17.1476	23.5516	29.2406 **	0.4764	0.2028 **	0.3393	0.1519 **
TFP×BANKINFO	296.1543	3373.7050	3.6649E+05	6.4986E+06	272.8471	3250.9100	3.3046	2.2393	3.1590E+04	1.5854E+05 **
Num_CLIENT	1.0000	0.0004	1.0006	0.0006	1.0000	0.0004	0.0001	0.0002	1.0003	0.0006
# Obs	2589		1413		2589		2570		1396	
# Groups	562		252		562		561		251	
Obs per group: min	1		2		1		4		2	
avg	4.6		5.6		4.6		4.6		5.6	
max	9		9		9		9		9	
LR chi2 or Wald chi2 (Panel Probit)	229.99		204.65		205.27		239.03		208.51	
Prob > chi2	0.0000		0.0000		0.0000		0.0000		0.0000	
Log likelihood	-		-383.53736		-964.05042		-933.57883		-375.10163	
Likelihood ratio test of rho0=0	-		-		4.72		0.61		-	
Prob >= chibar2	-		-		0.015		0.217		-	
Time-Dummy	yes		yes		yes		yes		yes	
Industry-Dummy	no		no		no		no		no	

Note: ***:1%, **:5%, *:10%.

Table 4 (3) : Estimation results for extensive margin (3)

	Panel Probit Fresh_Export_Asia		Panel Probit Fresh_Export_Namerica		Panel Probit Fresh_Export_CSAmerica		Panel Probit Fresh_Export_Africa		Panel Probit Fresh_Export_Oceania	
Extensive Margin	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.	dy/dx	Std.
LN_NUMWORKER	0.0581	0.0823	0.4464	0.1621 ***	0.1009	0.0545 *	0.1576	0.0843 *	0.1499	0.0763 **
FLEV	0.7978	0.7941	1.2477	1.1094	1.0709	0.5092 **	1.4298	0.7510 *	0.2956	0.6552
FBDEP	0.4545	0.5209	1.8494	0.9449 **	-0.2969	0.3508	-0.3514	0.5145	-0.3018	0.4636
FLIQ	0.3822	0.1888 **	0.3905	0.2378	0.1073	0.1112	0.1339	0.1625	-0.2702	0.1526 *
STtoTOTAL	0.3607	0.2663	0.4460	0.3702	0.0302	0.1705	-0.0789	0.2536	-0.0437	0.2199
wageperworker	-0.0798	0.0511	-0.0997	0.0658	0.0268	0.0327	0.1146	0.0456 **	0.0641	0.0410
overseas_cite_ratio_total	0.0332	1.5995	-2.4972	2.1615	-0.3675	0.7125	0.8157	0.8552	0.2359	0.8553
overseas_employee_ratio_total	42.2748	21.2118 **	77.6527	31.7772 **	17.8788	9.4868 *	-2.6105	12.4718	6.7518	11.3327
overseas_investment_ratio_total	-0.5063	0.3865	0.5267	0.3795	-0.0772	0.1476	0.1686	0.1818	0.2356	0.1624
overseas_LLOAN_ratio_total	0.0485	0.3312	-0.7049	0.5758	0.3178	0.1718 *	-0.0421	0.2431	0.0036	0.2387
TFP	-0.5318	7.3806	-5.0289	5.7492	-1.1761	2.3737	0.3440	0.9744	1.2884	2.3621
BANKINFO	2.8382	1.4160 **	0.6886	1.5599	1.4655	1.1103	-0.0336	0.2954	1.0355	1.0289
TFP×BANKINFO	1.7274	13.7284	14.4149	13.6617	8.8588	9.3470	-3.6875	14.2688	-6.3045	9.1479
Num_CLIENT	0.0008	0.0006	0.0004	0.0007	0.0001	0.0004	0.0000	0.0006	0.0002	0.0004
# Obs	815		1143		1910		1649		1969	
# Groups	213		275		483		434		454	
Obs per group: min	1		1		1		1		1	
avg	3.8		4.2		4.0		3.8		4.3	
max	9		9		9		9		9	
LR chi2 or Wald chi2 (Panel Probit)	41.33		22.84		164.84		82.65		40.6	
Prob > chi2	0.2490		0.9672		0.0000		0.0000		0.3147	
Log likelihood	-157.39564		-197.98686		-453.62402		-323.75553		-346.41648	
Likelihood ratio test of rho0=0	0.00		7.25		1.46		9.20		4.39	
Prob >= chibar2	1.000		0.004		0.113		0.001		0.018	
Time-Dummy	yes		yes		yes		yes		yes	
Industry-Dummy	yes		yes		yes		yes		yes	

Note: ***:1%,**:5%, *:10%.

