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The structure and the determinants of the trade of SME products

Sawako Maruyama*

Abstract

This paper aims to investigate the structure and the determinants of the trade of products manufactured by small- and medium-sized enterprises. For this purpose, trade database for selected SME-based industries is prepared. Analyzing this database, the following three findings are obtained. First, firms in SME-based industries are facing a large inflow of imported goods, while the volume of their export is relatively small. Secondly, the share of Asian countries in the trade of SME products is larger than overall trade. Thirdly, the gravity model can be applied for the trade of SME products. In some cases, distance and difference of income level tend to be more sensitive for SME products than overall trade. These results are consistent with the labor-intensive characteristics of SME products.

Keywords: Trade; Gravity model; Small and Medium-sized Enterprises (SMEs); Manufacturing

1 Introduction

This paper investigates the structure and the determinants of the trade of the products manufactured by small- and medium-sized enterprises, SMEs. SMEs play important roles in the business activities in Japan. They dominate large-sized enterprises with more than 90 percent of total number of firms, and their production accounts for nearly half of the shipment value of manufacturing. Meanwhile, SMEs have been facing stiff competition since the 1980s. The rapid Yen appreciation after the Plaza Accord in 1985 lowered competitiveness of Japanese SME products. In addition, the inflow of products from other Asian

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countries has declined domestic production of Japanese SMEs. Furthermore, recent Yen appreciation and the shrinking domestic market because of the aging population are enhancing these long-term trends. In contrast to the increased globalization of circumstances, globalization of the activities of Japanese SMEs is progressing slowly. An increasing number of SMEs engage in overseas activities, however, they are only a small part of total SMEs: only 2.8% of SMEs export their products abroad directly, and 1% of them make foreign direct investment(FDI)[1].

Globalization has changed business circumstances for Japanese SMEs, but to what extent have they changed? This paper attempts to estimate the volume of trade related to SMEs, since trade is most relevant among overseas activities for SMEs. A database of SME products is prepared with concordance between *Census of Manufactures* and *Trade Statistics*. This database makes it possible to analyze the characteristics and the trade structure of SME products. Moreover, this paper examines determinants of trade flow. How is the trade of SME products composed by industry and by region? What determines the trade flow of SME products? Do those determinants affect trade of SME products differently from overall trade? The aim of this paper is to answer these questions.

The rest of the paper is organized as follows. In the next section, we review literature which analyzes the overseas activities of SMEs in Japan. Section 3 explains the methodology of concordance between *Census of Manufactures* and *Trade Statistics*. In section 4, the determinants of trade of SME products are examined using the gravity model. The result of the analysis is summarized in section 5.

2 Literature

Firm size is recognized as one of the important factors for internationalization. It has been employed as a determinant of overseas expansion of firms in many empirical analyses. However, most empirical literature has focused on large firms. Generally, SMEs engage less in overseas activities in comparison to large enterprises. One reason is that SMEs are lacking their resources such as technology, human resources, and finance. Those resources are related to what Dunning called 'Ownership advantages' in his eclectic theory[2]. Internationalized SMEs are a small portion of all SMEs. On the other hand, more SMEs are affected by the globalized economy regardless whether or not they engage in international

[1]Small and Medium Enterprise Agency [21], p.71.
[2]See for example Dunning [8].

business. Therefore, when we discuss globalization and SMEs, it is important to distinguish the following issues: the globalization of SMEs themselves and globalization of circumstances surrounding SMEs. We summarize the recent literature concerning these issues.

2.1 Empirical analysis for SMEs

With regard to the globalization of SMEs, a growing number of empirical analyses have been made using firm-level data. For example, empirical analysis by Hollenstein [12] reveals that firm size affects the probability and the degree of internationalization, especially to cross a threshold of internationalization. Similar results are presented in the survey of empirical analyses during late 1980s and 1990s by Coviello and McAuley [5]. They point out that firm size appears to affect the internationalization of firms. Meanwhile, they also mention some difficulties for empirical investigation. One of those difficulties is that internationalization is not explained using only one framework. A number of frameworks need to be integrated for the investigation. Another difficulty is biased samples of the manufacturing sector and focusing too much on country-specific factors.

Similarly, most empirical analyses for Japanese SMEs focus on a specific industry or region. They often use questionnaires or interview surveys with qualitative factors, and there is only a small number of quantitative analyses for internationalization of Japanese SMEs. Urata and Kawai [27] is one of those quantitative analyses. They examine the determinants of FDI location by Japanese SME. They use a dataset including both SMEs and large firms. Their empirical results show that SMEs are more sensitive to local conditions in making decision for FDI.

Some empirical analyses suggest that international SMEs are more productive and profitable than domestic SMEs, and this is in line with the results obtained from the analyses done on large enterprises. For example, an analysis of Small and Medium Enterprise Agency [20] examines the effect of FDI on the performance of firms. They conclude that FDI by SMEs results in higher performance of domestic operations by shifting into the production of more sophisticated goods or operation of higher value-added fields[3]. Kawai [16] and Todo [23] also examine the difference of performance between international and domestic SME with firm-level data. Kawai investigates the determinants of global strategies by SMEs and divides these into four stages: trade, outsourcing, subsidiary by joint venture, and wholly-owned subsidiary. He concludes

[3]Small and Medium Enterprise Agency [20], pp.88-91.

that activities of SMEs are more globalized when SMEs possesses firm-specific assets such as R&D investment or technology, introducing IT, or participating in a joint project. Todo focuses on the overseas outsourcing including both inter-firm and intra-firm contracts. He finds that outsourcing to Asian firms improves the performance of headquarters in Japan.

These studies succeed in revealing the features of globalization by SMEs. However, the number of empirical analysis for SMEs is still fewer in comparison to large enterprises and the globalization of SMEs has not been examined sufficiently. Moreover, we have to pay attention for some limitations of analysis using firm-level data. Firstly, those studies investigate internationalized SMEs which account for only a small part of total SMEs. The vast majority of Japanese SMEs are not engaging in overseas activities, and the estimated result cannot be generalized to the whole of SMEs. Secondly, there is a potential of underestimation of trade since only direct trade is reported in the survey. A lot of manufacturing SMEs in Japan use trading companies for export, or trading companies independently export the products of manufacturing SMEs. Recently, there are studies emphasizing the importance of intermediaries on trade[4]. Thirdly, competing import goods are not observed in the survey which reports only direct import. To show the influence of trade on both international and domestic SMEs, it is necessary to estimate the trade effect at the industry level.

2.2 Import competition

For SMEs in developed countries, import competition with products from developing countries is one of the major impacts induced by globalization. Effect of import competition on wages and employment has been investigated, although the effect is not limited to SMEs. Freeman and Katz [11], Sachs and Shatz [18] are examples for these types of analyses. They use industry-level data aggregated at 2-digit level of SIC. More detailed data are prepared by Feenstra [9], and Feenstra *et al.* [10]. They offer a concordance dataset between industrial census using SIC code and trade statistics using HS code. This concordance enables us to test the impact of imports at a disaggregated level. Moreover, the 'import penetration ratio' can be calculated using shipment value and trade value by industry. In the Japanese case, a series of studies such as done by Tomiura and Uchida [26], Tomiura [24], and Tomiura [25] are examples which prepare a connected database between 4-digit industrial code for *Census of Manufactures*

[4]See Ahn *et al.* [1] and Bernard *et al.* [3]

and HS 9-digit code for *Trade Statistics*[5].

These studies reveal the change of circumstances by globalization. They suggest that increasing import from developing countries affect domestic economy. This is true for Japanese SMEs which experienced rapid change of demand after the appreciation of the yen in 1980s. However, the effect of import has not been examined sufficiently due to a lack of appropriate data. For example, studies investigating entry and exit of SMEs as Doi [7], Honjo and Harada [13], Kawai and Urata [17], Small and Medium Enterprise Agency [19][6] do not include import or export as explanatory variables.

Therefore, this paper attempts to combine these two issues of the globalization of SMEs and globalization of circumstances surrounding SMEs using a dataset for trade of SME products.

3 The methodology

3.1 Selection of SME-based industry

To start analyzing the trade of products manufactured by SMEs, we have to define SME products and to distinguish them from others. In order to distinguish SME products, we select industries whose production is dominated by SMEs. *Census of Manufactures* by METI, the ministry of economy, trade and industry of Japan, offers the aggregation of shipment value by firm size for the 3-digit code of Japan Standard Industrial Classification, JSIC[7]. According to the Act for Small- and Medium-sized Enterprises, SMEs are defined with the criteria of less than 300 employees or capital of 300 million yen for manufacturing. In this analysis, we employ a criterion of 300 employees. We aggregate shipment value of firms with less than 300 employees in 3-digit JSIC. When the aggregated value of an industry i accounts for more than 70% of total shipment, the industry i is regarded as an SME-based industry. We use the average of SME shipment ratio from 2002 to 2009.

The result of calculation shows that 63 industries out of 150 in 3-digit code are classified as SME-based industry (See Appendix Table 1). The number of SMEs in those 63 industries is 99,796 in average during 2002-2007, and it

[5]In order to connect these different codes, an appendix table of Input-Output table for rearranging trade statistics is used. This appendix table is originally used when trade sector of I-O table is estimated. Detail of the methodology is described in the appendix of Tomiura and Uchida [26].

[6]Small and Medium Enterprise Agency [19], 1.2.1.

[7]JSIC code has changed since 2008, therefore data after 2008 is adapted to the old classification until 2007.

accounts for 40.4% of the total number of SMEs. The rest of SMEs are included in large-firm-based industries or mixed industries of both sizes. A number of light industries such as textile, apparel and leather are included in SME-based industries. The largest SME-based industry concerning the number of firms is 'Fabricated constructional and architectural metal products' (254) with 15,187 firms. In addition to this, industries related to intermediate goods or inputs for construction such as 'Sawing, planning mills and wood products' (131), 'Cement and its products' (222), 'Furniture' (141), and 'Sliding doors and screens' (143) have a large number of firms.

What are the features of SME-based industries? Figure 1 shows the relationship between SME shipment ratio and three industrial characteristics including average wage, capital equipment ratio, and labor distribution ratio. Each index of industrial characteristics is expressed as a ratio to total manufacturing. The first figure (a) shows that the average wage of SME-based industries tend to be low[8]. 53 out of 63 SME-based industries indicate lower values than the average of total manufacturing. The correlation coefficient between SME shipment ratio and average wage is -0.734, which suggests a negative and strong relationship. The second figure (b) shows the relationship with capital equipment ratio[9]. A higher index indicates that an industry is more capital intensive. The correlation coefficient with SME shipment ratio is -0.345, and this means that SME-based industries tends to indicate a lower capital equipment ratio and be of labor-intensive nature. In addition, 51 SME-based industries show lower values of capital equipment ratio than average. The third figure, (c), shows a labor distribution ratio calculated as the ratio of total cash wage and salary to gross value added. An industry with high labor distribution ratio tends to be labor-intensive, and 55 SME-based industries indicate higher values than total manufacturing. The correlation with SME shipment ratio is positive with the value of 0.390. These facts suggest that most of SME-based industries are characterized as low-wage, labor-intensive industry.

