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WHY ARE RETAIL PRICES IN JAPAN SO HIGH?: EVIDENCE FROM GERMAN EXPORT PRICES

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ABSTRACT

It is well documented that retail prices in Japan are higher than in other countries for similar products. The two main competing explanations for this finding are: (1) a relatively high degree of discriminatory practices against imports and (2) relatively high distribution costs associated with getting goods to the point of final sale in Japan. The first of these explanations implies that foreign exporters should charge higher prices on shipments to Japan than elsewhere, provided at least some of the rent associated with restrictive practices can be captured by the exporter. For the vast majority of the 37 7-digit German export industries studied here, the data are consistent with this implication. Prices on shipments to Japan appear to be significantly higher than prices on shipments to the United States, the United Kingdom, and Canada.

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There is active debate in policy circles about whether Japan's trade regime is fundamentally different than that found in other countries. In particular, many observers contend that Japan's domestic market is unfairly protected from foreign competition. This is believed to have an adverse impact not only on Japanese consumers, who must pay higher prices for their products than they would in the presence of greater competition, but also on foreign producers who must overcome the protective barriers. Some even argue that this confers an advantage to Japanese firms in their export markets by allowing them to subsidize activities in foreign markets with profits earned in the protected domestic market, undercut rivals prices, at least temporarily, and gain greater market share.

The evidence that Japan's trade regime is different is not completely convincing, however, and there has been a lively academic debate on this subject.[1] There are several kinds of evidence that have been presented in past research on this topic. In general, economists look for different trade rules, different industrial or trade structures, or different behavior in markets, in assessing whether Japan's trade regime is unusual.

The starting point in determining whether Japan's domestic markets are more closed than other countries' markets is to examine Japan's overt trade barriers, such as tariffs, quotas, and other nontariff restrictions on goods entering the country. Japan's tariffs on tradable goods are in line with most other countries as a consequence of their GATT membership. Skeptics contend that although Japan is a GATT member, GATT does little to reduce nontariff barriers to trade that have been viewed as increasingly important in recent years. UNCTAD data on the presence of nontariff measures do confirm that Japan has a higher "coverage ratio" than most other developed countries for overall trade, but this is largely a result of global trade quotas in coal, which accounts for a high share of Japan's imports. Japan looks similar to many European countries with respect to nontariff measures on manufactured imports.

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[1] See for example the recent debate between Lawrence (1993) and Saxonhouse (1993).

Skeptics still argue that in practice Japan remains closed because of peculiarities in its institutions and industrial structure that make it difficult for foreign firms to penetrate its markets. Japanese linkages between industry and government are quite different than those found in many other industrialized countries. In particular, anti-trust laws seem to be more lax. The extent of vertical and horizontal connections between firms in Japan is considered to be unusual. However, in many cases, these vertical relationships replace what would possibly be vertical integration in other countries.

A third type of evidence is contained in econometric studies of trade theory, which can in principle reveal whether the theories explain Japanese trade structure as well as they explain other countries' trade structures. These papers typically use Heckscher-Ohlin theory to specify equations which use factor endowments to predict the pattern of trade flows. In general, Japan does not appear to be a major outlier in these studies, although there is some conflicting evidence in the literature. The shortcoming of this line of work is that testing trade theory in general is plagued by a variety of problems: measurement of all the relevant factors of production, deciding which theory to use in specifying the equations, etc. Furthermore, an unusual trade pattern in and of itself need not imply a closed domestic market. This sort of evidence cannot be given much weight in the overall debate.

The fourth type of evidence that has been used in this debate is an examination of the prices of goods and services traded in international markets. A number of government-sponsored studies have concluded that prices of foreign-produced goods tend to be higher in Japan than they are in other countries (e.g., U.S. Department of Commerce, 1989). These same studies conclude that prices of Japanese goods are not substantially higher in Japan than they are in other markets. The evidence that prices may in fact be higher in Japan is consistent with two alternative theories: (1) the market is relatively closed which restricts competition and increases prices in equilibrium or (2) transportation to or distribution within Japan is more costly (because of regulation or congestion, for example), which leads to all products having higher prices at the point of final sale.

This paper attempts to contribute further evidence on the openness of Japanese goods markets by examining the behavior of foreign firms exporting to both Japan and other export destinations. In particular, the paper will test for country-specific differences in the prices charged by exporters to buyers located in different destinations. Since export values are measured in the exporter's currency at the port of export, net of transportation and tariffs, export price differences cannot be attributed to differences in distribution costs in the export destinations. If high levels of nontariff barriers account for the higher retail prices in Japan, then export prices charged to Japan should be expected to exceed export prices on goods shipped to other markets. If distribution costs and retail markups explain higher retail prices, then there is no reason export prices charged to Japan should differ systematically from prices charged to buyers in other countries.

The basic framework used for this investigation follows Knetter (1994a), which considered whether pricing by German and Japanese exporters on shipments to the U.S. market was consistent with the hypothesis that U.S. product markets had become more competitive in the wake of the strong dollar during the 1980s. The current application uses panel data for each of 37 German 7-digit industries' exports to multiple destinations over time. This data permits the estimation of pricing equations for German exports to multiple markets, including Japan. In general, the evidence is quite strong that German exporters charge significantly higher prices on shipments to Japan than on shipments to the United States, the United Kingdom, and Canada, even after controlling for the effects of exchange rates and real income on prices. This empirical result is consistent with the view that higher levels of NTBs explain higher Japanese retail prices. It is not an implication of higher distribution costs in the Japanese market.

