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A New Evidence for Exchange Rate Pass-through: Disaggregated Trade Data from Local Ports

Yushi Yoshida
Faculty of Economics
Kyushu Sangyo University

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Yushi Yoshida*
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[Abstract]

For the estimation of exchange rate pass-through (henceforth ERPT), except for few evidences based on firm-level data, even the most disaggregated level of national export data is still biased with aggregation over sub-regions within an exporting country. We investigate to what extent this aggregation within product category is biased by comparing ERPT estimates across local ports. We use monthly exports at the HS 9-digit level from January 1988 to December 2005 for five major Japanese ports. In a panel data regression framework we control for exporting industry and importing country. Statistical tests provide strong evidence that export prices are set at different levels across local ports and that they correspond differently with respect to fluctuations of exchange rates.

JEL classification code: F14, F31, F41.
Keywords: Exchange rate pass-through; Firm heterogeneity; Japanese trade; Port-level trade; Pricing-to-market.

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* 2-3-1 Matsukadai, Higashi-ku, Fukuoka, 813-8503 Japan. e-mail: yushi@ip.kyusan-u.ac.jp. Tel: 81-92-673-5220. I would like to thank Helena Marques for her suggestions for improvements on the earlier version of this paper and participants at the All China Economy conference and the INFER workshop for helpful comments.

1. Introduction

The exchange rate pass-through (ERPT) measures the corresponding change in the price of traded goods with respect to changes in the exchange rate. The empirical evidence for ERPT prior to the 1980s is based on aggregated data more focused on macroeconomic phenomena, such as domestic inflation. Since then, the seminal work by Dornbusch (1987) has suggested that several features of imperfect competition, namely the number of competitors, finite demand elasticity, etc., lead to incomplete pass-through. Krugman (1987), on the other hand, extrapolated the decade-old literature differently, suggesting that the same features affecting incomplete pass-through can explain the international price differentials arising from exchange rate fluctuations. This phenomenon has been termed as "pricing-to-market". Enormous amounts of research, both theoretical and empirical, have since followed these studies[1].

More recent empirical evidence is provided with more disaggregated data to incorporate the microeconomic behavior of exporting firms. Takagi and Yoshida (2001) investigated the exchange rate pass-through of Japanese exports and imports to and from the Asian countries using HS (Harmonized Commodity Description and Coding System) 9-digit products, which constitute the most detailed international trade dataset of Japan. Gaulier et al. (2008) used the entire HS 6-digit product dataset and covered a broad range of exporting countries.

Some empirical research chooses to focus more on a particular market in order to emphasize the role of the exporting firms' price setting behaviors.

1 See Goldberg and Knetter (1997) for a survey.

Kadiyali (2000) used a structural econometric framework to study interacting effects of market structures and pricing strategies in the US photographic industry. Bernhofen and Xu (2000) examined the effect of market shares in an exporting market in the pass-through equation, and found that German and Japanese firms exercised significant market power in the US petrochemical market.

However, apart from the occasional evidence based on firm-level data, even the most disaggregated level of HS trade data can still be suspected of aggregation bias within a category over exports of different firms, over differentiated products, and across local ports of the country. Although many researchers are well aware of this problem, no single empirical study has been carried out to investigate the bias of the most finely disaggregated datasets, such as the HS 9-digit code for Japan and the HS 10-digit code for the US, as this has been practically impossible. Our study attempts to address this problem.

In this paper, we disaggregate Japanese export at the HS 9-digit level further than has been previously done by breaking up national trade into port-level trade. We investigate the exchange rate pass-through of Japanese local-port international trade at the HS 9-digit level. The Ministry of Finance of Japan provided the trade statistics for each customs jurisdiction and international ports[2]. We believe that investigations of port-level trade data at this disaggregation level are still few and far apart, if they can be found at all, in

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[2] Because original datasets are dispersed over eight hundred files for each custom jurisdiction, we had to reconstruct the local port international trade dataset.

the fields of international economics.

Although there is growing evidence of heterogeneity in the exchange rate pass-through in terms of product categories, exporting countryies, and importing countries, it is still interesting to further investigate whether the exchange rate pass-through is homogeneous across local regions within an exporting country. We can expect to find heterogeneity in the exchange rate pass-through in local ports, even at the most disaggregated product level, if (1) competing companies choose different regions for their productions of differentiated products, or (2) a firm chooses to produce different models in different regions. In the empirical section, we formally test the null hypothesis of homogeneous pricing in Japanese ports. We found strong evidence that export prices are set at different levels in Japanese local ports and respond differently to exchange rate fluctuations, even when we control for the HS4 industries and importing countries.

These results are consistent with the Dixit-Stiglitz type differentiated product assumptions, and with the work of Obstfeld and Rogoff (1995) and other following studies concerned with new open-economy macroeconomic[3] models, in which the degree of exchange rate pass-through plays a crucial role. We emphasize the importance of empirical evidence, as production locations within a country, in addition to quality and other factors already considered, are very important practical measures of product differentiations. This is an example of Armington-type product differentiation at sub-region levels within a country.

[3] See a recent survey in Lane (2001).

In the remainder of this paper, we describe the dataset structure (Section 2) and provide evidence of the heterogeneity of ERPT behaviors in local Japanese ports (Section 3). Section 4 discusses the possible underlying structures, which cause ERPT differentials across the different ports. The final section summarizes our findings and sets a future research agenda.

2. Data

This paper investigates the exchange rate pass-through of Japanese export at the level of the local ports by using datasets from the Ministry of Finance of Japan which provides the trade statistics for each customs jurisdiction. Due to the extremely large amount of data, datasets from each customs jurisdiction office were dispersed to over eight hundred files. We reconstructed the datasets from the original dispersed files using a computer program.

2-1. Customs ports in Japan

A total of 209 customs offices, all under the Ministry of Finance, are situated near ports and airports engaged in international trade. The Japanese Customs Organization consists of nine major headquarters, located in Hakodate, Tokyo, Yokohama, Nagoya, Osaka, Kobe, Moji, Nagasaki, and Okinawa, in addition to 67 branches and other local 133 offices. Corporations or individuals intending to ship goods abroad are required to submit an export declaration form via the online Nippon Automated Cargo Clearance System, or NACCS. The information required by the Customs Organization includes the

Japanese ports of export, the country of destination, the value of the shipments expressed in Japanese yen, the date of export, and the 9-digit classification code of the exported goods, among other information.

2-2. Export Unit Price and Exchange Rate

We use the monthly unit prices at the HS 9-digit level from January 1988 to December 2005 for goods exported from five Japanese major ports, Tokyo, Yokohama, Nagoya, Osaka, and Kobe, to six major importers of Japanese exports, China, Korea, Taiwan, Hong Kong, USA, and Germany. 50 HS 4-digit product groups, presented in Appendix A, were monitored in this study. There are a total of 815 HS 9-digit product price series.

The unit prices are calculated as the value of export divided by the number of units. When the number of units is not defined, the metric weight is used instead. Note that the price is expressed in Japanese yen. The monthly average exchange rate is expressed as the value of the foreign currency in Japanese yen, and is obtained from *International Financial Statistics*, IMF. Therefore, our definition of exchange rate pass-through elasticity takes the value of zero if the pass-through is complete, while a value of one corresponds to no pass-through at all.

2-3. Data selection criteria

Disaggregated product trade data has one disadvantage: many of the datasets contain no data points in the categories of lightly traded products. In order to avoid selecting products with very few data points, we chose our samples of exporting regions, importing countries, and HS 4-digit product groups to be as large as possible using the following selection criteria. When selecting the exporting regions, we chose the five local ports with the highest trade activity. Table 1 shows that 40 to 60 percent of Japanese exports actually depart from Tokyo, Yokohama, Nagoya, Osaka, or Kobe. Although the fraction of goods exported from these ports declines gradually during the period of study, the cargo exported from these ports still represents a large portion of the total Japanese exports.

As for the importing countries, we chose the six countries having conducted the largest number of total trades involving Japanese products between 1988 and 2005. These countries are the US, China, Taiwan, Korea, Hong Kong, and Germany. We intentionally set our selection criteria so that at least one European country would be included in our sample. The Japanese goods exported to these six countries makes up about 60 percent of the total Japanese exports.

The HS 4-digit product groups were chosen by identifying the 50 most exported products, as shown in Table 3. The accumulated share of the most traded products has a concave shape with respect to the number of products included. The 50 most traded HS4-digit code products make up 65 percent, the top 100 HS4 products make up 78 percent, the top 200 HS4 products account for 90 percent, and the top 300 HS4 products make up 95 percent of the total Japanese exports. We added to our list the 51st and 52nd most exported products, because two product categories, re-export [0000] and ships and vessels [8901], were excluded from the original list. The HS 4-digit code

[0000] covers entire products and [8901] contains only a small number of observations (only 129 data points).

The sum of export values of the top 50 HS 4-digit product groups from 1988 to 2005 are quite representative of the overall export. Their relative shares are similar to the figures in Table 1: Tokyo (50 trillion yen), Yokohama (68 trillion yen), Nagoya (71 trillion yen), Osaka (16 trillion yen), and Kobe (35 trillion yen).

3. Empirical Evidence

In this section, we estimate the exchange rate pass-through in a panel data model. We argue first the use of a parsimonious methodology to avoid the difficulty of direct estimates in a fully parameterized model. We also pay particular attention to the estimated coefficients of local-port fixed effects, which may reflect a price differential due to heterogeneity among local ports.

3-1. Methodological issues

A panel data model with a fully parameterized fixed effect takes into account parameters, namely the exporting regions in Japan, the importing countries, and the categories of exported products. Assuming homogeneous coefficients of exchange rate pass-through, our estimation model is summarized by equation (1):

$$P_{ijkt} = \alpha_{ijk} + \beta S_{jt} + \varepsilon_{ijkt} . \qquad (1)$$

The export price in Japanese yen for a HS 9-digit product *k* from a regional port *i* being exported to an importing country *j* at time *t* is denoted as P_{ijkt} in logarithmic form. The exchange rate, S_{jt} , is the value of the importing country's currency in Japanese yen. A fixed effect takes the value of one for each triplet (i, j, k). ε_{ijkt} is a disturbance term.

From previous empirical evidence, the differences in exchange rate pass-through between importing countries, exporting countries, and exported products are consistently supported. Our new dataset points to exporting local ports as an additional parameter causing differences in the exchange rate pass-through. A fully parameterized model with heterogeneous exchange rate pass-through coefficients can be described by equation (2). The dummy variable matrix, D_{ijk} , is used to create different exchange rate series variables for each regional port, importing country, and HS 9-digit product.

$$P_{ijkt} = \alpha_{ijk} + \sum_{i \in I} \sum_{j \in J} \sum_{k \in K} \beta_{ijk} D_{ijk} S_{jt} + \varepsilon_{ijkt} \; . \qquad (2)$$

The typical problem with a panel data model with fixed effect is that it requires estimating a large number of coefficients, which in turn means inverting an extremely large size matrix. A within-estimation methodology removes the fixed effect from the original model and reduces the size of the matrix. Equation (2), however, still requires a large number of coefficients for exchange rate pass-through, i.e., $I \times J \times K$. In addition to being computationally intensive, we frequently encounter cases in which the number of observations is extremely small for some triplets of (i, j, k) when disaggregated at the HS

9-digit level. In order to overcome this problem, we estimate ERPT coefficients at the HS 4-digit level while we control for fixed effects at the HS 9-digit level[4].

