Chapter 2

Japanese Small and Medium-Sized Enterprises' Export Decisions: The Role of Overseas Market Information

Tomohiko Inui
Nihon University, Tokyo

Keiko Ito
Senshu University, Tokyo.

Daisuke Miyakawa
Development Bank of Japan.

May 2016

This chapter should be cited as
Inui, T., K. Ito and D. Miyakawa (2014), 'I Japanese Small and Medium-Sized Enterprises' Export Decisions: The Role of Overseas Market Information, Hahn, C.H. and D. Narjoko (eds.), *'Globalization and Performance of Small and Large Firms*. ERIA Research Project Report 2013-3, pp.II-1-II40, Available at: ww.eria.org/RPR_FY2013_No.3_Chapter_2.pdf

CHAPTER 2

Japanese Small and Medium-Sized Enterprises' Export Decisions: The Role of Overseas Market Information*

TOMOHIKO INUI†

Nihon University, Tokyo.

KEIKO ITO‡

Senshu University, Tokyo.

DAISUKE MIYAKAWA**

Development Bank of Japan.

This paper examines how the Japanese firms' export decision is affected by the availability of information on export markets, focusing on how such a mechanism differs between large firms and small and medium-sized enterprises (SMEs). Unlike existing studies which solely focus on information sharing among firms, we are interested in the role of firms' lender banks as an additional source of information. Specifically, using a unique dataset containing information not only on firms' export activities but also on their lender banks' exposure to other exporting firms and lender banks' own overseas activities, we find that information spillovers through lender banks positively affects SMEs' decision to start exporting and the range of destinations to which they export. Such information spillovers also reduce the likelihood that exporter firms exit from export markets. The export-to-sales ratio of exporter firms, however, is not affected by such information spillovers. These results imply that information on foreign markets provided by lender banks substantially reduces the fixed entry costs associated with starting exporting and entering new export markets as well as firms' costs associated with continuing to export. Our results highlight that channels of information spillovers other than those examined in the literature so far may be of considerable importance, especially for SMEs.

Keywords: Export Decision; Lender Bank; Information Spillover; Extensive and Intensive Margins

JEL Classification: F10, F14, G21, L25

---

* This research was conducted as part of research projects for the Economic Research Institute for ASEAN and East Asia (ERIA), Research Institute of Economy, Trade and Industry (RIETI), and Economic and Social Research Institute (ESRI). This work was supported by JSPS KAKENHI Grant Numbers 23243050 and 23243044. The opinions expressed and arguments employed in this paper are the sole responsibility of the authors and do not necessarily reflect those of ERIA, RIETI, or any institution to which the authors are affiliated.

† Professor, College of Economics, Nihon University, 1-3-2, Misaki-cho, Chiyoda-ku, Tokyo, 101-8360, JAPAN. E-mail: inui.tomohiko@nihon-u.ac.jp.

‡ Professor, School of Economics, Senshu University. 2-1-1 Higashi-mita, Tama-ku, Kawasaki, Kanagawa, 214-8580, JAPAN. E-mail: keiko-i@isc.senshu-u.ac.jp.

** Research Associate, Weatherhead Center for International Affairs, Harvard University. 61 Kirkland Street, Cambridge, MA 02138, U.S.A. E-mail: damiyak@gmail.com.

1. Introduction

The successful globalization of Japanese firms, especially small and medium-sized enterprises (SMEs), is becoming one of the most import policy topics in Japan. Facing sluggish domestic sales against the background of an aging and shrinking population, Japanese firms have been shifting their sales and profits to export markets. The share of exports in Japan's GDP has increased from 10.9% in 2000 to 14.7% in 2012. While well-established large firms have been diversifying their destinations of sales and locations abroad, it is generically difficult for SMEs to overcome the various obstacles associated with entering overseas markets. Given that a large share of firm activities (e.g., in terms of the number of firms, the number of employees, and value added) are accounted for by SMEs in the manufacturing sector, however, it is important from a policy perspective to induce SMEs to expand their business activities towards overseas markets. Motivated by this discussion, this paper examines the determinants of firms' export behavior with putting a special emphasis on SMEs.

The international trade literature suggests that to start exporting firms incur fixed sunk costs. These costs reflect, for example, the fact that firms initially are uncertain about their export profitability, and, thus they have to collect a considerable amount of relevant information on export markets. Other potential costs include, for example, modifying products to suit local tastes and setting up distribution networks. Developing a theoretical model, Melitz (2003) therefore suggests that only firms which are sufficiently productive to cover such fixed costs can be exporters. Extant empirical studies (e.g., Bernard et al. 2003; Mayer and Ottaviano 2008; and Todo 2011) examining this hypothesis, however, indicate that there must be other important factors which affect firms' decision to export. They suggest that even when their productivity is not very high, firms can be exporters as long as other critical conditions are satisfied. In other words, understanding other important drivers of

exports effectively provides a chance for even SMEs, which tend to be less productive than larger firms, to expand their overseas business activities.

The extant literature has already focused on a number of conditions or factors that may affect firms' export decision. One important research strand in this context concentrates on information spillovers. The underlying idea is that information exchange with other exporting firms reduces the individual fixed costs associated with exporting, and that such information exchange therefore increases the probability that a firm will export (see, e.g., Krautheim (2012) for a theoretical investigation).[1] Having access to information on foreign markets, the hypothesis goes, substantially reduces uncertainty and encourages firms to engage in export activities. Empirical work by Koenig et al. (2010) confirms this hypothesis, showing that the presence of other exporters has a positive effect on the export decision of other firms. However, although Koenig et al. (2010) find evidence of positive information spillovers, the evidence produced by other empirical studies on such information spillovers is at best weak (e.g., Aitken et al. 1997, Barrios et al. 2003, Bernard and Jensen 2004). According to a survey conducted by the Small and Medium Enterprise Agency of Japan, however, it is clear that many enterprises that would like to export face problems in terms of, e.g., "securing outstanding partner enterprises" and "ascertaining the needs of local enterprises and residents overseas". Especially compared to large enterprises, a high percentage of SMEs have not been able to undertake export operations as a result of the difficulty to "secure outstanding partner enterprises." This is a serious challenge for SMEs, which have limited managerial resources compared to large enterprises (Japan Small Business Research Institute 2008). In fact, the productivity of SMEs on average is much lower than that of large firms, suggesting that many SMEs are not sufficiently profitable to afford the

[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(s), various country characteristics, and institutional factors such as free trade agreements, economic diplomacy, and so on.

fixed costs of exporting. Therefore, in order for SMEs to start exporting, they have to raise their productive or try to lower the costs of exporting. However, SMEs usually have much fewer transaction partners than large firms due to their small size of activities and it is expected that SMEs are more likely to face serious difficulties to find a partner enterprise abroad through information exchanges with their current transaction partners, implying that it is costly for SMEs to collect information on foreign markets and possible partner enterprises abroad. Thus, one of the most important research question is what channels contribute to the effective information exchange between exporting firms and non-exporting firms, which is more relevant for SMEs than large firms and has not been clearly examined in the extant studies. Depicting detailed sketches of information spillovers is important especially in the context of SMEs since it is much less clear how such information spillover arises for SMEs than for larger firms. For example, SMEs likely have much fewer opportunities to interact with export firms in their daily business activities than large firms.

Given these discussions on information spillovers, this paper focuses on information provided by lender banks as an additional channel of information spillovers. The hypothesis we examine in this paper is that lender banks also contribute to such information exchange in the form of conduit. In the case of Japan, lender banks generally provide not only financial support but also business consulting services utilizing extensive knowledge collected through their lending transaction relationships and from various information sources. Since the monitoring of borrower firms is important for banks, banks in general should accumulate information on borrower firms and related parties. Thus, if we assume that a particular bank is very knowledgeable about overseas business opportunities either through its own banking activities (e.g., foreign branches) or transactions with client firms with experience in exporting, potential exporter firms would find it helpful to

consult with such a bank.

The information provided by lender banks could be more important for SMEs than that for large firms from the following two reasons. First, although SMEs tend to have less resources about overseas market than larger firms (e.g., smaller number of trading partners, lower exposure to overseas information through imports, or more constraints on internal resources allocated to the collection of overseas market information), they are usually keeping close ties to lender banks and, thus in a good position to obtain feedback from banks on their business strategies. Hence, lender banks could play an important role as a conduit of export market information for SMEs. Second, lender banks themselves have a strong motivation to provide such information to client SMEs since the expansion of client firms' business activities naturally leads to larger business opportunities for lender banks. In other words, as far as lender banks have accumulated overseas market information, it is natural for them to share such information with their clients.

This paper contributes to the existing literature in at least two ways. First, we examine the export decision by using a dataset that makes it possible to link firm-level information with information on the lender banks of each firm. Our dataset includes a large number of firms, enabling us a rigorous analysis separately for large firms and SMEs. To the best of our knowledge, this is the first paper to explore the impact of information spillovers through lender banks on firms' export behavior, which are represented by starting exports (*an extensive margin*), expanding export destinations (*another extensive margin*), stopping exports (*another extensive margin*), and changing the export-to-sales ratio (*the intensive margin*), as well as the impacts of main banks' financial health and the agglomeration of nearby exporters.[2] Second, the paper especially investigates whether the importance of information provided by

[2] Financial institutions presumably play an important role in determining client firms' export activities has recently been highlighted in studies by Amiti and Weinstein (2011), Paravisini et al. (2011), Feenstra, Li and Yu (2013), and Miyakawa et al. (2013), which indicate that banks' financial health plays an important role in determining firms' export behavior.

banks is substantially sizable for SMEs. It is naturally expected that SMEs find it more difficult to collect the information associated with export markets by themselves than larger firms do due to its managerial resource constraints mentioned above. Our results below show that information on overseas markets provided by lender banks substantially reduces the fixed costs associated with exporting for SMEs and thereby helps them to enter export markets and continue exporting.

The organization of this paper is as follows. Section 2 describes the dataset used in this paper and provides some descriptive statistics for our sample firms. Section 3 briefly explains the roles that main banks play in Japan and presents the empirical strategy we employ in this paper. Section 4 presents our estimation results and Section 5 concludes.

