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Domestic and International Border Effects

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Abstract: Previous studies in the border-effect literature surprisingly found that domestic border effects are larger than international border effects (e.g., in the United States or Brazil). One interpretation of this result is that these estimates include the effects of producer agglomeration. Therefore, in this study, we estimate those border effects exclusively for transactions for final consumption, in which such agglomeration forces will be weak, in China and Japan. As a result, we found larger international border effects and could not find a significant role for producer agglomeration in the estimates of border effects. We also found that China's accession to the World Trade Organization reduces border effects in trading between China and Japan but does not decrease domestic border effects.

Keywords: Gravity; Border effects; China
JEL classification: F15, F53

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Domestic and International Border Effects

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Abstract: Previous studies in the border-effect literature surprisingly found that domestic border effects are larger than international border effects (e.g., in the United States or Brazil). One interpretation of this result is that these estimates include the effects of producer agglomeration. Therefore, in this study, we estimate those border effects exclusively for transactions for final consumption, in which such agglomeration forces will be weak, in China and Japan. As a result, we found larger international border effects and could not find a significant role for producer agglomeration in the estimates of border effects. We also found that China's accession to the World Trade Organization reduces border effects in trading between China and Japan but does not decrease domestic border effects.

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1. Introduction

Broadly defined transaction costs that include costs for both domestic and international transactions play a role in shaping the regional distribution of firms' production and locations and thus the direction and magnitude of their transactions. Those domestic costs mainly include physical transport costs. The development of transportation services will have significant effects on such domestic transaction costs. Even apart from physical transport costs, international transactions entail incurring various costs, including policy barriers (e.g., tariffs or non-tariff barriers (NTBs)) and those based on cultural differences. These international transaction costs have been viewed as a major obstacle to international trade.

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Based on such a view of their importance, recent academic literature has tried to quantify the costs of domestic and international transactions. McCallum (1995) conducted a pioneering study on the quantification of international transaction costs. Using data on trade among Canadian provinces and between Canadian provinces and U.S. states, he found that cross-provincial trade was 22 times larger than cross-border trade in 1988. Subsequently, due to this abnormally large magnitude, other studies developed an improved method of quantification. For example, Anderson and van Wincoop (2003) derived the gravity equation with "multilateral resistance terms," for which an easy estimation is suggested in Feenstra (2002). At the same time, studies such as Wolf (2000), Hillberry and Hummels (2008), and Daumal and Zignago (2010) quantified domestic transaction costs. These methodologies have been applied to the analysis of many countries.

In particular, Coughlin and Novy (2013) estimated both domestic and international transaction costs in the United States under a unified framework. This analysis is carried out by constructing a dataset incorporating three tiers of U.S. trade flows: trade within individual U.S. states (e.g., Minnesota–Minnesota), trade between U.S. states (e.g., Minnesota–Texas), and trade between U.S. states and foreign countries (e.g., Minnesota–Canada). They found larger border effects in domestic inter-regional transactions than in international transactions. Fally et al. (2010) found the same results for Brazil. One of the interpretations of this result in Coughlin and Novy (2013) is that those amounts reflect the local concentration of economic activity, i.e., the co-location of producers in supply chains that enables them to exploit informational spillovers, external economies of scale in the presence of intermediate goods, and associated agglomeration effects.[1] Hillberry and Hummels (2008) showed that trade within the United States is heavily concentrated at the local level.

Against this backdrop, and as in Coughlin and Novy (2013), we estimate both domestic and international transaction costs in China and Japan. To do that, we employ unique data, namely the "Transnational Interregional Input-Output Table for China and Japan" complied by Institute of Developing Economies (IDE). In this dataset, China and Japan are divided into seven and eight regions, respectively. This dataset enables us to identify transactions in these two countries at a more detailed level than the above mentioned dataset used by Coughlin and Novy (2013). Specifically, it includes domestic inter-regional transactions (e.g., Beijing region–Shanghai region), international inter-regional transactions (e.g., Beijing region–Tokyo region), and transactions inside a

[1] As another interpretation, the role of social and business networks has been suggested in the literature (Combes et al., 2005; Millimet and Osang, 2007; Garmendia et al., 2012).

region (e.g., Beijing region–Beijing region). One point to note is that due to the use of the interregional input–output data between China and Japan, estimated international border effects in China (Japan) are those for imports from Japan (China).