This paper is organized as follows. Section I describes how export pricing behavior by foreign producers can help distinguish among competing theories of higher retail prices in Japan. Section II presents the empirical model used to study export pricing behavior. Section III discusses the data, estimation, and results. Section IV concludes the paper.

I. Retail Prices and Foreign Exports

The evidence that retail prices for similar or identical products are higher in Japan than they are in other countries is quite convincing. As reported in Noland (1993), the U.S. Department of Commerce and the Japanese Ministry of International Trade and Industry conducted a joint survey of goods prices in Japan and the United States in 1991. Prices for two-thirds of the 112 products surveyed were higher in Japan. Japanese prices on average exceeded U.S. prices by 37 percent. Of the 40 products surveyed that were made in Japan, however, only 30 percent of them were more expensive in Japan. Prices in Japan were 1.4 percent lower on average for this group. Of the 34 U.S. made products in the sample, 31 were more expensive in Japan, with an average price differential of 70 percent. Of the 20 products made in other countries, 19 were more expensive in Japan with an average differential of 65 percent.[2]

At least two interpretations are consistent with these findings on relative final goods prices. One is that Japan has a very protected domestic market for manufactured goods, which reduces competition and raises prices in equilibrium. This is the interpretation given to the data by those who feel Japan is guilty of blocking foreign producers from entering the Japanese market. This view is used as a justification by those who seek to use aggressive tactics to pry open Japan's market to imports. The other possibility is that distribution costs in Japan are extremely high, perhaps due to excessive regulation or congestion, which causes relative final goods prices to be high in Japan. There is no obvious trade policy implication associated with this finding. It reflects much the same

[2] The remaining 18 products in the sample did not have a unique country of origin.

phenomenon that causes costs of living to be relatively higher in urban areas than in rural areas.

This paper will focus on prices charged by exporters from a particular source country to buyers located in different destination markets. By focusing on prices at the port of export, this work is able to abstract from the distribution costs that may give rise to cross-country price differences at the point of final sale. Before proceeding, it is worth examining whether the tariff and nontariff barriers affect prices charged by exporters in the same way they affect prices at the point of final sale.

Nontariff barriers (NTBs) to trade come in many forms. The most common NTBs are volume restraining measures such as quotas or "voluntary" export restraints (henceforth, VERs). However, there are many other subtler instruments that may have (possibly unintended) impacts on trade volumes, such as import licensing requirements, technical product standards, minimum price systems, price investigations (e.g., anti-dumping or countervailing duty), and price surveillance.[3] These types of measures have been proliferating rapidly in the wake of GATT agreements to reduce other more overt trade restrictions. These measures are also representative of the impediments that foreign producers claim they face in the attempt to enter Japan's markets.

The more explicit nontariff measures will have fairly straightforward effects on product markets in which they are imposed. In the case of a homogenous product traded in an integrated world market, binding quotas or VERs will raise the domestic price of the product above the world price. With homogeneous products, it is likely the quota rent will accrue to the firm that receives the quota import license, since competition among world producers will bid down the price charged to the importer. Consequently, with homogenous products the price received by the exporter will probably be unaffected by the

[3] Laird and Yeats (1990) present and discuss the entire UNCTAD classification scheme for nontariff trade control measures.

quota. The quantity of the product imported and total domestic consumption will be lower, and the domestic price will be higher than in the absence of the quota.

Most manufactured goods do not fit in the category of homogeneous goods traded in an integrated world market.[4] Producers of these goods tend to have market power which allows them to capture some or all of the quota rent. Thus, we expect that with differentiated products, price received by the exporter will be higher in the presence of an explicit quantitative restriction. This seems consistent with evidence on specific cases, such as the VER on Japanese autos in the U.S. market.[5] Apart from this issue of how the quota rent is allocated across market participants, the effects will be similar to the homogeneous products case: Imports and domestic consumption will be reduced and the domestic price for the imported good will be higher than otherwise.

A good case can be made that many of the subtler NTBs will have impacts on the import market that are similar to the impact of a quota or a VER. For example, a minimum price system is equivalent to a maximum quantity system when market demand and domestic supply are known with certainty. A minimum price system also clearly allows the foreign producer of a differentiated product to capture the rent associated with prices above the unconstrained equilibrium. Firms that fear price investigations and the possible penalties they imply may also behave as if they face a quantitative constraint. To avoid harassment, these firms may raise prices and restrict quantities shipped to markets where such policies have been exercised.

In general, the presence of any law that can be used as a tool to harass foreign exporters selling in the domestic market should lead the foreign exporters to charge prices that exceed what would be charged if no such law existed. The exporter will balance the small gain in current profit from a slightly lower price against the potential loss in future

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[4] The empirical literatures on the law of one price (see for example Isard (1977), Richardson (1978), and Giovannini (1988)) and pricing-to-market (Krugman (1987), Knetter (1989, 1993), and Marston (1990)) are rife with evidence to support this claim.

