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A Unified Framework for the Analysis of Bilateral Unit Values

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Quality Competition, Pricing-To-Market and Non-Tariff Measures: A Unified Framework for the Analysis of Bilateral Unit Values[1]

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ABSTRACT

This paper seeks to present a unified framework for several factors that have been independently studied as determinants of unit values in international trade: product differentiation by quality (which suggests that unit values should be positively correlated with exporters' per capita income), pricing-to-market (which suggests they should be positively correlated with importers' per capita income), and non-tariff measures (which suggests that remaining residuals may contain evidence of trade barriers). On a large sample of bilateral unit values for 2005, we find that about 60 percent of all HS-6 products demonstrate both significant quality-ladder effects and pricing-to-market effects, with quality-ladder effects predominating in importance. Distance-related effects appearing directly in prices appear significantly larger than one would expect as a result of shipping margins. We also rank importers by the remaining unexplained variation in import prices, and examine whether these variations are plausibly related to non-tariff measures.

[1] This paper represents solely the views of the authors and does not represent the views of the U.S. International Trade Commission or any of its Commissioners. The timely assistance of Ronald Jansen and his team at the United Nations Statistical Division with various puzzles involving the COMTRADE data is gratefully acknowledged.

Introduction

The abundance of data on unit values in trade has generated a large number of explorations into the stylized facts generating them. The present paper presents a unified framework for identifying systematic variation in unit values, using multilateral data at the HS-6 level. This compares to work on unit values that is motivated either by supply-side considerations relating to product quality, associating higher unit values with exporters' per capita income (Schott (2008) focusing on China, Fontagné, Gaulier and Zignagno (2008) which use a unit-value classification to motivate an extended gravity model of trade flows) or by demand-side considerations of pricing-to-market (Alessandra and Kaboski (2007), Co (2007)), associating higher unit values with importers' per capita income.

Most of this work (except for Fontagné et al.) tends also to focus on a single exporter or importer rather than on multilateral data, or on a particular motivation for variation in unit values in trade. We find that both quality effects and pricing-to-market effects are important in bilateral data, but that quality effects are relatively more important. The variation in the size of these effects across industries is indicative of the relative degree of product homogeneity. We also illustrate how the substantial amount of remaining variation in the data can be used to diagnose the possible presence of non-tariff measures.

Table 1 illustrates the type of variation one finds in the unit value data, for a particular HS-6 subheading, "watches (excluding wristwatches) with cases of or clad with precious metal, electrically operated." The example, which reflects the largest trade flows in quantity terms[2], illustrates several features which are frequently observed for a wide variety of products. First, the range in unit values is very broad, amounting to three or four orders of magnitude. Exports from Switzerland to Great Britain have a unit value of $1,001.68, while exports from China to Japan sell for $0.56 apiece. These are highly unlikely to represent the same product. Second, higher-income countries tend to sell a higher-priced product; in this sample, Swiss watches are always higher-priced than Chinese watches. Third, higher-income countries tend to pay more for products in this category; compare. imports of Great Britain and the Netherlands vs. imports of Bulgaria, South Africa, and Mexico. Fourth, there are observations that are exceptions to both the third and fourth rules. These are the features of the data which we will exploit in the analysis below.

Previous literature and theoretical motivation

Traditionally, models of trade assumed perfect competition and perfectly substitutable goods in deriving the notion of a single world price for traded commodities. In such a world well-defined traded goods would have the same import and export unit values regardless of the identity of the exporting and importing country. An early effort to relax this was the Armington (1969) model. The Armington assumption is that, within a particular product category, countries tend to specialize in exporting particular varieties while all importing countries tend to purchase a bundle of varieties. This should imply that the variation in import unit values across countries (for particular product

[2] After data cleaning; see below.

categories) is far lower than the variation in export unit values across countries. From the perspective of a particular country we would expect the data to be consistent with its producing (or at least exporting) a single variety within a product category (with a relatively low coefficient of variation (CV) of export unit values across all destination markets), but importing numerous varieties from the world (so a higher CV across source countries on import unit values). While the issue of the relative variance of import and export unit values across countries is of interest, and a topic for future research, in this paper we focus on explaining bilateral import and export unit values (as opposed to the variance of these values); on this topic, the Armington model has little to say.

The literature on pricing-to-market, in the form of international price discrimination, going back to Krugman (1987), suggests that a country's average import unit values (and bilateral export unit values to that country) will be a function of per-capita income (though working through price elasticities of demand), but not of supply-based factors in the exporting country. Recent empirical papers by Co (2007) and Alessandria and Koboski (2007) are consistent with such a relationship. The finding of a relationship between importers' per-capita income and unit values suggests an important cause for income-based deviations from purchasing-power parity (PPP) in addition to the often-invoked Balassa-Samuelson effect (Balassa (1964), Samuelson (1964), which attributes such deviations to the prices of non-tradable inputs into traded goods as delivered further down the supply chain. Deviations measured directly on export or import (f.o.b. or c.i.f. prices) do not include non-traded wholesale and retail margins, and are unlikely to be caused by embodied non-tradables in the importing country.

Co (2007), explaining patterns of variation across destination markets in U.S. exporter pricing (between 1989 and 2001), finds evidence consistent with several mechanisms supporting price discrimination – these include quality variation, transaction costs (as proxied by language of the importing country), and incomplete responses to currency fluctuations. Alessandria and Koboski (2007) also document price discrimination by U.S. exporters; however, they motivate this behavior through a consumer search model. They assume (and provide some evidence suggesting) that low-income importing-country consumers are more productive in search and for this reason are more price sensitive than are consumers in higher-income destination markets.

However, the Melitz (2003) model of heterogeneous producers, and subsequent work, focuses on the supply/exporting-country side of the market, suggesting that productivity differences within (as well as across) countries lead to variation in qualities of exported goods and in export unit values. Assuming that higher per-capita incomes in an exporting country will allow for both higher average quality of exports and a greater range of quality by that country's exporters, we would expect higher income to be associated with higher average export unit values, both in total and to particular destinations.

Schott (2008) looks at 10-digit US import data from both China and the OECD countries and finds considerable overlap in terms of quantities, but much less so in terms of export prices, suggesting that Chinese exporters are lower on the "quality ladder" than are those in more-developed economies. Fontagné, Gaulier and Zignagno (2008), while acknowledging demand-side forces determining unit values, focuses primarily on the supply-side influences and generally supports the Schott results – of higher unit values within product categories as the level of development increases -- across a large sample of bilateral unit values over a ten year period, though at a more aggregate product definition (6-digit HS).

To formalize these relationships, consider a monopolistically competitive export sector, where quality (R) is a function of local per-capita income (Y_j), but higher quality products can only be produced at a higher marginal cost.[3] For a simple specification (with i indicating importer country, and j the exporter country), let $MC_j= R^a$, $R= Y_j^b$, (both a, b >0) implying $MC_j= Y_j^{ab}$. In determining export price to a particular destination market, that market's import demand elasticity for a particular product is of course relevant, and we assume that the absolute value of the elasticity, $|\eta|$, is inversely related to importing-country per-capita income (Y_i);[4] for purposes of exposition, let $1 – (1/|\eta|) = Y_i^{-d}$ (d>0).

[3] An alternate motivation for this specification can be generated from the quality-ladder model in Grossman and Helpman (1991), ch. 4. Higher-quality products are innovated using costly R&D, and produce more utility for the consumer. The association of R&D with quality and higher prices thus comes on the demand side rather than the supply side, but the stylized fact that high-income countries are more R&D intensive continues to provide the motivation for an association between per capita income and product price.

[4] There are several explanations for why import demand elasticity and per-capita income are inversely related. For one, a positive income shock leading to a parallel shift of import demand will always lead to a reduced price elasticity of demand. An alternative mechanism is the higher search cost in high-wage economies leading to reduced price search by consumers and a resulting more inelastic demand (as discussed by Alessandria and Koboski (2007)).