Due to the nature of this dataset, Coughlin and Novy (2013)'s analysis can be refined in terms of two aspects. First, our dataset includes international inter-regional transactions.[2] Due to this inclusion, unlike Coughlin and Novy (2013), we can estimate both international and domestic border effects after controlling for multilateral resistance terms using the method proposed in Feenstra (2002). Second, we can differentiate between final consumption and intermediate use transactions. Therefore, we can estimate the border effects in transactions for final consumption and intermediate use separately. The above-mentioned effects from the local concentration of economic activity will function more strongly in the case of intermediate-goods transactions. In other words, when focusing on the transactions for finished goods or final consumption, we can exclude such effects to some extent. In this separate estimation, we examine whether border effects are different between final consumption transactions and intermediate use transactions.

Finally, our dataset is for 2000 and 2005. China joined the World Trade Organization (WTO) on December 11, 2011. Therefore, the difference in border effects for China between 2000 and 2005 will include the effects of WTO participation. Due to the introduction of most-favored-nation (MFN) rates, international border effects dropped substantially in China. In addition, domestic border effects may be also reduced in China if the WTO participation leads to improvements in logistics services or inward foreign direct investment (FDI) in such services. On the other hand, Japan granted MFN rates to China rather than the higher general tariff rates after China joined the WTO. Therefore, international border effects in Japan vis à vis China will also be reduced. A comparison of our estimates between 2000 and 2005 will provide some evidence of these prior expectations.

The rest of this paper is organized as follows. The next section explains our empirical framework. It essentially follows the specification in Coughlin and Novy (2013), except we control for multilateral resistance terms as mentioned above. Section 3 introduces our unique dataset. In Section 4, we report our estimation results, which show that the domestic border effects are smaller than the international border effects in our sample. Lastly, Section 5 concludes this paper.

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[2] For example, Poncet (2003; 2005) and De Sousa and Poncet (2011) estimated the costs for domestic and international transactions in China. Their dataset identified only intra-provincial transactions and each province's transactions with the rest of China.

2. Empirical Framework

To evaluate domestic and international transaction costs, we estimate a gravity equation. Its traditional version has logs for the importer's and exporter's GDPs and a log of distance between trading partners. It is well known that this gravity equation can be supported by various theoretical models. In particular, under an assumption of separable preferences, separable technologies, goods differentiated by country of origin, and symmetric trade costs, Anderson and van Wincoop (2003) derived the following gravity equation (equation 9 on page 175):

$$x_{ij} = \frac{y_i y_j}{y^W}\left(\frac{t_{ij}}{\Pi_i P_j}\right)^{1-\sigma}, \tag{1}$$

where

$$\Pi_i \equiv \left(\sum_j \left(\frac{t_{ij}}{P_j}\right)\theta_j\right)^{\frac{1}{1-\sigma}}, \quad P_j \equiv \left(\sum_i \left(\frac{t_{ij}}{\Pi_i}\right)\theta_i\right)^{\frac{1}{1-\sigma}}, \qquad \theta_i \equiv \frac{y_i}{y^W}.$$

x_{ij}, y_i, t_{ij}, and y^W are the nominal value exports from countries i to j, total income of country i, iceberg trade costs from countries i to j, and world nominal income, respectively; σ denotes the elasticity of substitution among varieties; and Π and P are price indices and are called "multilateral resistance" terms.

Taking the logs in equation (1), we obtain:

$$\ln x_{ij} = \ln y^W + \ln y_i + \ln y_j + (1-\sigma)\ln t_{ij} + (1-\sigma)\ln \Pi_i + (1-\sigma)\ln P_j. \tag{2}$$

Following Feenstra (2002), we control for total incomes and price indices by importer fixed effects (u_j) and exporter fixed effects (u_i). Therefore, this equation can be rewritten as follows:

$$\ln x_{ij} = (1-\sigma)\ln t_{ij} + \mathrm{u}_i + \mathrm{u}_j. \tag{3}$$

As in Feenstra (2002), the trade costs are modelled as follows:

$$\ln t_{ij} = \tau_{ij} + \rho \ln Dist_{ij} + \epsilon_{ij}. \tag{4}$$

$Dist_{ij}$ is the geographical distance between country i and country j; and τ_{ij} is the border effects between country i and country j. Substituting (4) into (3), we obtain the following.

