Imports "Я" Us: Retail Chains as Platforms for Developing-Country Imports*

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Abstract

By exploiting the uneven consolidation in the retail sector over the past few years we find that Chinese and other LDC imports are disproportionately sold by the largest retail firms. Smaller retailers sell almost as many imports but they are more likely to import from high-cost source countries. We apply a numerical algorithm to compute marginal propensities to import by firm size. The largest retail firms' propensity to import from China is 17 percentage points higher than that of smaller retailers; the corresponding difference in import propensities from LDCs as a whole is 27 points. The disproportionate growth of large retailers between 1997 and 2002 explains 5% of the overall growth in consumer goods imports, 20% of the growth in consumer goods imports from China, and 22% of the growth in consumer goods imports from LDCs.

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1 Introduction

A growing body of anecdotal evidence suggests that larger retailers sell a disproportionate share of imported goods. For example, Wal-Mart handles 6.5% of U.S. retail sales but accounts for over 15% of U.S. imports of consumer goods from China (Basker and Van, 2006). Toys "Я" Us, the second-largest toy seller in the United States (after Wal-Mart) received extra scrutiny in the wake of a recent Chinese lead-paint scare (see, for example, Schwartz, 2007). This is significant because the retail sector is increasingly dominated by large retail chains. Between 1997 and 2002, the average sales share of the top four firms in a retail sector increased by 4.5 percentage points. At the same time, U.S. consumer-goods imports have soared, particularly from developing countries. Between 1997 and 2002, consumer-goods imports from China increased by 64%; from Mexico increased by 43%; and Central America increased by 34%.

In this paper, we use data from the Census of Retail Trade and the International Trade Commission to test for a relationship between consolidation in the retail sector and the rise in imports of consumer goods from China and other less-developed countries (LDCs). A difference-in-difference specification shows that Chinese and other LDC imports have increased disproportionately in retail sectors with the sharpest consolidation into chains. To quantify the importance of chain growth to import growth we apply a numerical algorithm that generates marginal propensities to import by firm size. Our results imply that between 1997 and 2002 the largest retailers' marginal propensity to import from China was 17 percentage points higher than that of smaller retailers; the corresponding difference in import propensities from LDCs as a whole is 27 points. The disproportionate growth of large retailers between 1997 and 2002 explains 5% of the overall growth in consumer goods imports, 20% of the growth in consumer goods imports from China, and 22% of the growth in consumer goods imports from LDCs.

This relationship between retailer (chain) size and imports is explicitly modeled by Basker and Van (2006). In that model, there is a fixed cost associated with purchasing goods from new foreign sources. Changes in the economic environment such as improvements in technology allow the retail chain to grow, increasing the benefit of sourcing goods from lower-cost locations. When a chain shifts its sourcing, the drop in its input cost prompts it to grow further, increasing imports. A similar intuition is captured in Raff and Schmitt's (2008) general-equilibrium model exploring the relationship between trade costs and the size distribution of retailers.

We find evidence that the disproportionate growth of the largest retail firms, combined with their greater propensity to import, has significantly contributed to the rise in U.S. imports of consumer goods from LDCs. Existing explanations for this trend usually center on shifts in comparative advantage due to technological spillovers, skill upgrading and market liberalization. But these stories imply that the role of the importer is passive, merely selecting the lowest-cost supplier for each product. If the identity of the importer is irrelevant to the pattern of trade then we should never (except in a knife-edge case) see a narrowly-defined product concurrently imported from multiple source countries. In practice, however, many products are imported from a large number of source countries, and most products are imported from both rich and developing countries. The transition from rich to poor source countries, in other words, is not occurring one product at a time as the threshold good shifts but is taking place simultaneously across the spectrum of consumer goods, driven by the changing structure in the retail sector. Retailers, who serve as the intermediating platform between manufacturers and consumers, differ in their cost structures and therefore in their sourcing choices.[1] This retail platform is especially important to LDCs in which exports serve as the engine for growth.[2]

The rest of this paper is organized as follows. We describe the data in Section 2 and our

[1] An alternative, complementary, explanation for concurrent imports from multiple sources is that retailers specialize by quality and thus import source.

[2] Consistent with the idea that retailers face different tradeoffs, Evans and Harrigan (2005) use proprietary data from a major chain to show that the retailer's demand for just-in-time deliveries influences its choice of source countries.

reduced-form empirical specification and results in Section 3. In Section 4 we introduce a numerical algorithm to compute marginal propensities to import (MPIs) by firm size. The counterfactual exercise is described in Section 5. Section 6 concludes with a discussion of possible interpretations of our results and their implications.

2 Data Construction

Our unit of analysis is a 6-digit retail sector, such as tire dealers (441320), pharmacies and drug stores (446110), children's and infants' clothing stores (448130), office supplies and stationery stores (453210), and pet and pet supplies stores (453910). There are 72 (6-digit) sectors in 1997 and 2002 when the Census used the North American Industry Classification System (NAICS) to identify sectors; a complete listing is in Appendix Table A-1. Prior to 1997, the Census used the Standard Industrial Classification (SIC) system, which has 41 (3-digit) sectors in our data. A list of SIC codes and their descriptions is in Appendix Table A-2. For our purposes, a single retail chain is defined as all the stores owned by a single firm that are classified under a single NAICS code. For example, if a firm operates both a warehouse club chain (NAICS 452910) and a department store chain (NAICS 452110), the sales of each of these segments will be tallied separately.[3]

There is no readily-available measure of imports by retail sector. Instead, we use a weighted sum of imports by product, using as weights the importance of each sector in selling the product. Import figures by product are available at a very disaggregated level (HTS10) and we aggregate imports to broad categories to match them with retail sales data. Our import variable therefore is not equal to actual imports at the sector level, but is the level of imports a sector would have if it sold exactly the same proportion of imports as all other sectors selling the same good.[4]

[3]General-merchandise stores like Wal-Mart and Target use the NAICS code for department stores.
[4]In Section 4 we compute sector-level imports that are consistent with our estimation results.

Product-level import data come from the U.S. International Trade Commission (USITC) Trade DataWeb for each of 6,564 products by 10-digit Harmonized Tariff Schedule (HTS) codes, and allocated each HTS code to a product code.[5] Each year's imports of product p, m_p, is calculated as

$$m_p \equiv \sum_{h \in p} m_h$$

where $\mathbf{m}_h$ is the import value of HTS10 h. Let $\mathbf{M^p}$ denote the $P \times 1$ vector of product import, where P is the total number of products in our data; values m_p are the elements of $\mathbf{M^p}$.