In terms of bilateral import prices (or unit values), the profit maximizing price markup (or Lerner Index) is $[P - MC_j]/P = 1 / |\eta|$, which after some manipulation yields $P_{ij} = Yj^{ab}/ Y_i^{-d}$ or $\ln P_{ij} = ab \ln Yj + d \ln Y_i$, with all estimated parameters expected to be positive, both reflecting heterogeneous exporter quality and pricing-to-market. Of course, transportation and other trade costs need to be considered as well in explaining bilateral unit values derived from importer data. Also, consistent with the discussion above, an empirical finding that $d > 0$ may be motivated by other factors than price discrimination or search; it may also represent evidence of product differentiation along another dimension.

In addition, the residual in the estimated version of the above equation captures variation in import unit values not explained by either demand variation in import markets (pricing-to-market) or quality/productivity variation in export markets (producer heterogeneity). While one source of the remaining variation can be the inclusion in the HS6 product categories of widely disparate products, another can be the presence of non-tariff measures affecting trade. In future work we hope to attempt to disentangle these two influences; however, as a start, we present below some evidence on the products and importing countries in which the largest (normalized) residuals are present.

Data and Specification

The data analyzed are from a single year, 2005. The data are obtained from the COMTRADE system maintained by UNCTAD. The initial dataset represents all bilateral trade flows for all importing partners for all HS-6 subheadings (hereinafter "products"), as reported by the importing countries using the HS-2002 classification.[5] Unit values are generated as the observed ratio of values to quantities. A number of procedures are used to trim and clean the data. This is necessary in part because anomalous and extreme unit values can be generated for a number of reasons, and it is not always easy to distinguish spurious from authentic extreme values. Thus, the following procedures are adopted:

- HS-6 products are deleted from the dataset if:
    - There is no unit of quantity associated with them;
    - If less than 80 percent of global trade is measured in a consistent unit of quantity (e.g. number of units, or kilograms);
    - If the subheading label is "other."[6]
    - If there are fewer than 100 bilateral observations for the product.
- Individual observations are deleted if:
    - The available units of quantity were estimated by UNCTAD rather than directly reported by the importing country;
    - The observations record a country as importing from itself;
    - The observed value of bilateral imports is less than U.S. $25.
    - The calculated unit values are among the 5 percent of extreme observations for a given product (2.5 percent in each tail), after the first three exclusions are made;

[5] In order to avoid potential issues involving the reconciliation of exporters' and importers' data, it was decided to begin with importers' data based on the long-standing, if not always true, folk wisdom among empirical trade economists that importers' data are better because of duty collection and other interests of the customs authorities.

[6] This is a fairly broad and somewhat arbitrary criterion. We include products for which "other" appears elsewhere in the product name, categories described as "parts and components", and categories described as "nesi" or "nesoi" (not elsewhere specified or indicated).

- They do not have matching data for per-capita income or distance (see below) for one or both trading partners

The joint effect of these exclusions is to reduce the number of observations from approximately 6.02 million to 2.28 million, the number of usable HS-6 subheadings from 5,222 to 3,628, and the coverage of world imports to about 40 percent of the total. In exchange for the loss of universality, it is hoped that the results more accurately reflect available information about actual market conditions obtainable from the unit values.

The specification estimated for each product is

$$(1) \ln P_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln D_{ij} + \beta_4 C_{ij} + \beta_5 L_i + \beta_6 L_j + \varepsilon_{ij}$$

in which the subscripts i and j indicate the importing and exporting countries, P is the (normalized) unit value of imports of country i from country j, Y is purchasing-power parity per capita income in 2005, D is distance, C is a dummy variable indicating contiguous countries, and L is a dummy variable indicating landlocked countries. Since the equation is estimated separately for each product, the estimated coefficients vary across products, and the subscript for products is omitted for convenience. The coefficients are estimated with heteroskedasticity-consistent standard errors.

In exploratory work, we estimated a specification using only β_0, β_1, and β_2. The additional variables, which give the estimated equation the appearance of a sort of price dual to the gravity equation, were added because the prices are c.i.f. (importers') prices, and thus presumably have different insurance and freight margins for different country pairs. The addition of the distance-related variables status was originally intended simply to "sweep out" these margins in a crude way.[7] As it turns out, the results on per capita income are broadly robust to whether or not the additional variables are included, but we end up learning something extra from including the additional variables, as discussed below.

The measure of GDP per capita used is current 2005 GDP per capita on a PPP basis as reported in the World Development indicators. The various distance measures are available from CEPII and documented in Mayer and Zignagno (2006).[8]

Econometric Results

Table 2 provides the distribution of estimated coefficients for the 3,628 product categories, and the broad differences observed between agricultural (HS 1-24) and non-agricultural goods (HS 25-97). Agriculture contains a higher proportion of goods which may be homogeneous in the pure physical sense, while non-agricultural goods are more likely to be improvable by research. Thus, this split provides useful initial information about the variation among products.

For each of the six variables, the estimated sign is as expected for a majority of products. By far the strongest results are those for the relationship between unit values and exporters' per capita income, suggesting that quality ladders are pervasive. 96.4 percent of the 3,628 HS-6 products examined show a positive relationship between unit values and exporters' per capita income, and 82.6 percent of the products show a positive relationship which is also statistically significant at .01 or better (one-tail). The

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[7] Since we already know that matched-partner f.o.b./c.i.f. ratios from the COMTRADE data yield little in terms of credible transport margins (Hummels and Lugovskyy (2006)), it is not surprising that using simply c.i.f. prices and a regression framework does not yield results that look like actual margins.
[8] The measures themselves may be found at http://www.cepii.fr/anglaisgraph/bdd/distances.htm (accessed May 30, 2008).

proportion of statistically significant positive results at this level is higher for non-agricultural than for agricultural products (84.5 percent vs. 72.7 percent), as is the estimated coefficient for the mean product (.347 vs. .201).[9] This is consistent with the idea that non-agricultural products tend to be more improvable by research, and higher-income countries tend to be more research-intensive.[10]

The second finding is that the quality-ladder effect tends to be more important than the pricing-to-market effect. While a large majority of products (78.4 percent) show a positive estimate for importers' per capita income and a majority (54.1 percent) a statistically significant relationship at .01 or better, these percentages are both less than for the quality-ladder effect. Also, the estimated coefficients are, on average, less than half the size of those for exporters' per capita income (.152 vs. .326), and they do not show systematic variation between agricultural and non-agricultural products.

The estimated coefficients for the four distance variables show a larger percentage of unexpected signs and low-significance values than for the income variables. The effect of adding additional kilometers of distance is greater on average for agricultural products (spoilage?), as is the price premium associated with of landlocked importers, while the price premium associated with landlocked exporters is greater on average for non-agricultural products.

The considerable variation in the estimated effects of exporters' and importers' income (elasticities of observed price with respect to income) is exhibited in Table 3 and

[9] Means and medians are used interchangeably as measures of central tendency in this paper, for different expositional purposes. For the distributions we are looking at, the characterizations of the distribution are robust to this choice, i.e. they tend to be symmetric rather than skewed distributions.

[10] This is not to deny the importance of agricultural R&D. Such R&D may be broadly more focused on lowering production costs than improving product quality, as compared to manufacturing R&D, though this may change in the future with the increasing importance of GMOs.

Figures 1 and 2, which portray variation according to the 21 sections of the Harmonized System.[11] Table 3 provides the minimum, maximum, and quartile distribution of each of the estimated coefficients, while Figures 1 and 2 portray the interquartile range for importers' per capita income and exporters' per capita income respectively.