2. Differences in Export Behavior between Large Firms and SMEs

2.1. Data Description

Let us start by looking at the difference in export status and various firm characteristics between large firms and SMEs. In order to examine firms' export behavior and various characteristics, this study uses the firm-level panel data obtained from the *Basic Survey on Business Structure and Activities (BSBSA)*, which is collected annually by Ministry of Economy, Trade and Industry (METI) for the period 1997-2008. The survey is compulsory and covers all firms with at least 50 employees and 30 million yen of paid-in capital in the Japanese manufacturing, mining, and wholesale and retail 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).[3] It also contains the number of domestic and overseas subsidiaries, and various other financial data such as costs, profits, investment, debt, and assets. Although the survey covers firms in the non-manufacturing sector, this paper focuses on firms in the manufacturing sector only because the survey does not cover international transactions in services and only asks firms about the amount of trade in goods.[4]

The key aim of our analysis, as mentioned above, 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' lender banks and examine the relationships between firm characteristics, lender banks' ability to provide advice, and firms' export status. We merge the dataset with information on the lender banks for each firm using the loan relation information stored in Teikoku Databank Ltd's corporate information database. The database, called *COSMOS2*, contains the lender banks' names for each firm in the order of the importance to the firms (maximum ten lender banks for each firm). We assume that the bank listed as a first lender to a firm-year observation as the main bank for the firm in each year. In order to characterize the lender banks, we obtain various types of information on banks, such as the total assets of the bank, its equity ratio, and its loan deposit ratio from Nikkei NEEDS Financial Quest database. We also calculate the number of client firms for each bank using our firm-bank-linked dataset. Our unbalanced panel data contain approximately 7,000 manufacturing firms each year.

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

[4] 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 started to ask about international transactions in services in the 2010 survey.

2.2. Overview of the Firm-Bank-Linked Database

Using the firm-bank-linked database, we examine the differences in firms' export behavior and various characteristics between large firms and SMEs. First, Table 1 summarizes the share of exporters in our dataset. SMEs are defined as firms with paid-in capital of up to 300 million Japanese yen or up to 300 employees, following the Japanese legal definition of SMEs. We define all other firms in our database as large firms. We further divide SMEs into small firms and medium firms in order to examine the differences within SMEs more closely. Small firms are defined as firms whose paid-in capital is equal to or smaller than 150 million Japanese yen and the number of employees is equal to or smaller than 150. All of other SMEs are defined as medium-sized firms.

As shown in Table 1, the share of exporters differs considerably between large firms and SMEs. While approximately 60 percent of large firms are exporters, only 25 percent of SMEs are. The share of exporters is among small firms is even smaller, with more than 80 percent of small firms being non-exporters. Given that the nearly 90 percent of the firms in our dataset are SMEs, there are a significant number of non-exporting manufacturing firms as shown in Table 1. Table 1 also implies that becoming an exporter is particularly difficult for SMEs and that a lot of SMEs may suffer from the lack of resources and information on foreign markets required to start exporting.

Table 1: Number of Firms in the Dataset by Size and Export Status

	No. of firms	Share in all firms (%)	Share in the size category (%)
All firms	77,305	***100.0***	
Exporters	22,526	29.1	
Non-exporters	54,779	70.9	
Large firms	9,778	12.6	***100.0***
Exporters	5,876		60.1
Non-exporters	3,902		39.9
SMEs	67,527	87.4	***100.0***
Exporters	16,650		24.7
Non-exporters	50,877		75.3
Medium firms	45,298	58.6	***100.0***
Exporters	12,959		28.6
Non-exporters	32,339		71.4
Small firms	22,229	28.8	***100.0***
Exporters	3,691		16.6
Non-exporters	18,538		83.4

Table 1 suggests that SMEs are less likely to start exporting than large firms. Next, let us statistically test whether the probability of starting exporting is lower for SMEs than for large firms. We define an export starter as a firm which did not export from year *t-3* to year *t-1* but exported in year *t*. We construct various dummy variables representing a firm's export status and examine differences in export behavior across firms of different sizes. First, we prepare a dummy variable, *NEW_EXP*, which takes one for firms which did not export from year *t-3* to year *t-1* but exported in year *t*. This variable takes zero for firms which did not export from years *t-3* to *t*. Therefore, the variable *NEW_EXP* is not defined for firms which did export between years *t-3* and *t (Always exporter)*. For firms which exported in year *t-1*, we prepare a dummy variable, *NEW_REGION*, which takes one for firms which increased the number of export destinations in year *t*. For exporting firms which did not increase the number of export destinations in year *t*, the variable *NEW_REGION*

takes zero. For firms which exported in year *t-1*, we also prepare a dummy variable, *STOP_EXP*, which takes one for firms which stopped exporting in year *t*, and zero otherwise. Moreover, we construct a variable, *EXP_SALES*, which represents the ratio of export value to sales for firms which export in year *t*.

Table 2 shows the mean values for these variables. For all firms, the mean value of *NEW_EXP* is 0.034, suggesting that 3.4 percent of non-exporting firms in years *t-3* to *t-1* started exporting in year *t*. Looking at the difference between large firms and SMEs, 6.4 percent of non-exporting large firms started exporting in year *t* while 3.2 percent of non-exporting SMEs started exporting in year *t*. The difference of this propensity to start exporting is statistically significant at 1% level. Similarly, the propensity to start exporting differs significantly between medium firms and small firms. As for expansion of export destinations (*NEW_REGION*), larger firms are more likely to increase export destinations and the differences are statistically significant across different sizes of firms. On the other hand, smaller exporting firms are more likely to stop exporting than larger firms (*STOP_EXP*). These figures indicate that it is more difficult for smaller firms to cover the fixed costs to start exporting than for larger firms, and that smaller firms are less likely to continue exporting. However, while the export intensity (*EXP_SALES*) is larger for large firms than for SMEs, it is not statistically different between medium firms and small firms.

Table 2: Differences in export behavior by firm size

	All firms		Large firms vs. SMEs					Medium firms vs. Small firms				
			Large firms		SMEs			Medium firms		Small firms		
Variable	Obs.	Mean	Obs.	Mean	Obs.	Mean	*t*-test	Obs.	Mean	Obs.	Mean	*t*-test
NEW_EXP	50,385	0.034	3,711	0.062	46,674	0.032	***	29,844	0.037	16,830	0.023	***
NEW_REGION	20,884	0.156	5,606	0.181	15,278	0.147	***	11,944	0.152	3,334	0.126	***
STOP_EXP	20,884	0.067	5,606	0.051	15,278	0.072	***	11,944	0.066	3,334	0.093	***
EXP_SALES	20,143	0.135	5,138	0.160	15,005	0.127	***	11,704	0.126	3,301	0.130	

Note: *** indicates that the mean values of two groups of firms are different at the 1% significance level.

It appears that exporting is more difficult for SMEs than for large firms. Existing theories may explain the fact as small firms are not sufficiently productive to cover fixed costs to start exporting. Therefore, it is expected that small firms are much less productive than larger firms. In order for less productive small firms to start exporting, they may have to utilize various information sources to collect information on export markets, such as nearby exporting firms, foreign investors, transaction partners, and lender banks. Table 3 compares various firm characteristics and the availability of information between exporters and non-exporters for large firms and for SMEs. For firm characteristics, we examine mean values for TFP and firms' cash flow (liquid asset share) (*F_CASH*) for each size-category of firms. As proxies for the availability of information on export markets, we calculate the number of nearby firms (*F_NEARBYFIRM* and *F_NEARBYINDEXP*),[5] the foreign ownership ratio (*FOREIGN*), the import ratio (*IMPORTRATIO*), and the share of overseas assets in total assets (*FFORIVN*) for each firm. We also calculate several variables which proxy the amount of information on export markets provided by lender banks for each firm: the share of exporting client firms in the total number of client firms for the top-lender bank of a firm (*BANKINFO*), the average share of exporting client firms in the total number of client firms for all the lender banks of a firm (*BANKINFO_AVR*), the number of overseas branches of the top-lender bank of a firm (*BANKBR*), the average number of overseas branches of all the lender banks of a firm (*BANKBR_AVR*), and the size (total assets in logarithm) of the top-lender bank (*B_SIZE*). We also prepare a dummy variable, *EXIM*, which takes one for firms who borrow from the Japan Bank for International Corporation, formerly called the Japan Export-Import Bank. This is a government-run financial institution specialized in international banking such as trade finance.

[5] The first nearby-firm variable, *F_NEARBYFIRM*, represents the number of firms located in the same city for each firm. The second nearby-firm variable, *F_NEARBYINDEXP*, represents the number of exporting firms belonging to the same industry and located in the same city for each firm.

As shown in Table 3, exporters tend to have higher TFP and larger cash flow than non-exporters for all size categories, and the mean values for exporters and for non-exporters are significantly different for all the cases. These figures indicate that exporters are more productive and less financially constrained than non-exporters, thereby are able to cover the fixed costs of exporting. Moreover, exporters have a larger value for all the variables representing availability of information on export markets or information sources for each firm than non-exporters for all the size categories. Only for small firms, the mean value of *EXIM* is larger for non-exporters, although the difference in the mean values is not statistically significant. All these figures indicate that exporters tend to have more information available than non-exporters, implying that utilizing such available information lowers the fixed costs of exporting.

Moreover, we should note that the average TFP for exporting SMEs is much lower than the average TFP for non-exporting large firms (0.032 vs. 0.056). On the other hand, as for the mean values for the information related variables, the difference between exporting SMEs and non-exporting large firms looks small. Exporting SMEs tend to have a larger mean value for proxies of information obtained directly by a firm (*FOREIGN*, *IMPORTRATIO*, *FFORINV*) than non-exporting large firms. As for proxies of information provided by a firm's lender banks, although the mean values for exporting SMEs are smaller than those for non-exporting large firms, the difference is quite small.