The Census of Retail Trade, conducted every five years in years ending in "2"and "7," includes dollar sales, by sector, for each of 38 broad product categories (Table 2 in U.S. Census Bureau, various years b). Examples of product categories include toys, hobby goods, and games; apparel (which includes men's, women's, and children's apparel, as well as accessories); hardware (which includes tools as well as plumbing and electrical supplies), and audio equipment (including musical instruments, radios, stereos, compact discs, records, tapes, audio tape books, and sheet music).[6] A full list of the product categories is provided in Appendix Table A-3.

To impute sector-level imports, we assign product imports to sectors based on the value of sales of the product accounted for by each sector. Call S the total number of sectors and denote by $\mathbf{L}$ the $S \times P$ matrix of product-sector sales in a given year. An element l_{sp} of $\mathbf{L}$ is the dollar sales of product p through sector s. Total sales of product p in a given year, l_p, is

[5] An additional 13,280 HTS10 codes were classified as intermediate goods. Our concordance from HTS10 to Product Codes is available upon request. There may be mis-allocation of HTS codes to product codes due to the fact that some HTS codes contain both consumer and intermediate products (e.g., lumber, paper, foodstuffs). Because this type of error is constant over time it should increase the level of imports we calculate for some products and decrease the level we calculate for others, but not in a way that should affect any of our estimation results.

[6] Basker, Klimek, and Van (2008) use the establishment-level Census data underlying this table to analyze product assortment at general-merchandise stores, and show that store belonging to larger chains sell more diverse items. To our knowledge, the data on product-level sales for other sectors have never been utilized in an academic study.

the sum of the elements of column vector p. Let $N^c(\cdot)$ be a column normalization operator that converts elements of the argument matrix to shares within a column by dividing by the sum of elements within the column. That is, $N^c(\mathbf{L})$ is an $S \times P$ matrix whose elements are $\frac{l_{sp}}{l_p}$, or the share of the imports of product p sold through sector s. For each year of data, we compute the $S \times 1$ vector of sector imports as

$$\mathbf{M^s} = N^c(\mathbf{L})\mathbf{M^p}. \tag{1}$$

In other words, we assign imports of each product to each sector in proportion to the sector's sales share for that product; total import sales by sector s, m_s, is computed as the sum of product imports accounted for by the sector.

The data construction process is presented graphically in Figure 1. Ninety six products, including alphabet blocks and electric trains, are classified under product code 20460: toys, hobby goods, and games. In 2002, 27% of toys (by value) were sold in toy stores, 23% in department stores (including discount department stores such as Wal-Mart and Target), and 16% in warehouse clubs (such as Costco and Sam's Club). The remainder were sold at a variety of outlet types, including electronics stores, computer stores, clothing stores, and pharmacies. For example, since 23% of all toys were sold at toy stores that year, we allocated 23% of 2002 toy imports to toy stores, and similarly for the other subsectors.

Because we use sales information to calculate imports, we are able to measure all imports sold to consumers. In this respect our approach differs from a related study by Bernard, Jensen, and Schott (forthcoming), which analyzes the pattern of *direct* imports only. A significant portion of foreign-made consumer goods is imported indirectly, that is, handled by wholesalers, merchandisers, import firms, and other intermediaries. Even the largest retailers do not import the bulk of their foreign-made wares directly. In 2003, Target announced a multi-year plan to increase its direct imports from "about 15 percent of our purchases to approximately double this amount" (Target Corporation, 2003, p. 13). The following year, Wal-Mart, the largest retailer in the U.S., said that half of its imports from China were indirect (The Economist, 2004).

Finally, we define the "size of the largest firms" as the dollar sales of the four largest firms in each sector (Table 6 in U.S. Census Bureau, various years a).[7] In 59 of the 72 sectors, the share of retail dollars spent at the top four firms in each sector increased between 1997 and 2002. The average increase was 6 percentage points. Among the thirteen sectors with decreased concentration the average decrease in the top-four firms' share was 2 percentage points.

Our primary analysis uses the 72 six-digit NAICS sectors for 1997 and 2002. We would have liked to use a longer panel in our analysis, but that is not possible due to the Census switch from the Standard Industrial Classification (SIC) to NAICS between 1992 and 1997. Although a mapping from SIC to NAICS does exist, it is extremely noisy. In addition to the fact than many NAICS codes are created from *parts* of 4-digit SIC codes, and the data on the size of the top firms and product sales are at the 3-digit level, eleven of the 72 retail NAICS codes are mapped, in whole or in part, to wholesale rather than retail SIC codes. Since the Census of Wholesale Trade (CWT) uses a different product classification scheme than the Census of Retail Trade (CRT) the mapping between product codes is not 1-to-1, so several additional layers of noise would be introduced with this mapping. We opted instead to use a short panel of SIC data — one observation from the late 1980s, the second from 1992 — to test whether the above relationship holds in the earlier data as well.

The period 1987–1992 roughly coincides with Wal-Mart's famous "Buy American" campaign, launched in 1985 with pledges to "buy American whenever we can" and to pay up to a 5% premium for U.S.-made goods (Zellner, 1992). The campaign collapsed in late 1992

[7] By law the Census does not report data that can reveal the size of individual firms. Several other measures of firm size are available but the only one that is consistently available for all sectors is the largest-firm measure. Sales in firms with revenue above $250 million, for example, are omitted in 55 of the 72 sectors in 1997 to prevent disclosure, and even the number of firms with sales exceeding $250 million is missing for 18 of the sectors.

amid allegations by Dateline NBC that Wal-Mart was producing private-label clothes in Bangladesh, smuggling Chinese garments into the U.S. in excess of U.S. quotas, and placing imported clothes on racks marked "Made in the USA" (Gladstone, 1992). However, China was not the main concern of American protectionists during this period. The North American Free Trade Agreement (NAFTA) was ratified in 1992 amid much controversy and ultimately substantially increased U.S. imports from Mexico (Romalis, 2004).