Table-5(1): Estimation results for intensive margin (LN_EXPORT) (1)

Static	Panel Fe LN_EXPORT		Panel Fe LN_EXPORT_Asia		Panel Fe LN_EXPORT_Namerica		Panel Fe LN_EXPORT_CSAmerica		Panel Fe LN_EXPORT_Africa		Panel Fe LN_EXPORT_Oceania	
Intensive Margin	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.
LN_NUMWORKER	0.3634	0.1580 **	0.3135	0.1632 *	0.4132	0.2318 *	0.3354	0.2095	0.0158	0.3585	0.6034	0.2450 **
FLEV	0.2782	0.4207	0.3642	0.4424	1.0040	0.6593	0.1471	1.1316	1.0710	0.9786	-0.2719	0.8078
FBDEP	-0.5040	0.2419 **	-0.4806	0.2708 *	-0.6794	0.3223 **	0.2349	0.5913	0.1942	0.7209	0.0235	0.4778
FLIQ	-0.0497	0.0621	-0.1014	0.0656	0.0654	0.0833	0.0881	0.1681	-0.1719	0.1472	0.0010	0.1075
STtoTOTAL	-0.0788	0.0905	-0.1319	0.0978	-0.0392	0.1271	-0.1182	0.2491	-0.0787	0.3150	-0.0065	0.1935
wageperworker	0.0232	0.0153	0.0142	0.0161	0.0046	0.0218	-0.0106	0.0442	0.0730	0.0420 *	0.0127	0.0310
overseas_cite_ratio_total	0.4076	0.2210 *	0.1358	0.2616	0.3786	0.3390	-0.0948	0.5958	0.6870	0.5787	0.9322	0.5960
overseas_employee_ratio_total	6.2776	3.6102 *	9.7721	4.3683 **	3.4458	5.1458	0.5262	8.3983	-20.0925	11.5972 *	-0.6939	9.1411
overseas_investment_ratio_total	0.1583	0.0881 *	0.1371	0.1107	0.1821	0.1076 *	-0.1689	0.2074	0.1356	0.2213	0.0094	0.1314
overseas_LLOAN_ratio_total	0.1101	0.0561 **	0.1550	0.0634 **	0.1170	0.0877	-0.2174	0.1537	-0.1472	0.1898	0.0173	0.1213
TFP	1.9270	1.0683 *	-0.7004	1.8019	-1.4987	1.3888	-3.7362	2.0424 *	-0.5205	1.1487	0.6058	1.5595
BANKINFO	-0.9218	0.1910 ***	-1.1263	0.3743 ***	-0.2563	0.3069	-0.8657	1.0080	0.3790	0.2247 *	-0.8786	0.4896 *
TFP × BANKINFO	-2.6547	1.8158	3.4094	3.4294	4.2569	3.0865	11.8848	7.4550	-0.4084	3.6586	-3.3454	5.5965
Num_CLIENT	0.0000	0.0002	0.0002	0.0002	-0.0001	0.0002	0.0006	0.0003 *	0.0004	0.0005	0.0001	0.0002
_cons	6.4396	1.3759 ***	6.2314	1.4540 ***	4.0072	2.1217 *	2.9572	1.7771 *	3.4390	3.0228	0.6452	2.1420
# Obs	3731		3630		3005		1793		1208		1732	
# Groups	632		618		533		427		301		373	
Obs per group: min	1		1		1		1		1		1	
avg	5.9		5.9		5.6		4.2		4.0		4.6	
max	11		11		11		11		11		11	
F	10.26		11.15		23.76		6.77		3.65		1.6	
Prob > F	0.0000		0.0000		0.0000		0.0000		0.0000		0.0470	
R-sq: within	0.1023		0.1189		0.4208		0.1798		0.1179		0.0591	
between	0.4809		0.4062		0.3106		0.0995		0.0289		0.2952	
overall	0.4272		0.3414		0.2919		0.1137		0.0675		0.3469	
corr(u_i, Xb)	0.5214		0.4292		0.2321		0.066		0.0301		0.3903	
Time-Dummy	yes		yes		yes		yes		yes		yes	

Note: ***:1%, **:5%, *:10%.