Thus, it appears that SMEs are inferior to large firms in terms of both firms' own performance and the availability of various information sources. Even exporting SMEs are less productive than non-exporting large firms. Given the fact that they are not sufficiently productive to cover the cost of exporting, SMEs would need to utilize various information sources to lower the costs of exporting. Based on these figures, we conjecture that the availability of various information sources is more critical for

SMEs to start exporting than for large firms.

Table 3: Comparison of Mean Values for Exporters and Non-exporters

Variable	All firms		Large firms		SMEs		Medium firms		Small firms	
	Exporters	Non-exporters	Exporters	Non-exporters	Exporters	Non-exporters	Exporters	Non-exporters	Exporters	Non-exporters
TFP	0.050	-0.008	0.101	0.056	0.032	-0.013	0.043	0.000	-0.008	-0.036
F_CASH (t-1)	0.580	0.542	0.537	0.507	0.595	0.544	0.593	0.541	0.602	0.550
F_NEARBYFIRM	428.008	262.111	600.068	484.389	367.286	245.064	377.732	256.626	330.610	224.894
F_NEARBYINDEXP	4.667	1.592	5.519	2.656	4.366	1.510	4.434	1.559	4.127	1.424
FOREIGN	14.565	2.160	22.328	8.533	11.825	1.671	13.465	2.192	6.068	0.763
IMPORTRATIO	0.046	0.008	0.049	0.014	0.044	0.008	0.045	0.008	0.043	0.007
FFORINV	0.033	0.004	0.051	0.009	0.026	0.003	0.028	0.004	0.020	0.002
BANKINFO	0.240	0.207	0.261	0.237	0.233	0.204	0.234	0.208	0.228	0.198
BANKINFO_AVR	0.237	0.204	0.255	0.232	0.231	0.202	0.232	0.206	0.225	0.195
BANKBR	17.932	13.863	20.354	17.580	17.077	13.578	17.451	14.219	15.764	12.461
BANKBR_AVR	15.116	12.018	16.890	14.938	14.490	11.794	14.779	12.351	13.473	10.821
B_SIZE	16.718	16.308	17.011	16.733	16.614	16.276	16.651	16.352	16.485	16.142
EXIM	0.005	0.001	0.010	0.004	0.003	0.001	0.003	0.001	0.000	0.001

Note: The difference between exporters and non-exporters is statistically significant at the 1% significance level for all the cases except *EXIM* for small firms.

3. Empirical Strategy

3.1. The Main Bank System in Japan

The so-called "main bank system" has been a key feature of Japan's economic system that can be traced back as far as the early post-war period.[6] In this system, a firm's "main bank" usually is the bank from which it has borrowed the most and with which it typically has a long-term relationship. In addition, it is widely argued that main banks not only provide loans to client firms but also play a consulting role by providing relevant business information. In addition, main banks may get involved in the management of a firm in times of distress. Although the extent and form of main banks' involvement in firms' management in times of financial difficulties have been changing over time, main banks are still perceived to play an important role as providers of both funds and information to their client firms.

Trying to provide a theoretical underpinning for such long-term relationships

[6] For an overview of the origins of the main bank system, see, e.g., Hoshi and Kashyap (2001).

between main banks and borrower firms, Patrick (1994) argues that such relationships enable banks to gain access to "soft information" on borrower firms, which helps to raise the efficiency of loan screening and borrower monitoring. The argument that repeated bank loan transactions lead to the accumulation of soft information on client firms has also been voiced in more recent studies such as Degryse et al. (2009).

Such soft information on borrower firms and banks' own ability to collect information on industry-, region-, and nation-wide businesses has been helping Japanese main banks to provide effective and useful financial and consulting services to their client firms, and thereby has been contributing both to main banks' profits and the growth of their client firms' business. Particularly in recent years, aware of the fact that the growth prospects for Japan's domestic market are not necessarily promising and domestic manufacturing production has in fact been shrinking, banks have been promoting various services to support client firms' international activities. With more and more large Japanese firms relocating production overseas, smaller domestic firms have been forced to reduce output, resulting in a fall in demand for funds, which in turn has reduced business opportunities for banks in Japan. Moreover, if banks' existing client firm went out of business, banks would not only lose current business but also future business in which to utilize the firm-specific soft information they have accumulated. Thus, faced with a potentially shrinking market at home, many banks in recent years have put greater emphasis on providing support services to client firms seeking to exploit growth opportunities overseas.

Concrete examples of such kind of support services that banks provide to their borrowers to help them with regard to international activities are provided by a Japanese Bankers Association (JBA) report (Japanese Bankers Association 2011). According to the report, other than traditional banking services such as the usual loan business, deposit services, payment services, lease and leaseback deals, or the issue

of stand-by letters of credit (L/C), main banks often provide client firms with information on potential business partners in foreign countries as well as advice on recruiting employees, advertising, tax systems, and administrative issues such as accounting systems, laws, and regulations. These examples indicate that banks provide not only financial transactions but also information services. In the report, the JBA cites a survey it conducted according to which 38 out of 43 Japanese banks with activities in Asia say they provide services other than loan, deposit, and payment services. Specifically, 32 out of the 38 banks with activities in Asia say they provide information related to investment (i.e., tax and accounting systems, etc.), while 31 banks provide opportunities for business matching (e.g., organizing business matching events for Japanese firms and potential local partners). In addition, many banks provide information on firms located in destination regions (14 banks), loan guarantees (12 banks), and support with export and import procedures (8 banks).

Another important issue in the recent banking studies is the existence of non-main banks. Suppose that a firm with multiple loan relations faces an adverse shock only to its main bank while another firm faces adverse shocks to all its lender banks including main bank. It is natural to expect that the latter firm could find it more difficult to circumvent the adverse impact originating from loan suppliers. Khwaja and Mian (2008), for example, examine such an environment and find that an average level of shocks affecting lender banks is an appropriate measure of financial friction. Such a latest discussion motivates us to employ not only the variables related only to main bank but other lender banks.

3.2. Empirical Model

This section explains the empirical strategy we employ to investigate the determinants of export dynamics. We are particularly interested in the impact of

information provided by main banks on firms' export dynamics represented by (i) the initiation of exports (i.e., extensive margin), (ii) the expansion of export destinations (i.e., extensive margin), (iii) the termination of exports (i.e., extensive margin), and (iv) the intensity of exports (i.e., intensive margin). For the three extensive margins of exports (i) to (iii), we focus on the probabilities that a firm starts exporting, extends export destinations, and stops exporting, while we use the export-to-sales ratio to represent the intensive margin of exports (iv).

Following previous empirical studies on the determinants of the extensive margin (e.g., Koenig et al. 2010, Minetti and Zhu 2011), we assume that firm *i* starts exporting, extends export destination, and stops exporting if its profits are larger when exporting than when not exporting, extending destinations than when not extending, and stopping exports than when continuing, respectively. Let π_{it1}^{*},π_{it2}^{*}, and π_{it3}^{*} represent the differences between the profits of firm *i* when it starts exporting, extends export destination, and stops exporting at time *t*, respectively, and its profits when it does not at time *t*. The differences are determined by firm characteristics, the firm's financial conditions, main bank characteristics (health of banks providing trade finance), 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, extending exports destinations, and continuing exports and hence, to lower either the variable or the fixed cost associated with these exporting dynamics. While information spillovers from nearby exporter firms are also taken into account, we are particularly interested in information provided through the main bank and the non-main banks of the firm. Therefore, we parameterize π_{itk}^{*} as:

$$\pi_{itk}^{*} = \alpha_{1k} + Z_{it-1}\beta_{1k} + I_{it-1}\gamma_{1k} + \varepsilon_{it} \quad where\ k = 1,2,3 \qquad (1)$$

where Z_{it-1} is a vector of controls for firm characteristics and a firm's financial

condition which may affect firm *i*'s differential profits π_{itk}^{*}; I_{it-1} is a vector of variables representing information available to the firm; and ε_{it} captures unobserved firm characteristics and other unknown factors that may also affect differential profits.

We assume that firm *i* starts exporting, extends export destinations, and stops exporting if the differential profits $\pi_{itk}^{*}>0$. Under the assumption that ε_{it} is a normally distributed random error with zero mean and unit variance, the probabilities that firm *i* starts exporting, extends export destinations, and continues exporting can be written as:

$$\mathrm{Prob_{itk}} = \mathrm{Prob}(\alpha_{1k} + Z_{it-1}\beta_{1k} + I_{it-1}\gamma_{1k} + \varepsilon_{it} > 0) \;\; where\; k = 1,2,3 \qquad (2)$$

In the first instance, we estimate Equation (2) with a random effect panel probit approach. In order to take any potential endogeneity into account, we lag all right-hand side variables by one year. The dependent variable $Prob_{itk}$ denotes the change in export status at the firm-level and takes a value of 1 if a firm exports for the first time at time *t* (k=1), increases the number of export destination at time *t* (k=2), and stops exporting at time *t* (k=3). We define a firm as an export starter if the firm did not export over either the last three years from *t-3* to *t-1* and exports at time *t*. $Prob_{it1}$ takes a value of zero if a firm did not export for the last three years prior to year *t* and does not export in year *t*. Firms which always export are not included in the estimation of $Prob_{it1}$. For the estimation of $Prob_{it2}$ and $Prob_{it3}$, we only use firms which exported at *t-1*.

For the intensive margin, we estimate the following model (3) through a panel estimation assuming firm-level fixed effect. The dependent variable EXP_SALES_{it} denotes the ratio of exports to the total sales measured at the firm-level. For this estimation, we only use firms which exported at *t*.

$$\mathrm{EXP/SALES_{it}} = \alpha_{14} + \mathrm{Z_{it-1}}\beta_{14} + \mathrm{I_{it-1}}\gamma_{15} + \eta_{\mathrm{i}} + \varepsilon_{\mathrm{it}} \quad (3)$$

Regarding control variables for firm characteristics and the firm's financial conditions (Z_{it}), we include the TFP level of the firm, which is measured by the method detailed in Appendix 1. Based on the results of both theoretical and empirical studies, we expect TFP to be positively correlated with firms' decision to start exporting. Further, to take the impact of liquidity constraints on firms' export behavior into account, we include a variable representing firms' financial characteristics, such as the ratio of liquidity assets to total asset (*F_CASH*). The reason for including this variable is that, as highlighted by, e.g., Manova et al. (2011), Feenstra et al. (2013), and Minetti and Zhu (2011), financial constraints are likely to prevent firms from exporting because firms need sufficient liquidity in order to meet the entry costs associated with starting exporting. Therefore, we expect that firms with more liquidity are more likely to start exporting.