[5] Berry, Levinsohn, and Pakes (1994) find that Japanese automobile producers benefited from the VER imposed by the United States.

profit should harassment begin as a result of a lower price and a higher quantity today. Thus, most types of nontariff barriers in differentiated product markets will have the effect of increasing the unit price received by the foreign exporter relative to what would be observed in the absence of the restriction.

A second aspect of pricing behavior that has been evaluated in international markets is the degree to which exporters adjust prices to foreign markets in response to exchange rate changes, i.e., the degree of pricing-to-market (PTM). If firms face either explicit or implicit restrictions on the amount they can sell in a foreign market, then the local (foreign) currency price of the good will be invariant to exchange rate changes for the range of exchange rate realizations that cause the quantitative restriction to become binding. Firms will provide the (perceived) maximum allowable quantity at the market clearing local currency price. While this market clearing price will be relatively constant in units of the local currency, the price in units of the exporters currency will vary systematically with exchange rates. Thus, an aggressive pattern of PTM may be a manifestation of binding quantitative restrictions in the export market. However, the factors determining the degree of PTM in any market are very complex (see Knetter (1994b)) and there is little evidence of destination-specific variation in PTM (see Knetter (1993)), so this paper will concentrate on price levels, rather than price adjustment.

The discussion of the impact of NTBs on price levels assumed that the effect of an NTB on a market is more similar to a quota than a tariff. If the effect of an NTB is more like a tariff, then the impact on exporter's prices is ambiguous. It will depend on the exporter's perception of the elasticity of demand and how that elasticity changes with respect to price. Prices charged by the exporter may increase or decrease and there is no way of knowing how pricing to market would be affected by a tariff. This caveat merely implies that the lack of any country-specific tendencies in export price levels does not imply that the Japanese market is relatively open. If NTBs act like tariffs, they may be difficult to detect in the pricing behavior of foreign exporters.

II. The Empirical Model

The empirical framework adopted here follows Knetter (1989, 1994). The general model of export price adjustment estimated for a 7-digit industry in a given source country can be written as follows:

$$p_{it} = \theta_t + \lambda_i + \beta_i x_{it} + \gamma_i y_{it} + \varepsilon_{it} \qquad (1)$$

where $i = 1,...,N$ and $t = 1,...,T$ index the destination market for exports and time, respectively, p is the log of destination-specific export price (measured in units of the exporter's currency at the port of export), x is the log of the destination-specific exchange rate (expressed as units of the buyer's currency per unit of the seller's divided by the destination market price level), y is the log of income in the destination market and $\theta_t, \lambda_i, \beta_i$, and γ_i are parameters to be estimated.[6] The θ_t are coefficients corresponding to a set of time effects and the λ_i are coefficients corresponding to a set of destination market effects. The error term, ε_{it}, is assumed to be independent and identically distributed with mean zero and variance σ_ε^2.

The model given by (1) is an analysis of covariance model in which the intercept term is allowed to vary due to unobservable factors that are constant across individuals but vary over time (captured by the θ's) and unobservable factors that are constant over time but vary across individuals (captured by the λ's). The primary factor underlying the time effects is marginal cost of the exporter. It is likely that some common movement in prices is due to changes in the markup over marginal cost that are common to all destination

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[6] Adjusting the nominal exchange rate for changes in the price level in the destination market imposes the condition that export prices are unaffected by changes in currency values that leave the relative price in units of foreign currency unchanged. Both the exchange rate and income series for each destination are normalized around their means.

markets. The primary factor underlying the destination effects will be institutional features of destinations that vary across countries but are relatively constant over time. One can think of these factors as determining the "competitiveness" of the destination market and thus its average level of markup over cost. As written in equation (1), the model allows for the response of destination-specific prices to exchange rates and income to vary across destinations.

The errors in equation (1) can arise for many reasons. Measurement error in the dependent variable is perhaps the primary source, since unit value data will be used to measure prices. Many of the theoretical models of pricing to multiple export destinations imply either non-linearities in the relationship between exchange rates and prices or that responses are conditional on the nature of exchange rate changes, so (1) may suffer from misspecification as well. Nonetheless, the linear fixed effects model seems to be a sensible first pass at data from a wide range of industries. No single specification is likely to be best for all of them.[7]

The main coefficient of interest for this paper is the value of λ for Japan vis-a-vis other destination markets. Estimates of λ reveal the average percentage difference in prices across markets during the sample period, conditional on all other controls for destination-specific variation in those prices. In practice, only (N−1) separate values of λ can be estimated in the presence of a full set of time effects. Consequently, we will normalize our model around Japan and then test whether the fixed effects for other countries are significantly different from zero.