3.2 Concordance between SME-based industry and trade statistics

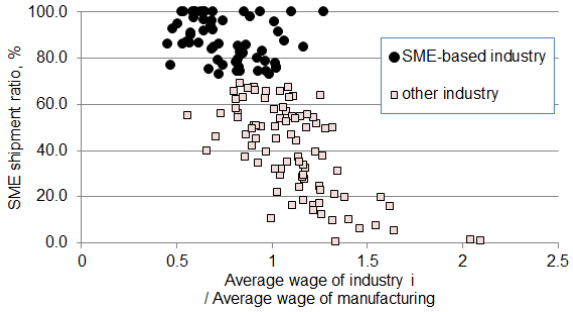
In the next step to estimate trade value of SME products, it is necessary to use a concordance table between *Census of Manufactures* and *Trade Statistics*. In this analysis, the concordance table from *the Input-Output Table* (hereafter I-O

[8]Average wage is calculated as total cash wages and salaries per employee.

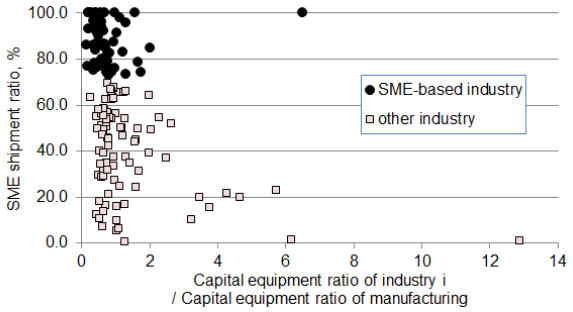
[9]Capital equipment ratio is calculated as the value of tangible fixed assets per employee using available data for enterprises with more than 30 employees.

Figure 1: Characteristics of SME-based industries

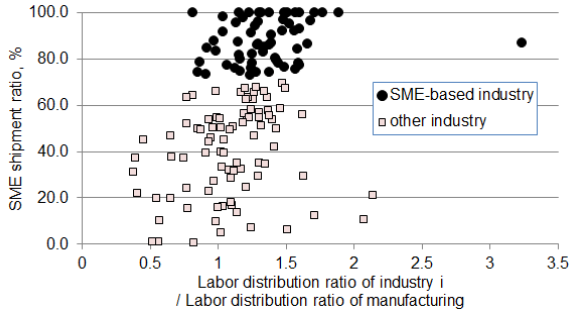
(a)



(b)



(c)



(Source) Own calculation.

(Notes) 'Other industry' includes both large-firm based industries and mix-sized industries.

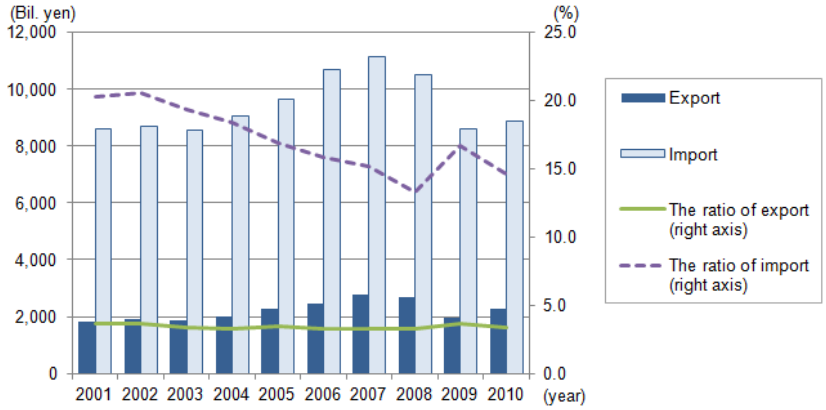
Average wage (mil. yen) = Total cash wage and salary (mil. yen)
/ The number of employees

Capital equipment ratio = Value of tangible fixed assets (end of the year, mil. yen)
/ The number of employees

(enterprises with more than 30 employees)

Labor distribution ratio = Total cash wage and salary
/ Gross value added (mil. yen) *100

Figure 2: Trade value of SME products and its ratio to overall trade



(Source) Own calculation.

table) by Statistics Bureau is used as described in the analysis by Tomiura and Uchida [26]. The concordance table is a list prepared for the I-O table of base year 2005. We match 3-digit JSIC code of SME-based industries to 4-digit code of I-O table and select correspondent sectors on I-O table. From the concordance table, we obtain HS 9-digit trade goods included in selected 4-digit sectors on I-O table. Trade data of HS 9-digit from *Trade Statistics* by Ministry of Finance, MOF, is aggregated according to 3-digit JSIC[10]. Trade statistics from 2001 to 2010 are connected, reflecting the changes of HS 9-digit code. Three SME-based industries (104, 169, 256) are excluded from the analysis because of the absence of corresponding trade goods, and one industry (242) is excluded on the grounds of being unable to distinguish from non-SME-based industry (241) in *Trade Statistics*. The number of exported goods included in SME products is 1,865, while the number of imported goods is 3,595 in 2005.

Aggregated import value of SME-products is about four times as large as export (Figure 2). In 2007, import of SME products was 11,122 billion yen, while export was 2,768 billion yen. Both aggregated import and export value for SME products tend to change along with business cycle. After the peak at 2007, both import and export values fell drastically. The share of SME products to overall export accounts for around 3.5% each year, while, concerning import, it accounts for around 20% of overall import.

These trade values are comparable to domestic production. As a production data, shipment values from 2002 to 2009 are available. Using average value of

[10] 3-digit JSIC code is not fully corresponding to 4-digit code of I-O table. Thus the correspondence between 3-digit JSIC code and 9-digit HS code is finally checked.

trade and shipment during the period, the following three indices are calculated: export ratio to shipment, import ratio to shipment, and import penetration ratio (See Appendix Table 2). The import penetration ratio is calculated as the share of import to domestic demand, that is shipment value plus import minus export. From export ratio to shipment, it is obvious that most of the SME-based industries show a low level of export. Only in four industries (114, 115, 209, 323), the export ratio to shipment indicates a value larger than 0.50, that is to say, more than half amount of domestic production in these industries are exported. In addition, seven industries take values between 0.25 and 0.50, which means that more than a quarter of the amount of production are exported. On the other hand, in fourteen industries the import ratio to shipment is larger than 1, which means that the value of import exceeds the domestic production. Apparel industries (121, 122), of which domestic production is large, are one of those industries.

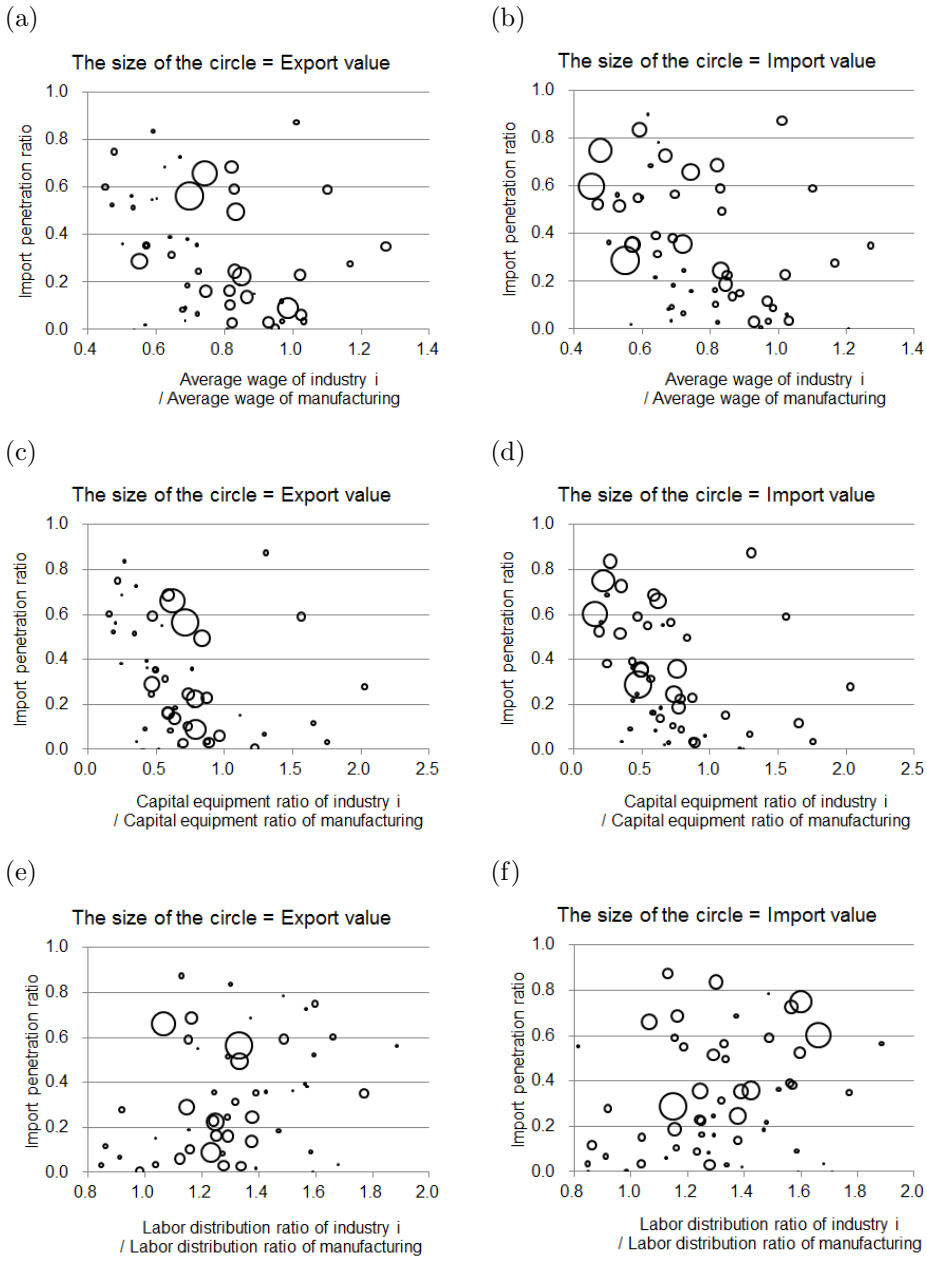
The import penetration ratio compares import to domestic production. 18 industries out of 59 industries indicate a value larger than 0.50 concerning import penetration ratio. The criterion of 0.50 means that import is equal to the supply by domestic firms. That suggests one-third of SME-based industries are facing the dominance of import goods in the domestic market.