We also control for the financial health of main banks. Feenstra et al. (2013), for example, find that the health of banks providing trade finance is an important determinant of firm level exports. As proxy variables for main banks' financial health, we employ variables such as bank size (the log of the total assets of the bank, *B_SIZE*), the equity ratio (*B_CAP*), and the loan deposit ratio (*B_LTD*).

Regarding information available to the firm (I_{it}), we include variables representing the amount of information on export markets accumulated by lender banks (i.e., both main and non-main banks) as well as information spillovers from nearby firms. The explanatory variable of main interest is the amount of information on export markets potentially available to the firm through its main bank and other lender banks, which are proxies for the amount of information firm *i*'s main bank and other lender banks have accumulated. Specifically, we measure this variable as (i) the ratio of the number of exporting client firms to the total number of the main bank's client firms, i.e., the intensity of each main bank's dealings with exporting firms,

BANKINFO, (ii) the average of the same variable as (i) for all the lender banks, *BANKINFO_AVR*, (iii) the number of foreign branches of the main bank, *BANKBR*, and (iv) the average of the same variable as (iii) for all the lender banks, *BANKBR_AVR*.

We conjecture that banks dealing with exporter firms with a higher intensity and/or operating a larger number of foreign branches accumulate more information related to overseas markets. The former conjecture could be the case when, for example, banks allocate limited lending/internal managerial capacity to each lending activity. Under this environment, the intensity of bank's dealing with exporting firms represents to what extent the bank focuses on the lending activities accompanying overseas market information (i.e., allocate more internal resources to exporting firms).

Note that using the average level of lender banks' information variable is likely to mitigate the potential bias coming from a systematic matching between a firm and a main bank. Suppose, for example, it is possible that firms being about to start exporting tend to choose a bank with larger amount of export market information. If this is the case, the reverse causality running from firms' export decision to main banks' information variables causes bias to our estimation of the coefficients associated with main banks' information variables. Given that it is relatively difficult for firms to entirely shuffle the list of lender banks just to initiate export, the average level of lender banks' information variable can mitigate the endogeneity bias originating from this reverse causality. We estimate the empirical model using average information variables instead of the main bank's information variable as a robustness check for our results.

Given our interests in the information spillovers through lender banks for SMEs, we run the regressions based on the equations (2) and (3) for subsamples consisting of all observations, large firms, and SMEs. To examine the importance of the

information spillovers for SMEs more precisely, we also use two subsamples of SMEs to run the equations (2) and (3): Medium firms and small firms.[7]

In addition to banks' information variables, as highlighted in previous studies, there may be some spillovers from nearby exporters. In order to examine whether this is the case, we included the two nearby-firm variables, *F_NEARBYFIRM* and *F_NEARBYINDEXP*, which are defined in Section 2.2. Industry dummies (for fifteen manufacturing industries) and year dummies are also included in order to control for industry-specific and time-specific fixed effects. The summary statistics for all the variables used in our empirical analysis and the distribution of *BANKINFO* over banks in our dataset in year 2000 are provided in Appendix 2 and Appendix 3, respectively.

4. Estimation Results

Tables 4 to 7 summarize the results of our estimation for the extensive and intensive margins of exports based on equations (2) and (3). In each table, the columns labeled (a), (b), and (c) show the estimation results for the sample of all firms, large firms, and SMEs, respectively. We also show the results for the medium firms and the small firms in the columns (c1) and (c2), respectively. For each size category, the column (i) and (ii) show the results using the main bank's information variables and those using the average of information variables of all the lender banks for each firm, respectively.

As for firms' entry to export market (*NEW_EXP*), first, Table 4 shows that the information spillovers from lender banks' transactions with other exporting firms (*BANKINFO* or *BANKINFO_AVR*) have a strong positive impact on firms' entry to export markets. While the information spillovers from lender banks have a strong

[7] The definition of the size categories is same as that in Section 2.2.

positive impact in the case of SMEs, they do not have a statistically significant impact in the case of large firms. It implies that the information provided by banks is an important driver of starting exports for SMEs. This result is found regardless of whether we measure the accumulation of overseas market information only for the main bank or for all the lender banks (columns (i) and (ii)). This confirms the robustness of the estimation result. SMEs presumably lack internal resources and external information sources to collect information on overseas markets for themselves than larger firms as we discussed in the previous section. Therefore, lender banks would be particularly important information sources for SMEs. Second, the number of lender banks' overseas branches (*BANKBR* or *BANKBR_AVR*) also has a positive impact on firms' entry to export markets. One interesting difference between large firms and SMEs is that the average number of lender banks' overseas branches (*BANKBR_AVR*) matters for large firms while only that of main banks (*BANKBR*) matters for SMEs. Given that banks' overseas branches play an important role for their client firms' overseas payment, this difference may imply that SMEs solely rely on their main bank to make settlement for overseas transactions while large firms tend to use overseas branches of several lender banks, not concentrating on their main bank. SMEs probably tend to start exporting with a small transaction volume and their overseas payment can be handled by their main bank. However, large firms, which are likely to have many transaction partners overseas, may need to utilize a greater number of overseas branches in as many countries as possible. The estimated significantly positive coefficient of *BANKBR_AVR* for large firms may reflect such difference. Third, as theoretically predicted, TFP has a positive impact on the decision to start exporting (see the column (a)). However, this result is not found for each subsample. It implies that the impact of TFP is largely overlapped with the impact of firms' size since there is no significant impact of TFP within each subsample. Fourth, also as theoretically predicted, firms' liquidity (*F_CASH*) has a

positive impact on firms' entry to export markets. Interestingly, this matters only for SMEs but not for large firms. As exporting is a more risky activity than selling products domestically, firms would have to hold sufficient cash flows in order to take this risky behavior. Particularly, SMEs may require sufficient liquidity to start exporting (i.e., enter foreign markets with a lot of uncertainties) because fund-raising or borrowing is usually more difficult for SMEs than for large firms. Fifth, among other independent variables, higher firms' overseas investment ratio (*FFORINV*) or import ratio (*IMPORTRATIO*), which are proxies for the degree of firms' exposure to overseas markets, increases the chance for firms to enter export markets. Sixth, the information spillovers through nearby firms or nearby exporters (*F_NEARBYFIRM* or *F_NEARBYINDEXP*) do not have any significant impacts on firms' entry to export markets, which is not consistent to the result by Koenig et al. (2010) but largely consistent with the results found in several studies such as Aitken et al. (1997), Barrios et al. (2003), and Bernard and Jensen (2004). Seventh, banks' balance sheet variables (i.e., *B_SIZE*, *B_CAP*, and *B_LTD*) also do not have any significant impact on firms' entry into export markets.

Table 4. Estimation Results for NEW_EXP

Random-Effect Panel Logit	(a) All Size Firms				(b) Large Firms				(c) SMEs											
													(c1) Medium firms				(c2) Small firms			
Dependent Variable: NEW_EXP(t)	(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average	
	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD
BANKINFO (t-1)	2.070	0.614 ***			-1.761	1.673			2.624	0.671 ***			2.384	0.779 ***			2.971	1.404 **		
BANKINFO_AVR (t-1)			3.480	0.765 ***			-2.664	2.189			4.419	0.838 ***			3.946	0.982 ***			5.252	1.720 ***
BANKBR (t-1)	0.006	0.003 **			0.005	0.007			0.007	0.003 **			0.007	0.003 **			0.006	0.006		
BANKBR_AVR (t-1)			0.002	0.004			0.022	0.010 **			-0.002	0.004			-0.001	0.005			-0.007	0.009
FFORINV (t-1)	6.213	1.060 ***	6.136	1.057 ***	7.651	2.767 ***	7.729	2.804 ***	5.684	1.178 ***	5.609	1.177 ***	2.919	1.427 **	2.897	1.429 **	10.731	2.087 ***	10.545	2.079 ***
EXIM (t-1)	0.189	0.802	0.106	0.797	0.263	1.326	0.219	1.350	-0.098	1.085	-0.247	1.085	-0.074	1.099	-0.182	1.099	-17.566	1.8E+04	-18.947	2.9E+04
B_SIZE (t-1)	-0.052	0.038	0.005	0.031	0.012	0.108	-0.061	0.096	-0.082	0.041 **	0.008	0.034	-0.079	0.048 *	0.012	0.040	-0.115	0.083	-0.017	0.068
B_CAP (t-1)	-4.072	3.090	-2.792	3.021	-12.629	9.742	-13.638	9.530	-3.118	3.294	-1.496	3.223	-2.655	3.879	-0.993	3.792	-3.335	6.515	-1.599	6.371
B_LTD (t-1)	-0.172	0.217	-0.151	0.210	-0.058	0.409	-0.170	0.400	-0.233	0.265	-0.199	0.256	-0.322	0.290	-0.290	0.277	-0.137	0.741	-0.073	0.733
F_NEARBYFIRM (t-1)	1.0E-04	9.2E-05	7.3E-05	9.2E-05	2.6E-04	2.1E-04	2.8E-04	2.1E-04	-4.5E-05	1.1E-04	-7.7E-05	1.1E-04	-3.2E-05	1.3E-04	-5.5E-05	1.3E-04	-1.9E-04	2.6E-04	-2.4E-04	2.6E-04
F_NEARBYINDEXP (t-1)	0.009	0.007	0.010	0.007	0.009	0.011	0.008	0.011	0.010	0.009	0.010	0.009	0.008	0.010	0.008	0.010	0.028	0.024	0.029	0.024
IMPORTRATIO (t-1)	3.628	0.583 ***	3.604	0.583 ***	3.256	1.501 **	3.366	1.513 **	3.873	0.643 ***	3.875	0.644 ***	3.742	0.765 ***	3.745	0.764 ***	5.502	1.339 ***	5.455	1.331 ***
FOREIGN (t-1)	0.001	0.001 *	0.001	0.001 *	0.000	0.002	0.000	0.002	0.001	0.001	0.001	0.001 *	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.002
TFP (t-1)	0.584	0.280 **	0.543	0.280 *	0.154	0.909	0.138	0.923	0.358	0.302	0.316	0.303	-0.068	0.351	-0.103	0.351	0.562	0.657	0.504	0.657
F_CASH (t-1)	0.504	0.247 **	0.512	0.247 **	1.175	0.773	1.166	0.783	0.637	0.267 **	0.647	0.268 **	0.540	0.308 *	0.544	0.308 *	1.385	0.577 **	1.407	0.577 **
Firm Random-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Obs.	37,798				2,770				35,028				22,507				12,521			
Number of Groups	9,370				815				8,803				6,013				3,762			
Obs per group: min	1				1				1				1				1			
avg	4				3.4				4				3.7				3.3			
max	10				10				10				10				10			
Wald chi2	301.34		304.7		47.11		48.3		257.44		260.82		184.58		185.19		89.78		92.66	
Prob > chi2	0.0000		0.0000		0.1018		0.0826		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Log likelihood	-4196.0		-4194.0		-491.4		-489.2		-3662.3		-3660.2		-2680.8		-2680.8		-933.9		-932.2	
Likelihood-ratio test of rho=0																				
chibar2	34.41		34.63		5.18		5.63		28.76		29.44		21.66		21.90		7.70		7.48	
Prob >= chibar2	0.0000		0.0000		0.0110		0.0090		0.0000		0.0000		0.0000		0.0000		0.0030		0.0000	