The discussion of how NTBs affect price levels was a static analysis that compared the price in the presence of an NTB to the price that would be obtained in an unconstrained equilibrium. The data do not allow us to compare these prices, but rather to compare the

[7] In previous work (Knetter (1994c)) I have evaluated a non-linear version of equation (1) derived from restrictions on how costs and exchange rates affect prices and found the results to be similar to those obtained with the linear model. There were instances of convergence problems and implausible parameter estimates with the non-linear model, which may be attributable to the presence of outlier observations in the unit-value data used in estimation. Thus, I will concentrate on the linear model in this paper.

price charged by a foreign exporter to Japan with the price charged by the same exporter for the same product to some other destination market. The unconstrained equilibrium prices in each market will depend on the elasticities of demand facing the exporters in each market and there is no reason to think they will necessarily be equal. However, there is no reason to expect systematic country-specific relationships to exist in relative prices for a wide range of manufactured goods for reasons that are due to the shape of industry demand curves. Thus, systematic evidence that export prices to one destination were consistently higher for a broad range of manufactured goods would imply that something country-specific, rather than industry-specific, must be responsible. If Japan has significantly more NTBs on the products in our sample and the exporters are able to capture at least some of the rent associated with these barriers, then we should find that the fixed effects for other destination countries in our sample are negative, reflecting their more competitive product markets and the absence of any quantitative restrictions on trade volumes.

The statistical interpretation of the β's is straightforward. A value of zero implies that the markup to a particular destination is unresponsive to fluctuations in the value of the exporter's currency against the buyer's. Thus, changes in currency values are fully passed through to the buyer apart from any possible impact they may have on the common marginal cost. Negative values of β imply that markup adjustment is associated with stabilization of local currency prices. For example, a value of -.5 means that in response to a 10% appreciation (depreciation) of his currency, the exporter would reduce (increase) his markup by 5%. Assuming constant costs, the price paid in units of the buyer's currency would rise (fall) by only 5%. Positive values of β correspond to the case in which destination-specific changes in markups amplify the effect of destination-specific exchange rate changes on the price in units of the buyer's currency. The estimated value of γ would be interpreted similarly. It gives the destination-specific response of price to changes in destination market income.

III. Data, Estimation, and Results

The data used for this study are based on destination-specific exports for 37 7-digit German industries during the 1975-1987 period.[8] For each industry, annual destination-specific export quantities and values are collected for 6 or 7 of the largest export destinations from Statistiches Bundesamt publications. In selecting destinations, a couple of criteria are used: each destination in the sample has a floating exchange rate against most major currencies (since the data originally were used to study pricing to market) and there is an attempt to choose a sample with geographic variation. Given the destination-specific values and quantities of shipments, destination-specific unit values are constructed over the sample period. These unit values will serve as the dependent variable in this study.

There are two destination-specific independent variables in the model, exchange rates and income. The exchange rate variable is constructed by first dividing the nominal exchange rate (units of destination market currency per Deutsch Mark) by the destination market wholesale price level. The log of the resulting series is normalized by subtracting its own sample mean from each observation to form the independent variable used in estimation. The log of the real income series is also normalized around its mean. The raw data on exchange rates, wholesale prices, and real income come from the *International Financial Statistics* publication of the IMF.

For each industry, the regression equations for each destination are estimated jointly, imposing the cross-equation restrictions. The errors are assumed to be independent and identically distributed. Errors are assumed to be uncorrelated across equations, since the presence of a full set of time dummies in the model precludes estimating an unrestricted covariance matrix.

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[8] Although there are 60 German export industries in the data analyzed in Knetter (1994b), only 37 of these include Japan as a destination market, a requirement for this study. A complete data appendix appears in that paper.

Our main interest is in whether there are systematic country-specific differences in export prices between Japan and other foreign destinations for German exports. Table 1 presents the estimates of country-specific effects for the United States and the United Kingdom for a simplified model with only time and country fixed effects. Recall that the model is normalized around Japan, so Japan does not have a fixed effect. Thus, statistically significant fixed effects for the United States and the United Kingdom imply systematic price differences relative to Japan.

We first estimate the simple fixed effects model without the country-specific exchange rates and income variables. The first two columns of Table 1 report the coefficients estimates and standard errors for the United States and United Kingdom country effects, respectively, in this simplified version of Equation 1. These estimates use the entire data smaple. Columns three through six report the results when the sample is split evenly in the time dimension.

The results for the simple model over the entire sample give a very clear message: German export prices to Japan are substantially higher for most product categories in the sample. Of the 37 products shipped to both Japan and the United States, there is statistically significant evidence of lower prices to the United States in 20 of these. In six industries, there is evidence of significantly lower prices charged to Japanese buyers. The remaining 11 industries are inconclusive. Of the 33 industries in which product is shipped to both the United Kingdom and Japan, the evidence is even stronger. In 25 of the 33 industries, prices are significantly lower on shipments to the United Kingdom. In only two cases are prices lower on shipments to Japan. The relationship to Japanese prices within industries is similar for the United States and the United Kingdom. Of the two cases in which Japanese prices are significantly lower than U.K. prices–glykocides and record players–Japanese prices are lower than U.S. prices in glykocides and are not significantly different from U.S. prices in record players. Automobiles is the main exception. Prices on shipments to the United States either exceed or are not significantly different from Japan, while prices on shipments to the United Kingdom are significantly lower than they are on shipments to Japan in every engine size category.

Table 2 adds exchange rates to the model to see if the results hold up when we account for how German exporters adjust prices in response to exchange rate movements. Including exchange rates strengthens the finding that export prices to Japan are higher in the case of the U.S.-Japan comparison, while the evidence remains roughly the same in the U.K.-Japan comparison.