$$\ln x_{ij} = (1-\sigma)\tau_{ij} + \rho(1-\sigma)\ln Dist_{ij} + \mathrm{u}_i + \mathrm{u}_j + (1-\sigma)\epsilon_{ij}. \tag{5}$$

We estimate this equation for transaction values between China's regions and Japan's regions as explained in the discussion regarding those data in the next section. Namely, our observations include domestic inter-regional transactions, international inter-regional transactions, and internal transactions within a region. Therefore, in the following discussion, the exporting country and importing country are called the seller region and buyer region, respectively. To estimate equation (5), we replace $(1-\sigma)\ \tau_{ij}$ with $\gamma\ International_{ij} + \delta\ Own_{ij}$, where $International_{ij}$ is a dummy variable taking a value of one if regions i and j belong to the different countries and zero otherwise. Own_{ij} is a dummy variable taking a value of one if $i = j$. Thus, the coefficients for these dummy variables are evaluated relative to the benchmark of domestic inter-regional transactions. This benchmark is chosen for the sake of enabling comparison with the estimates of Coughlin and Novy (2013). As a result, the above gravity equation is rewritten as follows:

$$\ln x_{ij} = \gamma International_{ij} + \delta Own_{ij} + \rho(1-\sigma)\ln Dist_{ij} + \mathrm{u}_i + \mathrm{u}_j + (1-\sigma)\epsilon_{ij}. \qquad (6)$$

Estimating this equation, we quantify the averages of both international border effects and domestic regions' border effects. Our estimations only cover transactions in manufacturing products.

Furthermore, we extend this equation in terms of two points. First, as mentioned in the introductory section, estimations for final consumption and intermediate use transactions are conducted separately. Coughlin and Novy (2013) interpreted the larger border effects in domestic inter-regional transactions compared to international transactions as reflecting the effect of producer agglomeration. Since such an effect is expected to be stronger in intermediate product transactions, we may find a different magnitude of border effects between final consumption and intermediate use transactions. Second, to obtain more direct estimates on border effects in domestic and international transactions, the estimates are produced under the benchmark of transactions inside a region. In other words, we replace Own_{ij} with $Domestic_{ij}$, which is a dummy variable taking a value of one if regions i and j belong to the same country but different regions and zero otherwise. As a result, the gravity equation can be rewritten as follows:

$$\ln x_{ij} = \gamma International_{ij} + \varphi Domestic_{ij} + \rho(1-\sigma)\ln Dist_{ij} + \mathrm{u}_i + \mathrm{u}_j + (1-\sigma)\epsilon_{ij}. \qquad (7)$$

In this equation, the coefficients for the dummy variables on border effects are evaluated relative to the benchmark of transaction inside a region.

3. Data Sources

This section introduces our data sources. As mentioned in the introductory section, our main data source is the "Transnational Interregional Input-Output Table for China and Japan" (IDE). We use the tables covering 2000 and 2005. China and Japan are divided into seven and eight regions, respectively (see Appendix A). We focus on transactions in manufacturing industries, which include three subsectors (see Appendix B). Transactions in this table are reported in terms of producer prices. Final consumption transactions include those for private consumption, government consumption, and gross fixed capital formation. Transactions for intermediate use are those used as inputs.[3] This dataset includes not only domestic inter-regional transactions (e.g., Beijing region–Shanghai region) and transactions inside a region (e.g., Beijing region–Beijing region) but also international inter-regional transactions (e.g., Beijing region–Tokyo region). The inclusion of this last type of transaction enables us to introduce exporter fixed effects and importer fixed effects.

Our dataset has some limitations. The compilers of the "Transnational Interregional Input-Output Table for China and Japan" (Institute of Developing Economies, 2007; Inomata and Meng, 2013) explain that this input–output table is compiled mainly by employing two kinds of input–output tables. One is the Asian International Input-Output Table (AIO) complied by IDE. The other is the inter-regional input-output table (IRIO) for China complied by the State Information Center jointly with IDE and the tables for Japan complied by the Ministry of Economy, Trade, and Industry (METI) in Japan. Data on domestic inter-regional transactions (e.g., Beijing region–Shanghai region) and transactions inside a region (e.g., Beijing region–Beijing region) can be drawn from the latter input–output table. On the other hand, international inter-regional transaction values (e.g., Beijing region–Tokyo region) are estimated by employing both kinds of input–output tables.