Table-5(2): Estimation results for intensive margin (ΔLN_EXPORT) (2)

Static	Panel Fe		Panel Fe		Panel Fe		Panel Fe		Panel Fe		Panel Fe	
	ΔLN_EXPORT		ΔLN_EXPORT_Asia		ΔLN_EXPORT_Namerica		ΔLN_EXPORT_CSAmerica		ΔLN_EXPORT_Africa		ΔLN_EXPORT_Oceania	
Intensive Margin	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.	Coef.	Clustered Std.
LN_NUMWORKER	-0.5848	0.1304 ***	-0.1762	0.0855 **	-0.1068	0.1214	0.3404	0.3338	0.1468	0.3639	0.0030	0.1460
FLEV	-0.3796	0.4075	0.0286	0.3318	-0.1102	0.3373	-0.7668	0.9898	1.4241	1.2299	-0.0406	0.8852
FBDEP	-0.1283	0.2504	-0.0793	0.1940	-0.2677	0.2284	0.2403	0.5057	-0.0234	0.7996	0.4642	0.4639
FLIQ	-0.0786	0.0679	-0.0299	0.0514	-0.0870	0.0641	0.0591	0.1398	0.4398	0.2781	0.1932	0.1941
STtoTOTAL	-0.2247	0.0841 ***	-0.0776	0.0763	-0.1070	0.0834	-0.1450	0.2123	-0.1393	0.2653	-0.1039	0.1364
wageperworker	-0.0586	0.0167 ***	-0.0193	0.0172	-0.0110	0.0208	-0.0739	0.0474	-0.0759	0.0532	-0.0077	0.0270
overseas_cite_ratio_total	0.1558	0.2489	-0.1887	0.2970	0.3070	0.3141	-0.6631	0.5207	-1.2250	0.8998	0.2124	0.5403
overseas_employee_ratio_total	5.5677	4.5327	4.2261	5.8863	-7.1611	5.7028	-0.3746	10.8009	-5.6577	15.1354	-0.9011	7.5475
overseas_investment_ratio_total	-0.0340	0.0967	-0.0099	0.0947	-0.1949	0.0868 **	0.0214	0.1867	-0.2297	0.1671	-0.0610	0.1159
overseas_LLOAN_ratio_total	0.0251	0.0609	0.0486	0.0530	0.0934	0.1038	-0.2243	0.1945	-0.1877	0.3476	0.0501	0.1763
TFP	-1.7196	1.4735	-1.1983	1.4603	0.6625	1.5489	-4.0003	2.5330	1.5591	0.9240 *	0.6446	1.6425
BANKINFO	-4.9071	0.3155 ***	-0.3141	0.3549	-0.0725	0.3519	0.0958	1.1449	-0.2299	0.2850	-0.4254	0.9199
TFP×BANKINFO	5.9160	2.7897 **	4.0124	2.8777	-1.1564	3.5959	18.4559	10.7995 *	0.4818	2.0658	-0.4617	5.4126
Num_CLIENT	-0.0002	0.0002	0.0001	0.0002	-0.0002	0.0002	0.0006	0.0004	0.0001	0.0005	0.0001	0.0003
_cons	7.4929	1.0654 ***	1.6454	0.7014 **	1.4202	0.9829	-1.7507	2.8970	-1.7224	3.0090	-0.2696	1.3448
# Obs	3057		2946		2330		1203		783		1195	
# Groups	596		582		481		281		210		307	
Obs per group: min	1		1		1		1		1		1	
avg	5.1		5.1		4.8		4.3		3.7		3.9	
max	11		11		11		11		10		10	
F	34.33		4.77		22.71		3.54		1.32		0.84	
Prob > F	0.0000		0.0000		0.0000		0.0000		0.1668		0.6735	
R-sq: within	0.4382		0.0278		0.5652		0.1966		0.0723		0.0694	
between	0.1371		0.0049		0.1996		0.1798		0.0669		0.0108	
overall	0.2364		0.0101		0.5315		0.1688		0.0481		0.0383	
corr(u_i, Xb)	-0.5377		-0.4256		-0.0731		-0.1849		-0.2633		-0.1667	
Time-Dummy	yes		yes		yes		yes		yes		yes	

Note: ***: 1%, **: 5%, *: 10%.