Note: ***, **, and * indicate significance at the 1, 5, and 10% level, respectively.

Let us consider the quantitative implications of these results. Specifically, let us focus on the results for the SMEs subsample (i.e., the column (c)). The marginal effect of *BANKINFO* and *BANKINFO_AVR* computed based on the estimation results are 2.624 and 4.419, respectively. Suppose that these variables accounting for the availability of information spillover through lender banks increase by one standard deviation for the subsample of non-exporter SMEs (i.e., 0.073 and 0.056 in Panel (c) in Appendix 2) in year *t-1*. Given the estimated marginal effects, the model predicts that the probability for non-exporter SMEs to start exporting will be 2.642 × 0.073 = 19.3% and 4.419 × 0.056 = 24.7% higher than in the case that banks' information variable does not increase. Considering that the sample mean and the standard deviation of the probability for SMEs to start exporting are 3.2% and 17.6%, respectively, this implies that the information spillovers through lender banks has an economically sizable impact on firms' entry to export markets.

The estimation results for the expansion of export destination (*NEW_REGION*) are summarized in Table 5. Information spillovers from lender banks have a positive and significant impact, particularly for SMEs, which is consistent to the results for *NEW_EXP* shown in Table 4. This means that the information provided by lender banks plays an important role not only for the initiation of exports but also for expansion of export destinations. Second, firms' liquidity (*F_CASH*) has a positive impact on the expansion of export destinations, which is also consistent to the results for *NEW_EXP*. However, while *F_CASH* does not have a statistically significant impact for large firms in the case of *NEW_EXP*, it does have a positive and significant impact for large firms in the case of *NEW_REGION*. This may suggest that even for large firms, expanding export destination requires a certain level of liquidity. Third, information spillovers from nearby firms have a positive impact on the probability of expanding destinations in the case of all size firms, but it is only weakly significant (see the column (a)).

Table 5. Estimation Results for NEW_REGION

Random-Effect Panel Logit	(a) All Size Firms				(b) Large Firms				(c) SMEs											
													(c1) Medium firms				(c2) Small firms			
Dependent Variable: NEW_REGION(t)	(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average	
	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD
BANKINFO (t-1)	1.393	0.390 ***			0.733	0.633			1.536	0.502 ***			1.494	0.551 ***			2.074	1.226 *		
BANKINFO_AVR (t-1)			1.580	0.469 ***			0.489	0.801			1.820	0.589 ***			1.858	0.652 ***			1.747	1.419
BANKBR (t-1)	0.002	0.001			-0.001	0.002			0.004	0.002 **			0.005	0.002 **			0.003	0.005		
BANKBR_AVR (t-1)			0.003	0.002			0.007	0.004 *			0.001	0.003			0.001	0.003			0.001	0.006
FFORINV (t-1)	-0.646	0.436	-0.664	0.436	-0.518	0.704	-0.554	0.705	-0.850	0.568	-0.859	0.568	-0.572	0.601	-0.567	0.602	-2.769	1.583 *	-2.815	1.582 *
EXIM (t-1)	0.349	0.305	0.272	0.306	0.473	0.355	0.460	0.358	-0.270	0.599	-0.375	0.599	-0.340	0.596	-0.450	0.597	N.A.	N.A.	N.A.	N.A.
B_SIZE (t-1)	0.008	0.024	0.024	0.020	0.055	0.045	0.000	0.039	-0.032	0.028	0.020	0.024	-0.033	0.032	0.026	0.027	-0.035	0.066	0.006	0.055
B_CAP (t-1)	-1.415	1.991	-1.095	1.944	1.422	3.878	-0.325	3.761	-2.173	2.344	-1.187	2.296	-2.215	2.626	-1.003	2.566	-3.017	5.324	-2.658	5.267
B_LTD (t-1)	0.104	0.100	0.135	0.097	-0.120	0.142	-0.067	0.135	0.258	0.144 *	0.265	0.140 *	0.258	0.149 *	0.260	0.145 *	0.191	0.552	0.229	0.548
F_NEARBYFIRM (t-1)	9.7E-05	5.5E-05 *	1.0E-04	5.5E-05 *	1.3E-04	8.9E-05	1.3E-04	8.9E-05	1.7E-05	7.0E-05	2.0E-05	7.0E-05	-1.0E-05	7.5E-05	-6.4E-06	7.5E-05	1.1E-04	2.0E-04	1.3E-04	2.0E-04
F_NEARBYINDEXP (t-1)	0.000	0.004	0.000	0.004	-0.003	0.009	-0.002	0.009	0.002	0.005	0.002	0.005	0.004	0.005	0.004	0.005	-0.011	0.018	-0.011	0.018
IMPORTRATIO (t-1)	0.016	0.279	-0.001	0.279	-0.112	0.526	-0.133	0.525	0.009	0.339	-0.005	0.340	-0.351	0.387	-0.368	0.388	1.485	0.763 *	1.490	0.765 *
FOREIGN (t-1)	0.000	0.000 *	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001
TFP (t-1)	0.212	0.170	0.200	0.170	-0.430	0.318	-0.441	0.317	0.232	0.209	0.221	0.209	0.255	0.232	0.240	0.232	-0.230	0.502	-0.221	0.502
F_CASH (t-1)	0.435	0.187 **	0.423	0.187 **	1.145	0.351 ***	1.153	0.350 ***	0.425	0.229 *	0.416	0.229 *	0.356	0.257	0.350	0.257	0.825	0.517	0.800	0.518
Firm Random-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Obs.	19,942				5,406				14,536				11,367				3,169			
Number of Groups	4,780				1,245				3,816				3,064				1,077			
Obs per group: min	1				1				1				1				1			
avg	4.2				4.3				3.8				3.7				2.9			
max	10				10				10				10				10			
Wald chi2	163.29		160.48		83.94		86.53		124.25		116.71		115.27		108.65		41.89		39.95	
Prob > chi2	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.1966		0.2596	
Log likelihood	-8405.8		-8407.3		-2484.6		-2483.4		-5877.5		-5881.4		-4709.0		-4712.4		-1146.8		-1147.9	
Likelihood-ratio test of rho=0																				
chibar2	271.33		273.28		29.16		28.69		246.21		249.96		171.58		174.79		62.58		62.54	
Prob >= chibar2	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Note: ***, **, and * indicate significance at the 1, 5, and 10% level, respectively.

Next, Table 6 summarizes the results for the exit from export markets. First, for SMEs, the *BANKINFO_AVR* has a negative impact on the probability for firms to stop export. In other words, it is more likely for a firm to continue exporting when the firm's lender banks accumulate larger amounts of information on export markets. It implies that keeping relations with these informative lender banks reduces the fixed cost incurred by firms in each period to, for example, update market information.[8] Second, different from the case of *NEW_EXP* and *NEW_REGION*, main banks' loan-to-deposit ratio (*B_LTD*) has a negative impact on the likelihood for firms to exit from export markets. This means that firms keeping a relation with a main bank showing higher intensity of loan provision relative to deposit exhibit higher survivability in export markets. This could reflect, for example, the importance of stable financial supply from its main bank for the survivability of a borrower firm to cover trade finance. Third, a higher *FFORINV*, or *IMPORTRATIO* significantly reduces the probability for firms to exit from export markets, suggesting that a firm's own international transactions such as foreign investments and imports help the firm to continue exporting.

[8] Like Baldwin and Krugman (1989), we assume that firms still have to pay some fixed costs to stay in the market, even after they entered export markets. For example, firms still have to invest in marketing, reputation, distribution, and so on, to remain there. Baldwin and Krugman (1989) call these costs "maintenance cost."