Figure 3 shows the relationship between import penetration ratio and three industrial characteristics. The Y-axis is import penetration ratio in all graphs. The X-axis of each graph shows respectively average wage in (a) and (b), capital equipment ratio in (c) and (d), and labor distribution ratio in (e) and (f). The size of each circle represents the value of export in (a), (c), (e), and import in (b), (d), (f). These figures show the following two tendencies. First, low-wage or labor-intensive industries tend to show a higher import penetration ratio, although the correlation is not so strong. The correlation coefficient with import penetration ratio is -0.334 for average wage, -0.259 for capital equipment ratio, and 0.163 for labor distribution ratio. Secondly, the volume of import tends to be large in low-wage or labor intensive industries. Meanwhile, the volume of export tends to be large in industries taking value around 1.0, which means close to total manufacturing and less labor-intensive.

For the convenience of analysis, 59 SME-based industries are classified in 10 industrial groups based upon a 2-digit classification: food and beverages, textile, apparel, lumber and furniture, paper and printing, manufactured goods classified by materials, leather, ceramic, fabricated metal, and miscellaneous[11]. To

[11]Respective industrial groups include following 3-digit industry: [Food and beverages] 92, 93, 96, 103, 106 [Textile] 111, 113, 114, 115, 117, 118, 119 [Apparel] 121, 122, 123, 124, 125,

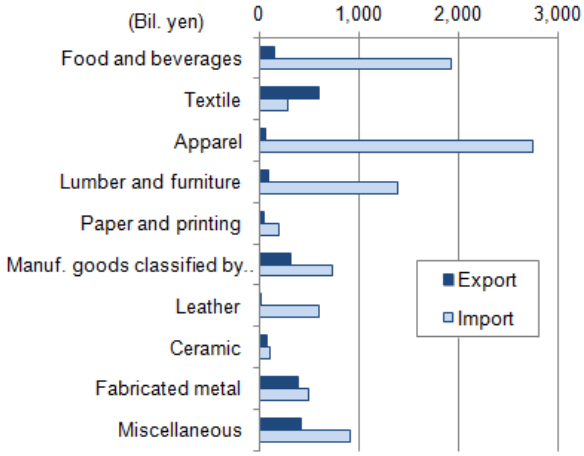
Figure 3: Trade status and industrial characteristics of SME-based industries



(Source) Own calculation.

(Note) The location of each circle is the same between (a) and (b), (c) and (d), (e) and (f), but the size is different within each pair. The circle is expressed as relative size within export or import, therefore the absolute size of export is non-comparable to that of import in these graphs.

Figure 4: Trade structure by industrial group (average during 2001-2010, %)



compare trade values among these industrial groups, we use the average during 2001-2010. Among the 10 groups, textile is the only one group in which export exceeds import (Figure 4). In other groups import value dominates export value. Import value is especially large in the apparel industry, which indicates that it is more than fifty times of export value. This result is interesting; the apparel industry, which is located at the downstream of the value-chain shows opposite trade flow with textile industry at the upper stream. On the other hand, the difference between import and export value is not large among industrial groups which produce materials such as ceramic, fabricated metal, and manufactured goods classified by materials.

4 The determinants of trade of SME products

4.1 The structure of trade of SME products

In this section, we investigate trade structure and determinants of SME products[12]. For most of the SME products, the share of East and Southeast Asia is large in both export and import. This is obvious when it is compared with the

129 [Lumber and furniture] 131, 132, 133, 139, 141, 142, 143 [Paper and printing] 151, 154, 162, 163 [Manufactured goods classified by materials] 171, 182, 183, 189, 194, 195, 202, 209 [Leather] 211, 212, 213, 214, 215, 216, 217, 218, 219 [Ceramic] 222, 227, 228 [Fabricated metal] 239, 252, 254, 257, 258 [Miscellaneous] 316, 321, 323, 326, 327.

[12]We have to pay attention that SME products do not cover all of the trade concerning SMEs; it only includes the industries dominated by SMEs. SMEs manufacturing large-size-based products and mixed-size-based products are excluded.

regional composition of overall trade. Table A3.1 and A3.2 of Appendix show the composition of trade by region for SME products and overall trade (columns noted 'all') using the average during 2001-2010. The sum of China, NIEs and ASEAN4 is higher in 46 products for export and 44 products for import than overall trade. Focusing on trade with China, the share in 27 products for export and in 43 products for import is larger than the overall export respective import. At the same time, the share of developed countries such as US and EU is smaller for SME products. It suggests that trade of SME products tends to be large with geographically approximate partners or developing countries.

4.2 The determinants of trade

4.2.1 The model

We examine the determinants of trade of SME products employing the gravity model. The gravity model is a model which explains the bilateral trade volume inspired from the law of universal gravitation. For variables it contains the economic size of countries of both origin and destination, and geographical distance. This model was used in the early study by Tinbergen [22], and has been applied in a lot of empirical analyses of trade. The basic model for the estimation is expressed as follows:

$$E_{ij} = Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} \tag{1}$$

E_{ij} is bilateral trade flow from country i to country j. Y_i is an economic size of export country and indicates the capacity of supplying. Generally, GDP is used as a proxy variable. The larger the GDP of the export country is, the more goods are supplied and traded. Y_j is an economic size of import country which indicates the market size, and for this GDP is also used as a proxy variable. The larger the GDP of the import country is, the more goods are demanded and traded. Both coefficients of β_1 and β_2 are expected to be positive. Geographical distance D_{ij} indicates transportation cost and affects negatively upon trade flow.

In this paper, both export and import between Japan and each trade partner are tested as dependent variable. In our estimation, trade preferential factor, difference of income level, and the exchange rates are added to expand the model[13]. The equation is expressed as follows using log-formation.

$$\ln E_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln D_{ij} + \beta_4 \ln P_{ij} + \beta_5 \ln y_{ij} + \beta_6 \ln x_{ij} + \epsilon_{ij} \tag{2}$$

[13]The gravity model has been expanded to include GDP per capita by Linnemann [15] to test the effect of income level.

Trade preferential factor P_{ij} is a dummy variable for free trade agreement, FTA, in effect between Japan and trade partners. β_4 is expected to be positive. y_{ij} is a variable indicating the difference of income level. x_{ij} is exchange rate. Appreciation of the yen increases import (positive sign) and decreases export (negative sign).

Among these gravity factors, in which do the characteristics of SME products appear? The products of SMEs tend to be labor-intensive and low-wage goods, as shown with related indices in Table 1. From these characteristics, two hypotheses are raised as follows:

Hypothesis 1 Import from the countries with lower income level tends to be larger for SME products in comparison with overall import.

As the factor proportion theory suggests, it is a developing country which holds comparative advantage in labor-intensive industries. Import of labor intensive goods including SME products to Japan is expected to be large from developing countries, as Japan is relatively capital abundant. Hypothesis 1 is tested using the difference of income level between Japan and each trade partner. The effect of income difference on import, β_5 in equation (2), is expected to be positive, and the coefficient to be larger than overall import. In other words, SME products are imported more from the country with larger income difference. While, the effect of income difference on export is not clear, since Japan has comparative disadvantage in those labor-intensive industries.

The other hypothesis is regarding an effect of transport cost. For an importer, a transport cost is an additional cost to a price of imported goods. A large transport cost relative to the price diminishes the benefits of importing, and the importer tends to choose to import from geographically closer countries. This is more likely to happen for low-price, low valued-added goods than high-price, high value-added goods, because the relative transport cost is higher for low-price goods. Therefore, trade with distant countries is expected to be less for low-price goods. There are some discussions in recent literature with regard to the relationship between price/quality and distance. Baldwin and Harrigan [2] show that high-price/high-quality goods are exported to distant markets, while low-price goods are not. Similarly, Hummels and Skiba [14] empirically examine the 'Alchian-Allen effect', and show a positive relationship between prices and transportation costs.

SME products are assumed to be low-price, low value-added goods from their labor-intensive characteristics. Therefore, trade with distant countries is expected to be smaller.

Hypothesis 2 Trade of SME products tend to be susceptible to transport costs.

The geographical distance is a proxy for transport cost and has a larger effect on SME products than overall trade[14]. The coefficient of distance, β_3 in equation (2), is expected to be larger for SME products in comparison with overall trade.

4.2.2 Data

In regression analysis, the panel data of bilateral trade of Japan and each trade partner during 2001-2010 are employed. In order to make the characteristic of SME products clear, both trade value of SME products and overall trade are tested and compared. In addition, SME products are divided into 10 industrial groups shown in Figure 4 and tested. The bilateral trade value of SME products, both aggregated value and respective values for ten industrial groups, are prepared from the database prepared in the previous section. Overall export/import value used as dependent variable is obtained from *Trade Statistics*. These data are deflated using *Corporate Goods Price Index 2005* by the Bank of Japan.

As shown in equation (2), a logarithm of trade value is used as a dependent variable. However, disaggregated trade data includes zero observations which are impossible to transform into a logarithm. In such a case, we need to employ some methods suitable for data with zero observation. Therefore, we use three methods in this analysis. The first method is to use logarithm of the value added one to each trade value ($\ln(E_{ij}+1)$). Then, it is possible to employ panel regression with the random effect which is used most commonly in the test of the gravity model. The second method is Tobit regression with random effect. Tobit model is employed when a dependent variable is truncated and contains a lot of zero observation. Also with this method, a logarithm of trade value plus one is used. The third method is negative binomial regression with fixed/random effect. Negative binomial model (hereafter NB model) is employed when a dependent variable is count data and it also allows the dependent variable to include zero observation[15]. In regression of the NB model, dependent variable is expressed in level, E_{ij}, and independent variables are expressed with linear

[14]For apparel products, there is another reason. Dicken [6] explains the importance of geographical proximity with a rapid rate of product turnover. He points that low-cost countries located close to the major consumer markets have a relative advantage in industries where time to delivery is critical.

[15]For details of NB model, see Cameron and Trivedi [4].

Table 1: Summary statistics

(Export)	n=1930			
	Mean	Std. Dev.	Min	Max
PARTRGDP	28.03896	2.551129	18.70462	34.97562
JAPANRGDP	33.84453	0.0319602	33.79756	33.89191
DIFGDPPC	2.378161	1.711203	-1.030336	11.85857
DISTANCE	9.150367	0.4343674	7.057898	9.829572
EXCHRATE	6.19e-08	1.000259	-2.60295	2.61194
(Import)	n=1890			
	Mean	Std. Dev.	Min	Max
PARTRGDP	28.08149	2.557016	18.70462	34.97562
JAPANRGDP	33.84453	0.0319604	33.79756	33.89191
DIFGDPPC	2.381252	1.705538	-1.030336	11.85857
DISTANCE	9.14526	0.4370898	7.057898	9.829572
EXCHRATE	-2.17e-06	1.000268	-2.6029	2.6119

relationship as equation (2). Among these three methods, Tobit model and NB model are used for the regression of disaggregated data which includes a lot of zero observations.