First, we can see what kinds of products typically have the highest association between either importers' or exporters' per capita income and observed importers' prices. These are summarized by sorting the estimated coefficients within each HS section, for each variable, and taking the median value for each variable.[12] Pricing-to-market effects are strongest for art and antiques (.800 at the median); footwear, headgear, and other accessories (.410); and hides, leather and skins (.357). These cases seem less explainable in terms of search than in terms of demand-side product differentiation. All of these categories contain consumer luxury products which may be very different in demand without being very different in terms of production costs or research intensity. The strongest quality-ladder effects for the median product in each sectionare for arms and ammunition (.460), instruments, clocks, etc. (.459), and machinery and equipment (.452), which includes capital equipment, electronics and computers. These are all cases for which the role of R&D in producing advanced products is self-evident.

Next, we can see where the exceptions to the rule of prices increasing with both partners' income are concentrated. As noted above, these are more widespread for importers' per capita income, the pricing-to-market effect. For mineral products, which include fossil fuels, fewer than half of the 105 HS-6 products exhibit positive pricing-to-

[11] An HS section is a standardized grouping of one or more two-digit HS chapters. See http://www.usitc.gov/tata/hts/bychapter/_0802.htm for the relationship between HS sections and chapters.
[12] The median product for one variable is generally not the same as the median product for another; the distributions are sorted separately.

market effects. At least one quarter of all products made of wood, cork, and straw do not exhibit positive pricing-to-market effects. This result also holds for metals and metal products.   Interpreting these cases according to the search model, it may be that the products which are exceptions to the rule are those for which product attributes are facially obvious; or, if they represent additional product differentiation, one could say that the differentiation within HS-6 subheadings is minimal. These cases all represent industrial intermediate goods, some of which are traded on commodity exchanges. The only category for which over 25 percent of goods fail to exhibit quality-ladder effects is gems and jewelry. While there is certainly skill involved in making these products, it is as much a matter of tradition and custom as of formal R&D, and the relevant skills are often present to a high degree in low-income countries, for example India.

Since the interpretation of an elasticity of c.i.f. prices with respect to per capita income is not intuitive, Table 4 illustrates the economic importance of the estimates by means of a simple simulation. Considering the median product and the 75th percentile (high effect) product in each HS section, Table 4 presents the estimated difference in product price for an importer (exporter) with the per capita income of the United States in 2005, as compared with the per capita income of China, in the form of a price premium. This reduces the price variation observed in the example of watches in Table 1 to a stylized fact, and illustrates in a different way the variation across categories of products. A 40 percent price premium, for example, indicates that when the unit value in a country with the per capita income of China is $1.00, the comparable unit value is $1.40 in the United States. Note that these are not actual comparisons between China and the United States, but stylized comparisons between countries at comparable stages of development.

Also, because China is a lower-middle income and not a low-income country, these price premia are not the largest that could reasonably be obtained by considering countries at extreme opposite stages of development.

The estimated price differences in Table 4 illustrate that very broad amounts of price dispersion associated with levels of development are not at all unusual. Median unit values for products produced by "United States" are at least double those for products produced by "China" in five HS sections (arms and ammunition, instruments and clocks, machinery and equipment, stone, ceramics and glass, art and antiques), and unit values for products at the 75th percentile are at least doubled in an additional 8 sections. Taking Tables 3 and 4 together, and considering the 75th percentile alone, we find that in the two "high-tech" sections 16 and 18 alone (machinery and equipment, and instruments and clocks) there must be at least 140 products for which the typical "United States" unit value is at least triple that of the typical "Chinese" unit value. Similarly, large pricing-to-market effects are widespread for many product categories, though not as widespread, and are extremely high for art and antiques.

Similarly, Tables 5 and 6 illustrate the effects of the various distance variables both for a median product in each HS section and for a 75th percentile product. In the case of geographic distance, the variable represents the price markup associated with moving the product the mean distance for an observation in the overall dataset (about 3,200 km) as opposed to not having to move it at all. For the median product overall, the distance effect corresponds to a price markup of 52.5 percent. This is much larger than one would expect for a c.i.f. margin. Available data for New Zealand and U.S. imports, which allow the margin to be separated from the total unit value, suggest typical values for transport and insurance costs on the order of 4 to 11 percent of the c.i.f. value (Hummels (2007)). It is unclear whether the estimated distance effects reflect some costs of trading not included in c.i.f. margins, some inefficiency in market information, or something else. In any case, normal distance-related effects on price appear to be very high for certain products, including mineral products; stone, ceramics, and glass; and some gems and jewelry products. They are the lowest and in fact usually absent, for textiles, apparel, footwear, and headgear. The estimated effects of contiguity and landlocked status are assessed for the case in which the status is present or absent, i.e. they are the effects observed when the associated dummy variable equals 1 rather than zero.

If high estimated values of β_2 really do indicate products that are quality-differentiated by research intensity, then these estimates could be used as potential indicators of what products involve the biggest technology gaps; that is, products for which innovation and production of the most advanced varieties is most difficult both to perform and to imitate. Table 7 lists the thirty products with the highest estimated quality ladder effects. These products involve price ratios on the simulated "U.S.-China" scale of between 6:1 and 22:1 for the high-quality and low-quality versions.

The list of high-quality-ladder products is instructive, and dominated by specialized machinery and instruments. These include five categories of metal working machinery, two categories of specialized weighing machines, cathode ray tubes and television camera tubes, telescopes, two kinds of cameras, and several kinds of agricultural machinery. There are also some categories of elements, compounds and alloys (arsenic, furfaldehyde, carbon disulphide, rare-earth metals, and natural calcium phosphates) which may be homogeneous chemically but which may vary importantly in purity or other attributes that may be expensive to produce.

Similarly, if pricing-to-market really reflects further differentiation of goods valued by high-income consumers as much or more than search, then his should be even more apparent when looking at the thirty products with the highest pricing-to-market effects, as we do in Table 8. This impression is in fact confirmed. The products involved include gold waste and scrap (with an over 300:1 price ratio on the "U.S.-China" simulated scale), pleasure boats; postage stamps; mink, fox, and other furskins; saffron; wigs and the hair used to make them; electric trains; silk handkerchiefs; and two different kinds of watches. There are also certain high-technology intermediate goods on this list, such as gas turbines for small aircraft, flat knitting machines; and chemicals doped for use in electronics, and piezoelectric crystals. These disaggregated results effectively undermine the search explanation in Alessandra and Co (2007) for an association between importers' income and unit values. It is less likely that the poor, having a low opportunity cost of time, are more efficient searchers for truffles and silk handkerchiefs, than that these come in different qualities and the rich get the best ones. The possibility that price discrimination, as described above, could play a role for some of these products, cannot be ruled out.

Residuals and non-tariff measures

As alluded to earlier, there is a substantial amount of variation in unit values that is not readily explained by either difference in importers' or exporters' per capita income or by distance effects. As a simple measure of this, the unadjusted R^2 is less than 0.2 for 78 percent of the 3,628 products studied, and less than 0.4 for over 99 percent of the products. The tariff-equivalent effects of non-tariff measures are often estimated by a "price gap" that captures the difference between the price paid by a particular importer suspected of having a non-tariff barrier, and a "world market" price taking into account appropriate transport and distribution margins. The product-specific information required to estimate these price gaps often requires specific knowledge of individual products, and it is challenging to come up with a convincing method of estimating price gaps for many products at once (Ferrantino (2006)).

The residuals for the specification estimated here can potentially be used to look at cases for which countries appear to pay "too much" or "too little" for their imports, on a quality-adjusted basis. Using both of the income effects to capture two different aspects of quality handles one problem which often plagues the estimation of price gaps. Since the residuals from our 3,628 regressions are available, we use them to generate summary measures of country- and product-category-specific deviation in c.i.f. import prices, and ask whether the resulting patterns resemble those which might reasonably be associated with non-tariff measures.[13]

Accordingly, we construct a summary index for the purpose of comparing each importing country's c.i.f. prices actually paid with the prices expected according to equation (1), for the products it actually imports, from the trading partners it imports from, as follows:

Let V_{ijk} be the reported value of exports from country i to country j of product k.

[13] For this purpose, estimating a specification with exporter fixed effects might have produced better results, as it would have captured differences in exporter-specific quality unassociated with a simple log-log function of per capita income. We intend to explore this option in future research.