In order to minimize the number of exchange rate pass-through coefficients needing to be estimated, we fix an importing country and an HS 4-digit category as standards, leaving only the differences between local exporting ports as possible causes for possible heterogeneity of pass-through coefficients. For the given j-th importing country and HS 4-digit product group,

$$P_{ikt} = \alpha_{ik} + \sum_{i \in I} \beta_i D_i S_{jt} + \varepsilon_{ikt} \ . \qquad (3)$$

As a test of the heterogeneity of the exchange rate pass-through among local exporting ports, we investigate the null hypothesis of $\beta_i = \beta_{i'}$ for all $i, i' \in I$ in equation (3). We estimate the restricted coefficient regression in equation (4) and conduct an F-test using the residual sum of the squares from equation (3) and (4).

$$P_{ikt} = \alpha_{ik} + \overline{\beta}_i S_{jt} + \varepsilon_{ikt} \, . \qquad (4)$$

The exchange rate pass-through is affected by price-setting behaviors of

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[4] Gaulier et al. (2008) use a similar methodology to estimate pass-through coefficients at the HS 4-digit level while controlling for HS 6-digit level fixed effects.

exporting firms in response to exchange rate fluctuations. A rejection of the null hypothesis can be interpreted as supporting evidence of heterogeneous products, even in a narrow category of HS 4-digit product groups. This heterogeneity can be explained by each firm in a different local region producing differentiated products, even within a narrowly defined product category. Another explanation would be that the same firm produces differentiated products in different regions of Japan.

Although the exchange rate pass-through is a dynamic response to exporting firms, it is also important to investigate whether export prices are different on average among exporting local ports in Japan. It is possible to compare the fully parameterized equation (2) and the similar equation with the fixed effect replaced by α_{jk} to test whether local port fixed effects enter into the exchange rate pass-through equations in a multiplicative way compared to other fixed effects, namely the importing country and the group of HS 9-digit products. However, it is much simpler and intuitive to see whether the fixed effects for exporting local ports, α_i, are different at a statistically significant level in equation (5):

$$P_{ijkt} = \alpha_i + \alpha_j + \alpha_k + \sum_{i \in I} \beta_i D_i S_{jt} + \varepsilon_{ijkt} \,. \qquad (5)$$

To test the heterogeneity of the fixed-effect coefficients among exporting local ports, we investigate the null hypothesis of $\alpha_i = \alpha_{i'}$ for all $i, i' \in I$ in equation (5). We estimate the restricted coefficient regression in equation (6) and conduct an F-test using the residual sum of the squares from equations (5) and (6):

$$P_{ijkt} = \overline{\alpha}_i + \alpha_j + \alpha_k + \sum_{i \in I} \beta_i D_i S_{jt} + \varepsilon_{ijkt} . \qquad (6)$$

3-2. Estimation results

3-2-a. Testing homogeneous ERPT coefficients among exporting ports

Table 4 shows the estimated coefficients for β_i in equation (3) for exports to Korea. The first number in square brackets shows the ranking by value among all Japanese exports from 1988 to 2005. A description of the HS 4-digit code in the second column can be found in the Appendix. The third column through seventh column shows the estimated exchange rate pass-through coefficients of five exporting ports. An asterisk indicates statistical significance. The next two columns provide information about the fitness of regression and the number of observations for each HS 4-digit group. The last column provides the F statistics used to test the null hypothesis of equal ER pass-through coefficients across five exporting ports. In Table 5 through Table 9 we provide the estimated exchange rate pass-through for other importing countries.

Among 300 ER pass-through regressions (50 HS 4-digit groups for six importing countries), at a statistical significance level of one percent, almost 80 percent of the observations reject the null hypothesis of the equality of ER pass-through coefficients among Japanese exporting ports[5]. Among the

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[5] At a level of one percent statistical significance, 237 out of 300 reject the null hypothesis, while 269 out of 300 reject the null at a level of ten percent statistical significance.

importing countries, the US rejects the null hypothesis for all but one of the 50 HS 4-digit categories . This pervasive rejection of the hypothesis of equal ER pass-through coefficients indicates that Japanese export products demonstrate quite different price responsiveness with respect to exchange rate fluctuations among exporting ports, even when we control for absolute price differences in importing countries, commodities, and exporting ports.

Since we have 1,500 estimated coefficients[6], it is very difficult to summarize the results by looking at all the tables. We therefore provide the Kernel density estimation of the ER pass-through in Figure 1 and 2. The moments of the Kernel distribution function are also summarized in Table 10 and 11.

3-2-b. Distributional characteristics of local port ERPT

The estimated exchange rate pass-through coefficients are summarized for exporting local ports in Figure 1 and Table 10. We observe a stark difference in the mean ERPT among these local ports, and there is a division into high ERPT ports (Tokyo), middle ERPT ports (Yokohama, Nagoya, Kobe), and low ERPT ports (Osaka). Using mean coefficients, heterogeneous ERPT behavior can be observed if each port specializes in one particular destination or product group.

The magnitude of the variance is also different among the five ports: Osaka demonstrates a substantially larger variance compared to the other ports. The

[6] 50 HS 4-digit groups, 5 exporting local ports, and 6 importing countries.

kernel density distributions are skewed toward zero, corresponding to a complete pass-through. The higher value of kurtosis for Osaka also reveals that Osaka has a fatter tail.

3-2-c. Distributional characteristics of importing-country ERPT

In Table 11, the estimated exchange rate pass-through coefficients are summarized for importing countries. Based on Table 11, we can categorize the importing countries into three groups: high ERPT countries (Germany, Korea and Taiwan), middle ERPT countries (Hong Kong and US), and low ERPT countries (China). The exchange rate pass-through of Japanese exports is surprisingly high (low in terms of our coefficients) for developed countries, which contrasts earlier empirical results, such as those by Gagnon and Knetter (1995).

3-2-d. HS 4-digit product ERPT

In Table 12, we sorted the HS 4-digit product groups by average ERPT from highest, 6.98, to lowest, -1.12. The average is calculated over the centermost 24 values of estimated coefficients in order to avoid extreme values influencing the average. The range is still wide, making the three highest and two lowest estimates are very difficult to interpret. It is very likely that our regressions for these product categories suffer very severely from the omitted variables. However, if we exclude these five extreme ERPT coefficients, the rest of the estimated coefficients fall relatively well in the range between zero and one, which is consistent with theoretical expectations.

For example, the estimated ERPT coefficients of video games [9504] and copiers [9009] are close to one. Export prices for these categories show an incomplete pass-through or are fixed at the consumer-currency price, causing the export price in Japanese yen to rise when the Japanese yen depreciates against the importer's currency.

On the other hand, the estimated ERPT coefficients of mobile phones and digital cameras [8525] and televisions [8528] are almost zero, corresponding to a complete pass-through. Prices in Japanese yen of these products are fixed, even with fluctuating exchange rates, meaning that price changes in terms of the importers' currencies correspond exactly to fluctuations in the exchange rates. It is interesting to focus on the broader automobile industry, which includes the following HS4 product groups: automobiles [8703], tires [4011], automobile parts [8708], and trucks [8704]. The average pass-through for the automobile category is relatively incomplete (59 percent), consistent with the empirical findings of Gagnon and Kentter (1995). The pass-through for tires (61 percent) also indicates that the substantial part of exchange rate fluctuations is absorbed by exporters. For automobile parts and trucks, export prices are relatively fixed as expressed in terms of the Japanese currency.

Computers [8471] and computer parts [8473], as well as optical fibers and cables [9001] and electrical capacitors [8532] also demonstrate a relatively low ER pass-through.

3-3. Price Differentials among Local Ports

In previous subsections, we showed evidence of heterogeneity among local ports in terms of the exchange rate pass-through. In this subsection, we also investigate heterogeneity of local port exports simply by comparing local-port fixed effects in equation (4). Table 13 shows estimates of local-port fixed effects and suppresses other estimates for importing-country fixed effects, HS 9-digit product fixed effects, and exchange rate pass-through. We should also note that the export price is expressed in logarithmic form, so that a difference of 0.693 implies a two-fold difference in nominal price. The F-test in Table 13 shows that there are large discrepancies in logarithmic export prices among exporting local ports. We therefore conclude that export prices, even at the disaggregated level of HS 9-digit products, are set differently across Japanese local ports.

4. Discussions: The Determinants of Differentials in the ERPT

The empirical results presented in the last section support the assertion that prices of export products across Japanese local ports respond differently to exchange rate fluctuations. In this section, we discuss the possible underlying causes, which may have influenced these differences in ERPT across these local ports. We will consider the following issues: (1) industry specialization of ports, (2) HS 9 product specialization within HS 4, and (3) differentiated quality and hedonic pricing.

We should note that some results might arise from the difference in industry structures of each region. Some ports may be located in regions specializing only in a subset of our sample industries. For a given industry, the dominant region may be able to choose a different pricing strategy.

Figure 3 shows each port's relative share of exports in each HS 4-digit product group. All five ports seem to engage substantially in exports of all product groups. Except for several cases of automobile-related and steel products, most of the product groups are not dominated by any one region[7]. We may therefore conclude that industry-specialization patterns of ports explain only the export trends of specific products.

The problem of port specialization in the HS 9 product category within the HS 4 product group still remains. For a given HS 4 product group, the differences in ERPT may only be picking up the ERPT of different HS 9 products, if each port specializes in the specific HS 9 product within the HS 4 product group. We can investigate whether or not this is the case indirectly by focusing on the HS 4 product groups consisting of only a single or a few products. For these HS 4 product groups, the HS 9 specialization effect should be small or nonexistent. The printed circuits category [8534] consists of only a single product, and the null hypothesis of the homogeneous ERPT is rejected for all six importing countries. For video recorders [8521] and switch boards [8537], there are only two HS 9 products within HS 4, and the null hypothesis of the homogeneous ERPT is rejected for 11 cases out of12. Therefore, other

[7] The exceptions are automobiles [8703], cold flat-rolled steel [7209], and flat-rolled alloy steel [7225], in which Nagoya dominates with 84, 72, and 68 percent, respectively. In other cases, Kobe dominates the motorcycle export [8711] by 64 percent, while 66 percent of trucks [8704] are exported in Yokohama.

factors seem to be present, causing the differences in ERPT in the HS 4 product group, while the HS 9 specialization effect may also be important.

Even within the HS 9 product group, each port may export differentiated products. The statistical F-tests in Table 13 provide evidence that products from different ports are priced differently within the HS 4 product group, even when controlling for importing countries and HS 9 products with fixed effects. These price differences within the HS 9 product group can be interpreted as evidence for differing quality of similar products (Flam and Helpman, 1987). Price differences may reflect the different compositions of several attributes, as in the hedonic pricing model (Rosen, 1974). In our framework, manufacturing plants producing products of varying quality or different composition of attributes are located in distinct regions (ports).

5. Conclusion

Recent empirical studies examining the exchange rate pass-through are more inclined to investigate finely disaggregated products or products in one particular industry. These studies show substantial evidence pointing to heterogeneity of exchange rate pass-through among exporting countries, importing countries, and traded products. To add another parameter influencing the heterogeneity of exchange rate pass-through, we constructed a dataset for international trade of local regions within a country.

Our empirical evidence strongly supports that export prices are set differently among Japanese local ports, and that price responsiveness with respect to a change in exchange rate also differs across Japanese local ports, even when sample products are restricted to the finely disaggregated industry group (HS 4) and the finest product fixed-effects (HS 9) are controlled for. We interpret this empirical result as evidence for (1) different firms choosing different regions for their differentiated products and (2) a firm possibly choosing different regions for each of its differentiated products. These behaviors of firms would not be surprising, but it is striking that it can be persistently confirmed with empirical regressions.