GDP data is obtained from the National Accounts database of the United Nations. Real GDP in national currency of each trade partner is transformed to a yen-basis using exchange rates crossrates prepared by UNCTAD. As a proxy of transport cost, direct distance between the capital cities is used[16]. All of these variables are transformed to logarithm.

The exchange rates are also introduced as an independent variable. We are interested in the volatility of currency, not in the cross-country difference, therefore normalized exchange rates for each trade partner are employed. A larger value means the appreciation of the yen, while a smaller value means depreciation. FTA dummy variable is introduced as a variable which indicates one since the year when FTA enters into effect. In case that FTA goes into effect during the last quarter of the year, FTA dummy starts to take one from the following year. In addition, all regressions include the year dummy. Summary statistics and correlation matrix of variables are listed in Table 1 and 2 respectively.

4.2.3 The results of estimation

We estimate determinants of trade using panel data of 193 countries for export and 189 countries for import. The results of estimation for export and import are shown in Table 3 and 4 respectively. Hausman test for NB regression supports the estimation with fixed effect, therefore the results of NB regression with random effect are omitted. In addition, export and import of SME products by

[16]Distance is calculated using a calculator of the website of Geospatial Information Authority of Japan and the latitude and longitude of each capital city.

Table 2: Correlation matrix

(Export)

	PARTRGDP	JAPANRGDP	DIFGDPPC	DISTANCE	EXCHRATE	FTADUMMY
PARTRGDP	1.0000					
JAPANRGDP	0.0381	1.0000				
DIFGDPPC	-0.4484	-0.0202	1.0000			
DISTANCE	-0.1020	0.0000	0.0332	1.0000		
EXCHRATE	-0.0517	-0.1040	0.0871	0.0000	1.0000	
FTADUMMY	0.1385	0.0670	-0.0740	-0.1138	0.0533	1.0000

(Import)

	PARTRGDP	JAPANRGDP	DIFGDPPC	DISTANCE	EXCHRATE	FTADUMMY
PARTRGDP	1.0000					
JAPANRGDP	0.0378	1.0000				
DIFGDPPC	-0.4578	-0.0199	1.0000			
DISTANCE	-0.0940	0.0000	0.0373	1.0000		
EXCHRATE	0.0519	-0.1071	0.0880	0.0000	1.0000	
FTADUMMY	0.1373	0.0677	-0.0753	-0.1127	0.0538	1.0000

industrial groups are tested using NB model with fixed effect, random effect and Tobit model with random effect. Results of these estimation with disaggregated data are listed Table A4.1 to A 4.6 in Appendix.

With regard to export, most coefficients of $PARTRGDP$ and $DISTANCE$ show expected signs for both overall export and SME products. Meanwhile, coefficients of $JAPANRGDP$ on SME products show unexpected negative signs in panel regression and Tobit regression with random effect, although they are insignificant. These three variables are fundamental factors for the gravity model, and they indicate similar tendency in the results of SME products by industrial groups. Concerning other variables, the signs of coefficient of $DIFGDPPC$ are different by estimating method; positive for Tobit model, and negative for NB model. Trade preferential factor $FTADUMMY$ is with a positive sign as expected, however, some cases are statistically insignificant. All coefficients of $EXCHRATE$ are positive, although expected signs are negative.

Regarding import, we obtain statistically significant coefficients for $PARTRGDP$ with positive signs and $DISTANCE$ with negative signs for both overall imports and SME products with any methods of estimation. The coefficients of $JAPANRGDP$ are significant but negative. $EXCHRATE$ and $FTADUMMY$ also show expected positive signs, however, only the results using NB model are significant for SME products. The coefficients of $DIFGDPPC$ are positive in panel regression and Tobit regression.

Among three fundamental variables of the gravity model, effects of $PARTRGDP$ and $DISTANCE$ are clear; coefficients of them show expected signs and are statistically significant for both export and import, and using any method. More-

Table 3: Determinants of Export

	Panel: random effect		Tobit: random effect		Negative binomial: fixed effect	
	Overall export	SME products	Overall export	SME products	Overall export	SME products
PARTRGDP	0.768	1.116	0.767	1.115	0.164	0.511
	(19.409) ***	(17.674) ***	(18.909) ***	(17.516) ***	(11.356) ***	(34.025) ***
JAPANRGDP	4.670	-2.398	4.712	-2.375	4.168	3.302
	(2.350) **	(-0.888)	(2.384) **	(-0.883)	(3.500) ***	(5.058) ***
DIFGDPPC	0.062	0.290	0.068	0.294	-0.108	-0.115
	(1.116)	(3.334) ***	(1.179)	(3.297) ***	(-5.364) ***	(-5.291) ***
DISTANCE	-1.314	-2.447	-1.316	-2.448	0.314	-1.150
	(-6.278) ***	(-7.310) ***	(-6.149) ***	(-7.264) ***	(3.735) ***	(-13.427) ***
EXCHRATE	0.132	0.094	0.130	0.093	0.046	0.079
	(3.323) ***	(1.739) *	(3.287) ***	(1.724) *	(1.958) *	(5.670) ***
FTADUMMY	0.585	0.435	0.576	0.431	0.473	0.195
	(2.163) **	(1.174)	(2.135) **	(1.168)	(3.444) ***	(3.018) ***
Constant	-151.705	83.130	-153.092	82.399	-148.258	-114.763
	(-2.259) **	(0.911)	(-2.292) **	(0.907)	(-3.680) ***	(-5.196) ***
No of obs.	1930	1930	1930	1930	1930	1930
Wald-chi2	667.773	488.521	388.208	200.63	321.499	2774.063
loglikeihood			-3333.216	-3952.281	-30396.051	-21970.602
Hausman					3795.32 ***	98.38 ***

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.
Negative binomial regression is tested using Stata command 'xtnbreg' with FE option.
Fixed effect is chosen from the result of Hausman test for FE vs RE.

Table 4: Determinants of Import

	Panel: random effect		Tobit: random effect		Negative binomial: fixed effect	
	Overall import	SME products	Overall import	SME products	Overall import	SME products
PARTRGDP	1.168	1.231	1.163	1.223	0.460	0.512
	(17.490) ***	(11.712) ***	(16.693) ***	(11.216) ***	(33.100) ***	(31.627) ***
JAPANRGDP	-4.825	-14.382	-4.704	-14.229	-1.486	-7.398
	(-2.131) **	(-4.164) ***	(-2.090) **	(-4.141) ***	(-2.495) **	(-7.495) ***
DIFGDPPC	0.338	0.582	0.357	0.606	-0.091	0.036
	(3.781) ***	(4.161) ***	(3.757) ***	(4.110) ***	(-4.444) ***	(1.613)
DISTANCE	-2.173	-2.547	-2.179	-2.555	-1.339	-1.080
	(-6.170) ***	(-4.591) ***	(-5.949) ***	(-4.457) ***	(-16.374) ***	(-13.440) ***
EXCHRATE	0.128	0.047	0.123	0.040	0.064	0.076
	(2.790) ***	(0.665)	(2.663) ***	(0.566)	(5.201) ***	(3.905) ***
FTADUMMY	0.265	0.224	0.253	0.216	0.043	0.207
	(0.854)	(0.473)	(0.821)	(0.460)	(0.715)	(2.126) **
Constant	164.575	485.935	160.655	480.991	50.672	245.449
	(2.152) **	(4.166) ***	(2.114) **	(4.147) ***	(2.508) **	(7.342) ***
No. of obs.	1890	1890	1890	1890	1890	1890
Wald-chi2	442.690	219.197	623.593	473.395	1750.808	1448.207
loglikeihood			-3558.230	-4361.436	-27345.731	-22931.229
Hausman					239.43 ***	23.06 *

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.
Negative binomial regression is tested using Stata command 'xtnbreg' with FE option.
Fixed effect is chosen from the result of Hausman test for FE vs RE.

over, all of the results for disaggregated export/import by industrial groups support it. Meanwhile, $JAPANRGDP$ shows unexpected or insignificant results. A possible reason of this is that $JAPANRGDP$ do not adequately express the difference of supply capacity or demand size of Japan – rather it represents a time-variant factor such as business fluctuation. Taking this into account, results of $JAPANRGDP$ are less important as a gravity factor. From the results of $PARTRGDP$ and $DISTANCE$, we can conclude that the gravity model is applicable for the trade of SME products; the longer the distance with a trade partner, the less SME products are traded.

Then, how about two hypotheses for the characteristics of SME products? From the first hypothesis concerning $DIFGDPPC$, we expect that the coefficient of import of SME products shows a larger value than that of overall import. In Table 4, the results of panel regression and Tobit model with random effect support the hypothesis. For the result using NB model, the test for overall import results in an unexpected negative sign, while SME products holds a positive sign. From these results, it is concluded that the import of SME products tends to be larger with developing countries.

The second hypothesis is concerning the effect of $DISTANCE$. We expect that the coefficient of SME products is larger than overall export/import. In the result of export in Table 3, coefficients of SME products exceed those of overall export in panel regression and the Tobit model. In NB model it is impossible to compare the strength of effect, because the signs are opposite between overall export and SME products. The results are similar in the case of import. Coefficients using panel regression and Tobit regression with random effect support the hypothesis 2. However, the coefficient of overall import is larger than SME products in NB model.

As a whole, hypothesis 1 is supported from our regression results. Hypothesis 2 is partly supported, and it depends on the method of regression.

5 Concluding remarks

This paper investigates the structure and the determinants of trade of SME products using the trade database prepared for selected SME-based industries. The main findings of this paper are summarized as follows. Firstly, the estimated trade value for SME products shows that firms in SME-based industries are facing a large inflow of imported goods, while the volume of their export is relatively small. In a third of SME-based industries, import exceeds domestic production. Secondly, the share of Asian countries in SME products is larger than those shares in overall trade. Thirdly, the gravity model explains the trade flow of SME products. The susceptibility to the distance and the difference of income level is consistent with the labor-intensive character of SME products.

The results from our analysis suggest that SMEs in Japan are facing a severe situation in competing with products from developing countries in the domestic market. This paper focuses on the trade during 2001-2010, however, the results should be interpreted in the context of a long-term change of industrial and trade structure since 1980s in Japan and the world economy. It illustrates a consequence of the changes of the circumstances for Japanese SMEs. Further research is necessary to examine quantitatively whether the trade has affect for SMEs concerning their domestic production, employment, and entry/exit. These issues should be analyzed in future studies.