Roughly speaking, international inter-regional transaction values are computed by employing the "split-in" method. Take the case of exports from the Beijing region to the Tokyo region (the industry dimension is omitted for simplicity). Let Z_{CJ}, E_{bJ}, and M_{tC} stand for exports from China to Japan, the share of Beijing-region exports to Japan out of total exports from China to Japan, and the share of Tokyo-region imports from China out of Japan's total imports from China, respectively. Data for the first one is obtained from the AIO, while data for the other two are drawn from the IRIO and information from each regional customs office. Then, exports from the Beijing region to the Tokyo region are computed primarily using $Z_{CJ} * E_{bJ} * M_{tC}$. This value is further adjusted using various sources of information provided by relevant ministries, such as the Ministry of Land, Infrastructure and Transport in Japan. In sum, although the

[3] This includes "inputs of manufacturing materials/parts in agricultural and service industries." However, the results are unchanged even if these inputs are excluded.

international inter-regional transaction values are based on the estimates, we believe these values are valuable for our analysis.

Our method of distance computation is as follows. In the case of transactions between different regions, $Dist_{ij}$ is measured by drawing a large circle between the regions' respective largest cities in terms of GDP in 2005.[4] Data on city-level GDP (and population, which will be used later) are obtained from "China City Statistical Yearbook" for China and the "Annual Report on Prefectural Accounts" for Japan. The method of measuring intra-regional distances is subject to some controversy. In this paper, we first employ the simplest, most widely used method, i.e., using two-thirds of the radius of the surface area (see, for example, Head and Mayer, 2000). For robustness checks, we also use some other distance measures.

4. Empirical Results

This section reports our estimation results. For our estimations, we employ the ordinary least-squares method (OLS) because our sample observations do not include those with zero values.[5] We first estimate for all our observations. Next, the robustness checks on the way of distance computation are conducted. Then, we carry out separate estimations of our gravity equation for several sets of observations.

4.1. Baseline Results

The results for equation (6) are provided in column (I) of Table 1. The "Total" column shows the results for (a log of) the sum of the transaction values for final consumption and intermediate use. In this column, the coefficients for International and Own are estimated to be significantly negative and positive, respectively, although the significance level in Own is 10%. Specifically, domestic inter-regional transaction values are 26 times higher than international trade values, while intra-regional transaction values are only 1.4 times higher than domestic inter-regional transaction values. Obviously, these results highly contrast those in Coughlin and Novy (2013) and Fally et al. (2010). However, our findings are consistent with the results of Poncet (2003) and De Sousa and Poncet (2011), which both found larger border effects for China's international transactions. Therefore, we can say at least that in China,

[4] In this computation for distance, the geographical units in China and Japan are city and prefecture, respectively.

[5] In the gravity literature, zero-valued trade is a hot issue. The pseudo-Poisson maximum likelihood technique (Silva and Tenreyro, 2006) or the extended technique of Heckman's two-step estimation (Helpman, Melitz, and Rubinstein, 2008) is used to address this issue.

international border effects are larger than domestic border effects. The coefficient for geographical distance is significantly negative. Furthermore, our model has high explanatory power because the R-squared value is almost 90%.

=== Table 1 ===

In column (I), we also report the results of the separate estimation for final-consumption transactions (“Final”) and intermediate-use transactions (“Input”). However, the results are qualitatively unchanged from those in the Total column. The coefficients for International and Own are again estimated to be significantly negative and positive, respectively. The absolute magnitude is again much larger in the case of International than in Own. In addition, we find that the absolute magnitude of each coefficient does not vary greatly between Final and Input, although it is slightly larger in Input, and we should be cautious about the differences in benchmark transactions between Final and Input.[6] This result may indicate that the effect of producer agglomeration is not a major reason for Coughlin and Novy’s (2013) results.