These results are even more relevant when seen in the light of the new Economic Geography literature, in which a choice of location of one firm has external effects on other firms in the region, as in the works of Krugman (1991) and Puga and Venables (1996). We expect that it is important to construct a theoretical model, which incorporates regions within a country into a framework of new open-economy macroeconomics.

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Appendix A. HS 4-digit group descriptions

HS4	code description
4011	New pneumatic tires, of rubber
7208	Flat-rolld products of iron/non-al/s wdth>/=600mm, hr, not clad, pltd
7209	Flat-rolld prod of iron/non-alloy steel wd>/=600mm, cr, nt clad, pltd
7210	Flat-rolled prod of iron or non-al/s wd>/=600mm, clad, plated or coat
7225	Flat-rolled products of other alloy steel, of a width of 600mm or mor
7304	Tubes, pipes and hollow profiles, seamless, or iron or steel
8407	Spark-ignition reciprocating or rotary int combu piston eng
8408	Compression-ignition int combu piston eng (diesel or semi-diesel eng)
8409	Part for use solely/principally with the eng of hd no84.07/84.08
8413	Pumps for liquids, w/n fitted with a measuring device; liquid elevato
8414	Air/vacuum pumps/air/o gas comp & fans; hoods incorp a fan, w/n w fil
8429	Self-propelld bulldozer/angledozer/ grader/excavator/shovel loader, e
8471	Automatic data proces mach; optical reader, mach for transcribg data,
8473	Parts & acces o/t cover/carryg cases & sim for use with hd 84.69-84.7
8477	Machinery for wrkg rbr/plas/for the mfr of prod from these material n
8479	Machines & mech appl having indiv func, nes or included in this chapt
8481	Tap, cock, valve for pipe, tank for the like, incl pressure reducing
8482	Ball or roller bearings
8483	Transmission shafts & cranks, bearing housing; gearing; ball screws;
8501	Electric motors and generators (excluding generating sets)
8504	Electric transformer, static converter (for example rectifiers) & ind
8507	Electric accumulatr, incl separatr therefr, w/n rectanglr (incl squar
8511	Electrical ignition/starting equip, ex spark plugs/starter motors, et
8517	Electric app for line telephony/line telegraphy, incl curr line syste
8521	Video recording or reproducing apparatus
8522	Parts and accessories of apparatus of heading nos 85.19 to 85.21
8523	Prepard unrecordd media for sound record/sim record, o/t prod of ch 3
8525	Transmissn app for radio-telephony radio-broadcastg; television camer
8527	Reception app for radio-telephony/radio-broadcastg w/n combi w a cloc
8528	Television receivers (incl video monitors & video projectors)
8529	Part suitable for use solely/princ with the app of headg no85.25-85.2
8532	Electrical capacitors, fixed, variable or adjustable (pre-set)
8534	Printed circuits
8536	Electrical app for switchg (ex fuse, switche, etc) nt exceedg 1000 vo
8537	Board, panels & o bases, equipped w two/more app of hd no 85.35/85.36
8540	Thermionic, cold cathode valves & tube (ex vac/ga filld, tv camera tu
8541	Diodes/transistors & sim semiconductor devices; light emitting diodes
8542	Electronic integrated circuits and microassemblies
8543	Electrical mach & app having individual function, nes/incl in thi cha
8544	Insulated wire/cable & o insul elec conductors w/n fitted w connector
8703	Motor veh princ designd for transp person (o/t 8702) incl car/sta wag
8704	Motor vehicles for the transport of goods
8708	Parts & access of the motor vehicles of heading nos 87.01 to 87.05
8711	Motorcycles & cycles w auxiliary motor, w or w/o side-cars; side-cars
9001	optical fibre, cables; sheets & plate of polarizing mat; lenses/prism
9009	Photo-copyg app incorp an optical sy/of the contact type & thermo-cop
9010	Apparatus & equip for photographic laboratories nes
9018	Instrument & appl usd in vet/med/surg/ dental, other electro-medicl a
9030	oscilloscope/spectrum analysers & other inst; inst & app for mea ioni
9504	Articles for funfair, table/parlor games & auto bowling alley equipt

Source: OECD International Trade by Commodity Statistics

Appendix B: Kernel Density Estimation

For each exporting port, the kernel density estimation in Figure 1 is calculated for every 0.05 points in the interval [-1, 2] from 300 estimated ER pass-through coefficients with the Gaussian kernel and the bandwidth of 0.3. When calculating the moments of the density function, wefirst calculate the kernel density estimation at the point x_i by (A.1):

$$f(x_i) = \frac{1}{0.3*300}\sum_{j=1}^{300}\frac{1}{\sqrt{2\pi}}e^{-\frac{\{(x_j-y_j)/0.3\}^2}{2}} . \tag{A.1}$$

Second, instead of using the infinite range of support, we approximate the distribution function by curtailing at the specific value. We chose this curtailing value to be wide enough to enclose the theoretical ER pass-through values of [0,1], namely -6 and 6 in this study. The approximate distribution function is normalized over the curtailed interval:

$$\tilde{f}(x_i) = \frac{f(x_i)}{\sum_{x_i\in[-6,6]} f(x_i)} \quad \text{and} \quad \sum_{x_i\in[-6,6]}\tilde{f}(x_i) = 1 \tag{A.2}$$

Finally, the probability of x_i is defined as the interval times the approximate density at x_i, $p(x_i) = 0.05*\tilde{f}(x_i)$. The mean and variance are calculated as shown in (A.3) and (A.4). The calculations of skewness and kurtosis follow similar procedures.

$$\text{Mean} = E(x) = \sum_{x_i\in[-6,6]} x_i\, p(x_i) \tag{A.3}$$

$$\text{Variance} = Var(x) = \sum_{x_i\in[-6,6]} p(x_i)[x_i - E(x)]^2 \tag{A.4}$$

Table 1: Share of Exports for Five Major Japanese Local Ports

(billion yen)	1988	1992	1996	2000	2004
Japan	33,986	43,137	44,887	51,848	61,333
Tokyo	12.4%	11.8%	9.9%	8.7%	7.2%
Yokohama	17.4%	16.9%	15.8%	11.8%	11.3%
Nagoya	11.3%	12.5%	13.5%	12.4%	13.4%
Osaka	5.4%	4.7%	4.5%	3.1%	3.3%
Kobe	12.5%	13.0%	9.2%	8.0%	7.9%
Five ports total	59.1%	58.8%	52.9%	44.0%	43.1%

Table 2: Major Trading partners with Japanese Exports

(billion yen)	1988		1992		1996		2000		2004	
World	33,986		43,137		44,887		51,848		61,333	
USA	11,500	(0.34)	12,147	(0.28)	12,210	(0.27)	15,388	(0.30)	13,762	(0.22)
China	1,220	(0.04)	1,518	(0.04)	2,394	(0.05)	3,297	(0.06)	8,003	(0.13)
Taiwan	1,858	(0.05)	2,700	(0.06)	2,838	(0.06)	3,896	(0.08)	4,570	(0.07)
Korea	1,992	(0.06)	2,268	(0.05)	3,205	(0.07)	3,327	(0.06)	4,805	(0.08)
Hong Kong	1,507	(0.04)	2,638	(0.06)	2,769	(0.06)	2,939	(0.06)	3,838	(0.06)
Germany	2,025	(0.06)	2,581	(0.06)	1,985	(0.04)	2,160	(0.04)	2,053	(0.03)

Note: The first figures indicate the Japanese export value in billion yen and the second figures in parenthesis represent the trading-partner country's share of the Japanese export in the world.

Table 3: Total Exports of Major HS 4-digit Product Groups (1988-2005)

	HS4	Sum of Export Value	product group share	cumulated share
	Total	851,368		
[01]	8703	110,840	13.0%	13%
[02]	8542	41,181	4.8%	18%
[03]	8708	32,639	3.8%	22%
[04]	8471	28,565	3.4%	25%
	0000	24,195	2.8%	28%
[05]	8473	23,281	2.7%	31%
	8901	18,018	2.1%	33%
[06]	8525	17,093	2.0%	35%
[07]	8704	16,403	1.9%	37%
[08]	8479	14,518	1.7%	38%
[09]	8541	10,789	1.3%	40%
[10]	9009	9,729	1.1%	41%
[11]	8407	9,160	1.1%	42%
[12]	8517	8,540	1.0%	43%
[13]	8711	8,465	1.0%	44%
[14]	8409	8,209	1.0%	45%
[15]	8536	8,037	0.9%	46%
[16]	8540	7,309	0.9%	47%
[17]	8429	7,305	0.9%	47%
[18]	8529	7,268	0.9%	48%
[19]	8521	6,918	0.8%	49%
[20]	4011	6,550	0.8%	50%
[21]	8414	6,391	0.8%	51%
[22]	8528	5,849	0.7%	51%
[23]	8532	5,729	0.7%	52%
[24]	8543	5,299	0.6%	53%
[25]	8523	5,260	0.6%	53%
[26]	8483	5,245	0.6%	54%
[27]	9018	4,983	0.6%	54%
[28]	7210	4,910	0.6%	55%
[29]	9010	4,898	0.6%	56%
[30]	7208	4,496	0.5%	56%
[31]	8504	4,375	0.5%	57%
[32]	8507	4,361	0.5%	57%
[33]	8482	4,225	0.5%	58%
[34]	8527	4,113	0.5%	58%
[35]	7304	4,040	0.5%	59%
[36]	8413	3,984	0.5%	59%
[37]	8408	3,921	0.5%	60%
[38]	7209	3,825	0.4%	60%
[39]	8522	3,756	0.4%	60%
[40]	8481	3,656	0.4%	61%
[41]	9504	3,581	0.4%	61%
[42]	9030	3,572	0.4%	62%
[43]	8501	3,514	0.4%	62%
[44]	8537	3,418	0.4%	63%
[45]	8477	3,381	0.4%	63%
[46]	8544	3,265	0.4%	63%
[47]	7225	3,234	0.4%	64%
[48]	9001	3,232	0.4%	64%
[49]	8534	3,227	0.4%	64%
[50]	8511	3,221	0.4%	65%

Note: The largest 52 HS 4-digit categories are selected. The '0000' (re-export) is excluded from the sample because this category contains the mix of various products. The '8901' (ships and vessels) is also not used due the small number of observaitons.