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References

[1] Ahn, Jae Bin, Amit K. Khandelwal and Shang-Jin Wei (2011) "The role of intermediaries in facilitating trade", *Journal of International Economics*, vol.84 pp.73-85.

[2] Baldwin, Richard and James Harrigan (2011) "Zeros, Quality, and Space: Trade Theory and Trade Evidence", *American Economic Journal: Microeconomics*, vol.3, No.2, pp.60-88.

[3] Bernard, Andrew B., Marco Grazzi and Chiara Tomasi (2011) "Intermediaries in international trade: direct versus indirect modes of export", *NBER worikng paper* No.17711.

[4] Cameron, A. Colin and Pravin K. Trivedi (2005) *Microeconometrics: methods and applications*, Cambridge: Cambridge University Press.

[5] Coviello, Nicole E. and Andrew McAuley (1999) "Internationalisation and the smaller firm: a review of contemporary empirical research", *Management International Review*, vol.39, No.3, pp.223-256.

[6] Dicken, Peter (2011) *Global Shift 6th edition*, London: SAGE.

[7] Doi, Noriyuki (1992) "The efficiency of small manufacturing firms in Japan", *Small Business Economics*, vol.4, pp.29-35.

[8] Dunning, John H. (1977) "Trade, location of economic activities and the MNE: A search for an eclectic approach", In: Ohlin B., P-O Hesselborn and P. M. Wijkman (eds.) *The international allocation of economic activity*, London: MacMillan.

[9] Feenstra, Robert C. (1996) "U.S. imports, 1972-1994: datat and concordances", *NBER Working Paper Series* No.5515.

[10] Feenstra, Robert C., John Romalis and Peter K. Schott (2002) "U.S. imports, exports and tariff data, 1989-2001", *NBER Working Paper Series* No.9387.

[11] Freeman, Richard B. and Lawrence F. Katz (1991) “Industrial wage and employment determination in an open economy”, In: Abowd, John M. and Richard B. Freeman (eds.) *Immigration, Trade and the Labor Market*, Chicago: The University of Chicago Press.

[12] Hollenstein, Heintz (2005) “Determinants of international activities: Are SMEs different?”, *Small Business Economics*, vol.24, pp.431-450.

[13] Honjo, Yuji and Nobuyuki Harada (2006) “SME policy, financial structure and firm growth: evidence from Japan”, *Small Business Economics*, vol.27, pp.289-300.

[14] Hummels, David and Alexandre Skiba (2004) “Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen Conjecture”, *Journal of Political Economy*, vol.112, No.6, pp.1384-1402.

[15] Linnemann, Hans (1966) *An Econometric Study of International Trade Flows*. Amsterdam: North-Holland.

[16] Kawai, Hiroki (2004) “Chusho kigyou no global-ka no shinten: sono youin to seika (Increasing globalization of small and medium enterprises: the factors and results)” (in Japanese), *RIETI Discussion Paper Series* 04-J-037.（河井啓希（2004）「中小企業のグローバル化の進展：その要因と成果」）

[17] Kawai, Hiroki and Shujiro Urata (2002) “Entry of small and medium enterprises and economic dynamism in Japan”, *Small Business Economics*, vol.18, pp.41-51.

[18] Sachs, Jeffrey D. and Howard J. Shatz (1994) “Trade and jobs in U.S. manufacturing”, *Brookings Papers on Economic Activity*, vol.1, pp.1-84.

[19] Small and Medium Enterprise Agency (ed.) (2002) *White Paper on Small and Medium Enterprises in Japan 2002*, Japan Small Business Research Institute.

[20] Small and Medium Enterprise Agency (ed.) (2006) *White Paper on Small and Medium Enterprises in Japan 2006*, Japan Small Business Research Institute.

[21] Small and Medium Enterprise Agency (ed.) (2012) *White Paper on Small and Medium Enterprises in Japan 2012*, Japan Small Business Research Institute.

[22] Tinbergen, Jan (1962) *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: The Twentieth Century Fund.

[23] Todo, Yasuyuki (2012) "Nihon no chusho kigyou no kaigai seisan itaku (Foreign outsourcing of Japanese small and medium enterprises)" (in Japanese), *RIETI Discussion Paper Series* 12-J-004. （戸堂康之（2012）「日本の中小企業の海外生産委託」.）

[24] Tomiura, Eiichi (2003) " The impact of import competition on Japanese manufacturing employment ", *Journal of The Japanese and International Economies,* Vol.17, pp.118-133.

[25] Tomiura, Eiichi (2004) " Import competition and employment in Japan: plant startup, shutdown and product changes ", *The Japanese Economic Review*, Vol.55, No.2, pp.141-152.

[26] Tomiura, Eiichi and Yukio Uchida (2001) " The Impact of import competition on gross job creation and destruction: A study based on Japanese import-industry data concordance ", *METI/RI Discussion Paper Series* 01-DOF-36.

[27] Urata, Shujiro and Hiroki Kawai (2000) "The determinants of the location of foreign direct investment by Japanese small and medium-sized enterprises ", *Small Business Economics*, vol.15, No.2, pp.79-103.

Appendix Table 1. SME shipment ratio and the number of the firms in SME-based industries

JSIC 3 digit code	Industry	SME shipment ratio	Number of enterprises	Number of SMEs	Ratio of SMEs (%)
92	Seafood products	87.1	7,401	7,363	99.5
93	Canned and preserved fruit and vegetable products	90.9	2,048	2,039	99.6
96	Flour and grain mill products	74.4	690	685	99.3
103	Tea and coffee	73.3	1,320	1,317	99.8
104	Manufactured ice	100.0	176	176	100.0
106	Prepared animal foods and organic fertilizers	78.7	692	690	99.7
111	Silk reeling plants	86.6	6	6	100.0
113	Twisting and bulky yarns	86.6	791	791	100.0
114	Woven fabric mills	84.8	1,998	1,992	99.7
115	Knit fabrics mills	96.1	447	447	100.0
117	Rope and netting	92.2	309	309	100.0
118	Lace and other textile goods	94.2	699	698	100.0
119	Miscellaneous textile mill products	82.1	1,361	1,354	99.4
121	Textile outer garments and shirts, including bonded fabrics and lace, except Japanese style	86.3	5,730	5,712	99.7
122	Knitted garments and shirts	93.0	2,372	2,371	100.0
123	Underwear	77.1	804	801	99.6
124	Japanese style apparel and “ Tabi ” -sock	94.9	472	472	100.0
125	Other textile apparel and accessories	86.3	1,164	1,160	99.6
129	Miscellaneous fabricated textile products	90.1	3,828	3,825	99.9
131	Sawing, planning mills and wood products	79.3	5,062	5,056	99.9
132	Millwork, plywood and prefabricated structural wood products	81.7	1,910	1,898	99.4
133	Wooden, bamboo and rattan containers	96.5	768	768	100.0
139	Miscellaneous manufacture of wood products, including bamboo and rattan	92.0	1,197	1,197	100.0
141	Furniture	74.3	4,403	4,386	99.6
142	Furniture for religious purposes	96.8	425	425	100.0
143	Sliding doors and screens	84.0	3,048	3,045	99.9
151	Pulp	95.6	21	20	99.2
154	Paper products	74.6	984	975	99.1
162	Plate making for printing	78.0	1,419	1,412	99.5
163	Bookbinding and printed matter	78.2	2,376	2,371	99.8
169	Service industries related to printing trade	100.0	104	104	99.5
171	Chemical fertilizers	84.8	113	112	99.1
182	Lubricating oils and greases (not made in petroleum refineries)	100.0	82	82	100.0
183	Coke	100.0	6	5	87.9
189	Miscellaneous petroleum and coal products	100.0	84	84	99.6
194	Formed and reinforced plastic products	85.2	1,419	1,410	99.4
195	Compounding plastic materials, including reclaimed plastic	75.8	774	768	99.2
202	Rubber and plastic footwear and its findings	75.4	573	571	99.7
209	Miscellaneous rubber products	82.8	460	458	99.5
211	Leather tanning and finishing	86.0	306	305	99.8
212	Mechanical leather products, except gloves and mittens	100.0	42	42	100.0
213	Cut stock and findings for boots and shoes	100.0	234	234	100.0

JSIC 3 digit code	Industry	SME ship-ment ratio	Number of enter-prises	Number of SMEs	Ratio of SMEs (%)
214	Leather footwear	100.0	607	607	100.0
215	Leather gloves and mittens	100.0	43	43	100.0
216	Baggage	100.0	357	357	100.0
217	Handbags and small leather cases	97.7	678	678	100.0
218	Fur skins	100.0	4	4	100.0
219	Miscellaneous leather products	100.0	112	112	100.0
222	Cement and its products	83.1	4,813	4,794	99.6
227	Abrasive products	76.1	232	229	98.6
228	Aggregated and stone products	98.0	2,308	2,308	100.0
239	Miscellaneous iron and steel	91.5	2,266	2,257	99.6
242	Secondary smelting and refining of non-ferrous metals, including non-ferrous alloys	87.6	313	310	99.0
252	Tableware (occidental type), cutlery, hand tools and hardware	85.7	2,411	2,404	99.7
254	Fabricated constructional and architectural metal products, including fabricated plate work and sheet metal work	74.3	15,187	15,143	99.7
256	Metal coating, engraving and heat treating, except enameled ironware	80.2	5,604	5,580	99.6
257	Fabricated wire products	78.2	911	910	99.9
258	Bolts, nuts, rivets, machine screws and wood screws	73.0	1,711	1,698	99.2
316	Ophthalmic goods, including frames	76.3	349	346	99.0
321	Precious metal products, including jewel	79.8	574	573	99.8
323	Toys and sporting goods	77.1	1,437	1,431	99.6
326	Lacquer ware	100.0	513	513	100.0
327	Sundry goods of straw, “ Tatami ” mats, umbrellas and other daily commodities	100.0	1,568	1,568	100.0
	Manufacturing	−	250,074	246,938	98.7

(Source) Own Calculation using METI Census of Manufactures.

(Notes) Industries with shaded code are classified in basic materials, otherwise in daily necessities. Number of enterprises and business establishments are average between 2002-2007.