Though the results are illuminating, we treat the historical data as secondary to the NAICS data for several reasons. First, the Economic Census for the late 1980s refers to 1987 but the earliest import data we could obtain from USITC were for 1989, so the match is imperfect. Second, at the 3-digit SIC level (for which we have Census data) there are only 41 sectors compared with the 72 6-digit NAICS codes available to us in the later data; three of these sectors have missing data so we are only able to use 38 in the analysis.[8] Third, the mapping between products and sectors was less precise in the earlier period and required some imputation. We used as much as possible of the information available (total sales per sector, total sales per product, and information about sales in any specific product-sector combination or product-set of sectors combination) to impute the missing observations before aggregating the data to the final form. Given these data limitations, in particular the smaller number of observations and the mismatch between the years for which imports and sales are measured, we expect lower precision as well as attenuation bias in our coefficient estimates.

Table 1 gives summary statistics for the relevant variables. The average sales of the four largest firms in each sector grew by 20% from 1987 to 1992 and by 37% from 1997 to 2002. Figure 3 shows the increasing share of retail dollars spent at chains, and especially large chains (with over 100 stores) over the past several decades. The average sales share of the top four firms in each sector, also shown, has followed a similarly-increasing trend. (Average sector sales appear to fall from 1992 to 1997, but that is only because the number of sectors

[8]SIC 549 is missing data on the top-four retailers' sales for 1992; SICs 593 and 599 are missing product-line sales for 1987.

increases from 41 to 72 with the switch from SIC to NAICS.) As a share of total sector sales, sales of the four largest firms in each sector grew from 15% in 1987 to 18% in 1992 and from 25% in 1997 to 32% in 2002. We also provide import figures for each of seven countries or sets of countries we later use in the analysis. The highest growth in consumer goods imports came from China, increasing by over 60% from 1989 to 1992 and by more than 50% from 1997 to 2002. Imports from Asia (inclusive of China) increased by only 5% in the earlier period but by 20% in the later period. Imports from Mexico and Central America (which includes Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua) also had increases in excess of 20% in both time periods. Following the 2007 World Bank definition of "high income" countries, non-rich countries are all world countries with gross national income per capita below $11,116.[9] Non-rich non-oil countries are all non-rich countries that are not OPEC members.[10] Overall imports from non-rich non-oil countries increased by over 30% in both time periods. Imports from Rich countries grew at a much slower pace: they increased by 15% from 1997 to 2002, and declined (by 7%) between 1989 and 1992. Figure 2 shows the share of consumer goods imports accounted for by rich countries, non-rich non-oil countries, and China from 1989 to 2007.

3 Estimation and Results

Combining the data on imports, sector sales, and the sales in the largest four firms, we test whether sectors whose largest firms grew disproportionately between 1997 and 2002 were more likely to sell products whose imports increased the most during this period. We

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[9] There are sixty high-income countries; see `http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html`; accessed January 2007. All other countries are included in our non-rich region.

[10] There are a total of thirteen OPEC members: Algeria, Angola, Ecuador, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela. Non-rich non-oil are non-rich countries excluding Algeria, Angola, Ecuador, Indonesia, Iran, Iraq, Libya, Nigeria, and Venezuela.

estimate the following difference-in-difference equation:

$$\mathbf{Imports}_{st} = \alpha_s + \delta_t + \beta\mathbf{Top4Sales}_{st} + \gamma\mathbf{Non4Sales}_{st} + \varepsilon_{st} \tag{2}$$

where $\mathbf{Top4Sales}_{st}$ is the sales amount in dollars by the largest four firms in sector s in year t; $\mathbf{Non4Sales}_{st}$ is the sales amount in dollars by all other firms in sector s in year t; α_s is a sector fixed effect, δ_t is a year fixed effect, and $\mathbf{Imports}_{st}$ is the dollar value of imports attributed to sector s. We estimate this regression for the years 1997 and 2002, with sectors identified by 6-digit NAICS codes.

By including sector fixed effects in the regression we allow for the fact that sectors with larger dominant firms may import more (or less) than other sectors for reasons not related to our story. We also include a 2002 year dummy to capture the fact that both sales at the largest firms and imports have increased over time. (The year dummy also captures any changes in price level across time periods.) Our focus is on the coefficients β and γ. If $\beta > \gamma$, then sectors that sell products whose import share has grown faster are the same sectors whose top-four firms have grown faster over this period.

Including both **Top4Sales** and **Non4Sales** in the regression is equivalent to including only one of them and controlling for total sector sales. We prefer this specification, however, because in the next section we use this functional form to estimate the marginal propensity to import (MPI) by firm type.

Because sectors vary dramatically in size — the largest sector, new car dealers (NAICS 441110) has sales 5,000–10,000 times as large as the smallest sector, other fuel dealers (NAICS 454319) — a concern in the OLS regression is that large sectors, with large errors, are over-weighted relative to smaller sectors. Although we use robust standard errors (with ε_{st} clustered by sector) we explicitly correct for heteroskedasticity due to differences in sector size using weighted least-squares (WLS). In the WLS specification each observation is weighted by $\frac{1}{\mathbf{SectorSales}_{st}^2}$, the inverse of squared sector sales. This weighting is equivalent to dividing each observation by $\mathbf{SectorSales}_{st}$.

Table 2 reports WLS estimates for each of the seven countries and sets of countries listed in Table 1 along with χ^2 statistics from Breusch-Pagan tests for heteroskedasticity related to sector size. We cannot reject the null of homoskedasticity for any region. For completeness, we report unweighted regression results in Table 3; there, we easily reject the null of homoskedasticity.[11]

For China, our point estimate of β is 0.0974, as compared with 0.0295 for γ; we can reject the hypothesis that $\beta \leq \gamma$ at the 95% confidence level.[12] Interpreting these point estimates, we find that for every dollar increase in top-four sales in a given sector, the value of Chinese imports of products sold by that sector increase by 9.74 cents; for every dollar increase in sales of smaller firms, the value of Chinese imports of products increase by only 2.95 cents. In other words, sectors selling products that are increasingly imported from China are more likely to be those with a high growth among the top-four retailers; sectors with a high growth among smaller retailers tend to sell products whose import rates have increased more slowly. The differences between our estimates of β and γ are positive for all other regions, except rich countries; and statistically significant at the 95% level for Mexico and non-rich non-oil countries (and at 90% for Central America).[13]

The effect is reversed for rich countries (second-to-last column). There we estimate $\beta = 0.0294$, as compared with $\gamma = 0.093$. This result is in line with Basker and Van's (2006) model; the costs of sourcing products from rich countries are similar to the costs of sourcing domestically, so we expect such sourcing to be more prevalent among small retailers than large ones. In this case we test the null hypothesis that $\beta \geq \gamma$, which we reject at the 90% confidence level. In fact, it is a rich country — Japan — that limits our ability to reject the

[11]The tests are performed using non-robust standard errors, but the standard errors reported in the table are robust. We continue to use robust standard errors in the weighted regressions because there are other potential causes of heteroskedasticity not addressed by the weighting scheme.