Table 4: Estimated exchange rate pass-through coefficients for Korea

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	F Stat
[01]	8703	1.377 **	0.532 ***	1.950 ***	0.618	0.600 ***	0.64	1512	3.0 **
[02]	8542	0.971 ***	0.104	-0.134	0.314 ***	-0.239 **	0.87	9626	23.1 ***
[03]	8708	-0.016	0.097 **	0.017	0.086	-0.544 ***	0.43	8580	21.4 ***
[04]	8471	0.781 ***	0.534 ***	0.979 ***	-0.171	0.261	0.59	8082	4.3 ***
[05]	8473	-0.407 ***	0.001	-0.049	-0.640 ***	0.496 ***	0.17	2861	7.2 ***
[06]	8525	0.252 ***	-0.323 ***	0.086	0.737 ***	0.019	0.46	3070	13.1 ***
[07]	8704	-1.835	0.323	0.307	-0.427	-0.706	0.70	365	0.6
[08]	8479	0.627 ***	0.392 ***	0.342 ***	0.252 ***	0.258 **	0.86	4817	2.3 *
[09]	8541	0.097	-0.616 ***	-0.250 **	-1.566 ***	-0.088	0.73	11071	31.3 ***
[10]	9009	1.120 ***	0.274 ***	0.666 ***	2.742 ***	0.615 ***	0.30	2469	31.6 ***
[11]	8407	0.937 **	0.739 ***	0.533 ***	0.173 *	-0.059	0.36	1582	8.2 ***
[12]	8517	-1.246 ***	-0.884 ***	0.628	-1.881 ***	-0.233	0.60	1771	4.8 ***
[13]	8711	2.167 ***	1.344 ***	0.467 **	0.739 ***	0.435 ***	0.75	1466	18.4 ***
[14]	8409	-0.333 **	-0.117	1.199 ***	-0.447 ***	0.137	0.35	4062	32.6 ***
[15]	8536	-0.199 ***	-0.234 ***	-0.330 ***	-0.286 ***	-0.027	0.31	9219	3.0 **
[16]	8540	-0.043	-0.225 **	0.799 ***	0.526 ***	-0.102	0.74	4025	16.7 ***
[17]	8429	0.893	1.620 ***	2.651 ***	1.910 ***	3.306 ***	0.57	1367	8.2 ***
[18]	8529	-1.688 ***	-0.237 *	-0.903 ***	-0.677 ***	-0.790 ***	0.50	2630	20.1 ***
[19]	8521	-0.401 **	-0.801 ***	-0.841 **	0.959 *	0.356	0.14	782	3.6 ***
[20]	4011	-0.354 ***	0.857 ***	-0.080	0.345 ***	-0.042	0.63	1377	17.9 ***
[21]	8414	-0.141 *	-0.016	0.257 ***	0.145 **	-0.220 ***	0.42	7728	6.9 ***
[22]	8528	-0.556 *	0.694 ***	-1.551 ***	0.388	0.314	0.33	1783	5.1 ***
[23]	8532	-0.696 ***	0.851 ***	0.156	1.364 ***	-0.027	0.30	6169	42.9 ***
[24]	8543	-1.191 ***	-2.125 ***	-1.848 ***	-1.723 ***	0.780 ***	0.50	2807	17.6 ***
[25]	8523	0.815 ***	-0.309 **	0.252	0.077	0.965 *	0.57	3143	8.9 ***
[26]	8483	0.196 ***	0.154 ***	0.609 ***	0.447 ***	-0.328 ***	0.28	11572	36.5 ***
[27]	9018	0.577 ***	-0.124 **	0.015	0.197 *	-0.393 ***	0.78	5837	13.6 ***
[28]	7210	8.627 ***	6.602 ***	8.297 ***	10.007 ***	8.174 ***	0.72	2352	9.1 ***
[29]	9010	-2.647 ***	-2.263 ***	-0.393	-1.812 ***	-1.392 **	0.80	2109	9.7 ***
[30]	7208	1.708 ***	0.783 ***	0.941 ***	1.562 ***	0.344 *	0.98	3029	4.4 ***
[31]	8504	-0.797 ***	-0.141 *	-0.455 ***	-0.781 ***	-0.876 ***	0.36	7872	12.7 ***
[32]	8507	1.045 ***	0.094	0.714 ***	-0.288 **	0.530 *	0.55	2676	11.5 ***
[33]	8482	1.079 ***	0.027	0.105 **	0.111 **	-0.603 ***	0.62	7147	66.0 ***
[34]	8527	-0.210 **	0.336 ***	1.221 **	-0.144	0.275	0.68	2504	5.4 ***
[35]	7304	10.025 ***	9.848 ***	9.914 ***	9.869 ***	9.639 ***	0.67	4983	0.2
[36]	8413	0.331 ***	0.110 **	0.172 ***	0.188 ***	-0.501 ***	0.35	9109	35.2 ***
[37]	8408	0.337	0.442 ***	0.887 ***	1.910 ***	0.022	0.42	2407	40.1 ***
[38]	7209	0.476	0.887 ***	0.500 ***	0.802 *	0.269 **	0.98	2221	2.7 **
[39]	8522	-1.855 ***	-2.092 ***	-0.162	-0.159	-2.363 ***	0.48	1170	21.8 ***
[40]	8481	0.047	0.100 **	0.191 ***	0.141 ***	-0.340 ***	0.34	9588	23.1 ***
[41]	9504	0.075	1.536 ***	0.466 **	-0.270	2.932 ***	0.26	1678	13.5 ***
[42]	9030	-1.039 ***	-0.995 ***	0.081	-1.079 ***	-0.564 ***	0.67	4913	14.1 ***
[43]	8501	-0.257 ***	-0.105 *	-0.310 ***	0.528 ***	-0.307 ***	0.32	11360	28.4 ***
[44]	8537	-0.144	0.034	0.535 ***	0.459 ***	-0.058	0.11	1367	5.4 ***
[45]	8477	-0.025	0.798 ***	1.874 ***	0.250 *	0.993 ***	0.32	3687	17.1 ***
[46]	8544	-0.378 ***	-0.483 ***	-0.364 ***	-0.525 ***	-0.264 ***	0.44	8019	1.4
[47]	7225	7.170 ***	6.895 ***	7.554 ***	2.284 ***	8.539 ***	0.70	2043	13.3 ***
[48]	9001	1.584 ***	0.501 ***	1.083 ***	1.333 ***	1.537 ***	0.67	1815	5.6 ***
[49]	8534	-1.154 ***	-0.351 *	-1.121 ***	-1.416 ***	-2.503 ***	0.29	995	17.5 ***
[50]	8511	-0.629 ***	-0.199 **	-0.235	-0.514 ***	-0.374 ***	0.48	3919	2.8 **

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal ER pass-through coefficients across exporting ports.

Table 5: Estimated exchange rate pass-through coefficients for China

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	F Stat
[01]	8703	-0.076	-0.006	0.499 ***	0.138 *	-0.148 ***	0.67	2938	7.1 ***
[02]	8542	0.596 ***	0.629 ***	0.591 ***	1.389 ***	0.013	0.90	10230	25.5 ***
[03]	8708	0.411 **	0.543 ***	0.679 ***	0.308 ***	0.239 ***	0.31	9609	9.0 ***
[04]	8471	0.016	0.056	-0.018	0.502 **	0.749 ***	0.33	7874	2.2 *
[05]	8473	0.723 ***	1.427 ***	-0.336	2.257 ***	0.731 **	0.30	1929	18.5 ***
[06]	8525	0.216 *	0.267 ***	-0.173	0.241 **	0.936 ***	0.38	3294	2.5 **
[07]	8704	-5.113	0.060 *	0.606 ***	0.174 *	0.088 *	0.76	1804	3.1 **
[08]	8479	0.428 ***	0.208 ***	0.177 **	0.214 ***	-0.105	0.81	4898	4.4 ***
[09]	8541	1.161 ***	1.039 ***	0.657 ***	1.681 ***	1.070 ***	0.86	11957	25.6 ***
[10]	9009	0.843 ***	1.444 ***	1.303 ***	1.858 ***	0.648 **	0.35	2274	6.2 ***
[11]	8407	-1.010 *	0.800 ***	0.558 **	1.095 ***	-0.023	0.58	2079	18.5 ***
[12]	8517	-0.247	-0.917 ***	0.441	0.044	-0.164	0.46	3074	6.2 ***
[13]	8711	0.775 *	0.804 ***	0.944 ***	0.483 **	0.005	0.51	800	4.0 ***
[14]	8409	1.156 ***	0.210 ***	0.076	0.112	0.070	0.33	3670	5.1 ***
[15]	8536	0.429 ***	0.751 ***	0.722 ***	0.461 ***	0.407 ***	0.31	9912	12.7 ***
[16]	8540	-0.037	-0.186 **	-0.615 ***	0.413 ***	-1.052 ***	0.70	3870	20.9 ***
[17]	8429	-1.312	0.269 ***	0.400 ***	-0.044	0.264	0.35	1572	2.4 **
[18]	8529	0.049	0.029	-0.246 *	-0.434 ***	-1.313 ***	0.32	2494	8.2 ***
[19]	8521	0.338	0.331 *	-0.186	0.495 **	-0.609	0.08	913	2.5 **
[20]	4011	-0.160	0.135	0.361	-0.181 **	0.039	0.40	986	1.7
[21]	8414	0.638 ***	0.359 ***	0.225 ***	0.492 ***	0.326 ***	0.37	8133	4.2 ***
[22]	8528	-0.161	-0.325 **	-0.289	-0.052	-0.414	0.45	2364	0.5
[23]	8532	0.548 ***	0.638 ***	0.559 ***	1.175 ***	1.286 ***	0.34	6766	11.8 ***
[24]	8543	-0.093	-0.405 **	0.210	-0.415 *	0.534	0.56	2725	1.8
[25]	8523	-0.984 ***	-0.764 ***	0.193	0.396 **	-2.555 ***	0.55	2316	14.1 ***
[26]	8483	0.681 ***	0.918 ***	0.693 ***	0.579 ***	0.551 ***	0.28	10665	8.9 ***
[27]	9018	1.351 ***	0.468 ***	1.158 ***	0.576 ***	-1.303 ***	0.62	5760	38.6 ***
[28]	7210	4.942 ***	3.464 ***	5.073 ***	2.860 ***	3.777 ***	0.51	3933	6.9 ***
[29]	9010	1.801 **	-0.959 ***	1.436 *	-1.374 ***	-1.506	0.72	1498	6.3 ***
[30]	7208	0.357	0.157 *	0.225 *	-0.124	0.208 **	0.97	3076	1.6
[31]	8504	0.475 ***	0.612 ***	0.759 ***	0.265 ***	0.358 ***	0.39	9156	6.9 ***
[32]	8507	0.455 **	0.199 *	0.540 ***	0.397 ***	-0.062	0.55	3353	1.7
[33]	8482	0.860 ***	0.243 ***	0.445 ***	0.478 ***	0.508 ***	0.39	6150	5.8 ***
[34]	8527	0.639 ***	0.201	-0.516 **	0.372 **	-0.280	0.49	1738	3.9 ***
[35]	7304	6.141 ***	4.567 ***	4.443 ***	5.215 ***	4.651 ***	0.33	2842	1.5
[36]	8413	0.663 ***	0.425 ***	0.769 ***	0.527 ***	0.197 ***	0.23	8178	10.4 ***
[37]	8408	-0.613	0.328 ***	0.366 ***	0.519 ***	0.095	0.59	2279	3.9 ***
[38]	7209	0.017	0.160	0.290 ***	0.351 ***	0.329 ***	0.99	3024	1.1
[39]	8522	-1.136 ***	0.415 ***	0.732 ***	1.518 ***	0.043	0.41	1207	34.6 ***
[40]	8481	1.205 ***	0.591 ***	0.370 ***	0.491 ***	0.290 ***	0.25	8263	25.3 ***
[41]	9504	-2.069 ***	1.367 ***	0.960	0.777 *	2.333 ***	0.34	1492	8.9 ***
[42]	9030	0.251 ***	0.278 ***	0.287 **	0.403 ***	-0.034	0.66	5896	1.9
[43]	8501	0.484 ***	0.853 ***	0.695 ***	0.518 ***	0.352 ***	0.24	9420	8.2 ***
[44]	8537	0.845 ***	0.065	0.137	0.196 *	0.251 **	0.12	1393	5.7 ***
[45]	8477	0.652 ***	0.621 ***	0.403 ***	0.335 ***	0.547 ***	0.29	4459	1.5
[46]	8544	0.229 ***	0.126 ***	0.324 ***	0.373 ***	0.427 ***	0.49	11274	4.2 ***
[47]	7225	-8.359	3.800 ***	6.909 ***	0.429	4.763 ***	0.61	1215	11.4 ***
[48]	9001	1.249 ***	-0.065	0.909 ***	0.735 ***	-1.683 **	0.57	1822	8.4 ***
[49]	8534	-0.308 **	0.890 ***	0.844 ***	1.150 ***	-2.253 ***	0.34	1059	97.7 ***
[50]	8511	-0.164	0.986 ***	1.842 ***	1.132 ***	0.517 ***	0.54	5131	18.1 ***

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal ER pass-through coefficients across exporting ports.