In Table 3, the results of estimating Equation (1), which includes both exchange rates and income, are reported. Once again, the basic pattern observed in Tables 1 and 2 is repeated: German exporters set higher DM prices on shipments to Japan than on shipments to the United States and the United Kingdom. Although some coefficients change slightly, roughly the same number of statistically significant coefficients appear when income is added. In fact, the results for the U.S. country effects are strengthened. Of the 37 industries, 24 industries show statistically significant negative coefficients, four coefficients are positive and significant, and nine are inconclusive. For the 33 U.K. industries, 25 are significant and negative, two are significant and positive, and six are inconclusive.

The evidence that German exporters sell at higher prices to Japanese buyers than U.S. or U.K. buyers is quite convincing in the models estimated in the paper. In order to assess the likelihood that this evidence reflects the impact of NTBs on foreign exporters, it is useful to consider some alternative explanations of this feature of the data. First, the data used to measure prices are unit values, as opposed to actual transaction prices for specific product varieties, so destination-specific quality differences in the product may give rise to differences in unit values, even though prices for identical varieties are the same. Second, it is possible that each country faces the same nonlinear pricing schedule, but that countries purchasing larger quantities face lower average unit prices. If Japan purchases lower quantities than the United States or the United Kingdom, for whatever reason, then the average price paid may be systematically higher.

In order for differences in the quality mix of exports across destinations to explain the findings of this paper, it must be the case that Japanese buyers purchase higher average quality than U.S. and U.K. buyers of the same 7-digit industry products. Unfortunately, nothing in the data set can determine whether this is actually the case. Two facts do seem to argue against this interpretation, however. First, the level of quality consumers demand is typically believed to be a function of their income level. Since Japan had lower per capita income than the U.S. and U.K. for most or all of the sample period in question (depending on how one converts standard of living to comparable currencies), one would suspect that this quality bias would work in the other direction–i.e., that unit values of shipments to Japan would be lower due to lower quality product mix. The fact that they are typically higher in spite of this likely bias is quite surprising. Second, the scope for quality differences is likely to be minimal for many of the 7-digit industries studied here–e.g., chemical products such as Vitamin A and C, hydrogen, etc. Consequently, the data in many cases must reflect price differences, not merely composition effects.

It is possible to examine whether the evidence is consistent with nonlinear pricing schedules by simply examining the volume of trade between the Germany and some of the destination markets and asking whether the country effects in our equations are consistent with the hypothesis that average prices decline with total quantity of shipments. While quantity variation across the U.S., U.K., and Japan can be informative on this issue, the U.S. and U.K. tend to import more from Germany than Japan does in nearly every industry in our sample. Thus, it will be useful to add a country that imports the same or less than Japan in as many industries as possible in order to determine whether quantity discounts may be driving our results.

Table 4 reports the quantity of shipments from Germany to the United States, United Kingdom, Japan, and Canada, while the estimated country effects for Canada are reported in the last column of Table 3. The quantity data show that the United States and United Kingdom are much larger purchasers of most German exports than Japan and Canada. Hence, volume discounts may explain the negative country effects for the United States and the United Kingdom in most industries, but not for Canada. Japan is a larger purchaser than Canada in 16 of the 25 industries for which data are available for each destination. In spite of a lower average import volume, Canada has lower average prices (after controlling for exchange rate and income effects) in 12 of the 16 industries. In the nine industries in which Canada is a larger importer than Japan, it has lower average prices in eight of them. The pattern of country effects and quantity of imports across industries does suggest that volume discounts play a role: the probability of Canada having lower prices than Japan is positively correlated with the ratio of Canada's imports to Japan's. However, the data also show that Japan's prices tend to be higher than Canada's even when it's import volumes are higher.

IV. Conclusion

The fact that retail prices of traded goods are higher in Japan than in other countries has been documented in studies on relative prices, including some recent joint work by MITI and the U.S. Department of Commerce. Higher relative prices in Japan are consistent with at least two popular explanations: (1) higher nontariff barriers to traded goods and (2) higher costs of distribution in the densely populated, and perhaps overly-regulated, Japanese market. This paper has attempted to determine whether foreign export prices on shipments to Japan favor one of these explanations over the other. If higher NTBs account for higher retail prices, then it is likely that foreign exporters are able to capture some of the rent associated with such barriers and thus charge higher prices for shipments to Japan than they charge on shipments to other export destinations. If distribution costs within Japan account for the higher prices, then foreign export prices should not be systematically higher on shipments to Japan.

The analysis of data on 37 7-digit German export industries clearly show that prices of German exports to Japan are systematically higher than prices of German exports to the United States, United Kingdom, and Canada, for the vast majority of industries examined. The paper considered two alternative explanations for these findings: (1) the effect of differences in composition of exports on unit values and (2) the possibility of non-linear pricing which could lead to lower average prices for higher-volume importers. Neither of these explanations appear capable of explaining the findings of this paper. Consequently, the findings are interpreted as supportive of the view that higher relative NTBs in Japan contribute to higher relative retail prices.

REFERENCES

Berry, Steven, Levinsohn, James, and Pakes, Ariel, "Voluntary Export restraints on Automobiles: Evaluating a Strategic Trade Policy on Automobiles", unpublished manuscript, 1994.