[12]The discussion refers to Table 2.

[13]Adding the non-rich oil countries to the non-rich non-oil region has little effect on either the point estimates or significance level.

null that $\beta \leq \gamma$ for Asia. If we omit Japanese imports when we calculate Asian imports the results (not shown) for Asia are starker: β increases to 0.135, γ falls to 0.052, and the null is rejected at the 95% confidence level.

World-wide imports follow a pattern between that of non-rich and rich countries.[14] Large firms do not simply import more than smaller firms. Rather, large firms import disproportionately from China and other LDCs, not from rich countries. Or, more accurately, imports of products that tend to be sold in sectors with high top-four growth have not increased much faster than imports of products that tend to be sold in sectors with high growth among smaller firms.

These estimates help to explain why Hobby, Toy, and Game Stores (NAICS 451120) and Hardware Stores (NAICS 444130), each of which sold roughly $16 billion of goods in 2002, imported dramatically different quantities from China. Our calculations imply that the toy sector imported over $3 billion in goods from China that year whereas the hardware sector imported only approximately $650 million. The top four firms accounted for over 70% of sector sales in the toy sector that year; in the hardware sector the top four firms accounted for only about 13% of sales.

As an alternative for dealing with heteroskedasticity, we also estimate a log-log specification:

$$\ln(\mathbf{Imports}_{st}) = \alpha_s + \delta_t + \beta \ln(\mathbf{Top4Sales}_{st}) + \gamma \ln(\mathbf{Non4Sales}_{st}) + \varepsilon_{st} \tag{3}$$

Results from the log specification are reported in the top panel of Table 4. Now, the coefficients β and γ can be interpreted as (reduced-form) elasticities. Because the sales size of the top four firms may be smaller or larger than the sales size of the rest of the firms in the retail sector, the *slope* implied by these estimates varies by sector. On average over this period

[14]World imports include oil countries, but again this makes no difference to either our qualitative results or significance levels.

the top four firms account for 30% of sales in each sector, but their share of sector sales varies from under 10% to about 90%, depending on the sector. The lower panels of Table 4 use, respectively, the mean and median values of Imports, Top4, and Non4 to evaluate and compare these two slopes. As in the previous specifications, for most low-cost source countries we find a stronger relationship between the growth of imports of products sold in a sector and growth in the top four firms in that sector than we do between import growth and the growth of smaller firms. Again, the relationship is reversed for rich (high-cost) source countries. We can reject equality of the two slopes for China, Central America, and the sum of non-rich non-oil countries at the 5% level at both mean and median values.

We also report results from regressions using data from 1987 and 1992 in Tables 5–7. These results are consistent with our hypotheses. The point estimates are generally smaller, as are the differences between the two coefficients, consistent with attenuation bias due to the imperfect match of ITC and Census data for the 1980s. In Table 5, which reports our preferred WLS specification, the difference between the coefficients is significant for China, Central America, and Non-Rich Non-Oil countries at the 90% confidence level. Confidence levels are overall higher in the unweighted regressions reported in Table 6, and generally lower in the log regressions reported in Table 7. Note, however, that the historical estimates cannot be compared directly to the current estimates since the identity and size of the largest firms depends on sector definitions, which changed between 1992 and 1997.

Overall, we find that there is a positive relationship between the (disproportionate) growth of the top retailers in a sector and growth in imports of products that are sold in that sector from less-developed countries. This result implies that not only do large retailers engage in more *direct* imports from LDCs (arrangements that require direct engagement with suppliers), but that smaller retailers do not make up the difference by simply buying more imported goods from intermediaries.

4 Numerical Results

The results in the previous section show a relationship between firm size and tendency to sell products more heavily imported from LDCs. In this section we go one step further and estimate firms' **marginal propensity to import** (MPI) by size. Conceptually, the difference between what we do here and in the previous section is that we now take into account the fact that two sectors with similar overall sizes and similar sales patterns (i.e., selling the same products at roughly the same rates) have different import shares if their levels of concentration (top-four sales as a fraction of total sales) are different. We use the term MPI to refer to a reduced-form, rather than structural, relationship between import levels and firm size. Methodologically, this exercise requires determining sector imports and estimating the regression equation simultaneously, which we do using a numerical algorithm. Because the method is computational, we cannot rely on asymptotic or even Huber-White standard errors to assess the statistical significance of the results; we use delete-one jackknife resampling to obtain standard errors and correct the point estimates for bias.

If firms of different sizes have different import propensities then sectors with similar overall sales figures but different size distributions of firms must import at different rates. In other words, by assuming, as we did in the previous section, that imports of a product are distributed across sectors in proportion to the sales of that product, and constructing sector imports without regard to the size distribution of firms in the sector, we implicitly disregarded our hypothesis. The fact that we obtained economically and statistically different estimates of coefficient estimates on sales of large and small firms (β and γ, respectively) confirms our hypothesis. But this method under-assigned import values to sectors with larger firms than implied by our estimates. As a result, $\widehat{\beta}$ understates large-firms' MPI and $\widehat{\gamma}$ overstates small-firms' MPI.[15]

In general, sector imports in a given year are derived from product imports by way of a

[15] This relationship is reversed for imports from rich countries.

transformation that we write in matrix form as

$$\mathbf{M^s} = \mathbf{W}\mathbf{M^p} \tag{4}$$

where the transformation matrix $\mathbf{W}$ is a function of $\mathbf{L}$, and of the variables **Top4Sales** and **Non4Sales** in each sector as well as the two marginal propensities to import, β and γ. It is the latter element that is missing in the way we constructed the transformation matrix in Equation (1). To account for this missing piece, define θ_s as the sales share of the top four firms in sector s; the share of the non-top-four firms is thus $(1 - \theta_s)$. Define $\boldsymbol{\theta}$ as an $S \times 2$ matrix where a row s is a vector $[\theta_s \quad 1-\theta_s]$. Define also the vector of MPIs as $\mathbf{B^T} = [\beta \quad \gamma]$.