Table 6: Estimated exchange rate pass-through coefficients for Taiwan

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	F Stat
[01]	8703	-2.975 ***	0.213	-0.475	-0.893 **	0.023	0.88	1241	8.1 ***
[02]	8542	-0.033	0.469 ***	-1.113 ***	0.454 **	0.280	0.85	8864	8.9 ***
[03]	8708	0.008	0.393 ***	0.537 ***	-0.252 ***	-0.138 **	0.52	12242	17.5 ***
[04]	8471	0.769 ***	-0.112	0.777 **	-1.030 ***	0.640 **	0.58	8562	6.5 ***
[05]	8473	-0.475 **	0.741 ***	2.793 ***	-0.552	0.680 **	0.22	2579	20.4 ***
[06]	8525	-0.139	-0.667 ***	0.296	0.328 **	-1.061 ***	0.41	3603	8.8 ***
[07]	8704	0.026	-0.674 ***	0.582 ***	0.182	-0.513 ***	0.79	1694	9.9 ***
[08]	8479	0.319 *	-0.479 ***	-0.576 ***	-0.826 ***	-0.303 *	0.85	4891	6.1 ***
[09]	8541	-0.870 ***	-0.278 *	-1.684 ***	-0.951 ***	0.345 **	0.77	10333	16.4 ***
[10]	9009	1.648 ***	2.399 ***	2.019 ***	5.514 ***	1.330 ***	0.47	2923	34.8 ***
[11]	8407	0.632 ***	0.109	-0.880 ***	0.548 ***	-0.165	0.65	2617	8.2 ***
[12]	8517	-0.901 ***	0.280	1.294 ***	-0.603 **	0.676 **	0.44	4454	11.6 ***
[13]	8711	-1.141 **	2.776 ***	-0.498	2.212 ***	-1.279 *	0.62	809	10.6 ***
[14]	8409	-0.581 ***	-0.756 ***	0.281	-0.906 ***	2.282 ***	0.34	4216	43.4 ***
[15]	8536	-1.191 ***	0.429 ***	0.351 ***	0.246 ***	-0.448 ***	0.37	10750	66.1 ***
[16]	8540	0.902 ***	0.809 ***	1.138 ***	0.617 ***	-0.449 **	0.75	4274	8.5 ***
[17]	8429	2.467 ***	0.265 ***	0.277 ***	0.307 *	0.427 **	0.42	4018	20.3 ***
[18]	8529	-1.995 ***	-0.636 ***	-2.618 ***	-1.550 ***	-2.601 ***	0.44	3312	12.8 ***
[19]	8521	-0.821 ***	-0.949 ***	-0.672 ***	-0.379 **	-0.779 *	0.21	1302	1.4
[20]	4011	0.757 ***	0.644 ***	-0.099	0.020	0.757 ***	0.75	2609	17.2 ***
[21]	8414	-0.103	0.617 ***	-0.082	0.171	-0.863 ***	0.44	8859	23.1 ***
[22]	8528	-0.359	-0.105	-0.114	0.335	0.098	0.47	2761	0.6
[23]	8532	-0.454 ***	0.594 ***	3.165 ***	1.003 ***	1.567 ***	0.34	6309	40.9 ***
[24]	8543	-0.045	-4.283 ***	-0.098	-1.402 **	2.524 ***	0.48	2725	27.0 ***
[25]	8523	0.340 *	-2.197 ***	1.391 ***	0.156	4.625 ***	0.70	3294	45.3 ***
[26]	8483	0.031	0.277 ***	0.238 **	-0.477 ***	0.611 ***	0.38	11918	22.4 ***
[27]	9018	-0.387 ***	0.290 ***	0.536 ***	0.344 ***	0.413 ***	0.75	7476	10.8 ***
[28]	7210	11.953 ***	10.145 ***	10.546 ***	10.343 ***	10.802 ***	0.60	6140	3.1 **
[29]	9010	-4.542 ***	-4.829 ***	-0.585	-2.582 ***	-1.939	0.76	1904	4.0 ***
[30]	7208	0.463 **	0.274	0.644 ***	1.134 **	0.612 ***	0.98	2469	0.7
[31]	8504	-0.713 ***	-0.265 **	0.182	-0.764 ***	-0.712 ***	0.41	8384	9.9 ***
[32]	8507	0.562 ***	-0.450 ***	0.923 ***	-0.077	-1.143 ***	0.75	3811	15.5 ***
[33]	8482	-1.356 ***	-0.001	0.258 ***	0.385 ***	0.501 ***	0.54	7505	71.5 ***
[34]	8527	-0.414 ***	0.478 ***	0.772 ***	0.098	-1.050 ***	0.57	3464	9.4 ***
[35]	7304	14.326 ***	11.693 ***	13.602 ***	14.666 ***	11.166 ***	0.51	4488	7.3 ***
[36]	8413	0.106	0.590 ***	0.193 **	-0.100	0.311 ***	0.46	10153	10.0 ***
[37]	8408	0.341	0.638 ***	1.227 ***	1.109 ***	-0.290	0.62	3417	6.0 ***
[38]	7209	0.506 ***	-0.138	0.603 ***	0.748 *	0.845 ***	0.99	3605	5.0 ***
[39]	8522	-2.583 ***	-1.565 ***	0.279	-1.349 ***	1.052 ***	0.46	1355	25.8 ***
[40]	8481	-0.107	-0.300 ***	-0.283 ***	-0.519 ***	-0.279 ***	0.31	9967	3.5 ***
[41]	9504	0.311	1.787 ***	2.917 ***	2.567 ***	6.311 ***	0.42	2160	41.2 ***
[42]	9030	-1.368 ***	-0.452 ***	1.127 ***	-1.099 ***	-0.041	0.71	5408	24.6 ***
[43]	8501	-0.099	0.872 ***	0.210 *	-0.128	-0.094	0.34	11754	19.6 ***
[44]	8537	-0.397 *	0.019	-1.180 ***	-0.571 ***	0.094	0.07	1395	6.1 ***
[45]	8477	-0.180	0.599 ***	0.035	-0.421 **	0.254	0.27	3776	3.9 ***
[46]	8544	-1.062 ***	-0.012	0.243 *	-1.202 ***	-0.782 ***	0.42	9917	27.0 ***
[47]	7225	5.085 **	8.914 ***	9.103 ***	3.791 **	11.234 ***	0.64	1633	6.3 ***
[48]	9001	-1.439 ***	0.548 *	3.060 ***	1.133 ***	2.345 ***	0.49	2098	28.0 ***
[49]	8534	-2.346 ***	-0.014	-1.738 ***	-2.966 ***	-2.735 ***	0.36	1010	12.5 ***
[50]	8511	0.086	0.677 ***	1.652 ***	0.206	-0.763 ***	0.50	5827	32.2 ***

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal ER pass-through coefficients across exporting ports.

Table 7: Estimated exchange rate pass-through coefficients for Hong Kong

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	F Stat
[01]	8703	3.644 ***	0.433 ***	1.185 ***	1.051 ***	-0.001	0.56	4949	20.6 ***
[02]	8542	-0.516 ***	0.422 ***	0.476 **	1.357 ***	0.957 ***	0.90	11093	17.4 ***
[03]	8708	-0.201	0.529 ***	-0.698 ***	0.293 **	-0.501 ***	0.58	12160	13.7 ***
[04]	8471	0.743 ***	2.017 ***	2.443 ***	0.826 *	0.812 **	0.33	10259	4.9 ***
[05]	8473	0.526 **	0.012	1.834 ***	-0.622	0.329	0.16	3654	5.8 ***
[06]	8525	0.006	-0.036	-0.431 **	0.164	-0.418	0.50	6356	1.9
[07]	8704	2.301	0.040	0.077	0.846 **	0.453 ***	0.65	2601	2.5 **
[08]	8479	-0.305	-0.144	-0.477 *	0.179	0.607 **	0.68	4217	2.9 **
[09]	8541	-0.100	1.033 ***	-0.226	0.221	0.973 ***	0.86	12940	10.3 ***
[10]	9009	1.205 ***	2.207 ***	1.515 ***	1.921 ***	2.253 ***	0.26	3004	1.8
[11]	8407	1.727 ***	0.422	-0.794 **	2.415 ***	-0.215	0.73	2019	14.2 ***
[12]	8517	0.397	0.840 ***	0.883 **	2.028 ***	1.463 ***	0.35	5307	4.0 ***
[13]	8711	1.149 ***	0.831 ***	1.636 ***	1.056 ***	0.306 **	0.86	4611	11.9 ***
[14]	8409	-0.469 **	0.221	-0.631 ***	-0.867 ***	-0.799 ***	0.22	4142	5.5 ***
[15]	8536	-0.159	0.536 ***	-0.071	0.266 **	-0.308 **	0.41	10880	8.3 ***
[16]	8540	0.520 **	0.034	0.836 **	0.599 **	0.835 **	0.74	3254	1.7
[17]	8429	1.273 *	-0.161	-0.330 *	-0.024	0.131	0.16	2688	1.4
[18]	8529	0.206	-0.352	1.416 ***	-0.074	-2.300 ***	0.43	3398	15.1 ***
[19]	8521	0.586	0.728 **	-0.026	0.743 **	-1.309 ***	0.31	1896	4.7 ***
[20]	4011	0.327 **	0.604 ***	1.056 ***	0.353 ***	0.453 ***	0.62	3092	4.5 ***
[21]	8414	-0.852 ***	0.031	0.284 *	0.013	-0.087	0.50	8516	6.3 ***
[22]	8528	0.629 **	0.450	1.449 ***	-0.112	-0.570 *	0.64	4270	5.3 ***
[23]	8532	0.530 ***	1.206 ***	1.346 ***	1.136 ***	0.014	0.33	7505	5.6 ***
[24]	8543	0.912 *	0.440	3.442 ***	-0.222	0.055	0.57	2733	4.9 ***
[25]	8523	-0.019	0.415 *	-1.683 ***	0.389 *	3.317 ***	0.60	4524	14.7 ***
[26]	8483	-1.066 ***	-0.001	-0.198	-0.268 *	-0.613 ***	0.32	10150	7.8 ***
[27]	9018	0.717 ***	0.348 ***	0.792 **	0.153	-0.147	0.76	6593	3.3 **
[28]	7210	0.016	-2.065 **	1.586 ***	3.840 ***	-0.137	0.45	3953	4.9 ***
[29]	9010	-0.845	-0.294	0.240	-0.507	1.245	0.62	2093	0.4
[30]	7208	1.155 ***	0.093	0.323	-0.247	0.955 *	0.98	932	1.2
[31]	8504	-0.357 **	-0.109	-0.615 ***	-0.722 ***	-0.221	0.41	8044	2.0 *
[32]	8507	-0.090	0.391	1.995 ***	0.749 ***	0.457	0.69	4375	8.6 ***
[33]	8482	-2.624 ***	0.263	0.528 ***	-0.341 **	0.119	0.47	5503	37.6 ***
[34]	8527	0.209	1.167 ***	0.893 ***	0.628 ***	-1.283 ***	0.44	5768	7.9 ***
[35]	7304	0.080	5.316 ***	3.675 ***	5.310 ***	1.078	0.20	1728	2.5 **
[36]	8413	0.100	0.257 *	0.184	-0.079	0.121	0.40	7455	0.7
[37]	8408	0.999 *	-0.316	-1.358 ***	-0.147	0.403	0.60	1745	5.0 ***
[38]	7209	0.499 ***	2.073 ***	0.805 ***	4.240 ***	0.937 ***	0.99	3807	21.2 ***
[39]	8522	-1.632 ***	-0.290	2.557 ***	1.171 **	-2.036 ***	0.40	1758	13.5 ***
[40]	8481	-0.880 ***	-0.601 ***	-0.783 ***	-1.028 ***	-1.574 ***	0.29	8264	4.8 ***
[41]	9504	0.091	2.355 ***	2.384 ***	0.319	5.555 ***	0.33	3258	19.3 ***
[42]	9030	-0.097	0.044	0.449	0.130	0.502 **	0.58	5656	1.3
[43]	8501	-0.455 **	-0.124	0.019	0.167	-0.912 ***	0.33	9441	6.6 ***
[44]	8537	0.548	-0.229	1.963 ***	-0.611	-0.483	0.20	1255	6.6 ***
[45]	8477	0.690 *	0.545 *	0.007	-0.717 **	-0.402	0.49	3355	3.0 **
[46]	8544	-0.611 ***	0.186	0.225	-0.203	-0.130	0.53	12206	5.4 ***
[47]	7225	-7.655	0.015	-9.517 ***	1.034	2.644 ***	0.66	580	5.0 ***
[48]	9001	0.184	0.057	-2.079 ***	1.133 ***	0.371	0.53	2523	5.7 ***
[49]	8534	0.471	1.090 ***	2.336 ***	1.833 ***	1.234 ***	0.49	1053	2.9 **
[50]	8511	-1.254 ***	-0.573 ***	-0.570 ***	-0.815 ***	-0.548 ***	0.43	5243	1.4