Appendix Table 2. Shipment value, trade value and import penetration ratio (average during 2002-2009)

JSIC code	Shipment value (mil. yen)	Export value (mil. yen)	Export ratio to shipment	Import value (mil. yen)	Import ratio to shipment	Import penetration ratio
92	3,296,077	117,071	0.036	1,291,769	0.392	0.289
93	787,872	8,736	0.011	429,532	0.545	0.355
96	1,317,288	9,508	0.007	45,992	0.035	0.034
103	585,121	6,545	0.011	41,862	0.072	0.067
106	1,095,638	8,027	0.007	146,137	0.133	0.118
111	623	213	0.341	3,725	5.983	0.901
113	83,161	877	0.011	1,627	0.020	0.019
114	449,751	366,077	0.814	108,479	0.241	0.565
115	122,250	64,377	0.527	11,072	0.091	0.161
117	78,480	8,586	0.109	15,840	0.202	0.185
118	103,320	12,834	0.124	8,313	0.080	0.084
119	670,640	159,322	0.238	149,216	0.222	0.226
121	749,419	15,339	0.020	1,107,499	1.478	0.601
122	307,308	15,460	0.050	877,634	2.856	0.750
123	183,367	5,218	0.028	196,259	1.070	0.524
124	44,043	745	0.017	24,710	0.561	0.363
125	232,704	8,358	0.036	238,405	1.025	0.515
129	641,577	14,521	0.023	345,025	0.538	0.355
131	1,004,126	3,044	0.003	558,643	0.556	0.358
132	1,266,338	1,480	0.001	294,047	0.232	0.189
133	105,534	312	0.003	3,917	0.037	0.036
139	157,656	2,705	0.017	99,703	0.632	0.392
141	1,389,610	81,167	0.058	426,225	0.307	0.246
142	45,282	-	-	12,551	0.277	0.217
143	313,927	3,449	0.011	30,988	0.099	0.091
151	31,351	10,522	0.336	144,998	4.625	0.874
154	516,887	39,449	0.076	55,369	0.107	0.104
162	447,180	193	0.000	6	0.000	0.000
163	323,710	978	0.003	239	0.001	0.001
171	259,490	14,496	0.056	94,374	0.364	0.278
182	167,290	-	-	575	0.003	0.003
183	152,468	39,151	0.257	61,005	0.400	0.350
189	85,678	34,140	0.398	74,017	0.864	0.590
194	784,173	43,421	0.055	21,822	0.028	0.029
195	570,869	53,844	0.094	154,200	0.270	0.230
202	103,596	2,524	0.024	269,170	2.598	0.727
209	220,933	141,137	0.639	78,244	0.354	0.495
211	70,480	14,014	0.199	18,325	0.260	0.245
212	30,559	35	0.001	29	0.001	0.001
213	18,638	2,034	0.109	21,496	1.153	0.564
214	187,352	1,357	0.007	115,152	0.615	0.382
215	9,066	31	0.003	11,122	1.227	0.552
216	64,363	3,544	0.055	311,767	4.844	0.837
217	91,826	689	0.007	111,174	1.211	0.550
218	436	94	0.216	1,246	2.856	0.785
219	12,892	841	0.065	26,287	2.039	0.686
222	2,937,353	30,115	0.010	15,369	0.005	0.005
227	196,113	55,132	0.281	9,201	0.047	0.061

JSIC code	Shipment value (mil. yen)	Export value (mil. yen)	Export ratio to shipment	Import value (mil. yen)	Import ratio to shipment	Import penetration ratio
228	516,171	304	0.001	91,511	0.177	0.151
239	2,960,942	16,233	0.005	111,404	0.038	0.036
252	700,269	69,288	0.099	101,195	0.145	0.138
254	5,994,761	56,798	0.009	184,971	0.031	0.030
257	286,095	59,393	0.208	44,355	0.155	0.164
258	867,934	201,628	0.232	65,954	0.076	0.090
316	134,577	45,261	0.336	129,373	0.961	0.592
321	202,559	76,921	0.380	274,602	1.356	0.686
323	520,881	293,506	0.563	441,965	0.848	0.660
326	38,442	73	0.002	-	-	0.000
327	209,803	19,426	0.093	87,562	0.417	0.315

(Note) '-' is denoted in industries lacking the corresponding code in either export of import.

Appendix Table 3. Trade structure by region, (average during 2001-2010, %)

A3.1 Export

JSIC	All	92	93	96	103	106	111	113	114	115	117	118	119	121	122
China	14.3	18.9	7.7	2.7	4.3	8.4	1.6	54.3	52.9	61.2	10.5	54.4	31.8	7.5	6.0
NIEs	23.1	40.1	36.9	67.2	30.1	44.4	1.2	12.0	15.0	17.6	26.1	16.7	26.0	49.6	80.4
ASEAN4	9.0	11.6	4.8	7.8	7.1	13.5	2.5	5.8	4.8	5.8	10.5	7.9	10.0	1.0	0.6
North America	23.0	14.5	31.7	1.7	26.3	13.2	0.3	7.6	4.6	3.5	16.3	3.4	13.8	22.0	5.0
EU	14.5	1.6	11.9	0.6	10.6	11.5	4.0	4.3	5.0	2.2	6.2	5.1	9.0	15.9	6.9
Others	16.1	13.2	7.0	20.0	21.6	9.1	90.4	16.0	17.9	9.6	30.5	12.6	9.6	3.9	1.1

JSIC	123	124	125	129	131	132	133	139	141	143	151	154	162	163	171
China	11.2	43.8	35.8	16.9	20.8	59.4	9.9	8.9	20.7	32.3	53.7	27.2	17.8	5.6	2.4
NIEs	71.9	18.3	28.4	34.7	12.6	13.3	29.4	21.6	10.0	19.4	35.0	25.6	34.9	16.6	19.8
ASEAN4	12.4	11.2	3.1	9.3	38.6	17.0	14.9	8.0	12.6	12.6	6.7	19.4	30.1	14.4	42.6
North America	1.4	4.6	12.2	12.6	14.3	1.3	19.0	36.2	29.3	5.6	0.2	10.6	2.5	30.9	12.9
EU	0.9	11.1	10.8	11.2	4.8	0.9	11.1	15.4	12.2	13.6	0.1	9.8	10.4	21.8	2.3
Others	2.1	11.0	9.7	15.4	8.9	8.3	15.6	9.7	15.1	16.4	4.4	7.4	4.3	10.7	20.0

JSIC	183	189	194	195	202	209	211	212	213	214	215	216	217	218	219
China	10.1	37.2	14.9	31.1	13.6	15.7	44.1	13.0	53.4	6.5	13.6	3.8	2.6	52.3	30.2
NIEs	6.2	16.5	27.7	59.5	70.5	13.9	40.1	31.0	37.4	72.4	31.3	67.9	80.0	28.9	33.2
ASEAN4	3.9	8.6	7.6	1.5	5.3	13.7	10.7	18.2	3.2	2.0	7.2	2.6	0.7	0.4	14.9
North America	34.6	14.7	23.5	4.7	2.5	22.3	0.4	9.9	0.2	5.4	3.8	12.8	6.9	0.8	6.5
EU	14.3	11.5	19.8	1.4	4.1	17.4	0.8	11.4	0.6	9.7	21.5	10.0	7.2	16.8	5.5
Others	30.9	11.6	6.6	1.8	4.1	16.9	3.7	16.4	5.2	3.9	22.7	2.9	2.8	0.8	9.8

JSIC	222	227	228	239	252	254	257	258	316	321	323	326	327		
China	9.4	13.2	24.8	13.3	9.1	13.5	18.8	16.5	3.3	6.9	7.5	6.7	7.9		
NIEs	43.3	38.0	32.7	27.2	26.7	40.7	24.7	9.2	15.0	67.4	28.3	27.4	19.9		
ASEAN4	7.4	22.2	1.6	7.9	11.4	12.1	13.9	22.1	1.5	8.6	2.6	2.9	9.5		
North America	1.9	12.5	20.6	6.6	23.3	12.4	18.9	29.1	43.2	8.4	33.7	26.2	23.2		
EU	0.9	7.5	6.8	5.0	16.9	6.2	8.7	11.2	33.2	3.3	24.3	30.3	14.8		
Others	37.1	6.6	13.5	40.0	12.5	15.1	15.1	11.9	3.7	5.4	3.5	6.4	24.8		

(Notes) NIEs include South Korea, Taiwan, Hong Kong, and Singapore.
ASEAN4 includes Thailand, Malaysia, Philipine and Indonesia.

A3.2 Import

JSIC	All	92	93	96	103	106	111	113	114	115	117	118	119	121	122
China	20.1	19.9	44.4	14.8	28.4	8.1	69.8	56.2	40.2	19.7	54.7	41.2	35.1	80.7	85.7
NIEs	9.4	8.2	5.1	0.4	1.9	1.6	0.0	1.6	8.2	32.5	8.4	15.5	15.2	0.7	2.8
ASEAN4	11.7	16.3	6.6	18.8	4.7	17.7	0.5	22.1	13.9	4.3	8.3	21.1	10.9	2.1	2.0
North America	14.4	14.5	20.6	53.7	7.7	29.9	0.0	3.2	1.1	9.2	3.9	3.4	12.4	1.1	1.2
EU	11.1	3.2	8.8	2.5	11.7	8.2	0.0	15.9	29.4	31.9	3.4	16.2	13.6	7.4	5.1
Others	33.3	37.8	14.4	9.9	45.5	34.5	29.6	1.0	7.3	2.3	21.3	2.5	12.9	8.0	3.2

JSIC	123	124	125	129	131	132	133	139	141	142	143	151	154	162	163
China	88.2	74.5	67.7	83.6	6.3	9.9	60.0	70.0	42.6	65.1	40.5	0.4	34.2	0.0	20.9
NIEs	1.3	14.3	5.5	2.9	0.6	1.0	1.9	2.4	9.0	0.7	4.2	0.0	7.6	4.4	14.9
ASEAN4	3.1	6.3	5.9	3.0	7.9	69.2	4.3	18.3	20.2	17.5	33.0	7.0	22.4	2.9	6.0
North America	0.2	1.1	1.8	2.1	25.7	4.1	6.7	1.8	5.1	0.0	12.7	64.0	5.8	50.2	27.8
EU	1.4	1.0	14.9	3.5	15.8	11.5	11.2	4.6	12.8	0.3	8.8	4.2	7.7	30.6	26.9
Others	5.9	2.8	4.2	4.9	43.7	4.3	16.0	2.9	10.5	16.3	0.7	24.4	22.3	11.9	3.6

JSIC	171	182	183	189	194	195	202	209	211	212	213	214	215	216	217
China	14.0	18.1	91.1	12.8	31.5	44.4	86.4	30.0	6.5	5.7	79.4	29.6	76.1	56.6	40.1
NIEs	5.6	6.4	1.7	12.2	16.3	11.9	2.1	8.4	7.0	5.6	6.3	1.4	1.1	2.2	1.0
ASEAN4	11.4	0.4	0.0	2.4	17.2	8.2	4.0	41.8	4.1	0.0	4.7	5.1	11.1	1.7	1.0
North America	45.3	33.0	0.1	63.0	15.0	18.1	0.3	7.0	5.0	13.8	1.5	2.6	0.6	2.2	1.1
EU	4.6	37.5	0.1	3.8	18.5	14.2	3.4	8.8	25.5	37.8	2.7	36.9	8.7	34.4	55.4
Others	19.3	4.6	7.0	5.9	1.6	3.0	3.9	4.0	51.9	37.2	5.4	24.5	2.5	2.9	1.5

JSIC	218	219	222	227	228	239	252	254	257	258	316	321	323	327	
China	44.4	47.0	30.5	27.0	89.0	53.5	48.2	42.5	47.4	30.3	15.1	4.0	73.6	76.6	
NIEs	2.0	3.8	33.0	17.4	1.2	12.5	12.4	18.8	28.3	26.6	6.4	7.7	5.6	3.3	
ASEAN4	0.3	2.1	10.6	20.6	0.8	6.7	4.1	25.6	5.9	6.6	13.6	5.7	5.6	9.5	
North America	5.6	3.7	8.4	18.6	0.2	9.6	13.8	5.2	7.2	25.7	15.2	17.4	7.9	3.7	
EU	32.3	39.4	15.2	14.0	6.1	15.1	17.3	5.6	8.8	8.1	47.6	35.3	5.6	5.1	
Others	15.4	4.1	2.2	2.4	2.7	2.5	4.1	2.3	2.3	2.7	2.1	29.8	1.7	1.9	

(Notes) NIEs include South Korea, Taiwan, Hong Kong, and Singapore.
ASEAN4 includes Thailand, Malaysia, Philipine and Indonesia.