Giovannini, Alberto, "Exchange Rates and Traded Goods Prices", *Journal of International Economics*, February 1988, 45-68.

Goldberg, Pinelopi, "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry," unpublished manuscript, 1993.

Isard, Peter, "How Far Can We Push the 'Law of One Price'?", *American Economic Review*, December 1977, 942-948.

Knetter, Michael, "Price Discrimination by U.S. and German Exporters", *American Economic Review*, March 1989, 198-210.

Knetter, Michael, "International Comparisons of Pricing-to-Market Behavior", *American Economic Review*, June 1993, 473-486.

Knetter, Michael (1994a), "Did the Strong Dollar Increase Competition in U.S. Product Markets?", *Review of Economics and Statistics*, February 1994.

Knetter, Michael (1994b), "Exchange Rates and Corporate Pricing Strategies", in Y. Amihud and R. Levich, eds., *Exchange Rates and Corporate Performance*, New York:Irwin, 1994, 181-220.

Knetter, Michael (1994c), "Pricing-to-Market in Response to Unobservable and Observable Shocks", forthcoming in *International Economic Journal*, 1994.

Krugman, Paul, "Pricing to Market When the Exchange Rate Changes", in S.W. Arndt and J.D. Richardson, eds., *Real-Financial Linkages Among Open Economies*, Cambridge: MIT Press, 1987.

Laird, Sam, and Yeats, Alexander, *Quantitative Methods for Trade Barrier Analysis*, New York University Press: New York, 1990.

Lawrence, Robert, "Japan's Trade Regime: An Analysis with Particular Reference to Keiretsu", *Journal of Economic Perspectives*, Summer 1993, 3-20.

Marston, Richard, "Pricing to Market in Japanese Manufacturing", *Journal of International Economics*, December 1990, 217-236.

Noland, Marcus, "Why are Prices in Japan So High?", unpublished manuscript, August 1993.

Richardson, J. David, "Some Empirical Evidence on Commodity Arbitrage and the Law of One Price", *Journal of International Economics*, May 1978, 341-351.

Saxonhouse, Gary, "What Does Japanese Trade Structure Tell Us About Japanese Trade Policy?", *Journal of Economic Perspectives*, Summer 1993, 21-44.

Table 1. Estimated Country Effects for US and UK from Equation (1) when $\beta = \gamma = 0$.

Industry	Full Sample		First half sample		Second half sample	
	λ_{us}	λ_{uk}	λ_{us}(75-81)	λ_{uk}(75-81)	λ_{us}(82-87)	λ_{uk}(82-87)
semi-gold plating	-.261(.104)*		-.036(.074)		-.523(.149)	
selenium	-.086(.073)	.454(.309)	-.037(.117)	.347(.329)	-.143(.072)	.579(.545)
coated paper	-.110(.033)*	-.362(.040)*	-.060(.044)	-.426(.064)	-.168(.037)	-.288(.014)
aluminum hydroxide	-.307(.071)*	-.998(.071)*	-.269(.102)	-.903(.094)	-.350(.096)	-1.11(.089)
autos, under 1.5 liter engine	.238(.080)*	-.193(.056)*	.107(.074)	-.154(.045)	-.390(.124)	-.239(.106)
titanium pigment	-.449(.053)*	-.173(.062)*	-.589(.054)	-.300(.090)	-.287(.032)	-.243(.019)
titanium dioxide	-.445(.081)*	-.448(.069)*	-.447(.090)	-.414(.092)	-.443(.142)	-.489(.101)
vitamin A	-.231(.074)*	-.621(.076)*	-.104(.044)	-.436(.092)	-.378(.129)	-.837(.032)
vitamin C	-.057(.034)	-.027(.009)*	-.032(.055)	-.177(.013)	-.086(.031)	-.039(.011)
beer	.035(.037)	-.267(.025)*	.027(.030)	-.324(.020)	.045(.071)	-.120(.033)
synthetic dyes	-.148(.016)*	-.280(.022)*	-.134(.019)	-.234(.030)	-.165(.026)	-.334(.010)
special dyes	.083(.104)	-.202(.046)*	.235(.146).	-.070(.028)	-.093(.109)	-.355(.038)
white wine	-.102(.025)*	-.330(.060)*	-.052(.033)	-.157(.038)	-.161(.016)	-.531(.048)
aluminum oxide	-.659(.152)*	-1.11(.098)*	-.785(.263)	-1.20(.071)	-.513(.089)	-1.01(.187)
autos, 1.5-2 liter engine	.060(.056)	-.169(.035)*	-.002(.042)	-.150(.059)	.133(.102)	-.192(.029)
autos 2-3 liter engine	-.057(.055)	-.374(.039)*	-.194(.064)	-.479(.039)	.102(.027)	-.251(.018)
autos over 3 liter engine	.025(.018)	-.065(.021)*	-.007(.017)	-.049(.023)	.064(.024)	-.084(.034)
glass balls and tubes	-.219(.127)	-.046(.117)	-.573(.066)	-.311(.091)	.194(.131)	.262(.154)
glazed ceramic tiles	.083(.035)*	-.232(.033)*	.164(.042)	-.243(.048)	-.011(.026)	-.219(.043)
aldehyde derivatives	-.654(.179)*	-.758(.157)*	-.735(.279)	-.823(.224)	-.558(.203)	-.683(.216)
aromatic ketones	-1.10(.057)*	-.973(.051)*	-1.17(.069)	-.954(.047)	-1.03(.084)	-.994(.094)
hydrocarbons	-.293(.104)*	-.020(.036)	-.472(.137)	-.058(.043)	-.083(.108)	.024(.056)
hydrogen	-.471(.049)*	-.799(.071)*	-.506(.047)	-.584(.053)	-.429(.089)	-1.05(.011)
cocoa powder	-.319(.048)*		-.279(.085)		-.366(.018)	
sandals	.214(.060)*	-.498(.122)*	-.202(.025)	-.164(.056)	-.229(.126)	-.889(.134)
women's blouses	-.636(.079)*		-.409(.045)		-.901(.071)	
glykocides	.537(.025)*	.666(.027)*	.507(.026)	.605(.025)	.571(.040)	.737(.030)
glass panels	-.992(.147)*		-1.14(.186)		-.820(.212)	
semi-finished platinum	-.334(.047)*	-.425(.763)	-.396(.074)	-.254(.071)	-.261(.033)	-.623(.090)
ornamental ceramics	2.25(.107)*	-.326(.155)*	2.38(.097)	-.233(.226)	2.11(.185)	-.434(.199)
calcium, barium	-.538(.075)*	-.603(.087)*	-.592(.124)	-.748(.138)	-.476(.066)	-.433(.029)
olive oil	.055(.073)	-.092(.081)	.050(.112)	-.237(.115)	.060(.090)	.078(.064)
induction furnaces	-.647(.085)*	-1.08(.080)*	-.755(.139)	-1.14(.127)	-.520(.052)	-1.01(.082)
record players	-.144(.092)	1.02(.156)*	-.329(.128)	.778(.226)	.071(.059)	1.30(.144)
razor blades	.254(.034)*	-.545(.081)*	.310(.047)	-.369(.078)	.188(.034)	-.751(.097)
pneumatic tires	.107(.071)	.053(.065)	.018(.082)	.020(.108)	.210(.105)	.922(.058)
platinum plating	-.264(.023)*	-.469(.051)*	-.265(.033)	-.329(.023)	-.263(.031)	-.632(.055)