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal ER pass-through coefficients across exporting ports.

Table 8: Estimated exchange rate pass-through coefficients for Germany

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	F Stat
[01]	8703	0.019	0.514 ***	2.622 ***	0.360 ***	0.531 ***	0.77	3505	5.6 ***
[02]	8542	-0.158	-0.279	-0.155	-0.750 **	0.077	0.76	4956	1.1
[03]	8708	0.167 **	0.285 ***	-0.107	0.240 ***	-0.507 ***	0.53	11478	21.2 ***
[04]	8471	0.167	-0.107	1.616 ***	0.206	0.648 ***	0.68	9545	12.6 ***
[05]	8473	-0.198	0.547 *	-0.165	-0.451 *	1.679 ***	0.30	3316	16.2 ***
[06]	8525	0.186 *	0.100	-0.454 ***	0.100	0.805 ***	0.53	4981	7.1 ***
[07]	8704	-0.907 *	0.372 ***	-0.292	0.352	0.481 ***	0.87	1079	2.8 **
[08]	8479	-0.282	-0.236	0.681 **	1.141 ***	0.644 **	0.82	2777	5.7 ***
[09]	8541	-0.584	-0.053	0.390	-2.748 ***	0.127	0.62	6515	18.0 ***
[10]	9009	0.718 ***	0.527 ***	0.261 **	0.055	0.229 *	0.59	2464	4.6 ***
[11]	8407	-0.122	-0.104	-0.072	0.130	-0.359 *	0.55	1744	0.8
[12]	8517	0.900 ***	0.376 *	1.135 ***	-1.058 ***	1.379 ***	0.65	2908	27.3 ***
[13]	8711	0.265	-0.274	2.490 ***	0.388 ***	0.572	0.66	1560	10.1 ***
[14]	8409	0.572 ***	0.032	0.114	-0.169	-0.072	0.41	3963	3.1 **
[15]	8536	-0.272 **	-0.056	0.514 ***	-0.213 **	0.966 ***	0.39	7139	15.8 ***
[16]	8540	0.250	-1.314 ***	0.455 **	-0.710 ***	-0.640 **	0.75	3179	11.1 ***
[17]	8429	0.299	0.030	0.174	0.445 ***	0.166	0.53	1404	1.6
[18]	8529	-0.064	-0.534 **	0.174	-1.452 ***	-1.043 ***	0.37	3284	6.2 ***
[19]	8521	-0.028	-0.681 ***	-0.405 *	0.171	0.642 *	0.19	1336	3.3 ***
[20]	4011	1.183 ***	1.294 ***	0.067	0.506 ***	0.506 ***	0.71	2958	20.4 ***
[21]	8414	-0.060	0.665 ***	0.560 **	0.935 ***	-0.099	0.55	4585	7.9 ***
[22]	8528	0.089	-0.621 ***	-0.378	-0.300	1.081 ***	0.61	2995	6.4 ***
[23]	8532	-0.698 ***	0.357	0.202	-0.464 **	1.563 ***	0.44	4312	10.4 ***
[24]	8543	0.127	-3.891 ***	3.115 ***	-1.683 ***	3.136 ***	0.68	2398	45.1 ***
[25]	8523	-0.273	0.212	1.866 ***	-0.075	2.063 *	0.53	3583	13.2 ***
[26]	8483	0.626 ***	0.809 ***	-0.181	0.986 ***	0.220 *	0.46	9676	14.3 ***
[27]	9018	0.233 *	-0.474 ***	0.472	0.379 **	-0.990 ***	0.73	5990	12.6 ***
[28]	7210	1.628	2.716	-6.011	13.573 ***	0.909	0.75	276	9.6 ***
[29]	9010	-3.131 ***	-3.397 ***	-1.676	-1.560 **	1.004	0.65	1638	3.8 ***
[30]	7208	0.000	1.085	0.000	-3.725	-4.904	0.96	17	0.0
[31]	8504	0.368 **	-0.154	0.480 ***	-0.513 ***	-0.216	0.44	5759	6.3 ***
[32]	8507	0.500 ***	-0.117	1.575 ***	0.564 ***	1.004 ***	0.83	3195	14.7 ***
[33]	8482	0.488 ***	-0.365 *	0.529 ***	0.359 ***	0.523 ***	0.55	6481	4.8 ***
[34]	8527	0.062	0.529 ***	0.721 ***	-0.523 ***	-1.421 ***	0.49	4785	18.0 ***
[35]	7304	12.416 ***	11.613 ***	45.432	5.432 ***	0.000	0.48	380	2.5 **
[36]	8413	0.863 ***	0.745 ***	0.214	-0.412 ***	-0.625 ***	0.41	5998	25.8 ***
[37]	8408	0.617 ***	0.023	0.424 ***	0.597 ***	0.311 **	0.31	2536	2.8 **
[38]	7209	0.000	0.747	0.685 **	0.000	-260.859 ***	1.00	29	3.1 *
[39]	8522	1.128 ***	0.639 *	0.074	1.066 ***	1.027 **	0.60	1306	1.6
[40]	8481	0.071	0.340 **	0.246	0.284 **	-0.878 ***	0.40	6498	10.9 ***
[41]	9504	0.514	1.011 *	0.798	2.748 ***	-36.949	0.43	777	6.1 ***
[42]	9030	-0.589 ***	-0.939 ***	1.312 **	-0.590 ***	0.321 *	0.55	3407	8.9 ***
[43]	8501	0.368 ***	-0.750 ***	0.859 ***	-0.163	-0.158	0.35	7705	20.2 ***
[44]	8537	-0.009	0.889 ***	0.767 ***	0.097	0.738 ***	0.22	1096	3.2 **
[45]	8477	0.272	0.057	0.458	0.210	1.857 ***	0.35	836	1.4
[46]	8544	-0.917 ***	-0.188	1.088 ***	-0.449 **	-0.938 ***	0.38	6079	15.1 ***
[47]	7225	0.773	0.658	25.151 ***	1.221	0.000	0.90	115	9.5 ***
[48]	9001	1.229 ***	-2.777 ***	0.425	0.086	3.810 ***	0.46	1545	37.2 ***
[49]	8534	0.397	-0.830	1.540 ***	-1.836 ***	-0.585	0.30	923	5.1 ***
[50]	8511	-0.437 ***	-0.019	-0.824 ***	0.136	-0.193	0.59	5689	5.7 ***

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal ER pass-through coefficients across exporting ports.