We postulate the form of the transformation matrix as:

$$\mathbf{W} = N^c(D(\boldsymbol{\theta}\mathbf{B})\mathbf{L}). \tag{5}$$

The product $\boldsymbol{\theta}\mathbf{B}$ is an $S \times 1$ vector with elements $\theta_s\beta + (1 - \theta_s)\gamma$, the average propensity to import of sector s. $D(\boldsymbol{\theta}\mathbf{B})$ is an $S \times S$ matrix whose diagonal is the vector $\boldsymbol{\theta}\mathbf{B}$ and the off-diagonal elements are zero. The product $D(\boldsymbol{\theta}\mathbf{B})\mathbf{L}$ is a matrix of product-sector imports implied by the MPI vector $\mathbf{B}$. Elements of $N^c(D(\boldsymbol{\theta}\mathbf{B})\mathbf{L})$ are the share of product p imports going to sector s.[16]

We can now see that the weighting matrix we used in Section 2 was a special case of this weighting matrix. If $\mathbf{B^T} = [\beta \quad \beta]$, then $D(\boldsymbol{\theta}\mathbf{B}) = \beta\mathbf{I}_{S\times S}$ where $\mathbf{I}_{S\times S}$ is an $S \times S$ identity matrix. Plugging this into Equation (5) we get $\mathbf{W} = N^c(\beta\mathbf{L}) = N^c(\mathbf{L})$: i.e., the matrix of sales shares of a product across sectors. Similarly, if the sales shares of the top four firms are the same across all sectors, $\theta_s = \theta\, \forall s$, then $D(\boldsymbol{\theta}\mathbf{B}) = (\theta\beta + (1 - \theta)\gamma)\mathbf{I}_{S\times S}$ and $\mathbf{W} = N^c((\theta\beta + (1 - \theta)\gamma)\mathbf{L}) = N^c(\mathbf{L})$. The transformation matrix is also the matrix of sales shares of a product across sectors.

[16] Recall that $N^c(\cdot)$ is a column normalization operator that converts elements of the argument matrix to shares within a column by dividing by the sum of elements within the column.

Conceptually, we want to find a vector $\mathbf{B}^*$ such that the vector of sector imports constructed from $\mathbf{B}^*$ will result in an estimate of the MPIs equal to $\mathbf{B}^*$. Operationally, we guess a value $\mathbf{B_j}$. Using equations (4) and (5) and data $\mathbf{L}, \mathbf{B}$, and $\mathbf{M^P}$, we construct sector imports $\mathbf{M^s_j}$. We use $\mathbf{M^s_j}$ to obtain an estimate of the MPIs, $\widehat{\mathbf{B}}_\mathbf{j}$. If $\widehat{\mathbf{B}}_\mathbf{j}$ is sufficiently close to the original guess $\mathbf{B_j}$ (both parameters are within 10^{-5}) then this is our solution $\mathbf{B}^*$. If not, then we update our guess and repeat the exercise.[17]

The top panel of Table 8 show results from this computation applied to our preferred (WLS) specification.[18] We use a delete-one jackknife plan to correct for bias and compute standard errors.[19] We use jackknife rather than bootstrap resampling because the latter method is much more computationally intensive. As a check, we did calculate bootstrap estimates for China which turned out to be very similar to the jackknife results. Overall, we find that the difference between the top-four firms' and smaller firms' MPIs is larger in absolute value than the difference between the coefficients reported in Table 2. This finding is consistent with our observation that the initial data construction under-allocated imports to more-concentrated sectors and over-allocated them to less-concentrated sectors.

Focusing on China, we find that the marginal propensity to import by the top-four firms was 14%, whereas the MPI for the rest of the sector was −2.9%. The top-four MPI of 14% means that, *ceteris paribus*, an increase of one dollar in sales at the top-four firms is accompanied by a 14 cent increase in that sector's imports from China. The negative MPI for smaller firms means that, *ceteris paribus*, an increase of one dollar in sales at a non-top-four retailer results in a *decrease* of almost 3 cents in that sector's imports from China. Note, however, that imports need not turn negative or even stop increasing, because

[17]We limit our search to a subset of $\mathbb{R}^2$. Our methodology does not preclude the possibility of solution outside the search space. We disregard the trivial solution $\mathbf{B^T} = [0 \quad 0]$ as well as any solution that assigns a negative value to any sector's imports.

[18]We use only the recent NAICS-based data (1997–2002) in this exercise because of the historical data's shortcomings discussed in Section 2, in particular the small number of observations and the mismatch between the 1989 import data and the 1987 sales figures.

[19]In practice, we omit one *sector* at a time. For each jackknife sample we search for the vector $\mathbf{B}^*$ that satisfies the above condition.

there are still sector and year fixed effects in the regression.[20] Holding all else (including the size of the top-four firms) constant, a sector whose smaller firms increased their sales by \$1 million between 1997 and 2002 will have seen imports from China increase by \$28,700 *less* than a sector whose smaller firms did not grow over this period.

The most striking numbers are for the rich and non-rich, non-oil regions. The top-four firms' MPI from non-rich, non-oil countries is 23% whereas the smaller firms' MPI from these countries is −4%. In contrast, the MPI from rich countries is negative (−1.6%) for the largest firms and positive (13%) for smaller firms.

The computed MPIs roughly agree with the difference-in-difference estimates reported in Table 2 but are larger in absolute value. The difference-in-difference estimates capture the relationship between consolidation (differential growth) in a retail sector and growth of imports of *the sort of products* that the sector tends to sell. The computational results quantify the relationship between consolidation in a sector and imports that the sector actually sells by using a more accurate allocation of import shares.

While these estimates correct for the allocations of imports across sectors, there is one factor they omit. The left-hand side variables, imports, is measured in *input* dollars, whereas the right-hand side variable, retail revenues, is measured in *output* dollars. To compare these figures we need to know the size of the retail markup over the import price, or equivalently the elasticities of residual demand curves facing individual stores. If store-specific elasticities of demand range from approximately 2 (for DVDs, estimated by Chiou, forthcoming) to 3 (estimate for aggregate demand elasticity at Wal-Mart from Basker and Van, 2006), then the difference of 17 cents between large and small firms' MPIs translates to a difference as large as 25–34 cents between the share of the marginal dollar spent at a top-four retailer and the share spent at a smaller retailer that goes to Chinese-produced goods. A similar calculation shows that the difference between the share of the marginal dollar spent at large and small

[20] Both point estimates for β and γ were similar, but marginally smaller in absolute value, with bootstrapping; as were the standard errors. Equality of the coefficients is resoundingly rejected.

retailers that purchases goods from LDCs as a whole ranges between 40 and 54 cents.