Our estimation results for equation (7) are provided in column (II) of Table 1. The results on border effects are qualitatively unchanged. In all specifications, the coefficients for International and Domestic are estimated to be significantly negative. However, due to the change in benchmark transactions, the coefficients’ magnitudes change greatly. Specifically, in the “Total” column, intra-regional transaction values are 230 times higher than those of international trade and seven times higher than domestic inter-regional transaction values. In addition, the coefficient for geographical distance is quantitatively changed from approximately −0.7 to −0.3. Since the difference between (I) and (II) is only the benchmark transaction for border dummy variables, this change in distance coefficients may indicate that the estimates for border effects are severely affected by the method used to calculate distance.

4.2. Robustness Checks for Distance Computation

Based on the previous findings, we now conduct some robustness checks on the methods used to calculate distance. We first add the square term of logged distance.

[6] We also estimate equations (6) and (7) for the dataset that pools transactions for final consumption and intermediate use, under introducing the interaction terms of each explanatory variable with a dummy variable taking a value of one for those for intermediate use. The interaction term has significantly negative effects only in International and not in Own and Domestic. This result implies that international border effects are much larger in transactions in which the effects of producer agglomeration work more strongly, not supporting the agglomeration explanation in Coughlin and Novy (2013). These results are available upon request.

Second, we compute great circles in pairs of all cities and take their simple averages according to pairs of buyer and seller regions. Third, we take their weighted averages by using the population size in 2005 as a weight. The results shown in Table 2 only report findings for observations for total transactions.[7] The results on border effects are qualitatively unchanged, although their coefficients differ across these three types of estimations. Namely, in any case of benchmark transactions, international border effects are estimated to be larger than domestic border effects.

=== Table 2 ===

4.3. Country-by-Country Results

We estimate our model by importing countries. Although the above gravity equation is derived under the assumption of symmetric trade costs, this assumption is obviously too strong in our sample countries, i.e., China and Japan. This separate estimation will be useful to reveal differences in border effects between China and Japan. In the case of China, for example, we simply restrict buyer observations to those for China's regions only. The results are reported in Table 3. It is clear that border effects are much higher in China than in Japan. Specifically, intra-regional transaction values in China are 10,562 times higher than those for international trade and nine times higher than domestic inter-regional transaction values. In Japan, on the other hand, these values are just 19 times higher than those for international trade and four times higher than domestic inter-regional transaction values. Such large differences are unchanged even if transactions for final consumption and intermediate use are estimated separately.

=== Table 3 ===

4.4. Industry-by-Industry Results

The gravity equations are estimated per industry. Specifically, three manufacturing industries are examined separately: household consumption products, basic industrial materials, and processing and assembling. We expect to find differences in producer agglomeration effects across industries. For example, those will be stronger for processing and assembling. The results are shown in Table 4. Compared with household consumption products and processing and assembling, international and domestic border effects are lower for basic industrial materials. This result is unchanged even if estimating final consumption and intermediate use transactions separately. One

[7] Results for final-consumption and intermediate-use observations are available upon request.

simple interpretation of this result is that basic industrial materials are less perishable (than household consumption products) and less bulky (than processing and assembling). In short, we again cannot detect an outstanding role for producer agglomeration in our estimates of border effects. On the other hand, the distance effect is smaller (insignificant) for both processing and assembling.

=== Table 4 ===

4.5. Year-by-Year Results

Finally, we estimate our gravity equation by year (2000 or 2005) to identify any time-series changes in border effects. The results are shown in Table 5. As the previous results indicate, the coefficients on International and Domestic are estimated as being significantly negative for each year. In particular, international border effects are significantly reduced. This result is unchanged even when transactions for final consumption and intermediate use are estimated separately. On the other hand, compared with the case of the international border effects, the magnitude of domestic border effects does not essentially change from 2000 to 2005 other than showing a slight rise. This result is basically unchanged even if transactions for final consumption and intermediate use are estimated separately. In sum, China's accession to WTO reduces the border effects for trade between China and Japan but does not reduce domestic border effects.