Table 9: Estimated exchange rate pass-through coefficients for USA

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	F Stat
[01]	8703	-0.125	-0.159	1.284 *	0.596 *	0.348 **	0.68	3134	2.6 **
[02]	8542	0.130	0.584 ***	0.947 ***	0.681 ***	-0.518 ***	0.83	9954	8.4 ***
[03]	8708	0.232 ***	0.192 ***	-0.441 ***	-0.073	0.240 ***	0.56	16461	15.3 ***
[04]	8471	0.053	0.013	1.045 ***	0.163	0.279 *	0.68	13901	5.9 ***
[05]	8473	0.358	1.064 ***	0.755 ***	0.002	1.239 ***	0.47	4473	4.3 ***
[06]	8525	0.930 ***	-0.338 ***	0.265 **	0.145	0.117	0.51	7726	14.2 ***
[07]	8704	3.564 ***	0.687 ***	-2.553 ***	-0.191	0.575 *	0.74	1838	10.5 ***
[08]	8479	0.403 **	-0.121	0.746 ***	0.105	0.349 *	0.91	4753	3.0 **
[09]	8541	0.414 *	0.584 ***	0.797 ***	-0.272	0.417 *	0.78	10946	2.6 **
[10]	9009	1.052 ***	0.045	0.206	0.918 ***	0.484 ***	0.60	3172	13.9 ***
[11]	8407	0.082	0.575 ***	0.480 ***	0.318 ***	0.390 ***	0.78	5050	2.6 **
[12]	8517	-0.032	0.325	0.918 ***	0.122	1.214 ***	0.57	5336	5.4 ***
[13]	8711	0.987 ***	0.694 **	-1.159 ***	-0.036	1.384 ***	0.67	2208	9.6 ***
[14]	8409	-0.072	-0.238 *	0.874 ***	-0.411 ***	0.537 ***	0.62	6046	13.5 ***
[15]	8536	-0.113	0.552 ***	0.123	0.292 ***	-0.457 ***	0.30	11039	13.1 ***
[16]	8540	0.202	0.018	-0.254	0.457 **	-0.240	0.78	6287	2.3 *
[17]	8429	1.262 ***	0.483 ***	0.495 ***	0.191	-0.576 ***	0.42	4283	10.6 ***
[18]	8529	-0.854 ***	-1.524 ***	-0.330	0.122	-0.894 ***	0.47	4397	7.3 ***
[19]	8521	-0.160	-0.216	0.637 ***	0.275	-0.988 ***	0.28	1866	6.4 ***
[20]	4011	1.010 ***	0.389 ***	0.549 ***	-0.043	0.866 ***	0.73	5065	21.3 ***
[21]	8414	-0.132	0.360 ***	0.582 ***	0.278 **	0.294 **	0.54	9484	4.7 ***
[22]	8528	-0.478 **	0.124	0.292	-0.917 ***	0.684 ***	0.61	4390	6.9 ***
[23]	8532	0.171	1.100 ***	-0.074	1.210 ***	-1.582 ***	0.41	7232	19.5 ***
[24]	8543	-0.793 *	-0.463	1.528 ***	-0.291	-0.506	0.57	2997	2.8 **
[25]	8523	-0.376 **	0.442 ***	1.514 ***	-0.072	2.184 ***	0.71	6503	24.6 ***
[26]	8483	0.157	0.852 ***	1.015 ***	0.163	0.842 ***	0.43	13662	14.9 ***
[27]	9018	0.453 ***	-0.227 **	-0.511 *	1.165 ***	-0.393 **	0.81	10064	18.0 ***
[28]	7210	0.693	9.780 ***	5.799 ***	5.836 ***	2.650 ***	0.55	1734	6.1 ***
[29]	9010	-0.227	-1.024 **	0.400	-2.340 ***	0.616	0.67	2252	2.1 *
[30]	7208	0.000	0.995 **	0.549	-1.751	-1.634 ***	0.99	255	4.5 ***
[31]	8504	0.362 **	0.023	0.602 ***	0.055	-0.734 ***	0.33	9253	8.7 ***
[32]	8507	-0.411 **	-0.379 **	0.404 *	0.132	1.048 ***	0.75	4773	7.9 ***
[33]	8482	0.548 ***	1.333 ***	0.501 ***	0.281 ***	0.688 ***	0.62	8365	13.0 ***
[34]	8527	-0.108	-0.468 ***	0.692 ***	0.069	-0.513 ***	0.44	6226	9.2 ***
[35]	7304	1.251	0.123	1.150	9.360 ***	-8.376 ***	0.20	2616	14.3 ***
[36]	8413	1.051 ***	0.448 ***	0.481 ***	0.463 ***	-0.058	0.42	9057	12.3 ***
[37]	8408	-0.139	0.508 ***	0.299 ***	-0.011	0.111	0.39	5169	7.0 ***
[38]	7209	-7.101	-3.510 ***	0.328	0.834	0.732 ***	0.99	1235	21.2 ***
[39]	8522	0.069	-0.891 ***	-0.247	-0.227	-0.695	0.39	1706	1.3
[40]	8481	-0.213 **	-0.673 ***	0.436 ***	0.037	1.414 ***	0.33	9841	56.9 ***
[41]	9504	-0.459	1.471 ***	0.525	1.828 ***	0.027	0.34	2712	5.0 ***
[42]	9030	-1.376 ***	-1.176 ***	0.440	-0.631 ***	-0.090	0.63	5745	9.0 ***
[43]	8501	-0.267 ***	0.325 ***	0.050	0.072	-0.095	0.47	13750	4.9 ***
[44]	8537	-1.118 ***	-0.761 ***	1.818 ***	0.327	0.440	0.22	1337	16.0 ***
[45]	8477	0.845 ***	0.267	0.551 *	-0.140	0.457 **	0.35	4496	3.1 **
[46]	8544	0.497 ***	0.051	0.204	-0.984 ***	-0.631 ***	0.44	12072	18.4 ***
[47]	7225	2.156	-1.828	-3.573	0.679	4.413 ***	0.65	1138	4.8 ***
[48]	9001	0.788 ***	0.655 **	-2.009 ***	2.246 ***	0.918 *	0.57	3420	14.3 ***
[49]	8534	0.090	-3.562 ***	4.681 ***	2.371 ***	0.366	0.25	1063	66.6 ***
[50]	8511	0.139	0.199 *	-0.259	-0.328 ***	0.279 **	0.64	10128	5.6 ***

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal ER pass-through coefficients across exporting ports.

Table 10. Summary Statistics for Kernel Density Estimation by Exporting Ports

	peak	mean	variance	skewness	kurtosis
Tokyo	0.10	0.10	0.009	-0.001	0.0001
Yokohama	0.20	0.16	0.024	-0.004	0.0006
Nagoya	0.20	0.23	0.051	-0.012	0.0026
Osaka	0.40	0.46	0.206	-0.093	0.0423
Kobe	0.20	0.27	0.073	-0.020	0.0054

Note: Kernel densityis estimated for each importing country from 300 estimated ER pass-through coefficients with Gaussian kernel and band width of 0.3. The Kernel density is estimated every 0.05 points in [-6, 6]. To calculate the moments of estimated distribution function, only the interval [-1,2] is used. For the precise methodology used to calculate the moments in this table, see the appendix.

Table 11. Summary Statistics for Kernel Density Estimation by Importing Countries

	peak	mean	variance	skewness	kurtosis
Korea	0.05	0.09	0.008	-0.001	0.0001
China	0.35	0.48	0.221	-0.104	0.0491
Taiwan	0.20	-0.24	0.055	0.013	0.0030
Hong Kong	0.25	0.26	0.067	-0.017	0.0044
Germany	0.10	0.05	0.002	0.000	0.0000
US	0.25	0.25	0.059	-0.014	0.0035

Note: Kernel densityis estimated for each importing country from 250 estimated ER pass-through coefficients with Gaussian kernel and band width of 0.3. The Kernel density is estimated every 0.05 points in [-6, 6]. To calculate the moments of estimated distribution function, only the interval [-1,2] is used. For the precise methodology used to calculate the moments in this table, see the appendix.

Table 12. ER Pass-through Coefficients by HS4 Product Groups

Description (selected)	HS4	Average(middle 24 obs)	Max	Min
	7304	6.98	45.43	-8.38
	7210	5.35	13.57	-6.01
	7225	3.10	25.15	-9.52
video games	9504	1.20	5.51	0.04
copier	9009	1.13	2.78	-1.28
motor cycles	8711	0.69	3.81	-2.78
optical fiber & cables	9001	0.65	3.17	-1.58
electrical capacitors	8532	0.60	3.31	-1.31
bulldozer	8429	0.47	2.44	-1.03
lat-rolled iron>600mr	7209	0.47	2.79	-0.64
computer	8471	0.45	3.64	-2.97
automobiles	8703	0.41	4.63	-2.55
tires	4011	0.39	1.29	-0.35
computer parts	8473	0.38	1.87	-0.72
	8507	0.36	1.99	-1.14
	8523	0.36	1.91	-1.36
	8477	0.35	2.42	-1.01
	7208	0.34	1.02	-1.07
	8483	0.32	1.05	-0.63
	8408	0.32	1.39	-1.11
	8482	0.30	2.03	-1.88
	8413	0.27	1.33	-2.62
	8517	0.27	1.35	-1.30
	8407	0.26	1.96	-1.18
	8542	0.26	0.93	-0.86
	9018	0.20	1.14	-0.83
	8414	0.18	6.31	-36.95
	8540	0.16	1.14	-1.31
	8479	0.15	0.97	-1.19
	8537	0.13	1.22	-1.42
	8527	0.12	1.71	-4.90
	8541	0.12	0.94	-1.06
	8536	0.10	0.87	-0.91
automobiles parts	8708	0.08	0.68	-0.70
	8501	0.07	2.28	-0.91
trucks	8704	0.07	1.68	-2.75
digital cameras	8525	0.07	1.45	-1.55
television	8528	-0.03	1.84	-1.25
	8409	-0.04	3.56	-5.11
	8481	-0.08	1.41	-1.57
	8511	-0.11	0.96	-1.31
	8521	-0.13	0.76	-0.88
	8543	-0.17	3.44	-4.28
	8504	-0.17	1.09	-1.20
	8544	-0.20	4.68	-3.56
	9030	-0.23	1.31	-1.38
	8522	-0.24	2.56	-2.58
	8534	-0.27	1.42	-2.62
	8529	-0.72	1.80	-4.83
	9010	-1.12	4.24	-260.86

Note: The average of HS4 is calculated over the middle 24 values of estimated coefficients from Table 4 to 9. There are only four cases in which the difference between this average from the average of entire coeffcients exceeds 0.15 in absolute terms. For the precise description of product, see the Appendix A.

Table 13: Estimated Local Port Fixed Effects in Equation (4)

	HS4	Tokyo	Yokohama	Osaka	Kobe	Nagoya	Adj R^2	NOB	No of	F Stat
[01]	8703	6.676 ***	6.710 ***	6.050 ***	6.419 ***	6.643 ***	0.37	17,279	20	73.6 ***
[02]	8542	0.471 ***	0.749 ***	0.619 ***	0.434 ***	0.917 ***	0.72	54,723	35	140.3 ***
[03]	8708	1.317 ***	0.775 ***	0.763 ***	1.165 ***	1.158 ***	0.31	70,530	17	523.6 ***
[04]	8471	4.685 ***	4.837 ***	4.664 ***	5.067 ***	4.934 ***	0.38	58,223	29	51.2 ***
[05]	8473	2.690 ***	2.731 ***	3.019 ***	3.300 ***	2.734 ***	0.12	18,812	6	88.4 ***
[06]	8525	3.242 ***	3.162 ***	3.298 ***	3.102 ***	3.328 ***	0.34	29,030	17	21.8 ***
[07]	8704	9.063 ***	9.189 ***	9.177 ***	8.941 ***	9.213 ***	0.50	9,381	18	3.9 ***
[08]	8479	0.983 ***	0.670 ***	0.477 ***	0.458 ***	0.611 ***	0.81	26,353	11	152.9 ***
[09]	8541	2.335 ***	2.841 ***	2.507 ***	2.693 ***	2.623 ***	0.72	63,762	20	135.0 ***
[10]	9009	3.510 ***	3.372 ***	3.283 ***	2.969 ***	3.695 ***	0.25	16,306	10	85.5 ***
[11]	8407	2.961 ***	2.855 ***	2.553 ***	2.836 ***	3.172 ***	0.45	15,091	14	80.7 ***
[12]	8517	1.785 ***	1.701 ***	1.116 ***	1.725 ***	1.645 ***	0.32	22,850	21	31.0 ***
[13]	8711	6.128 ***	5.949 ***	5.913 ***	5.979 ***	5.966 ***	0.65	11,454	14	9.8 ***
[14]	8409	5.276 ***	4.876 ***	4.698 ***	4.872 ***	4.855 ***	0.22	26,099	7	123.5 ***
[15]	8536	3.254 ***	3.040 ***	2.980 ***	2.963 ***	3.066 ***	0.20	58,939	15	134.4 ***
[16]	8540	0.555 ***	0.718 ***	0.689 ***	0.692 ***	0.889 ***	0.64	24,889	22	29.9 ***
[17]	8429	0.320 ***	0.365 ***	0.235 ***	0.455 ***	0.313 ***	0.46	15,332	13	16.5 ***
[18]	8529	-0.340 ***	-0.243 ***	-0.176 **	-0.082	0.320 ***	0.31	19,515	7	73.9 ***
[19]	8521	2.097 ***	2.094 ***	2.473 ***	2.173 ***	3.143 ***	0.16	8,095	2	60.3 ***
[20]	4011	0.031	0.054	0.290 ***	-0.098 **	0.010	0.57	16,087	14	72.1 ***
[21]	8414	2.000 ***	1.907 ***	1.757 ***	2.024 ***	2.011 ***	0.29	47,305	16	73.7 ***
[22]	8528	4.711 ***	4.686 ***	4.695 ***	4.648 ***	4.800 ***	0.37	18,563	15	2.5 **
[23]	8532	2.776 ***	2.741 ***	2.881 ***	2.835 ***	2.871 ***	0.24	38,293	10	11.5 ***
[24]	8543	2.833 ***	2.886 ***	3.181 ***	2.375 ***	2.150 ***	0.44	16,385	10	79.6 ***
[25]	8523	0.781 ***	1.052 ***	1.030 ***	0.949 ***	1.604 ***	0.49	23,363	14	70.8 ***
[26]	8483	1.476 ***	1.150 ***	1.046 ***	1.052 ***	1.244 ***	0.19	67,643	15	255.1 ***
[27]	9018	3.342 ***	3.373 ***	3.271 ***	3.008 ***	3.485 ***	0.63	41,720	24	90.4 ***
[28]	7210	13.456 ***	14.262 ***	13.614 ***	14.223 ***	14.236 ***	0.51	18,388	22	40.0 ***
[29]	9010	1.184 ***	1.482 ***	1.302 ***	1.657 ***	1.020 ***	0.66	11,494	9	16.0 ***
[30]	7208	-1.398 ***	-0.673 ***	-1.094 ***	-0.524 ***	-1.076 ***	0.97	9,778	69	195.6 ***
[31]	8504	1.514 ***	1.197 ***	1.363 ***	1.388 ***	1.664 ***	0.27	48,468	25	151.3 ***
[32]	8507	0.106	0.061	-0.090	-0.079	0.252 ***	0.61	22,183	9	35.9 ***
[33]	8482	1.950 ***	1.210 ***	0.845 ***	0.908 ***	1.700 ***	0.37	41,151	9	,615.9 ***
[34]	8527	1.586 ***	1.363 ***	1.119 ***	1.762 ***	1.357 ***	0.28	24,485	19	70.8 ***
[35]	7304	19.937 ***	20.500 ***	19.982 ***	20.355 ***	20.202 ***	0.38	17,037	26	19.4 ***
[36]	8413	1.994 ***	1.885 ***	1.516 ***	1.845 ***	2.010 ***	0.24	49,950	18	380.2 ***
[37]	8408	2.315 ***	2.219 ***	1.774 ***	1.695 ***	2.248 ***	0.42	17,553	9	249.1 ***
[38]	7209	4.523 ***	5.349 ***	4.692 ***	5.066 ***	4.759 ***	0.98	13,921	41	395.7 ***
[39]	8522	3.172 ***	3.110 ***	3.505 ***	3.150 ***	4.169 ***	0.33	8,502	3	90.9 ***
[40]	8481	1.704 ***	1.583 ***	1.330 ***	1.576 ***	1.666 ***	0.11	52,421	10	200.9 ***
[41]	9504	3.768 ***	3.243 ***	2.926 ***	3.446 ***	2.950 ***	0.30	12,077	6	71.9 ***
[42]	9030	3.496 ***	3.406 ***	3.413 ***	3.763 ***	3.673 ***	0.58	31,025	12	87.3 ***
[43]	8501	2.178 ***	1.911 ***	1.863 ***	2.030 ***	2.017 ***	0.20	63,430	27	121.9 ***
[44]	8537	2.606 ***	2.579 ***	2.452 ***	2.328 ***	2.459 ***	0.16	7,843	2	25.5 ***
[45]	8477	1.536 ***	1.324 ***	0.982 ***	1.321 ***	1.200 ***	0.29	20,609	10	58.9 ***
[46]	8544	0.339 ***	0.126 ***	0.060	0.240 ***	0.407 ***	0.40	59,567	29	106.8 ***
[47]	7225	15.488 ***	15.643 ***	14.813 ***	15.197 ***	14.951 ***	0.61	6,724	23	26.1 ***
[48]	9001	5.895 ***	5.154 ***	5.025 ***	5.043 ***	5.339 ***	0.42	13,223	7	129.7 ***
[49]	8534	1.776 ***	1.648 ***	1.606 ***	1.390 ***	2.526 ***	0.20	6,103	1	138.6 ***
[50]	8511	2.148 ***	2.021 ***	1.700 ***	1.956 ***	1.956 ***	0.38	35,937	13	45.2 ***