First, define $V_{i*k} = \sum_{j} V_{ijk}$.

Second, assign weights to each exporter-product pair $\theta_{ik} = \frac{V_{i*k}}{\sum_{i,k} V_{i*k}}$. Then, extract from the regressions on each of the k products the residuals ϵ_{ijk} . Finally, construct, for each of the j importers, the index

$$\eta_j = \frac{\sum_{i,k} \theta_{ik} \varepsilon_{ijk}}{\sum_{i,k\,"good} \theta_{ik}} ,$$

where the weights in the denominator include only those values of (i,k) observed for a particular importer j. The resulting indices should provide an indicator of whether each importer is paying "too much" or "too little" for the products it is importing from the sources it is importing from. The weights serve the purpose of removing from the index effects arising purely from the fact that different importers import different bundles of goods, or that they trade with different partners for geographic reasons.

The results of this index are reported in Table 9, in alphabetical order. The index is calculated for all products and then partitioned for agricultural and non-agricultural products.[14] While we have yet to do any formal analysis of these scores, they do not immediately show any obvious pattern either by level of development or by our impressionistic notions of the incidence of non-tariff barriers. The countries with the highest import prices, *ceteris paribus*, are Iceland, Belarus, Madagascar, and Jamaica, while those with the lowest import prices are Suriname, Pakistan, Togo, and Lithuania.

[14] The data for one importer, Israel, was included in the regressions but not in the rankings in Table 9, since it is represented by too few products with good data to yield a meaningful score.

The results do have one unusual feature. Even though the index numbers are aggregates of OLS residuals which have mean zero in each regression, the index numbers themselves are asymmetric, taking a larger number of negative than positive values (for total trade, the negative index values outnumber the positive ones by 90 to 18). This feature of the results is deserving of a good explanation, which as yet we are lacking.

In an attempt to provide at least one *ad hoc* test of whether the residuals in aggregate might contain some information on the prevalence of price-increasing non-tariff measures, we compared the agriculture scores for members of the G-10 and Cairns Group countries with sufficient data to calculate the score. This was based on the idea that the G-10, who work within the current WTO negotiations to maintain their agricultural import restraints, are likely to have higher-than-average non-tariff barriers, while the Cairns Group, who seek to lower agricultural barriers, are likely to have lower-than-average non-tariff barriers themselves. The results are portrayed in Figure 3. As it turns out, the G-10 countries do pay above-average import prices for agricultural goods, *ceteris paribus*, than the Cairns Group, with a mean index value of .023 for the seven members of the G-10 we can score, and a similar value of -.082 for the seventeen members of the Cairns Group. For this number of countries, the standard difference-of-means test has a p-value of almost exactly .10, that is, the difference is of marginal statistical significance when the countries are treated as observations. This result, while suggestive that there may be some policy-related information in our residuals, should not be given excessive weight.

Conclusions

We have combined different strands in the recent literature on unit values, the "quality ladder" strand representing income-based variation by exporter and the "pricing-to-market" strand focusing on income-based variation by importer. By examining the prevalence of these effects on disaggregated products, and for multilateral trade data, we have shown that both quality-ladder and pricing-to-market effects are widely prevalent in international trade. Quality-ladder effects, in particular, are more universally prevalent and stronger, and our estimates of these effects look like they provide useful information about international technology gaps. Pricing-to-market effects seem less likely to do with a comparative advantage in search than with some aspect either of product differentiation or price discrimination as experienced by consumers. In some cases they also appear to capture aspects of technology along a different dimension than the quality-ladder effects, as yet to be defined. The possibility that a refinement of this approach could yield higher-quality residuals for the "mass-produced" estimation of NTM price gaps is a topic for future research, which we have sketched here but not fully explored.

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Table 1
Significant Trade Flows for HS 910191
Watches (excluding wristwatches) with cases of or clad with precious metal, electrically operated
Bold italics indicates World Bank high-income country

Exporter	Importer	Quantity	Unit Value
Switzerland	***Great Britain***	5,091	$1,001.68
Switzerland	***Netherlands***	4,301	$301.18
Switzerland	***Singapore***	10,431	$117.03
Great Britain	***Ireland***	40,115	$56.62
Malaysia	***Ireland***	4,527	$32.86
Hong Kong	South Africa	5,775	$14.12
Hong Kong	Slovakia	8,355	$14.07
China	***Great Britain***	22,080	$11.85
France	Mauritius	9,550	$10.55
China	***New Zealand***	4,839	$9.81
Japan	***United States***	15,974	$8.99
Indonesia	***Singapore***	171,390	$7.86
Hong Kong	***Australia***	18,924	$6.22
China	Saudi Arabia	15,220	$6.20
Hong Kong	Bulgaria	8,093	$5.82
Hong Kong	***Netherlands***	6,323	$5.31
Hong Kong	***Spain***	7,715	$4.78
China	***Hong Kong***	444,728	$3.98
Hong Kong	***Saudi Arabia***	6,954	$3.68
China	***Netherlands***	26,407	$3.48
Hong Kong	Malaysia	68,619	$3.27
China	***Spain***	58,343	$3.25
Hong Kong	***United States***	150,039	$2.63
China	***United States***	819,453	$2.13
China	***Australia***	16,840	$1.62
Germany	Bulgaria	22,274	$1.24
China	South Africa	15,278	$0.92
China	Mexico	54,159	$0.90
Hong Kong	Mexico	47,607	$0.59
China	***Japan***	248,020	$0.56

Table 2
Distribution of Estimated Coefficients at HS-6 (subheading) level

	Total HS 1-97	Agriculture HS 1-24	Non-Agriculture HS 25-97
Number of HS-6 subheadings	3,628	539	3,089
Number of observations	2,261,009	280,585	1,980,424
Log GDP_Importer			
Mean	.152	.147	.154
Percentage of estimates positive	78.3	85.5	77.0
And significant at .1 (one-tail)	65.0	75.1	63.3
And significant at .01 (one-tail)	54.1	64.0	52.4
Log GDP_Exporter			
Mean	.326	.201	.347
Percentage of estimates positive	96.4	93.5	96.9
And significant at .1 (one-tail)	90.6	84.7	91.7
And significant at .01 (one-tail)	82.6	72.7	84.5
Log GDP_Distance			
Mean	.052	.074	.048
Percentage of estimates positive	68.4	73.8	67.5
And significant at .1 (one-tail)	43.5	53.2	41.8
And significant at .01 (one-tail)	28.3	38.0	26.5
Contiguity			
Mean	-.139	-.135	-.140
Percentage of estimates negative	78.2	78.1	78.2
And significant at .1 (one-tail)	38.2	41.4	37.6
And significant at .01 (one-tail)	12.8	15.6	12.3
Landlocked Importer			
Mean	.133	.195	.120
Percentage of estimates positive	75.8	86.3	74.0
And significant at .1 (one-tail)	41.3	56.6	38.7
And significant at .01 (one-tail)	17.5	27.6	15.7
Landlocked Exporter			
Mean	.147	.059	.159
Percentage of estimates positive	69.7	56.8	72.0
And significant at .1 (one-tail)	40.5	29.1	42.5
And significant at .01 (one-tail)	20.8	11.9	22.3