Appendix Table 4. Determinants of trade flow for SME products

A4.1 Export, Negative binomial regression: fixed effect

	Food and Beverages		Textile		Apparel		Lumber and Furniture		Paper and Printing	
PARTRGDP	0.406		0.593		0.586		0.622		0.678	
	(17.746)	***	(28.693)	***	(27.435)	***	(28.139)	***	(28.613)	***
JAPANRGDP	2.742		-7.069		-0.858		4.829		2.097	
	(1.825)	*	(-7.303)	***	(-0.634)		(3.445)	***	(1.531)	
DIFGDPPC	-0.446		-0.227		-0.057		-0.082		-0.027	
	(-15.433)	***	(-8.441)	***	(-2.128)	**	(-3.141)	***	(-0.947)	
DISTANCE	-1.585		-1.414		-1.347		-1.398		-0.966	
	(-16.350)	***	(-15.087)	***	(-13.860)	***	(-15.890)	***	(-10.668)	***
EXCHRATE	0.113		0.113		0.030		0.093		0.021	
	(3.391)	***	(5.542)	***	(1.082)		(3.125)	***	(0.760)	
FTADUMMY	0.614		0.257		0.307		0.298		0.175	
	(4.112)	***	(2.475)	**	(2.348)	**	(2.184)	**	(1.311)	
Constant	-90.52		235.05		23.617		-169.633		-82.559	
	(-1.781)	*	(7.164)	***	(0.515)		(-3.570)	***	(-1.784)	*
No. of obs.	1550		1760		1710		1770		1610	
Wald-chi2	1167.606		1845.919		1455.239		1671.945		1459.601	
loglikeihood	-12200.92		-15736.003		-11849.394		-12000.255		-11202.661	
Hausman	1.44		193.51	***	82.94	***	20.3		80.83	***

	Manuf. Goods by Material		Leather		Ceramic		Fabricated Metal		Miscellaneous	
PARTRGDP	0.611		0.863		0.799		0.545		0.403	
	(35.822)	***	(26.316)	***	(31.680)	***	(31.813)	***	(23.100)	***
JAPANRGDP	4.408		-8.566		3.933		-1.898		0.457	
	(5.242)	***	(-5.536)	***	(2.835)	***	(-2.150)	**	(0.387)	
DIFGDPPC	-0.082		-0.068		-0.141		-0.142		-0.334	
	(-3.647)	***	(-1.766)	*	(-4.462)	***	(-6.634)	***	(-14.215)	***
DISTANCE	-0.856		-1.474		-1.068		-1.164		-1.267	
	(-9.530)	***	(-16.084)	***	(-11.714)	***	(-14.130)	***	(-15.809)	***
EXCHRATE	0.102		0.087		0.065		0.069		0.160	
	(5.981)	***	(2.759)	***	(2.226)	**	(3.754)	***	(6.531)	***
FTADUMMY	0.039		0.182		0.356		0.029		0.121	
	(0.460)		(1.147)		(2.560)	**	(0.310)		(0.988)	
Constant	-158.426		276.382		-147.514		59.629		-15.354	
	(-5.602)	***	(5.273)	***	(-3.160)	***	(1.999)	**	(-0.385)	
No. of obs.	1900		1310		1570		1880		1760	
Wald-chi2	2183.564		1334.523		1929.326		1884.063		1648.201	
loglikeihood	-18115.906		-7161.189		-10516.528		-18649.192		-14931.381	
Hausman	118.75	***	18.1		49.61	***	152.23	***	468.63	***

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.

Negative binomial regression is tested using Stata command 'xtnbreg' with FE option.

Groups with all zero outcomes are dropped.

A4.2 Export, Negative binomial regression: random effect

	Food and Beverages		Textile		Apparel		Lumber and Furniture		Paper and Printing	
PARTRGDP	0.540		0.691		0.657		0.658		0.771	
	(25.594)	***	(36.590)	***	(34.571)	***	(32.831)	***	(37.201)	***
JAPANRGDP	1.661		-8.027		-2.123		4.852		1.986	
	(1.127)		(-8.911)	***	(-1.703)	*	(3.564)	***	(1.555)	
DIFGDPPC	-0.313		-0.170		-0.046		-0.058		-0.005	
	(-12.004)	***	(-7.061)	***	(-1.850)	*	(-2.450)	**	(-0.184)	
DISTANCE	-1.653		-1.472		-1.524		-1.441		-1.060	
	(-17.037)	***	(-16.217)	***	(-16.624)	***	(-17.584)	***	(-12.742)	***
EXCHRATE	0.123		0.123		0.047		0.102		0.036	
	(3.787)	***	(6.497)	***	(1.802)	*	(3.544)	***	(1.352)	
FTADUMMY	0.639		0.270		0.366		0.317		0.204	
	(4.302)	***	(2.728)	***	(2.992)	***	(2.401)	**	(1.605)	
Constant	-57.704		264.92		65.834		-171.164		-80.783	
	(-1.157)		(8.670)	***	(1.557)		(-3.711)	***	(-1.872)	*
No. of obs.	1930		1930		1930		1930		1930	
Wald-chi2	1523.007		2711.994		2238.987		2158.019		2378.833	
loglikeihood	-14766.717		-18459.605		-14066.604		-14360.799		-13301.513	

	Manuf. Goods by Material		Leather		Ceramic		Fabricated Metal		Miscellaneous	
PARTRGDP	0.651		0.922		0.825		0.607		0.498	
	(40.067)	***	(33.789)	***	(37.003)	***	(38.037)	***	(30.726)	***
JAPANRGDP	4.391		-9.463		3.885		-1.978		0.364	
	(5.459)	***	(-6.547)	***	(2.879)	***	(-2.353)	**	(0.323)	
DIFGDPPC	-0.075		-0.063		-0.167		-0.101		-0.298	
	(-3.537)	***	(-1.910)	*	(-5.905)	***	(-4.981)	***	(-13.546)	***
DISTANCE	-0.902		-1.569		-1.245		-1.199		-1.395	
	(-10.451)	***	(-18.696)	***	(-15.003)	***	(-15.195)	***	(-18.295)	***
EXCHRATE	0.106		0.093		0.083		0.072		0.157	
	(6.459)	***	(3.106)	***	(2.888)	***	(4.075)	***	(6.706)	***
FTADUMMY	0.039		0.237		0.395		0.036		0.127	
	(0.474)		(1.540)		(2.889)	***	(0.406)		(1.081)	
Constant	-158.635		305.792		-145.122		60.75		-13.992	
	(-5.867)	***	(6.240)	***	(-3.194)	***	(2.138)	**	(-0.369)	
No. of obs.	1930		1930		1930		1930		1930	
Wald-chi2	2623.530		2204.701		2742.600		2349.419		2381.522	
loglikeihood	-20991.321		-8730.880		-12730.842		-21616.950		-17558.304	

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.

Negative binomial regression is tested using Stata command 'xtnbreg' with RE option.

A4.3 Export, Tobit regression: random effect

	Food and Beverages		Textile		Apparel		Lumber and Furniture		Paper and Printing	
PARTRGDP	1.040		1.355		1.191		1.333		1.339	
	(9.760)	***	(13.791)	***	(16.475)	***	(18.310)	***	(18.134)	***
JAPANRGDP	-2.383		-12.444		0.175		-1.592		-2.849	
	(-0.482)		(-3.561)	***	(0.047)		(-0.376)		(-0.856)	
DIFGDPPC	-0.100		0.233		0.136		0.176		0.239	
	(-0.664)		(1.737)	*	(1.320)		(1.673)	*	(2.279)	**
DISTANCE	-3.387		-3.961		-3.665		-3.581		-3.142	
	(-6.010)	***	(-7.604)	***	(-9.626)	***	(-9.324)	***	(-8.065)	***
EXCHRATE	0.088		0.053		0.062		0.085		0.104	
	(0.888)		(0.746)		(0.836)		(1.018)		(1.557)	
FTADUMMY	0.946		0.288		0.228		0.804		0.026	
	(1.399)		(0.598)		(0.452)		(1.407)		(0.056)	
Constant	88.777		426.785		-0.157		54.590		92.497	
	(0.532)		(3.616)	***	(-0.001)		(0.382)		(0.822)	
No. of obs.	1930		1930		1930		1930		1930	
Wald-chi2	127.425		195.421		163.573		176.808		144.281	
loglikeihood	-5111.513		-4485.460		-4539.329		-4773.261		-4352.184	

	Manuf. Goods by Material		Leather		Ceramic		Fabricated Metal		Miscellaneous	
PARTRGDP	1.325		1.068		1.311		1.255		1.123	
	(16.350)	***	(14.847)	***	(14.085)	***	(15.777)	***	(12.469)	***
JAPANRGDP	-0.362		-6.456		14.810		-4.986		-10.777	
	(-0.121)		(-2.049)	**	(3.817)	***	(-1.475)		(-3.239)	***
DIFGDPPC	0.370		0.104		0.149		0.283		-0.029	
	(3.301)	***	(1.022)		(1.141)		(2.556)	**	(-0.223)	
DISTANCE	-2.189		-3.605		-3.519		-3.011		-3.760	
	(-5.090)	***	(-9.486)	***	(-7.149)	***	(-7.151)	***	(-7.930)	***
EXCHRATE	0.083		0.184		-0.078		-0.034		0.339	
	(1.371)		(2.897)	***	(-0.994)		(-0.505)		(4.983)	***
FTADUMMY	0.291		-0.029		0.375		0.183		0.403	
	(0.706)		(-0.066)		(0.702)		(0.394)		(0.882)	
Constant	3.528		224.619		-500.518		170.104		374.802	
	(0.035)		(2.110)	**	(-3.819)	***	(1.489)		(3.336)	***
No. of obs.	1930		1930		1930		1930		1930	
Wald-chi2	238.261		232.349		257.574		272.672		272.021	
loglikeihood	-4180.989		-4250.635		-4660.895		-4393.114		-4379.650	

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.