5 Counterfactual Exercise

To understand the effect of the relationship between import growth and retail-chain consolidation, we use the MPI estimates in Table 8 to calculate what import growth from the various source countries and regions would have been had the consolidation trend, depicted in Figure 3, stopped in 1997. Specifically, we perform the following thought experiment. Holding fixed (at actual levels) the total increase in sales in each sector, we ask how much imports would have increased if this sector-level growth had been uniform, that is, if sales at the top-four firms had increased at the same rate as sales in the smaller firms.

We calculate the counterfactual 2002 import level as

$$\begin{aligned}\textbf{Counterfactual Imports}_{s,2002} = \widehat{\alpha}_s + \widehat{\delta}_{2002} + \widehat{\beta} \cdot (\lambda_s \cdot \textbf{Top4Sales}_{s,1997}) \\ + \widehat{\gamma} \cdot (\lambda_s \cdot \textbf{Non4Sales}_{s,1997}) \quad (6)\end{aligned}$$

where λ_s is overall sales growth in sector s between 1997 and 2002, and $\widehat{\beta}$ and $\widehat{\gamma}$ are the MPIs obtained from the numerical exercise in Section 4. We also calculate predicted 2002 imports using the actual values of $\textbf{Top4Sales}_{s,2002}$ and $\textbf{Non4Sales}_{s,2002}$ in place of $(\lambda_s \cdot \textbf{Top4Sales}_{s,1997})$ with $\textbf{Top4Sales}_{s,2002}$ and $(\lambda_s \cdot \textbf{Non4Sales}_{s,1997})$, respectively.[21]

The impact of the disproportionate growth of larger retailers on import growth between 1997 and 2002 is summarized in the lower panel in Table 8. For each source country or region we calculate the import growth rate, starting from 1997 levels, under the actual and counterfactual scenarios. We do this by aggregating the implied import increases, sector by sector, that are implied by the MPI estimates. For example, import growth from China

[21] Predicted 2002 imports using this formula differ slightly from actual 2002 imports because we use the regression coefficients from the weighted regression to generate the predicted values. We use the same coefficient estimates to make both the actual and the counterfactual predictions.

under the actual change in the size distribution of retailers is estimated at 71% over this period. Had the size distribution of firms remained constant, however, import growth from China would have been lower by 20 points. There is approximately a 10-point difference in the growth of Asian, Mexican, and Central American imports, and a 22-point difference in the overall growth of imports from LDCs.

The main impact of the size distribution of firms is not on the total volume of imports, however, but on the *distribution* of imports: which source countries are used the most. The growth in world imports is estimated to be similar under the two scenarios: the difference is only 5%. Growth of imports from rich countries would have been sharply curtailed had small firms and large firms grown at the same rate over this period, partially offsetting the growth of LDC imports. These results underscore the point that both small and large retailers sell imported products — but they obtain them from different places.

6 Concluding Remarks

We use data from the Census of Retail Trade and the U.S. International Trade Commission to test for a relationship between the size of the largest retail firms in each sector and the value of imports the sector sells. Using a difference-in-difference specification to control for both time-invariant differences across sectors and overall growth of imports, we find disproportionate increases in imports from China and other less-developed countries (LDCs) for goods sold in sectors that are increasingly dominated by large chains. We estimate the difference between large and small firms' marginal propensity to import from China — the share of an additional dollar in sales that is used to buy goods from China — at nearly 17 cents per dollar, and over 27 cents per dollar for LDCs as a whole. In contrast, small firms spend nearly 15 cents more per dollar than large firms on imports from rich source countries. Since these figures do not adjust for a retail markup, the true differences in MPIs may be up to twice as large.

These differences in import propensities help explain the dramatic growth in imports of consumer goods from China and other LDCs over the past two decades. The largest retail firms have grown faster than smaller firms in almost every sector, thanks in part to their advantage in procuring cheap imports: the share of retail dollars spent at the top four firms in each sector increased in 82% of retail sectors between 1997 and 2002. Had retail firms grown uniformly, import growth from LDCs would have been 22% lower over this period, and import growth from China would have been 20% lower. Overall U.S. imports of consumer goods would have been only marginally lower, however, because imports from rich source countries have grown at a *lower* rate than they would have in the absence of consolidation in the retail sector.

The growth of the largest retailers has increased retailers' bargaining power in global input markets (see, for example, Feenstra and Hamilton, 2006; Petrovic and Hamilton, 2006), with possible implications for upstream industry structure. Javorcik, Keller, and Tybout (2006) argue that Walmex's entry in Mexico led to increased innovation by Mexican soap producers and Javorcik and Li (2008) find a similar effect for supplying firms when global retail chains expanded in Romania. A similar effect may occur via "backward-integration" of the retailer with its suppliers (Betancourt, 2004). Buyer power can also have ramifications for the distribution of rents between retailers and manufacturers when trade is liberalized (Raff and Schmitt, 2007).

The increase in imports from developing countries has also contributed to low and falling prices for many consumer goods. Consumer prices have fallen dramatically in some of the sectors with the highest increase in imports from China between 1997 and 2002. At a time when the overall CPI rose by 14%, the CPI for computer hardware and software fell by 80% and 30% respectively, by 40% for televisions, and by more than 20% for toys. These falling prices have disproportionately benefited poorer Americans (Broda and Romalis, 2008).

Large chains have contributed to falling prices by facilitating substitution between high-cost imports and low-cost imports. All retailers sell imported products but small retailers do not sell the volume necessary to warrant incurring the fixed costs associated with contracting directly with low-cost countries. These small retailers are more likely to use intermediaries who mark up the price or to sell imports from rich countries. Retailers from LDCs cannot sell directly in the U.S. market because the fixed (and variable) costs to do so are prohibitive. This leaves the large U.S. retailers as the main platform for imports of consumer goods from LDCs. In this role, large retailers reap the benefits of substantially lower production costs in LDCs while facilitating growth in the LDCs by bringing their products to market.