Table 3 Distribution of income coefficients by HS Section

HS Section		Log(Importers' per capita GDP)					Log (Exporters' per capita GDP)				
Name	Number of products	min	p25	**p50**	p75	max	min	p25	**p50**	p75	max
1. Animals and animal products	145	-0.376	0.093	**0.191**	0.298	0.824	-0.345	0.082	**0.162**	0.265	0.750
2. Vegetable products	215	-0.495	0.059	**0.155**	0.234	1.326	-0.181	0.104	**0.191**	0.298	0.917
3. Fats and oils	29	-0.193	0.029	**0.081**	0.182	0.428	-0.099	0.100	**0.200**	0.296	0.517
4. Prepared food, beverages, and tobacco	150	-0.497	0.048	**0.121**	0.173	0.693	-0.395	0.131	**0.218**	0.303	0.805
5. Mineral products	105	-0.478	-0.178	**-0.067**	0.046	0.322	-0.035	0.185	**0.278**	0.447	1.069
6. Chemicals and chemical products	555	-0.575	-0.080	**0.023**	0.139	0.910	-0.331	0.150	**0.264**	0.406	1.664
7. Rubber and plastics	162	-0.137	0.012	**0.079**	0.154	0.446	-0.416	0.188	**0.299**	0.448	0.789
8. Hides, leather, and skins	49	-0.155	0.171	**0.357**	0.497	0.958	-0.087	0.148	**0.199**	0.309	0.584
9. Wood, cork, and straw	42	-0.709	-0.004	**0.066**	0.178	0.311	-0.014	0.141	**0.240**	0.373	0.588
10. Paper, pulp, and printing	120	-0.113	0.024	**0.097**	0.163	0.613	-0.176	0.064	**0.159**	0.256	0.741
11. Textiles and apparel	716	-0.220	0.160	**0.269**	0.393	0.815	-0.271	0.259	**0.338**	0.407	0.749
12. Footwear, headgear, etc	41	0.112	0.269	**0.410**	0.569	0.940	-0.101	0.215	**0.298**	0.361	0.724
13. Stone, ceramics, and glass	95	-0.277	0.027	**0.137**	0.265	0.684	0.106	0.302	**0.411**	0.542	1.063
14. Gems and jewelry	18	-0.130	0.117	**0.263**	0.459	3.093	-0.209	-0.092	**0.064**	0.415	0.895
15. Metals and metal products	445	-0.518	-0.007	**0.080**	0.199	0.551	-0.113	0.210	**0.349**	0.471	0.973
16. Machinery and equipment	444	-0.594	0.013	**0.131**	0.270	1.755	-0.248	0.304	**0.452**	0.609	1.611
17. Transport equipment	71	-0.406	0.111	**0.208**	0.342	1.142	-0.301	0.105	**0.274**	0.510	0.859
18. Instruments, clocks, etc	126	-0.641	0.020	**0.217**	0.385	1.227	-0.062	0.336	**0.459**	0.620	1.239
19. Arms and ammunition	9	0.043	0.072	**0.214**	0.287	0.687	0.129	0.333	**0.460**	0.585	0.654
20. Miscellaneous manufactures	89	-0.279	0.135	**0.255**	0.348	0.799	-0.112	0.248	**0.321**	0.426	0.737
21. Art and antiques	2	0.598	0.598	**0.800**	1.003	1.003	0.401	0.401	**0.404**	0.408	0.408

Figure 1
Search Effects by HS Section
(Interquartile range of estimated elasticity of oberved price with respect to Log Importers' Per Capita Income)

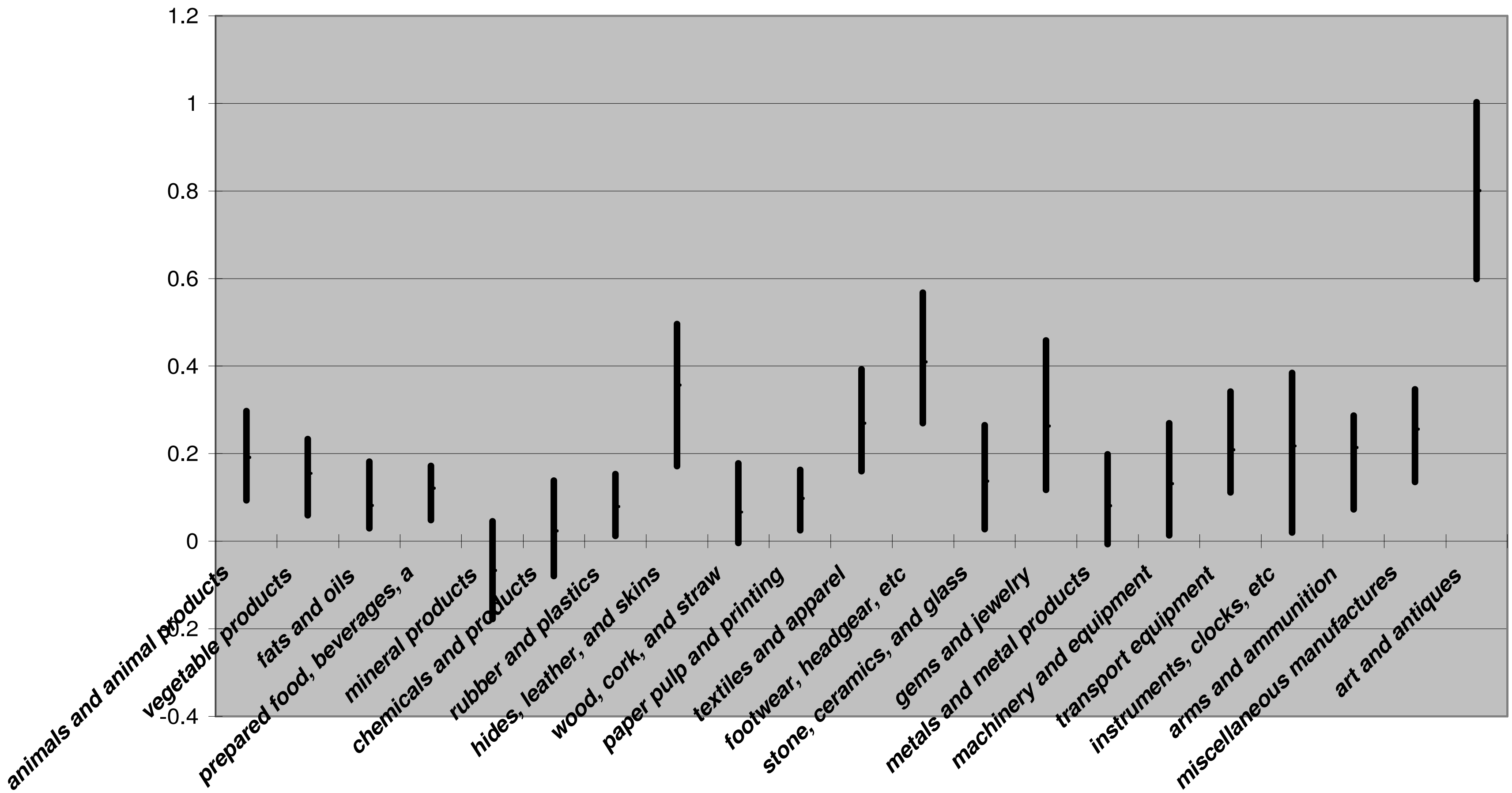


Figure 2
Quality-Ladder Effects by HS Section
(Interquartile range of estimated elasticity of oberved price with respect to Log Exporters' Per Capita Income)