Table 6. Estimation Results for STOP_EXP

Random-Effect Panel Logit	(a) All Size Firms				(b) Large Firms				(c) SMEs				(c1) Large SMEs				(c2) Small SMEs			
Dependent Variable: STOP_EXP(t)	(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average	
	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD
BANKINFO (t-1)	-0.334	0.642			-1.571	1.204			0.016	0.794			0.056	0.931			-0.339	1.603		
BANKINFO_AVR (t-1)			-1.491	0.795 *			-0.182	1.519			-2.227	0.974 **			-2.588	1.163 **			-1.186	1.840
BANKBR (t-1)	-0.002	0.002			-0.002	0.005			-0.002	0.003			0.000	0.003			-0.005	0.006		
BANKBR_AVR (t-1)			-0.006	0.004			-0.008	0.008			-0.004	0.004			0.002	0.005			-0.019	0.009 **
FFORINV (t-1)	-4.426	0.863 ***	-4.357	0.862 ***	-3.042	1.570 *	-3.039	1.575 *	-4.765	1.066 ***	-4.705	1.062 ***	-4.716	1.249 ***	-4.674	1.246 ***	-4.419	1.988 **	-4.450	2.003 **
EXIM (t-1)	-0.697	0.806	-0.609	0.806	-0.785	1.154	-0.787	1.155	-0.566	1.174	-0.459	1.174	-0.422	1.190	-0.311	1.193	N.A.	N.A.	N.A.	N.A.
B_SIZE (t-1)	0.009	0.039	0.011	0.033	-0.020	0.089	-0.004	0.078	0.024	0.044	0.024	0.037	-0.001	0.053	-0.004	0.044	0.061	0.086	0.088	0.070
B_CAP (t-1)	5.853	3.120 *	5.559	3.052 *	12.594	7.316 *	13.155	7.183 *	4.575	3.552	4.132	3.479	1.748	4.246	1.510	4.145	10.718	6.731	10.308	6.682
B_LTD (t-1)	-0.489	0.225 **	-0.469	0.221 **	-0.136	0.327	-0.198	0.322	-0.689	0.323 **	-0.623	0.316 **	-1.230	0.442 ***	-1.154	0.434 ***	0.483	0.597	0.543	0.593
F_NEARBYFIRM (t-1)	-8.8E-05	1.1E-04	-6.6E-05	1.1E-04	4.5E-05	2.1E-04	6.0E-06	2.1E-04	-3.1E-05	1.4E-04	8.4E-06	1.3E-04	6.7E-05	1.5E-04	1.1E-04	1.5E-04	-3.9E-04	3.0E-04	-3.7E-04	3.0E-04
F_NEARBYINDEXP (t-1)	-0.011	0.010	-0.010	0.010	0.015	0.020	0.015	0.020	-0.023	0.013 *	-0.022	0.013 *	-0.028	0.015 *	-0.028	0.015 *	0.002	0.026	0.002	0.026
IMPORTRATIO (t-1)	-1.054	0.515 **	-1.055	0.515 **	-1.599	1.269	-1.583	1.276	-1.056	0.583 *	-1.070	0.582 *	-0.600	0.672	-0.628	0.672	-2.576	1.211 **	-2.465	1.216 **
FOREIGN (t-1)	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	-0.011	0.011	-0.011	0.011
TFP (t-1)	-0.819	0.285 ***	-0.787	0.285 ***	-0.413	0.662	-0.436	0.663	-0.628	0.335 *	-0.592	0.334 *	-0.837	0.398 **	-0.804	0.398 **	0.868	0.645	0.870	0.649
F_CASH (t-1)	0.045	0.316	0.061	0.316	-0.031	0.746	-0.040	0.747	-0.124	0.367	-0.094	0.367	-0.046	0.441	-0.029	0.441	-0.660	0.671	-0.577	0.675
Firm Random-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Obs.	19,942				5,406				14,536				11,367				3,169			
Number of Groups	4,780				1,245				3,816				3,064				1,077			
Obs per group: min	1				1				1				1				1			
avg	4.2				4.3				3.8				3.7				2.9			
max	10				10				10				10				10			
Wald chi2	191.07		195.62		57.94		56.58		152.10		157.77		123.6		127.82		60.38		63.25	
Prob > chi2	0.0000		0.0000		0.0117		0.0158		0.0000		0.0000		0.0000		0.0000		0.0049		0.0024	
Log likelihood	-4551.2		-4548.6		-997.0		-997.7		-3519.6		-3516.5		-2570.7		-2568.1		-915.4		-912.9	
Likelihood-ratio test of rho=0																				
chibar2	275.18		275.03		66.92		67.76		217.45		215.00		170.58		169.54		34.93		35.66	
Prob >= chibar2	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Note: ***, **, and * indicate significance at the 1, 5, and 10% level, respectively.

Finally, Table 7 shows the estimation results for the intensive margin (i.e., export-to-sales ratio: *EXP_SALES*). First, the most important finding is that the information spillovers from lender banks do not have any significant impact on firms' intensive margin of exports, while information from lender banks positively affects firms' extensive margin of exports (starting and stopping exporting and expansion of export destinations). This result implies that the information provided by banks mainly reduces the fixed costs associated with exporting. Second, among the independent variables, firms' overseas investment (*FFORINV*) shows a negative impact on the intensive margin. It may imply the substitutability between own exporting activities and overseas production. Third, the foreign ownership ratio (*FOREIGN*) has a positive and significant impact on the intensive margin of exports in most cases, suggesting that foreign participation is likely to increase the export intensity. This could capture the importance of the cooperation with its foreign parent firms or investors in export markets. However, *FOREIGN* has a significantly negative impact in the case of small firms (column (c2)). Although this is beyond the scope of this paper, the conspicuous difference between small firms and larger firms would be an interesting issue that should be examined more closely in the future. The purpose or characteristics of foreign investors may be different between the case of small firms and the case of larger firms, resulting in the different degrees of export intensity between them. Fourth, transactions with the Japan Bank for International Corporation (JBIC), *EXIM*, have a positive and significant impact on the intensive margin in the case of all size firms (column (a)), though it does not have any significant coefficient in the cases of extensive margins (Tables 4-7). This result suggests that JBIC helps to increase exports from Japanese firms by financing their export activities, and that provision of financing from JBIC lowers the variable costs incurred by exporting firms. This is consistent with the fact that firms usually consult with JBIC as to trade financing after they decide to start exporting, not before the

decision of starting exporting. However, the variable *EXIM* becomes insignificant in all the estimation results using subsamples (columns (b) and (c)). Although it implies that this mechanism largely overlaps with the effect of firm size, the insignificant results may be partly due to the fact that only a small number of exporters (especially SMEs) borrow from JBIC. According to Table 3 above, only 0.5 percent of exporters report that JBIC is one of the top-ten lender banks. Nevertheless, our result in Table 7 confirms that JBIC plays a certain role in promoting and increasing exports from Japanese firms.

Table 7: Estimation Results for EXP_SALES

Fixed-Effect Panel Estimation	(a) All Size Firms				(b) Large Firms				(c) SMEs											
													(c1) Large SMEs				(c2) Small SMEs			
Dependent Variable: EXP_SALES(t)	(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average		(i) Main bank		(ii) Average	
	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD	dy/dx	SD
BANKINFO (t-1)	0.001	0.017			0.026	0.031			-0.004	0.021			0.013	0.023			-0.045	0.049		
BANKINFO_AVR (t-1)			-0.018	0.020			0.023	0.039			-0.029	0.024			-0.011	0.027			-0.105	0.053 **
BANKBR (t-1)	0.000	0.000			0.000	0.000			0.000	0.000			0.000	0.000			0.000	0.000		
BANKBR_AVR (t-1)			0.000	0.000			0.000	0.000			0.000	0.000			0.000	0.000			0.000	0.000
FFORINV (t-1)	-0.084	0.014 ***	-0.084	0.014 ***	0.046	0.049	0.044	0.049	-0.098	0.014 ***	-0.097	0.014 ***	-0.101	0.014 ***	-0.100	0.014 ***	0.022	0.076	0.026	0.076
EXIM (t-1)	0.022	0.013 *	0.023	0.013 *	0.013	0.017	0.012	0.018	0.013	0.020	0.015	0.020	0.013	0.020	0.014	0.020	N.A.	N.A.	N.A.	N.A.
B_SIZE (t-1)	-0.001	0.001	-0.001	0.001	-0.001	0.002	-0.003	0.002 *	-0.001	0.001	-0.001	0.001	-0.001	0.001	-0.001	0.001	0.002	0.002	0.001	0.002
B_CAP (t-1)	-0.039	0.076	-0.059	0.073	-0.125	0.168	-0.190	0.162	-0.003	0.083	-0.004	0.081	-0.007	0.094	-0.010	0.092	0.177	0.179	0.164	0.177
B_LTD (t-1)	0.008	0.004 *	0.008	0.004 *	0.007	0.007	0.009	0.007	0.010	0.006 *	0.010	0.006 *	0.011	0.006 *	0.012	0.006 *	0.002	0.023	0.002	0.023
F_NEARBYFIRM (t-1)	-3.5E-06	7.3E-06	-3.3E-06	7.3E-06	-3.0E-06	1.3E-05	-2.8E-06	1.3E-05	-2.1E-06	9.9E-06	-2.3E-06	9.9E-06	-8.4E-06	1.1E-05	-8.5E-06	1.1E-05	1.6E-05	3.4E-05	1.3E-05	3.4E-05
F_NEARBYINDEXP (t-1)	0.000	0.000	0.000	0.000	-0.001	0.001	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.002	-0.001	0.002
IMPORTRATIO (t-1)	-0.022	0.019	-0.022	0.019	-0.137	0.038 ***	-0.136	0.038 ***	0.003	0.022	0.002	0.022	-0.066	0.025 ***	-0.067	0.025 ***	0.293	0.053 ***	0.292	0.053 ***
FOREIGN (t-1)	3.4E-05	1.2E-05 ***	3.5E-05	1.2E-05 ***	9.0E-05	2.6E-05 ***	8.8E-05	2.6E-05 ***	1.4E-05	1.3E-05	1.5E-05	1.3E-05	2.5E-05	1.4E-05 *	2.6E-05	1.4E-05 *	-7.0E-05	3.8E-05 *	-6.6E-05	3.8E-05 *
TFP (t-1)	0.023	0.010 **	0.023	0.010 **	0.018	0.022	0.017	0.022	0.018	0.011	0.018	0.011	0.003	0.013	0.003	0.013	0.036	0.027	0.036	0.027
F_CASH (t-1)	0.006	0.014	0.007	0.014	-0.001	0.031	0.000	0.031	0.008	0.016	0.009	0.016	-0.007	0.018	-0.007	0.018	0.041	0.039	0.045	0.039
Firm Fixed-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year-Effect	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Obs.	19,862				5,326				14,536				11,367				3,169			
Number of Groups	4,778				1,222				3,816				3,064				1,077			
Obs per group: min	1				1				1				1				1			
avg	4.2				4.4				3.8				3.7				2.9			
max	10				10				10				10				10			
F-value	163.78		163.76		63.14		63.24		95.26		95.4		78.01		78.02		18.72		18.91	
Prob > F	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
R-sq: Within	0.2070		0.2070		0.2708		0.2711		0.1761		0.1763		0.1844		0.1845		0.1722		0.1737	
Between	0.0109		0.0106		0.0231		0.0228		0.0156		0.0154		0.0111		0.0111		0.0323		0.0313	
Overall	0.0482		0.0478		0.0758		0.0754		0.0411		0.0409		0.0354		0.0351		0.0448		0.0463	
corr(u_i, Xb)	-0.0280		-0.0290		-0.0202		-0.0209		-0.0189		-0.0197		-0.0451		-0.0461		-0.0505		-0.0456	
F test that all u_i=0:																				
F-value	12.56		12.56		12.04		12.06		12.42		12.43		12.01		12.02		11.55		11.57	
Prob > F	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Note: ***, **, and * indicate significance at the 1, 5, and 10% level, respectively.