=== Table 5 ===

5. Concluding Remarks

Previous studies in the border effect literature surprisingly found that domestic border effects were larger than international border effects in several countries, such as the United States and Brazil. One interpretation of this result is that these estimates include producer agglomeration effects. In this paper, we estimated those border effects in China and Japan by employing unique data drawn from the "Transnational Interregional Input-Output Table for China and Japan." Since those data include international inter-regional transactions, we could control for multilateral resistance terms by introducing exporter-year and importer-year fixed effects. Furthermore, we estimated those effects exclusively for final consumption transactions, in which such agglomeration forces will be weak. As a result, we found larger international border effects and did not find a significant role played by producer agglomeration in the border effects estimates. Furthermore, we also found that China's accession to the WTO reduced the border effects in trading between China and Japan but did not decrease domestic border effects.

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Appendix A. Sample Regions

Country	Region	Provinces/Preferectures
China	Dongbei	Liaoning, Jilin, Heilongjiang
China	Huabei	Beijing, Tianjin, Hebei, Shandong
China	Huadong	Shanghai, Jiangsu, Zhejiang
China	Huanan	Fujian, Guangdong, Hainan
China	Huazhong	Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan
China	Xibei	Inner Mongolia, Shaanxi,, Gansu, Qinghai, Ningxia, Xinjiang
China	Xinan	Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet
Japan	Hokkaido	Hokkaido
Japan	Tohoku	Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima
Japan	Kanto	Ibaraki, Tochigi, Gunma, Saitama, Chiba, Tokyo, Kanagawa, Niigata, Yamanashi, Nagano, Shizuoka
Japan	Chubu	Toyama, Ishikawa, Gifu, Aichi, Mie
Japan	Kinki	Fukui, Shiga, Kyoto, Osaka, Hyogo, Nara, Wakayama
Japan	Chugoku	Tottori, Shimane, Okayama, Hiroshima, Yamaguchi
Japan	Shikoku	Tokushima, Kagawa, Ehime, Kochi
Japan	Kyushu & Okinawa	Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima, Okinawa

Source: Transnational Interregional Input-Output Table for China and Japan (IDE)

Appendix B. Sample Sectors

Industry	Description
Household consumption products (Life-related manufacturing products)	Milled grain and flour, Fish products, Slaughtering, meat products and dairy products, Other food products, Beverage, Tobacco, Spinning, Weaving and dyeing, Knitting, Wearing apparel, Other made-up textile products, Leather and leather products, Timber, Wooden furniture, Other wooden products, Other manufacturing products
Basic industrial materials (Primary makers' manufacturing products)	Pulp and paper, Printing and publishing, Synthetic resins and fiber, Basic industrial chemicals, Chemical fertilizers and pesticides, Drugs and medicine, Other chemical products, Refined petroleum and its products, Plastic products, Tires and tubes, Other rubber products, Cement and cement products, Glass and glass products, Other non-metallic mineral products, Iron and steel, Non-ferrous metal, Metal products
Processing and assembling (Secondary makers' manufacturing products)	Boilers, engines and turbines, General machinery, Metal working machinery, Specialized machinery, Heavy electrical equipment, Television sets, radios, audios and communication equipment, Electronic computing equipment, Semiconductors and integrated circuits, Other electronics and electronic products, Household electrical equipment, Lighting fixtures, batteries, wiring and others, Motor vehicles, Motor cycles, Shipbuilding, Other transport equipment, Precision machines

Source: Transnational Interregional Input-Output Table for China and Japan (IDE)

Table 1. Baseline Estimation

	(I)			(II)		
	Total	Final	Input	Total	Final	Input
International	-3.256***	-3.123***	-3.413***	-5.438***	-5.279***	-5.562***
	[0.147]	[0.161]	[0.139]	[0.526]	[0.593]	[0.499]
Own	0.356*	0.357*	0.369**			
	[0.186]	[0.206]	[0.176]			
Domestic				-1.900***	-1.879***	-1.876***
				[0.442]	[0.501]	[0.418]
ln Distance	-0.748***	-0.699***	-0.775***	-0.328**	-0.285**	-0.364***
	[0.103]	[0.111]	[0.099]	[0.127]	[0.143]	[0.121]
Number of Obs.	450	450	450	450	450	450
R-squared	0.8858	0.8605	0.9014	0.8905	0.865	0.9057

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, exporter-year fixed effects and importer-year fixed effects are included. We estimate by OLS.