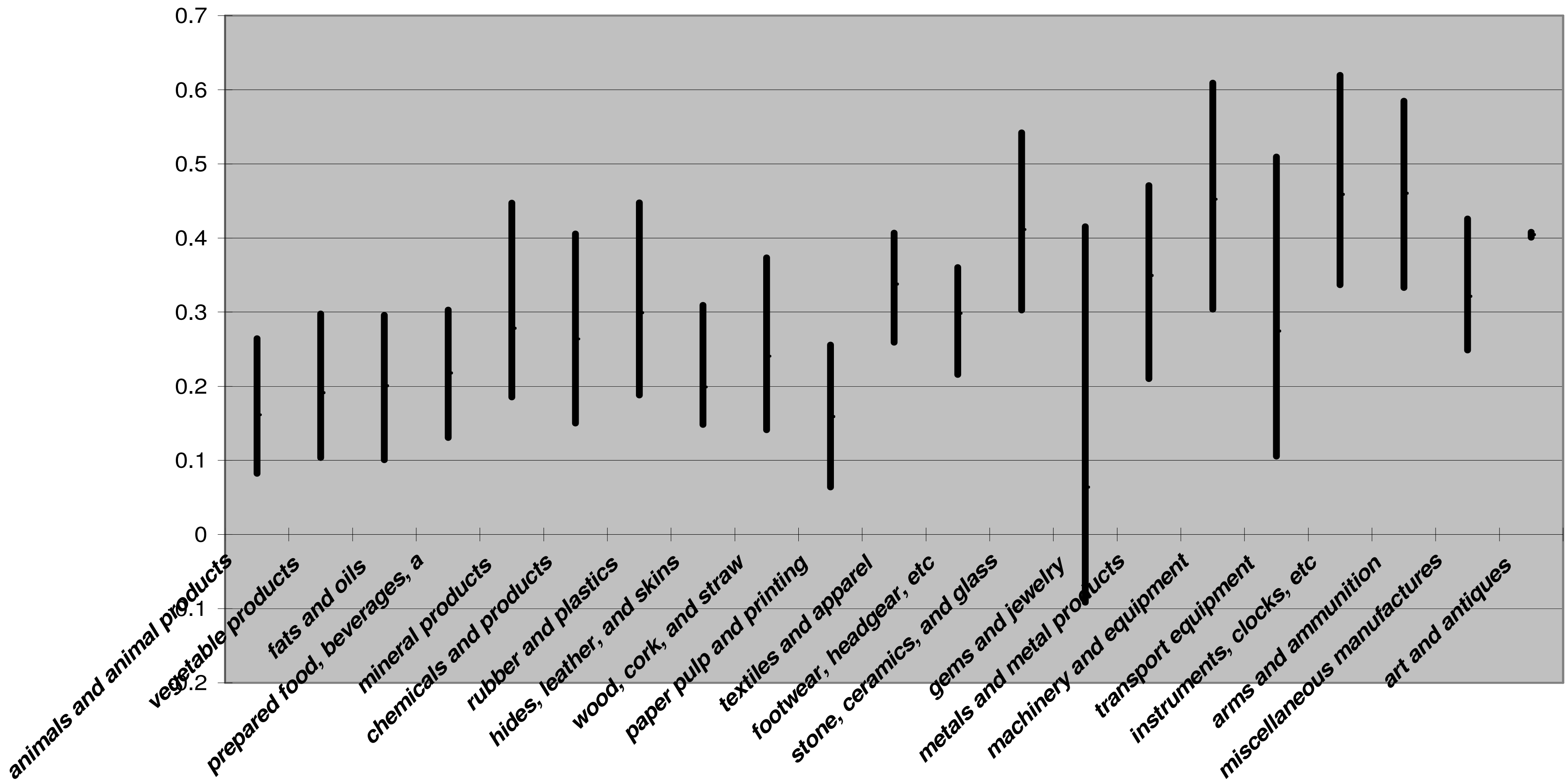


Table 4

Estimated price differences for median and 75th percentile products at a difference in per capita income corresponding to the difference between the United States and China

HS section	Name	Importers' Price (median)	Importers' price (75th percentile)	Exporters' price (median)	Exporters' price (75th percentile)
1	animals and animal products	42.4%	73.5%	34.8%	63.2%
2	vegetable products	33.1%	54.1%	42.5%	73.6%
3	fats and oils	16.2%	40.1%	44.9%	73.0%
4	prepared food, beverages, and tobacco	25.0%	37.6%	49.7%	75.2%
5	mineral products	-11.6%	8.9%	67.3%	128.8%
6	chemicals and products	4.4%	29.3%	62.8%	111.8%
7	rubber and plastics	15.7%	32.9%	73.8%	128.8%
8	hides, leather, and skins	93.4%	150.5%	44.4%	77.2%
9	wood, cork, and straw	13.1%	39.0%	56.0%	99.5%
10	paper pulp and printing	19.7%	35.3%	34.2%	60.5%
11	textiles and apparel	64.5%	106.9%	86.8%	112.3%
12	footwear, headgear, etc	113.4%	186.2%	73.6%	94.8%
13	stone, ceramics, and glass	28.8%	63.2%	113.9%	172.6%
14	gems and jewelry	62.5%	133.9%	12.5%	115.6%
15	metals and metal products	16.1%	44.4%	90.8%	139.0%
16	machinery and equipment	27.5%	64.7%	130.7%	208.6%
17	transport equipment	46.9%	88.3%	66.1%	156.7%
18	instruments, clocks, etc	49.5%	103.8%	133.6%	214.8%
19	arms and ammunition	48.5%	70.1%	134.3%	195.0%
20	miscellaneous manufactures	60.4%	90.2%	81.2%	120.0%
21	art and antiques	339.4%	538.8%	111.2%	112.7%

Memo: 2005 PPP per capita income, United States - $41,950
China - $6,600

Table 5

Estimated price differences for median and 75th percentile products associated with distance effects, evaluated at global mean distance, and with contiguity, for contiguous countries

	Distance 50th percentile	Distance 75th percentile	Contiguity 50th percentile	Contiguity 75th percentile
animals and animal products	47.8%	203.0%	-6.9%	-15.2%
vegetable products	94.6%	235.8%	-8.9%	-21.0%
fats and oils	52.4%	192.4%	-15.7%	-28.9%
prepared food, beverages, a	45.4%	125.9%	-13.8%	-21.7%
mineral products	172.8%	848.4%	-20.9%	-37.5%
chemicals and products	72.9%	231.2%	-14.5%	-26.0%
rubber and plastics	69.3%	176.2%	-11.9%	-19.7%
hides, leather, and skins	28.9%	86.9%	-13.9%	-26.1%
wood, cork, and straw	75.5%	177.0%	-15.3%	-30.5%
paper pulp and printing	93.4%	253.4%	-14.5%	-23.4%
textiles and apparel	-0.6%	43.0%	-13.4%	-22.7%
footwear, headgear, etc	-6.5%	14.3%	-16.4%	-23.8%
stone, ceramics, and glass	106.4%	306.4%	-20.1%	-32.2%
gems and jewelry	20.6%	400.1%	0.2%	-14.0%
metals and metal products	68.2%	158.4%	-9.5%	-18.5%
machinery and equipment	53.3%	221.1%	-8.5%	-21.9%
transport equipment	39.0%	107.9%	-6.6%	-16.2%
instruments, clocks, etc	18.1%	123.9%	-13.5%	-32.7%
arms and ammunition	33.8%	99.8%	-1.9%	-11.8%
miscellaneous manufactures	22.8%	110.0%	-11.5%	-23.6%
art and antiques	-17.2%	86.8%	-11.7%	-21.3%
Aggregate median	52.5%		-13.0%	

Memo: Global mean distance for all products (not trade-weighted): approximately 3,200 kilometers. Contiguity is evaluated as the effect of being contiguous vs. non-contiguous.

Table 6

Estimated price differences for median and 75th percentile products associated with landlocked status

	Importer landlocked 50th percentile	Importer landlocked 75th percentile	Exporter landlocked 50th percentile	Exporter landlocked 75th percentile
animals and animal products	20.7%	42.5%	0.0%	43.9%
vegetable products	22.5%	40.0%	2.1%	45.1%
fats and oils	18.7%	38.3%	11.8%	53.5%
prepared food, beverages, a	9.3%	19.7%	11.0%	47.3%
mineral products	21.4%	40.9%	2.5%	46.2%
chemicals and products	13.2%	33.2%	30.7%	61.1%
rubber and plastics	13.8%	25.4%	14.1%	47.8%
hides, leather, and skins	13.0%	29.3%	15.2%	49.9%
wood, cork, and straw	10.0%	28.3%	2.1%	42.1%
paper pulp and printing	12.9%	26.5%	7.2%	46.8%
textiles and apparel	10.2%	23.0%	16.6%	49.4%
footwear, headgear, etc	13.2%	31.6%	15.2%	47.8%
stone, ceramics, and glass	12.3%	30.3%	14.6%	50.9%
gems and jewelry	-2.1%	44.6%	48.8%	68.1%
metals and metal products	11.9%	24.7%	11.6%	49.0%
machinery and equipment	6.0%	25.6%	20.5%	53.8%
transport equipment	6.2%	18.3%	3.4%	48.3%
instruments, clocks, etc	6.3%	29.2%	34.5%	70.4%
arms and ammunition	14.1%	19.8%	23.1%	54.4%
miscellaneous manufactures	8.6%	25.1%	17.1%	49.6%
art and antiques	15.0%	22.2%	48.4%	58.5%
Aggregate median	14.2%		15.9%	

Evaluated as the effect of landlocked vs. non-landlocked status.