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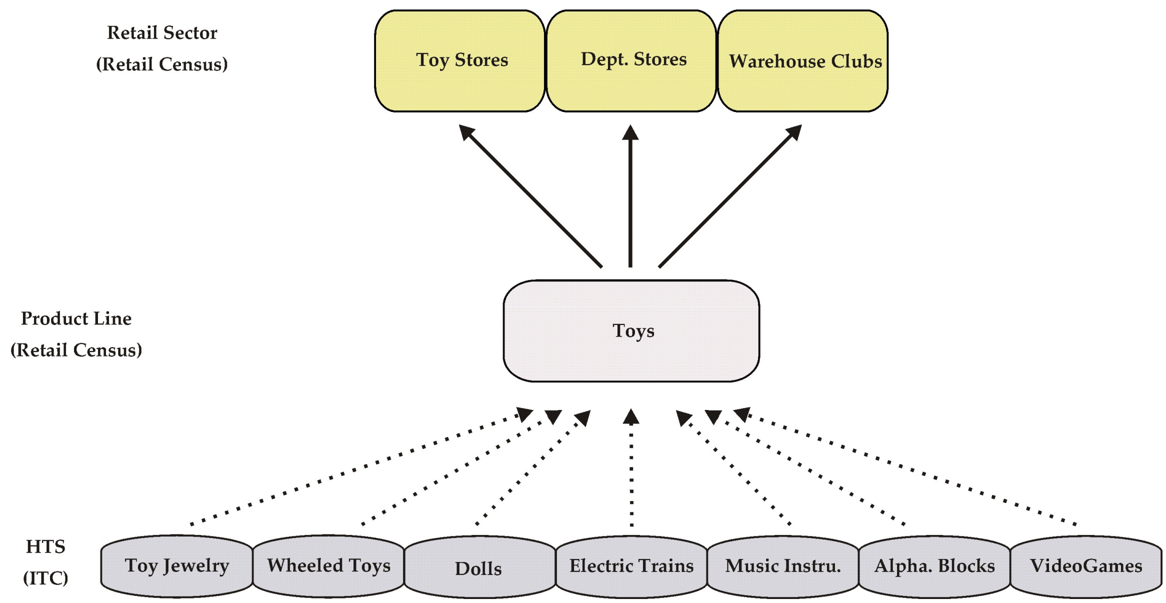
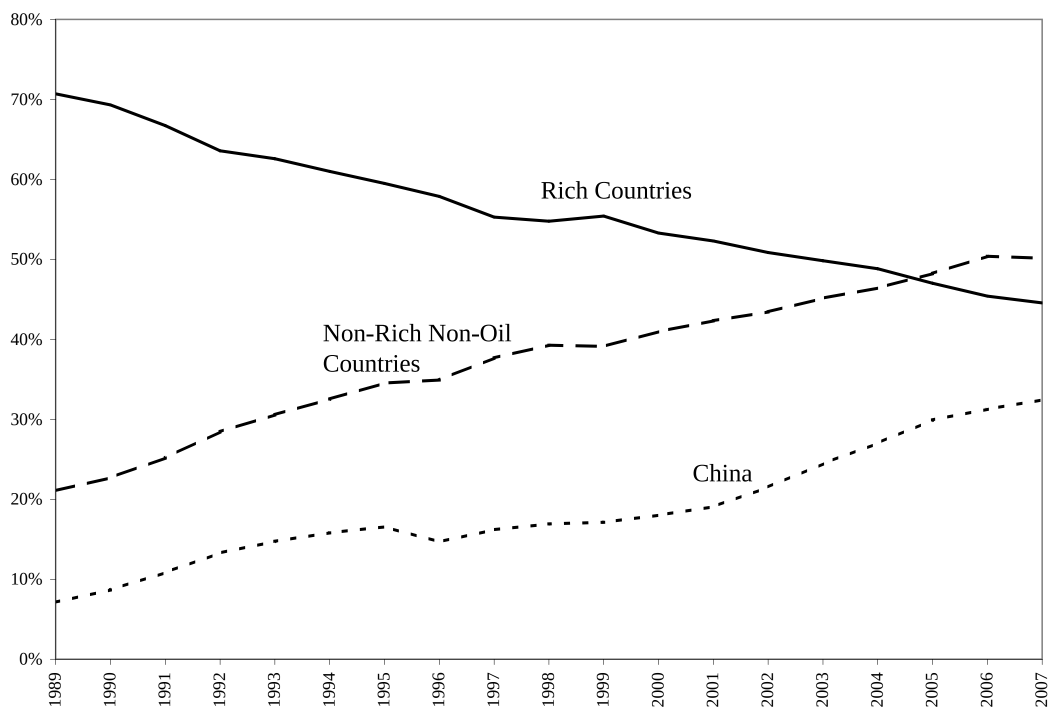
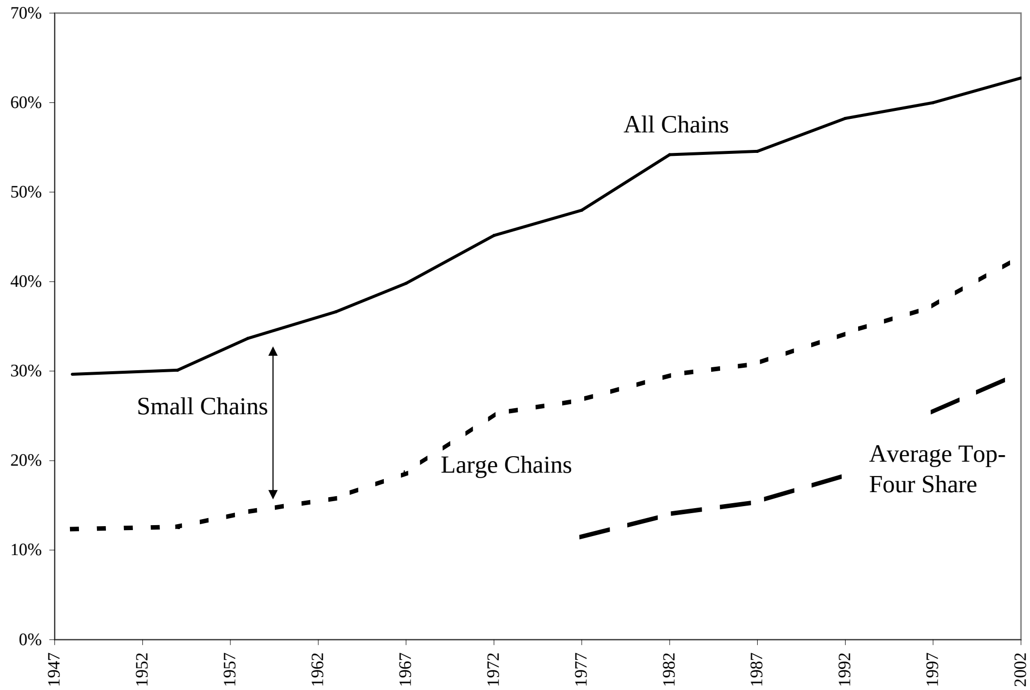