To summarize, these results imply that information on foreign markets provided by various channels, especially by lender banks, substantially reduces the fixed costs of exporting. Our results highlight that channels of information spillovers other than those examined in the literature so far may be of considerable importance. Moreover, the information channel from lender banks is particularly important for SMEs who, compared with large firms, usually have less number of transaction partners in their purchases and sales, and lack internal resources to collect information on export markets.

5. Concluding Remarks

This paper examined the role of information spillovers through lender banks in the context of firms' export decisions. To do so, we used a unique dataset containing information not only on Japanese firms' export activities and the availability of nearby exporting firms, but their lender banks' experience in transacting with other exporting firms and the lender banks' own overseas activities. The estimation results indicate that information spillovers through the banks positively affect SMEs' decision to start exporting and extend their export destinations. The information spillovers also reduce the likelihood for exporters to exit from export markets. The export-to-sales ratio of exporters, however, is not affected by the information spillovers. These results imply that information on foreign markets provided by lender banks substantially reduces the fixed entry costs of export markets as well as the costs associated with maintaining firms' export status.

The research presented in this study could be expanded in a number of directions. One such direction would be to extend our analysis to examine others important dimensions of firms' international activities such as foreign direct investment. A

further potentially interesting extension would be to use the model in this study to analyze how the impact of changes in currency exchange rates interacts with information spillovers through lender banks. If information spillovers work more promptly under the depreciation of Japanese yen, which supposedly encourage Japanese firms to expand their exports, the effect of banks' information provision will be more sizable under the depreciation of Japanese yen than in the case of appreciation. We believe all of these extensions would provide further insights to gain a better understanding of firms' export dynamics and the role of lender banks.

This paper also provides an important policy implication. As mentioned in the introduction, our knowledge regarding what factors are important for firms to become an exporter remains very limited, even though export promotion has been an important policy issue in many countries. With regard to Japan, many firms, particularly SMEs, do not export even though their performance is good or they actively invest in research and development. Promoting exports by these firms is an urgent policy issues for Japan, which has been facing population decline and sluggish domestic demand for a prolonged period. This paper showed the importance of banks' role as an information provider for potential exporters, implying that the government should proactively involve banks in its export promotion policies. The availability of information from lender banks is particularly important for SMEs to start exporting, which suggests that lender banks play a crucial role as information sources for the export decision of SMEs who are likely to be lack of internal resources and have limited number of transaction partners.

On the other hand, banks may also be interested in providing more support services for firms trying to expand their business abroad. In fact, particularly small banks see their client firms face declining domestic demand and therefore worry that their own business may shrink. Helping such banks to build international service networks and building on the banks' support services may allow the government to

implement its export promotion policies more effectively. Moreover, since banks have accumulated a lot of information on their client firms' business, they may have useful knowledge on what type of firms should receive support from the government and on what type of support is most effective. The government should recognize that SMEs strongly need useful information on export markets in order to lower the fixed costs of exporting and consider how to provide useful information effectively to SMEs. Of course, government and non-profit organizations already provide various support services for firms' international business and for trading companies. Information provided by such organizations or trading companies is complementary to information collected by banks through lending relationships, and it is important for the government to effectively utilize these various information sources for export promotion policies.

References

Aitken, H., G. H. Hanson, and A. E. Harrison (1997), "Spillovers, Foreign Investment, and Export Behavior," *Journal of International Economics* 43 (1-2): 103-132.

Amiti, M. and D. Weinstein (2011), "Exports and Financial Shocks," *Quarterly Journal of Economics* 126 (4): 1841-1877.

Baldwin, R. and P. Krugman (1989), "Persistent Trade Effects of Large Exchange Rate Shocks," *Quarterly Journal of Economics* 104 (4): 635-654.

Barrios, S., H. Gorg, and E. Strobl (2003), "Explaining Firms' Export Behaviour: R&D, Spillovers and the Destination Market," *Oxford Bulletin of Economics and Statistics* 65 (4): 475-496.

Bernard, A. B. and J. B. Jensen (2004), "Why do Firms Export," *Review of Economics and Statistics* 86 (2): 561-569.

Bernard, A. B., J. Eaton, J. B. Jensen, and S. Kortum (2003), "Plants and Productivity in International Trade," *American Economic Review* 93 (4): 1268-1290.

Degryse, H., M. Kim and S. Ongena (2009), *Microeconometrics of Banking: Methods, Applications, and Results.* Oxford University Press, Oxford.

Feenstra, R. C., Z. Li and M. Yu (2013), "Exports and Credit Constraints under Incomplete Information: Theory and Evidence from China," *Review of Economics and Statistics*, forthcoming.

Good, D., M. Nadiri, and R. Sickles (1997), "Index Number and Factor Demand Approaches to the Estimation of Productivity," in H. Pesaran and P. Schmidt, eds., *Handbook of Applied Econometrics: Microeconomics*, 14-80, Blackwell, Oxford.

Hoshi, T. and A. Kashyap (2001), *Corporate Financing and Governance in Japan: The Road to the Future*, MIT Press, Cambridge, Mass.

Japanese Bankers Association (2011), *Ajia Keizai-ken ni totte Nozomashii Kinyu-Hoken Shijo no Arikata: Ginko no Torihikisaki Kigyo no Kaigai Shinshutsu ni okeru Shien Jisseki* [The Shape of a Desirable Financial and Capital Market for the Asian Economy: Case Studies on Banks' Services to Support Client Firms' International Activities], March 2011, Japanese Bankers Association.

Japan Small Business Research Institute (2008), *White Paper on Small and Medium Enterprises in Japan 2008: Improvement of Productivity and the Challenge of Community Revitalization*, The Small and Medium Enterprise Agency.

Koenig, P., F. Mayneris and S. Poncet (2010), "Local Export Spillovers in France," *European Economic Review* 54: 622-641.

Krautheim, S. (2012), "Heterogeneous Firms, Exporter Networks and the Effect of Distance on International Trade," *Journal of International Economics* 87 (1): 27-35.

Khwaja, A.I. and A. Mian (2008), "Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market," *American Economic Review* 98: 1413-1412.

Manova, K., S. Wei and Z. Zhang (2011), "Firm Exports and Multinational Activity under Credit Constraints," *NBER Working Paper* 16905.

Mayer, T. and G. Ottaviano (2008), "The Happy Few: The Internationalisation of European Firms," *Intereconomics* 43: 135-148.

Melitz, M. (2003), "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica* 71 (6): 1695-1725.

Minetti, R. and S. C. Zhu (2011), "Credit Constraints and Firms Export: Microeconomic Evidence from Italy," *Journal of International Economics* 83: 109-125.

Miyakawa, D., K, Hosono, T. Uchino, M. Hazawa., A. Ono., H. Uchida and I. Uesugi (2013), "Natural Disasters, Financial Shocks, and Firm Export," mimeo.

Paravisini, D., V. Rappoport, P. Schnabl and D. Wolfenzon (2011), "Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data," *NBER Working Paper* 16975.

Patrick, H. (1994), "The Relevance of Japanese Finance and Its Main Bank System," in M. Aoki and H. Patrick, eds., *The Japanese Main Bank System: Its Relevance for Developing and Transforming Economies*, 359-360, Oxford University Press, Oxford.

Todo, Y. (2011), "Quantitative Evaluation of Determinants of Export and FDI: Firm-Level Evidence from Japan," *World Economy* 34 (3): 355-381.

Appendix 1: The multilateral TFP index

As detailed in Fukao et al. (2011), the TFP level of firm *i* in 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*. In the EALC 2010 Database, the benchmark year t_0 is set to the year 2000 and the firm-level TFP level is calculated as follows, using the multilateral TFP index method developed by Good et al. (1997):.