Note: Statistical significance at one percent, five percent, and ten percent level is shown respectively by ***, **, and *. The figures in the F stat indicate the F statistics for testing the null hypothesis of equal fixed-effect coefficients across exporting ports.

Figure 1. Kernel Density Estimation of (HS4) ER Pass-through by Exporting Ports

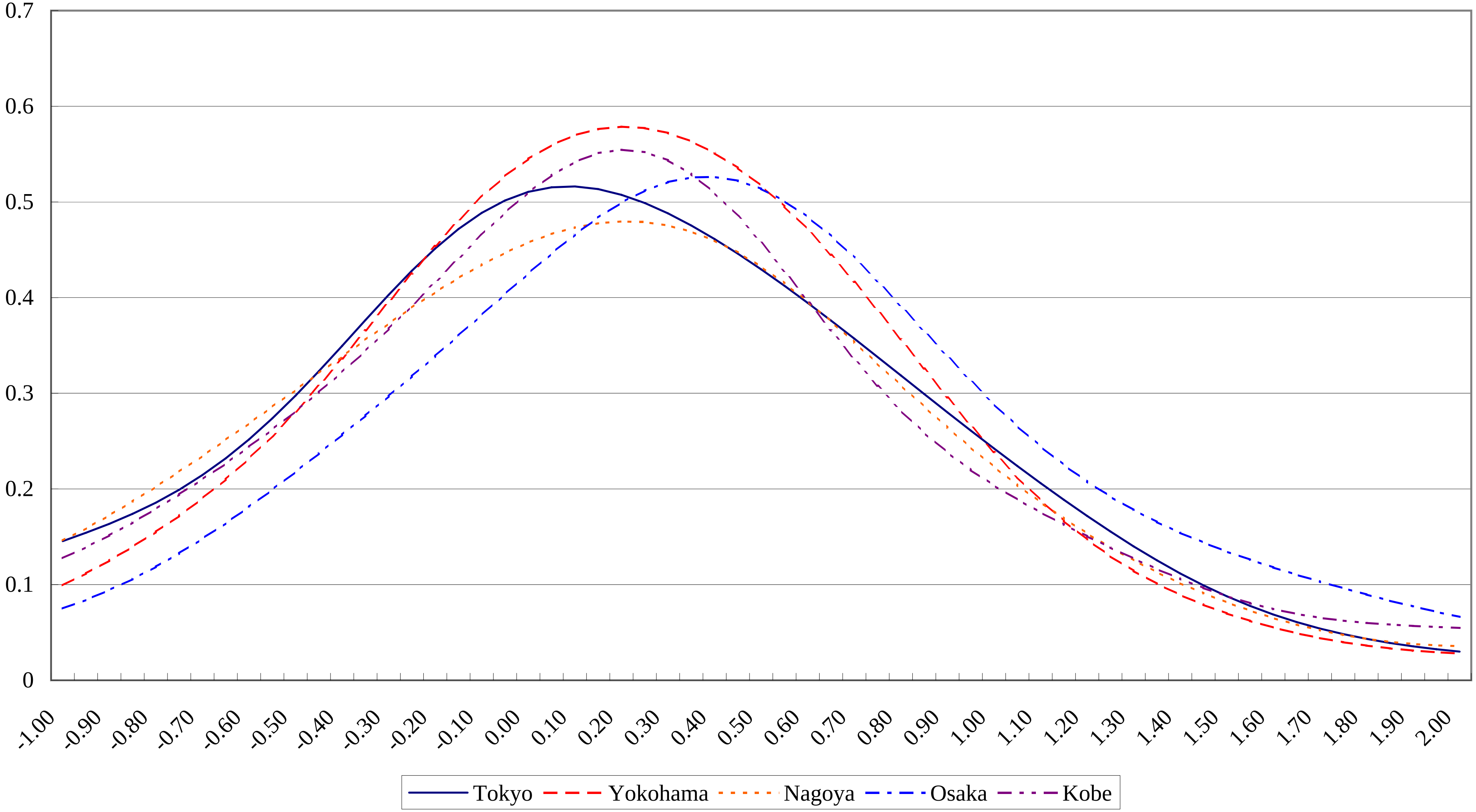

Figure 2. Kernel Density Estimation of (HS4) ER Pass-through by Importers

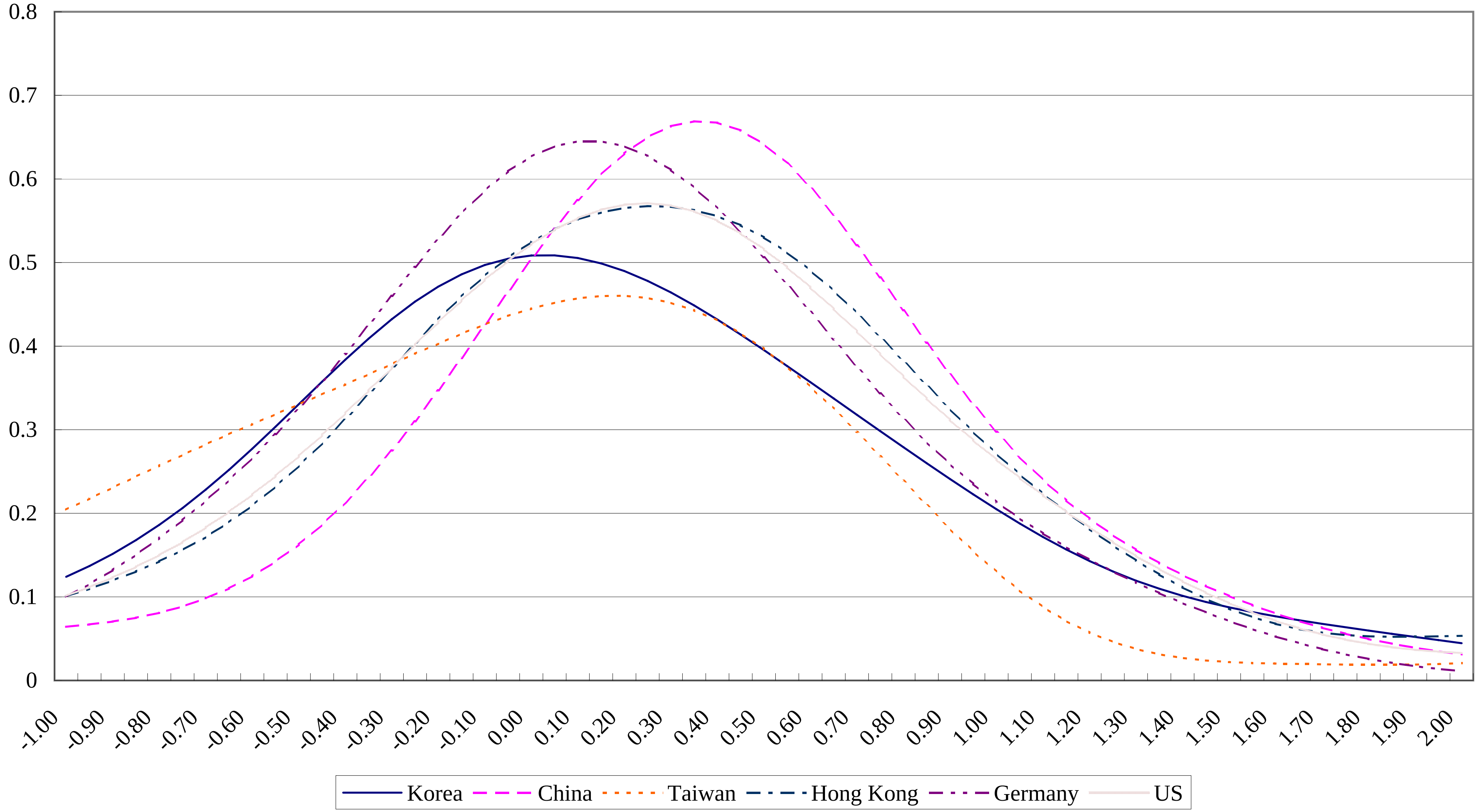

Figure 3.The Relative Ports' Share of Export in HS 4-digit Product Groups