Table 7
Thirty Products With The Highest Income-Related Quality-Ladder Effects

Product	Product_Name	Estimated elasticity of price with respect to exporters' per capita income	Simulated price ratio for per capita income of U.S. and China
280480	Arsenic	1.664	21.70
843353	Root or tuber harvesting machines	1.611	19.69
845891	Lathes (including turning centers), for removing metal, numerically controlled	1.610	19.65
293212	2-Furaldehyde (furfuraldehyde)	1.573	18.33
854060	Cathode ray tubes, other	1.458	14.84
846310	Draw-benches for bars, tubes, profiles, wire or the like, for working metal or cermets, without removing material	1.317	11.42
281310	Carbon disulphide	1.313	11.35
846140	Gear cutting, gear grinding, or gear finishing machines for working by removing metal or cermets	1.273	10.53
846021	Other grinding machines for metal or cermets, w/positioning accuracy in any one axis of at least 0.01 mm, numerically controlled	1.265	10.38
900630	Photographic cameras for underwater, aerial, medical, surgical, forensic or criminological purposes, not cinematographic	1.239	9.89
846040	Honing or lapping machines for working metal or cermets	1.208	9.34
843041	Self-propelled boring or sinking machinery	1.203	9.26
843680	Agricultural, horticultural, forestry or bee-keeping machinery, other	1.178	8.83
846241	Punch/notch machines (incl. presses), incl. combined punch & shearing machines, numerically controlled for working metal or metal carbides	1.172	8.73
843850	Machinery for the preparation of meat or poultry, other	1.167	8.65
844230	Machinery and apparatus for preparing or making plates, cylinders, and other printing components	1.152	8.42
900640	Instant print cameras	1.142	8.27
280530	Rare-earth metals, scandium and yttrium, whether or not mixed or alloyed	1.134	8.14
843610	Machinery for preparing animal feed	1.117	7.89
854020	Television camera tubes	1.111	7.80
845150	Machines for reeling, unreeling, folding, cutting or pinking textile fabrics	1.106	7.73
842320	Scales for continuous weighing of goods on conveyors	1.099	7.64
845620	Machine tools operated by ultrasonic processes	1.099	7.63
910191	Watches (excl. wrist watches) with cases of or clad with precious metal, electrically operated	1.094	7.56
251020	Natural calcium phosphates, natural aluminum calcium phosphates and phosphatic chalk, ground	1.069	7.23
900580	Optical telescopes and other optical astronomical instruments	1.068	7.21
841920	Medical, surgical or laboratory sterilizers	1.066	7.18
842330	Constant weight scales and scales for discharging a predetermined weight of material into a bag or container, including hopper scales	1.065	7.17
700231	Glass tubes of fused quartz or other fused silica, unworked	1.063	7.14
902750	Instruments and apparatus using optical radiations (ultraviolet, visible, infrared), other (e.g. exposure meters)	1.036	6.80

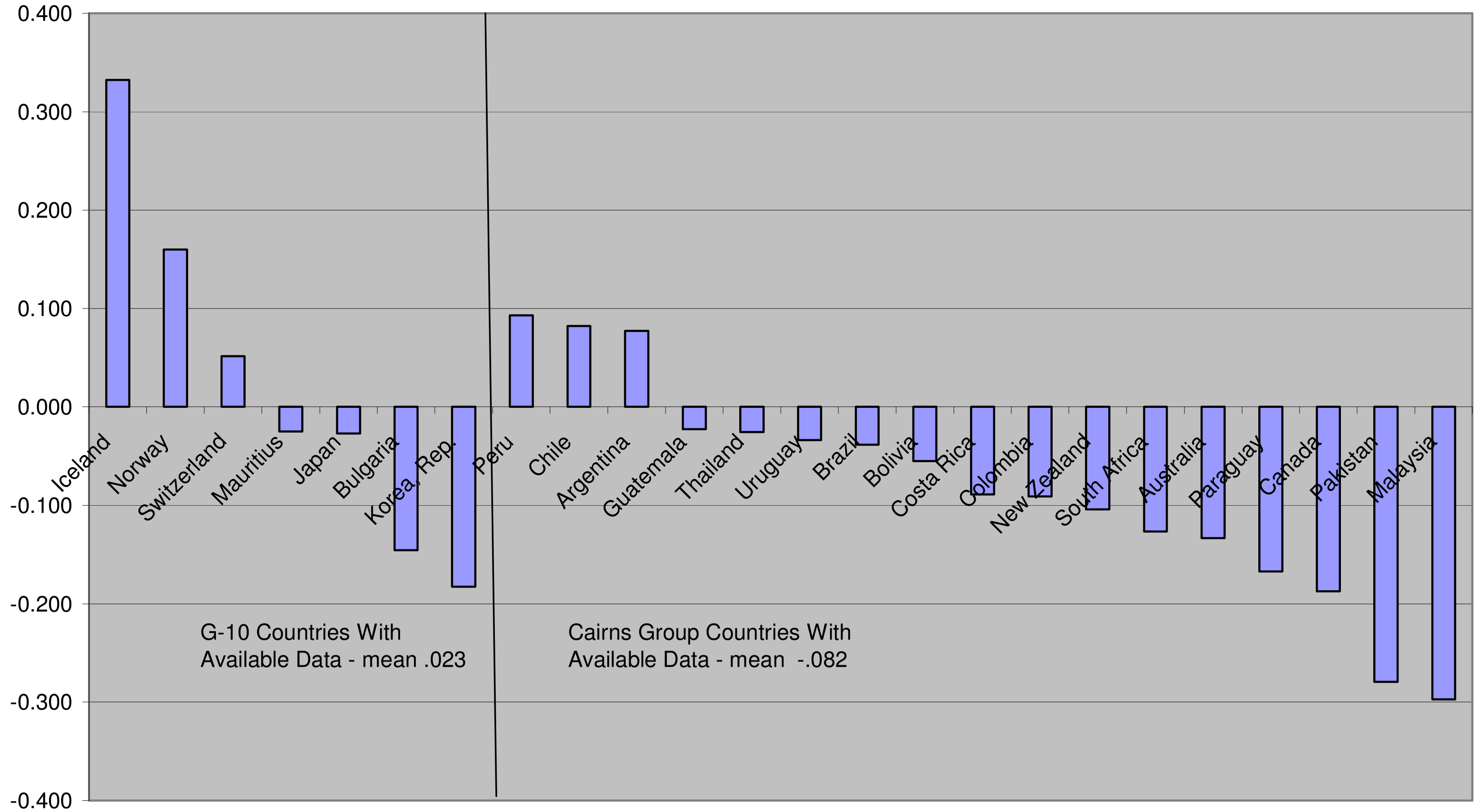
Table 8
Thirty Products With The Highest Pricing-To-Market Effects