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

$$\text{for } t = t_0$$

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

$$\text{for } t > t_0$$

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

$$\text{for } t < t_0$$

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

Appendix 2: Summary Statistics

Panel (a): All Firms

	All Firm Size								
	All firms			Exporter			Non-Exporter		
Variable	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.
TFP	77,305	0.009	0.156	22,526	0.050	0.162	54,779	-0.008	0.150
F_CASH (t-1)	77,305	0.553	0.173	22,526	0.580	0.154	54,779	0.542	0.179
F_NEARBYFIRM	77,305	310.452	534.795	22,526	428.008	608.762	54,779	262.111	493.162
F_NEARBYINDEXP	77,305	2.488	5.611	22,526	4.667	7.196	54,779	1.592	4.515
FOREIGN	77,305	5.774	56.487	22,526	14.565	88.610	54,779	2.160	35.062
IMPORTRATIO	70,680	0.019	0.068	21,529	0.046	0.095	49,151	0.008	0.046
FFORINV	77,305	0.012	0.050	22,526	0.033	0.076	54,779	0.004	0.029
BANKINFO	77,305	0.217	0.074	22,526	0.240	0.071	54,779	0.207	0.074
BANKINFO_AVR	77,305	0.214	0.059	22,526	0.237	0.057	54,779	0.204	0.057
BANKBR	77,305	15.049	21.236	22,526	17.932	22.416	54,779	13.863	20.615
BANKBR_AVR	77,305	12.920	12.280	22,526	15.116	12.589	54,779	12.018	12.035
B_SIZE	77,305	16.428	1.539	22,526	16.718	1.496	54,779	16.308	1.541
B_CAPRATIO	77,305	0.044	0.014	22,526	0.043	0.014	54,779	0.044	0.014
B_LTD	77,305	0.578	0.202	22,526	0.599	0.233	54,779	0.570	0.188
EXIM	77,305	0.002	0.047	22,526	0.005	0.067	54,779	0.001	0.036

Panel (b): Large Firms

		All firms			Large Firms Exporter			Non-Exporter	
Variable	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.
TFP	9,778	0.083	0.149	5,876	0.101	0.150	3,902	0.056	0.144
F_CASH (t-1)	9,778	0.525	0.154	5,876	0.537	0.143	3,902	0.507	0.167
F_NEARBYFIRM	9,778	553.905	650.779	5,876	600.068	663.208	3,902	484.389	625.287
F_NEARBYINDEXP	9,778	4.377	6.902	5,876	5.519	6.879	3,902	2.656	6.574
FOREIGN	9,778	16.823	80.969	5,876	22.328	90.707	3,902	8.533	62.653
IMPORTRATIO	9,136	0.036	0.088	5,663	0.049	0.096	3,473	0.014	0.068
FFORINV	9,778	0.034	0.062	5,876	0.051	0.072	3,902	0.009	0.030
BANKINFO	9,778	0.252	0.079	5,876	0.261	0.078	3,902	0.237	0.079
BANKINFO_AVR	9,778	0.246	0.062	5,876	0.255	0.061	3,902	0.232	0.060
BANKBR	9,778	19.247	22.452	5,876	20.354	22.744	3,902	17.580	21.902
BANKBR_AVR	9,778	16.111	12.458	5,876	16.890	12.527	3,902	14.938	12.262
B_SIZE	9,778	16.900	1.448	5,876	17.011	1.410	3,902	16.733	1.489
B_CAPRATIO	9,778	0.042	0.013	5,876	0.041	0.013	3,902	0.043	0.013
B_LTD	9,778	0.640	0.321	5,876	0.645	0.318	3,902	0.632	0.324
EXIM	9,778	0.007	0.085	5,876	0.010	0.099	3,902	0.004	0.060

Panel (c): SMEs

		All firms			SMEs Exporter			Non-Exporter	
Variable	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.
TFP	67,527	-0.002	0.154	16,650	0.032	0.162	50,877	-0.013	0.150
F_CASH (t-1)	67,527	0.557	0.175	16,650	0.595	0.155	50,877	0.544	0.179
F_NEARBYFIRM	67,527	275.200	506.236	16,650	367.286	576.229	50,877	245.064	477.287
F_NEARBYINDEXI	67,527	2.214	5.343	16,650	4.366	7.281	50,877	1.510	4.306
FOREIGN	67,527	4.175	51.801	16,650	11.825	87.697	50,877	1.671	31.926
IMPORTRATIO	61,544	0.017	0.064	15,866	0.044	0.095	45,678	0.008	0.044
FFORINV	67,527	0.009	0.047	16,650	0.026	0.077	50,877	0.003	0.029
BANKINFO	67,527	0.211	0.072	16,650	0.233	0.066	50,877	0.204	0.073
BANKINFO_AVR	67,527	0.209	0.056	16,650	0.231	0.053	50,877	0.202	0.056
BANKBR	67,527	14.441	20.985	16,650	17.077	22.236	50,877	13.578	20.485
BANKBR_AVR	67,527	12.458	12.185	16,650	14.490	12.552	50,877	11.794	11.988
B_SIZE	67,527	16.359	1.540	16,650	16.614	1.511	50,877	16.276	1.540
B_CAPRATIO	67,527	0.044	0.014	16,650	0.043	0.014	50,877	0.044	0.014
B_LTD	67,527	0.570	0.177	16,650	0.583	0.191	50,877	0.565	0.172
EXIM	67,527	0.001	0.039	16,650	0.003	0.052	50,877	0.001	0.033

Panel (d): Medium Firms

				Medium firms					
	All firms			Exporter			Non-Exporter		
Variable	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.
TFP	45,298	0.012	0.154	12,959	0.043	0.160	32,339	0.000	0.150
F_CASH (t-1)	45,298	0.556	0.174	12,959	0.593	0.151	32,339	0.541	0.180
F_NEARBYFIRM	45,298	291.272	518.487	12,959	377.732	581.793	32,339	256.626	486.549
F_NEARBYINDEX1	45,298	2.382	5.699	12,959	4.434	7.554	32,339	1.559	4.502
FOREIGN	45,298	5.417	58.654	12,959	13.465	92.927	32,339	2.192	36.364
IMPORTRATIO	41,357	0.019	0.067	12,354	0.045	0.094	29,003	0.008	0.047
FFORINV	45,298	0.011	0.053	12,959	0.028	0.082	32,339	0.004	0.034
BANKINFO	45,298	0.216	0.073	12,959	0.234	0.067	32,339	0.208	0.073
BANKINFO_AVR	45,298	0.213	0.056	12,959	0.232	0.054	32,339	0.206	0.056
BANKBR	45,298	15.144	21.307	12,959	17.451	22.400	32,339	14.219	20.781
BANKBR_AVR	45,298	13.046	12.211	12,959	14.779	12.497	32,339	12.351	12.024
B_SIZE	45,298	16.438	1.530	12,959	16.651	1.503	32,339	16.352	1.532
B_CAPRATIO	45,298	0.044	0.014	12,959	0.043	0.014	32,339	0.044	0.014
B_LTD	45,298	0.577	0.197	12,959	0.587	0.204	32,339	0.573	0.194
EXIM	45,298	0.002	0.043	12,959	0.003	0.058	32,339	0.001	0.036

Panel (e): Small Firms

				Small firms					
	All firms			Exporter			Non-Exporter		
Variable	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.	Obs.	Average	Std. Dev.
TFP	22,229	-0.031	0.150	3,691	-0.008	0.162	18,538	-0.036	0.147
F_CASH (t-1)	22,229	0.559	0.176	3,691	0.602	0.167	18,538	0.550	0.177
F_NEARBYFIRM	22,229	242.448	478.649	3,691	330.610	554.773	18,538	224.894	460.002
F_NEARBYINDEX1	22,229	1.873	4.514	3,691	4.127	6.223	18,538	1.424	3.939
FOREIGN	22,229	1.644	33.633	3,691	6.068	65.821	18,538	0.763	22.120
IMPORTRATIO	20,187	0.013	0.057	3,512	0.043	0.100	16,675	0.007	0.039
FFORINV	22,229	0.005	0.030	3,691	0.020	0.057	18,538	0.002	0.020
BANKINFO	22,229	0.203	0.071	3,691	0.228	0.063	18,538	0.198	0.071
BANKINFO_AVR	22,229	0.200	0.056	3,691	0.225	0.051	18,538	0.195	0.055
BANKBR	22,229	13.009	20.238	3,691	15.764	21.603	18,538	12.461	19.910
BANKBR_AVR	22,229	11.262	12.044	3,691	13.473	12.689	18,538	10.821	11.862
B_SIZE	22,229	16.199	1.548	3,691	16.485	1.532	18,538	16.142	1.545
B_CAPRATIO	22,229	0.045	0.014	3,691	0.044	0.014	18,538	0.045	0.014
B_LTD	22,229	0.554	0.125	3,691	0.571	0.137	18,538	0.551	0.123
EXIM	22,229	0.001	0.027	3,691	0.000	0.016	18,538	0.001	0.028

Appendix 3: BANKINFO Variable

The table shows the distribution of *BANKINFO* for top 76 banks as of the end of 2000 FY in our dataset. Each column accounts for one bank. The bank is sorted as descending order in terms of *BANKINFO*. *NUM_CLIENT* is the number of total client firms for each bank.

Ranking	*NUM_CLIENT*	*BANKINFO*	Ranking	*NUM_CLIENT*	*BANKINFO*
1	126	0.44	39	780	0.21
2	76	0.41	40	3,033	0.20
3	56	0.38	41	54	0.20
4	62	0.34	42	69	0.20
5	3,347	0.31	43	499	0.20
6	1,670	0.30	44	508	0.20
7	7,035	0.30	45	3,312	0.19
8	1,232	0.30	46	493	0.19
9	58	0.29	47	208	0.18
10	453	0.29	48	4,544	0.18
11	2,110	0.28	49	83	0.18
12	378	0.28	50	504	0.18
13	107	0.27	51	100	0.18
14	616	0.27	52	553	0.18
15	828	0.27	53	73	0.18
16	9,582	0.26	54	377	0.18
17	1,109	0.26	55	97	0.18
18	7,492	0.26	56	263	0.17
19	1,196	0.26	57	975	0.17
20	55	0.25	58	476	0.17
21	402	0.25	59	279	0.17
22	1,044	0.25	60	143	0.17
23	4,705	0.24	61	54	0.17
24	206	0.24	62	186	0.17
25	167	0.24	63	642	0.17
26	71	0.24	64	716	0.16
27	3,234	0.24	65	147	0.16
28	1,384	0.24	66	295	0.16
29	416	0.24	67	136	0.16
30	143	0.23	68	94	0.16
31	561	0.22	69	208	0.16
32	185	0.22	70	1,400	0.16
33	224	0.21	71	57	0.16
34	571	0.21	72	541	0.16
35	260	0.21	73	552	0.15
36	128	0.21	74	145	0.15
37	171	0.21	75	179	0.15
38	627	0.21	76	317	0.15