Note: Standard errors in parentheses, * denotes coefficient is significant at the 5% level

Table 2. Estimated US and UK Country Effects from Equation (1), $\gamma = 0$

Industry	λ_{uk}	λ_{us}
semi-gold plating		-.142 (.074)
selenium	.319 (.244)	-.003 (.105)
coated paper	-.391 (.061)*	-.086 (.039)*
aluminum hydroxide	-.961 (.084)*	-.319 (.079)*
autos, under 1.5 liter engine	-.176 (.038)*	.186 (.054)*
titanium pigment	-.275 (.042)*	-.516 (.034)*
titanium dioxide	-.455 (.091)*	-.424 (.081)*
vitamin A	-.479 (.045)*	-.157 (.043)*
vitamin C	-.023 (.009)*	-.045 (.047)
beer	-.300 (.025)*	.028 (.021)
synthetic dyes	-.252 (.018)*	-.138 (.070)*
special dyes	-.123 (.018)*	.163 (.128)
white wine	-.232 (.026)*	-.057 (.020)*
aluminum oxide	-1.18 (.068)*	-.700 (.229)*
autos, 1.5-2 liter engine	-.150 (.047)*	.019 (.031)
autos 2-3 liter engine	-.441 (.034)*	-.154 (.033)*
autos over 3 liter engine	-.050 (.022)*	.004 (.016)
glass balls and tubes	-.188 (.113)	-.373 (.085)*
glazed ceramic tiles	-.261 (.022)*	.117 (.042)*
aldehyde derivatives	-.737 (.153)*	-.684 (.240)*
aromatic ketones	-.979 (.043)*	-1.13 (.056)*
hydrocarbons	-.025 (.039)	-.407 (.091)*
hydrogen	-.667 (.027)*	-.497 (.052)*
cocoa powder		-.324 (.072)*
sandals	-.294 (.044)*	-.162 (.074)*
women's blouses		-.492 (.048)*
glykocides	.640 (.020)*	.508 (.028)*
glass panels		-1.10 (.147)*
semi-finished platinum	-.360 (.061)*	-.337 (.060)*
ornamental ceramics	-.133 (.109)	2.35 (.097)*
calcium, barium	-.694 (.116)*	-.587 (.125)*
olive oil	-.192 (.102)	.018 (.109)
induction furnaces	-1.11 (.101)*	-.702 (.108)*
record players	.859 (.196)*	-.246 (.114)*
razor blades	-.434 (.047)*	.292 (.037)*
pneumatic tires	.004 (.072)	.042 (.066)
platinum plating	-.390 (.022)*	-.252 (.019)*

Note: Standard errors in parentheses, * denotes coefficient is significant at the 5% level

Table 3. Estimated Country Effects for US, UK and Canada from equation (1)