Product	Product_Name	Estimated elasticity of price with respect to importers' per capita income	Simulated price ratio for per capita income of U.S. and China
711291	Gold waste and scrap, including metal clad with gold but excluding sweepings containing other precious metals	3.093	304.88
841181	Gas turbines other than turbojets or turbopropellers, of a power not exceeding 5,000 kW, aircraft and other	1.755	25.66
70952	Truffles	1.326	11.61
910111	Wrist watches with cases of or clad with precious metal, electrically operated, with mechanical display only	1.227	9.67
890391	Vessels, sailboats, with or without auxiliary motor, for pleasure or sports	1.142	8.26
844720	Flat knitting machines; stitch-bonding machines; V-bed flat knitting machines	1.089	7.49
911190	Parts of watch cases	1.054	7.02
890392	Vessels, motorboats (o/than outboard motorboats), for pleasure or sports	1.018	6.57
970400	Postage or revenue stamps, stamp-postmarks, first-day covers, postal stationery, and the like, used or unused, other than heading 4907	1.003	6.39
430220	Heads, tails, paws, other pieces or cuttings of dressed or tanned furskins, not assembled	0.958	5.88
670420	Wigs of human hair	0.940	5.69
430110	Raw furskins of mink, whole, with or without head, tail or paws	0.930	5.58
381800	Chemical elements doped for use in electronics, in the form of discs, wafers etc., chemical compounds doped for electronic use	0.910	5.38
670300	Human or animal hair prepared for making wigs and the like	0.909	5.37
430180	Other furskins, whole, with or without head, tail, or paws	0.884	5.13
91020	Saffron	0.865	4.95
844210	Phototypesetting and composing machines	0.839	4.72
10110	Purebred breeding animals (horses, asses, mules and hinnies)	0.824	4.59
621310	Handkerchiefs, of silk or silk waste	0.815	4.51
430160	Raw furskins of fox, whole, with or without head, tail or paws	0.814	4.51
854160	Mounted piezoelectric crystals	0.813	4.49
611490	Other garments, knitted or crocheted, of other textile materials (mostly wool and silk)	0.803	4.42
950310	Electric trains, including tracks	0.799	4.38
580500	Handwoven tapestries and needlework tapestries	0.797	4.37
711810	Coin (other than gold coin), not being legal tender	0.783	4.26
320730	Liquid lustres and similar preparations, of a kind used in the ceramic, enamelling or glass industry	0.783	4.25
843221	Disc harrows for soil preparation or cultivation	0.783	4.25
670411	Complete wigs of synthetic textile materials	0.777	4.20
280450	Boron; tellurium	0.772	4.17
910191	Watches (excl. wrist watches) with cases of or clad with precious metal, electrically operated	0.767	4.13

Table 9
Index of Residual Ln Import Price For All Products

Importer	Total	Agriculture	Non-Agriculture	Importer	Total	Agriculture	Non-Agriculture
Albania	-0.332	-0.235	-0.344	Korea, Rep.	-0.097	-0.184	-0.087
Algeria	-0.002	-0.346	0.035	Lithuania	-0.494	-0.187	-0.568
Argentina	0.006	0.079	-0.001	Luxembourg	0.073	0.227	0.050
Armenia	-0.115	-0.199	-0.103	Latvia	-0.069	-0.142	-0.055
Australia	-0.228	-0.133	-0.249	Morocco	-0.107	-0.123	-0.105
Austria	-0.159	-0.075	-0.175	Moldova	0.083	0.072	0.086
Azerbaijan	-0.088	-0.513	-0.035	Madagascar	0.136	0.222	0.127
Belgium	-0.172	-0.113	-0.180	Mexico	-0.127	-0.102	-0.135
Benin	-0.256	-0.222	-0.261	Macedonia, FYR	-0.115	-0.063	-0.121
Bulgaria	-0.132	-0.147	-0.130	Malta	-0.149	0.017	-0.170
Bahrain	-0.074	0.056	-0.093	Mongolia	-0.116	-0.270	-0.065
Belarus	0.141	0.144	0.141	Mozambique	-0.167	0.236	-0.201
Belize	-0.339	-0.114	-0.375	Mauritius	-0.073	-0.025	-0.083
Bolivia	-0.243	-0.055	-0.261	Malawi	0.018	0.002	0.019
Brazil	-0.159	-0.039	-0.167	Malaysia	-0.349	-0.298	-0.358
Canada	-0.158	-0.187	-0.153	Namibia	-0.059	-0.051	-0.059
Chile	-0.022	0.082	-0.046	Niger	0.096	0.200	0.074
China	-0.079	-0.166	-0.070	Nicaragua	-0.284	0.098	-0.330
Cote d'Ivoire	-0.009	0.334	-0.062	Netherlands	-0.186	-0.219	-0.180
Cameroon	-0.311	0.133	-0.368	Norway	0.065	0.160	0.048
Colombia	-0.062	-0.091	-0.059	New Zealand	-0.076	-0.104	-0.073
Costa Rica	-0.246	-0.089	-0.264	Pakistan	-0.612	-0.280	-0.642
Croatia	0.080	0.013	0.092	Panama	-0.323	-0.148	-0.346
Czech Republic	-0.196	-0.192	-0.196	Peru	0.032	0.093	0.028
Dominica	-0.302	-0.055	-0.336	Poland	-0.105	-0.072	-0.111
Denmark	-0.032	-0.169	-0.004	Portugal	-0.185	-0.165	-0.191
Ecuador	-0.123	0.034	-0.145	Paraguay	-0.275	-0.167	-0.292
El Salvador	-0.193	0.065	-0.221	Romania	-0.010	-0.106	0.014
Estonia	0.115	0.042	0.125	Russian Federation	-0.369	-0.443	-0.358
Ethiopia	0.010	0.167	0.001	Saudi Arabia	-0.266	-0.236	-0.270
Finland	0.028	0.053	0.021	Senegal	-0.173	0.163	-0.231
Fiji	-0.107	0.099	-0.134	Singapore	-0.155	-0.058	-0.176
France	-0.129	-0.128	-0.129	Spain	-0.206	-0.194	-0.208
Gabon	-0.045	-0.024	-0.048	Suriname	-0.647	-0.446	-0.691
Germany	-0.205	-0.161	-0.216	Slovak Republic	-0.183	-0.113	-0.190
Ghana	-0.045	0.124	-0.067	Slovenia	-0.265	-0.172	-0.301
Greece	-0.181	-0.142	-0.190	Sri Lanka	-0.123	-0.185	-0.104
Guatemala	0.000	-0.023	0.005	Sweden	-0.010	-0.016	-0.009
Guyana	-0.410	-0.003	-0.464	Switzerland	-0.010	0.052	-0.019
Hong Kong	-0.167	-0.188	-0.164	Syrian Arab Republic	-0.453	-0.427	-0.459
Honduras	-0.351	-0.324	-0.354	Togo	-0.543	-0.413	-0.561
Hungary	-0.281	-0.222	-0.289	Thailand	-0.100	-0.025	-0.108
India	-0.055	0.146	-0.070	Trinidad and Tobago	-0.189	-0.190	-0.189
Ireland	-0.105	0.027	-0.123	Tunisia	0.063	-0.088	0.074
Iran, Islamic Rep.	-0.214	-0.385	-0.199	Turkey	-0.005	-0.164	0.008
Iceland	0.176	0.332	0.145	Tanzania	-0.283	0.056	-0.321
Italy	-0.181	-0.172	-0.183	Uganda	-0.101	-0.179	-0.096
Jamaica	0.123	0.169	0.115	Uruguay	-0.033	-0.034	-0.033
Jordan	-0.238	-0.125	-0.254	United Arab Emirates	-0.285	-0.245	-0.292
Japan	-0.001	-0.028	0.003	United Kingdom	-0.208	-0.139	-0.219
Kazakhstan	-0.039	0.004	-0.045	United States	-0.218	-0.128	-0.235
Kenya	0.120	0.431	0.097	South Africa	-0.166	-0.126	-0.170
Kyrgyz Republic	-0.255	0.075	-0.295	Zambia	-0.045	0.286	-0.065
Kiribati	-0.103	-0.039	-0.244	Zimbabwe	-0.339	-0.307	-0.340

Figure 3
Agricultural price residuals for G-10 and Cairns Group countries
(equal means rejected at c. p = .10)



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