Table 2. Robustness Checks on Distance Computation

	Square term		Simple average		Weighted average	
	(I)	(II)	(I)	(II)	(I)	(II)
International	-2.959***	-6.594***	-3.001***	-5.054***	-3.021***	-5.105***
	[0.195]	[0.551]	[0.148]	[0.462]	[0.150]	[0.464]
Own	0.526**		0.633***		0.634***	
	[0.205]		[0.209]		[0.211]	
Domestic		-3.426***		-1.829***		-1.855***
		[0.505]		[0.389]		[0.391]
ln Distance	0.908	3.239***	-1.138***	-0.696***	-1.108***	-0.663***
	[0.581]	[0.604]	[0.130]	[0.145]	[0.131]	[0.146]
Square of ln Distance	-0.148***	-0.289***				
	[0.053]	[0.050]				
Number of Obs.	450	450	448	448	448	448
R-squared	0.8892	0.9009	0.8883	0.8961	0.8876	0.8957

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, exporter-year fixed effects and importer-year fixed effects are included. We estimate by OLS.

Table 3. Border Effects in China versus Border Effects in Japan

	China's import			Japan's import		
	Total	Final	Input	Total	Final	Input
International	-9.265***	-9.456***	-9.198***	-2.921***	-3.249***	-2.638***
	[0.745]	[0.767]	[0.775]	[0.531]	[0.522]	[0.558]
Domestic	-2.146***	-1.928***	-2.276***	-1.363***	-1.378***	-1.290***
	[0.623]	[0.692]	[0.622]	[0.285]	[0.312]	[0.280]
ln Distance	-0.404*	-0.465*	-0.371*	-0.378***	-0.292***	-0.445***
	[0.216]	[0.237]	[0.216]	[0.067]	[0.073]	[0.066]
Number of Obs.	210	210	210	240	240	240
R-squared	0.9491	0.9399	0.9488	0.9814	0.9745	0.9848

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, exporter-year fixed effects and importer-year fixed effects are included. We estimate by OLS.

Table 4. Estimation by Industry

	Total	Final	Input
Household consumption products			
International	-5.803***	-5.861***	-6.017***
	[0.623]	[0.657]	[0.612]
Domestic	-1.757***	-1.667***	-1.825***
	[0.526]	[0.554]	[0.517]
ln Distance	-0.448***	-0.460***	-0.442***
	[0.146]	[0.154]	[0.142]
Number of Obs.	450	450	450
R-squared	0.877	0.8784	0.8811
Basic industrial materials			
International	-5.009***	-3.674***	-5.177***
	[0.500]	[0.579]	[0.496]
Domestic	-1.457***	-0.731	-1.560***
	[0.416]	[0.483]	[0.412]
ln Distance	-0.528***	-0.758***	-0.497***
	[0.121]	[0.138]	[0.120]
Number of Obs.	450	450	450
R-squared	0.9086	0.8785	0.9103
Processing and assembling			
International	-6.312***	-5.889***	-7.040***
	[0.622]	[0.655]	[0.628]
Domestic	-2.445***	-2.276***	-2.732***
	[0.514]	[0.543]	[0.516]
ln Distance	-0.089	-0.098	-0.031
	[0.154]	[0.161]	[0.154]
Number of Obs.	450	450	450
R-squared	0.8775	0.8614	0.8927

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, exporter-year fixed effects and importer-year fixed effects are included. We estimate by OLS.

Table 5. Estimation by Years

	2000			2005		
	Total	Final	Input	Total	Final	Input
International	-6.084***	-6.137***	-6.071***	-4.791***	-4.421***	-5.053***
	[0.834]	[0.914]	[0.795]	[0.467]	[0.519]	[0.457]
Domestic	-1.787**	-1.812**	-1.723**	-2.013***	-1.946***	-2.030***
	[0.704]	[0.773]	[0.669]	[0.389]	[0.438]	[0.377]
ln Distance	-0.378*	-0.342	-0.424**	-0.278**	-0.228*	-0.304***
	[0.202]	[0.220]	[0.194]	[0.112]	[0.127]	[0.109]
Number of Obs.	225	225	225	225	225	225
R-squared	0.8897	0.8741	0.9011	0.9395	0.9216	0.9489

Notes: ***, **, and * represent significance at the 1%, 5%, and 10% statistical levels, respectively. Parentheses contain the heteroscedasticity-consistent standard error. In all specifications, exporter fixed effects and importer fixed effects are included. We estimate by OLS.