Industry	λ_{us}	λ_{uk}	λ_{cn}
semi-gold plating	-.324 (.145) *		
selenium	.137 (.225)	.593 (.389)	
coated paper	-.123 (.046) *	-.442 (.079) *	
aluminum hydroxide	-.371 (.044) *	-.995 (.058) *	
autos, under 1.5 liter engine	.125 (.054) *	-.231 (.041) *	
titanium pigment	-.438 (.042) *	-.173 (.040) *	
titanium dioxide	-.495 (.090) *	-.525 (.093) *	
vitamin A	-.178 (.042) *	-.389 (.061) *	-.306 (.063)*
vitamin C	-.056 (.037)	-.047 (.018) *	-.043 (.017)*
beer	-.075 (.030) *	-.378 (.039) *	-.130 (.042)*
synthetic dyes	-.106 (.012) *	-.225 (.018) *	-.346 (.033)*
special dyes	.079 (.108)	-.209 (.093) *	-.154 (.047)*
white wine	-.072 (.020) *	-.298 (.027) *	-.021 (.021)
aluminum oxide	-.765 (.174) *	-1.27 (.142) *	-2.02 (.288)*
autos, 1.5-2 liter engine	-.118 (.032) *	-.266 (.035) *	-.281 (.054)*
autos 2-3 liter engine	-.114 (.039) *	-.416 (.033) *	-.269 (.056)*
autos over 3 liter engine	-.012 (.043)	-.077 (.047)	-.078 (.050)
glass balls and tubes	-.190 (.188)	.030 (.201)	
glazed ceramic tiles	.100 (.050) *	-.345 (.032) *	-.060 (.036)
aldehyde derivatives	-.706 (.247) *	-.815 (.205) *	
aromatic ketones	-.963 (.071) *	-.852 (.079) *	
hydrocarbons	-.526 (.071) *	-.084 (.056)	
hydrogen	-.543 (.037) *	-.709 (.038) *	
cocoa powder	-.224 (.094) *		-.119 (.105)
sandals	-.013 (.096)	-.189 (.103)	-.253 (.068)*
women's blouses	-.537 (.072) *		-.888 (.077)*
glykocides	.458 (.039) *	.611 (.046) *	.583 (.053)*
glass panels	-.891 (.127) *		-.805 (.106)*
semi-finished platinum	-.342 (.089) *	-.501 (.085) *	-.663 (.079)*
ornamental ceramics	2.27 (.153) *	-.162 (.082) *	.919 (.119)*
calcium, barium	-.653 (.067) *	-.642 (.120) *	-.225 (.130)
olive oil	-.108 (.039) *	-.317 (.036) *	.055 (.048)
induction furnaces	-.508 (.117) *	-.905 (.137) *	-.501 (.081)*
record players	-.200 (.119)	1.08 (.195) *	.983 (.151)*
razor blades	.113 (.070)	-.696 (.113) *	-.246 (.071)*
pneumatic tires	.057 (.126)	.048 (.134)	.073 (.142)
platinum plating	-.264 (.025) *	-.458 (.027) *	-.124 (.040)*

Note: Standard errors in parentheses, * denotes coefficient is significant at the 5% level

Table 4. German Export Quantities to US, UK, Japan, and Canada

Industry	United States	United Kingdom	Japan	Canada
semi-gold plating	888,657		196,003	
selenium	15,025	4,150	6,355	
coated paper	402,429	661,622	86,296	
aluminum hydroxide	80,048	53,427	8,880	
autos, under 1.5 liter engine	30,479	78,810	3,083	
titanium pigment	222,896	62,870	33,872	
titanium dioxide	95,232	13,814	5,391	
vitamin A	543,072	152,380	137,361	78,911
vitamin C	12,040	4,933	7,513	3,125
beer	764,045	217,400	13,298	23,127
synthetic dyes	78,021	50,678	46,853	22,252
special dyes	4,804	5,438	5,996	2,342
white wine	415,757	544,757	38,716	88,462
aluminum oxide	47,698	54,054	3,345	779,103
autos, 1.5-2 liter engine	163,114	131,388	18,679	19,045
autos 2-3 liter engine	112,890	42,044	6,347	7,176
autos over 3 liter engine	40,340	4,663	3,655	2,040
glass balls and tubes	1,684	272	866	
glazed ceramic tiles	50,708	137,054	36,389	10,600
aldehyde derivatives	89,690	68,177	15,301	
aromatic ketones	86,093	46,723	1,643	
hydrocarbons	77,644	38,160	29,267	
hydrogen	10,328	36,081	5,385	
cocoa powder	50,429		11,057	2,731
sandals	406,353	324,822	65,304	35,403
women's blouses	705,534		56,557	315,287
glykocides	622,420	83,538	107,605	10,505
glass panels	44,729		7,243	22,409
semi-finished platinum	1,053,901	1,714,534	235,632	94,299
ornamental ceramics	4,621	6,560	266	1,126
calcium, barium	61,601	48,341	8,236	5,172
olive oil	33,187	45,610	12,731	859
induction furnaces	16,627	14,820	2,088	2,255
record players	1,601,148	723,093	324,534	119,582
razor blades	1,564,355	439,919	705,860	627,984
pneumatic tires	1,436,758	1,047,772	793,785	87,787
platinum plating	1,869,865	6,592,563	624,536	276,720