A4.4 Import, Negative binomial regression: fixed effect

	Food and Beverages		Textile		Apparel		Lumber and Furniture		Paper and Printing	
PARTRGDP	0.557		1.155		0.587		0.715		0.856	
	(25.896)	***	(34.975)	***	(26.521)	***	(29.284)	***	(20.376)	***
JAPANRGDP	-7.543		-11.281		-10.164		-8.595		-10.381	
	(-5.007)	***	(-12.209)	***	(-7.029)	***	(-5.203)	***	(-5.506)	***
DIFGDPPC	0.103		0.167		-0.047		0.160		-0.229	
	(3.854)	***	(4.454)	***	(-1.758)	*	(5.497)	***	(-5.216)	***
DISTANCE	-0.603		-1.414		-0.843		-0.646		-1.031	
	(-6.836)	***	(-13.159)	***	(-9.224)	***	(-6.386)	***	(-8.425)	***
EXCHRATE	0.028		0.128		0.058		0.098		0.200	
	(0.944)		(6.470)	***	(2.121)	**	(3.132)	***	(5.050)	***
FTADUMMY	0.286		0.238		0.298		0.505		0.340	
	(1.967)	**	(2.082)	**	(2.201)	**	(3.416)	***	(1.926)	*
Constant	243.620		359.116		333.892		274.356		333.857	
	(4.778)	***	(11.578)	***	(6.821)	***	(4.911)	***	(5.238)	***
No. of obs.	1700		1240		1730		1650		900	
Wald-chi2	833.771		1686.016		1157.775		1077.873		658.600	
loglikeihood	-18016.149		-9767.067		-15203.597		-13440.018		-6964.079	
Hausmann	7.36		7.67		181.02	***	-109.4		25.72	**

	Manuf. Goods by Material		Leather		Ceramic		Fabricated Metal		Miscellaneous	
PARTRGDP	0.691		0.732		1.098		0.898		0.729	
	(29.366)	***	(26.461)	***	(24.187)	***	(30.003)	***	(25.393)	***
JAPANRGDP	-5.492		-6.794		-13.645		-12.212		-9.303	
	(-4.556)	***	(-4.099)	***	(-7.578)	***	(-9.438)	***	(-6.035)	***
DIFGDPPC	-0.322		0.007		0.110		-0.057		-0.080	
	(-9.400)	***	(0.229)		(2.330)	**	(-1.607)		(-2.334)	**
DISTANCE	-1.597		-0.593		-1.071		-1.790		-1.178	
	(-15.938)	***	(-6.242)	***	(-8.272)	***	(-15.020)	***	(-12.307)	***
EXCHRATE	0.167		0.133		0.084		0.140		0.104	
	(6.697)	***	(4.205)	***	(2.480)	**	(5.166)	***	(3.455)	***
FTADUMMY	0.465		0.407		0.385		0.287		0.504	
	(3.540)	***	(2.691)	***	(2.331)	**	(1.990)	**	(3.479)	***
Constant	179.727		212.667		436.829		401.660		303.054	
	(4.387)	***	(3.795)	***	(7.189)	***	(9.188)	***	(5.809)	***
No. of obs.	1360		1420		1010		1360		1530	
Wald-chi2	1811.436		1082.723		890.054		1241.993		1303.366	
loglikeihood	-11032.171		-11614.150		-6809.697		-9405.027		-11450.538	
Hausman	3.73		-428.48		51.72	***	64.08	***	35.03	***

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.

Negative binomial regression is tested using Stata command 'xtnbreg' with FE option. Groups with all zero outcomes are dropped.

A4.5 Import, Negative binomial regression: random effect

	Food and Beverages		Textile		Apparel		Lumber and Furniture		Paper and Printing	
PARTRGDP	0.561		1.171		0.609		0.738		0.918	
	(26.513)	***	(37.838)	***	(29.767)	***	(32.533)	***	(23.062)	***
JAPANRGDP	-7.673		-11.333		-10.580		-8.725		-10.748	
	(-5.125)	***	(-12.713)	***	(-7.455)	***	(-5.289)	***	(-5.986)	***
DIFGDPPC	0.104		0.167		-0.066		0.158		-0.243	
	(3.892)	***	(4.570)	***	(-2.622)	***	(5.603)	***	(-5.646)	***
DISTANCE	-0.620		-1.479		-0.957		-0.661		-1.054	
	(-7.079)	***	(-14.235)	***	(-10.866)	***	(-6.630)	***	(-8.818)	***
EXCHRATE	0.031		0.128		0.060		0.099		0.208	
	(1.039)		(6.696)	***	(2.209)	**	(3.167)	***	(5.543)	***
FTADUMMY	0.288		0.241		0.311		0.540		0.322	
	(1.996)	**	(2.137)	**	(2.303)	**	(3.649)	***	(1.839)	*
Constant	248.080		361.016		348.314		278.134		344.603	
	(4.895)	***	(12.065)	***	(7.249)	***	(4.986)	***	(5.675)	***
No. of obs.	1890		1890		1890		1890		1890	
Wald-chi2	869.952		1999.999		1401.045		1302.095		835.107	
loglikeihood	-21135.399		-11734.803		-17944.559		-16013.819		-8405.655	

	Manuf. Goods by Material		Leather		Ceramic		Fabricated Metal		Miscellaneous	
PARTRGDP	0.699		0.767		1.185		0.925		0.797	
	(30.671)	***	(28.608)	***	(32.716)	***	(33.647)	***	(31.314)	***
JAPANRGDP	-5.621		-7.264		-15.794		-12.943		-9.891	
	(-4.737)	***	(-4.509)	***	(-9.452)	***	(-9.979)	***	(-6.618)	***
DIFGDPPC	-0.328		0.012		0.018		-0.115		-0.047	
	(-9.707)	***	(0.377)		(0.430)		(-3.476)	***	(-1.504)	
DISTANCE	-1.618		-0.609		-1.309		-1.790		-1.221	
	(-16.368)	***	(-6.543)	***	(-11.710)	***	(-16.027)	***	(-13.442)	***
EXCHRATE	0.167		0.136		0.119		0.155		0.106	
	(6.789)	***	(4.452)	***	(3.744)	***	(5.676)	***	(3.608)	***
FTADUMMY	0.465		0.418		0.517		0.361		0.443	
	(3.572)	***	(2.816)	***	(3.117)	***	(2.440)	**	(3.049)	***
Constant	184.076		227.648		508.913		425.505		321.149	
	(4.564)	***	(4.179)	***	(9.013)	***	(9.712)	***	(6.349)	***
No. of obs.	1890		1890		1890		1890		1890	
Wald-chi2	1985.427		1218.035		1745.188		1706.898		1680.093	
loglikeihood	-13259.894		-13870.707		-8319.024		-11436.235		-13797.100	

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.

Negative binomial regression is tested using Stata command 'xtnbreg' with RE option.

A4.6 Import, Tobit regression: random effect

	Food and Beverages		Textile		Apparel		Lumber and Furniture		Paper and Printing	
PARTRGDP	1.282		1.468		1.296		1.544		1.176	
	(8.294)	***	(11.393)	***	(9.715)	***	(10.995)	***	(9.283)	***
JAPANRGDP	-17.279		-15.527		-9.976		-19.057		-11.867	
	(-4.125)	***	(-5.223)	***	(-2.973)	***	(-5.309)	***	(-4.405)	***
DIFGDPPC	0.651		0.918		0.692		0.927		0.461	
	(3.251)	***	(5.546)	***	(4.103)	***	(5.083)	***	(2.933)	***
DISTANCE	-2.113		-3.605		-3.772		-2.369		-2.657	
	(-2.580)	***	(-5.269)	***	(-5.383)	***	(-3.184)	***	(-3.936)	***
EXCHRATE	0.015		0.178		0.065		0.128		0.170	
	(0.175)		(2.847)	***	(0.928)		(1.715)	*	(3.013)	***
FTADUMMY	0.371		0.166		-0.194		0.292		0.008	
	(0.646)		(0.409)		(-0.424)		(0.594)		(0.022)	
Constant	575.661		519.956		341.576		627.444		395.195	
	(4.072)	***	(5.188)	***	(3.018)	***	(5.181)	***	(4.353)	***
No. of obs.	1890		1890		1890		1890		1890	
Wald-chi2	207.616		346.894		487.946		571.067		515.469	
loglikeihood	-4762.029		-4132.076		-4349.538		-4476.284		-3959.893	

	Manuf. Goods by Material		Leather		Ceramic		Fabricated Metal		Miscellaneous	
PARTRGDP	1.372		1.527		1.255		1.410		1.476	
	(11.335)	***	(12.660)	***	(12.512)	***	(12.868)	***	(12.531)	***
JAPANRGDP	-9.728		-6.378		-11.019		-9.695		-10.758	
	(-2.754)	***	(-1.859)	*	(-3.580)	***	(-2.732)	***	(-2.899)	***
DIFGDPPC	0.179		0.596		0.332		0.288		0.356	
	(1.108)		(3.779)	***	(2.446)	**	(1.893)	*	(2.197)	**
DISTANCE	-3.721		-2.929		-2.720		-3.860		-3.755	
	(-5.878)	***	(-4.606)	***	(-5.147)	***	(-6.709)	***	(-6.055)	***
EXCHRATE	0.480		0.176		0.181		0.155		0.211	
	(6.565)	***	(2.493)	**	(2.857)	***	(2.125)	**	(2.765)	***
FTADUMMY	0.372		0.573		0.628		-0.270		0.946	
	(0.771)		(1.220)		(1.491)		(-0.555)		(1.865)	*
Constant	329.655		203.863		364.764		327.755		361.630	
	(2.766)	***	(1.760)	*	(3.511)	***	(2.736)	***	(2.887)	***
No. of obs.	1890		1890		1890		1890		1890	
Wald-chi2	381.470		419.624		404.761		401.028		309.144	
loglikeihood	-4421.892		-4376.019		-4157.325		-4415.960		-4506.055	

(Note) The numbers in parentheses are z-values. *, **, *** indicate significant level at 10%, 5%, and 1% respectively.