Figure 1. Constructing Sector Imports: Toy Stores



Source: Authors' calculations from U.S. International Trade Commission

Figure 2. Share of Total Consumer Goods Imports to the U.S. by Source.



Source: Basker, Klimek, and Van (2008) and authors' calculations from Census of Retail Trade

Figure 3. All Chains', Large Chains', and Top Four Firms' Share of Dollar Sales

Table 1. Summary Statistics

	1987/89[a]	1992	1997	2002
Average Sector Sales[b]	61,212	62,754	38,310	42,450
Average Top-4 Sales[b]	9,095	11,135	9,433	13,626
Consumer Goods Imports from:				
China	12,846	24,878	49,859	83,981
Asia	145,758	152,983	187,572	229,257
Mexico	10,811	13,736	35,418	48,336
Central America	2,217	3,516	7,232	9,039
Non-Rich Non-Oil Countries	49,508	69,050	133,861	195,646
Rich Countries	177,422	165,575	198,955	232,029
Entire World	254,542	263,951	367,492	465,827

All figures in millions of 2002 dollars

[a] Sales figures are for 1987; import figures are for 1989

[b] 1987 and 1992 sectors are 3-digit SIC; 1997 and 2002 are 6-digit NAICS

Table 2. Weighted Least Squares Coefficient Estimates

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
Top4Sales	0.0974***	0.1222***	0.0355***	0.0076**	0.1750***	0.0294*	0.2187***
	(0.0230)	(0.0296)	(0.0112)	(0.0034)	(0.0388)	(0.0154)	(0.0385)
Non4Sales	0.0295*	0.0853***	0.0078	0.0023**	0.0589***	0.0930***	0.1616***
	(0.0156)	(0.0227)	(0.0051)	(0.0011)	(0.0203)	(0.0327)	(0.0294)
t statistic[a]	2.2440	0.9251	2.0111	1.6436	2.4799	1.4791	1.1209
p value (one sided)	0.0140	0.1790	0.0241	0.0523	0.0078	0.0718	0.1331
χ^2 statistic[b]	0.0367	0.5445	0.3264	2.6975	0.0018	0.4810	0.4108
p value	0.8481	0.4606	0.5678	0.1005	0.9663	0.4880	0.5215

Each column represents a separate WLS regression. Observations are weighted by $\frac{1}{\mathbf{SectorSales}^2}$.

Each regression has 144 observations. Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

[b] χ^2 statistic is for a Breusch-Pagan test for heteroskedasticity with respect to sector size

Table 3. Ordinary Least Squares Coefficient Estimates

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
Top4Sales	0.0371***	0.0848***	0.0203***	0.0033**	0.0834***	0.0750***	0.1758***
	(0.0116)	(0.0189)	(0.0038)	(0.0013)	(0.0172)	(0.0246)	(0.0179)
Non4Sales	0.0008	0.0814**	0.0283**	-0.0004	0.0354	0.1761*	0.2185***
	(0.0208)	(0.0348)	(0.0122)	(0.0010)	(0.0244)	(0.0894)	(0.0789)
t statistic[a]	1.9249	0.1184	0.9011	3.0075	2.0221	1.5658	0.7615
p value (one sided)	0.0291	0.4530	0.6853	0.0018	0.0235	0.0609	0.7244
χ^2 statistic[b]	65.7062	88.3765	132.6773	16.0755	45.2372	450.4402	233.7182
p value	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000

Each column represents a separate OLS regression.

Each regression has 144 observations. Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

[b] χ^2 statistic is for a Breusch-Pagan test for heteroskedasticity with respect to sector size

Table 4. Log Specification Coefficient Estimates

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
ln(**Top4Sales**)	0.6117***	0.2763**	0.2204	0.3688**	0.3632***	0.1925*	0.2714***
	(0.1730)	(0.1144)	(0.1413)	(0.1487)	(0.1017)	(0.1029)	(0.1006)
ln(**Non4Sales**)	0.2201	0.4688**	0.5298**	0.0708	0.2893*	0.7770***	0.6631***
	(0.2314)	(0.1839)	(0.2051)	(0.2539)	(0.1675)	(0.1880)	(0.1619)
χ^2 statistic[b]	2.8819	0.7757	2.3925	0.3577	2.0931	1.6785	2.0367
p value	0.0896	0.3785	0.1219	0.5498	0.1480	0.1951	0.1535
				Slope Evaluated at Mean Values			
Top4Sales	0.0495	0.0690	0.0111	0.0036	0.0721	0.0497	0.1357
Non4Sales	0.0072	0.0473	0.0108	0.0003	0.0232	0.0810	0.1339
t statistic[a]	2.2879	0.5064	0.0357	1.7710	1.6466	0.7352	0.0236
p value (1-sided)	0.0126	0.2833	0.4604	0.0372	0.0448	0.7592	0.4906
				Slope Evaluated at Median Values			
Top4Sales	0.0536	0.0873	0.0102	0.0009	0.0923	0.0531	0.1840
Non4Sales	0.0058	0.0445	0.0074	0.0001	0.0221	0.0644	0.1350
t statistic[a]	2.5761	0.8698	0.3663	1.9702	2.0350	0.2770	0.5213
p value (1-sided)	0.0060	0.1937	0.3576	0.0264	0.0228	0.3913	0.3019

Each column represents a separate regression.

Each regression has 144 observations. Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

[b] χ^2 statistic is for a Breusch-Pagan test for heteroskedasticity with respect to sector size

Table 5. WLS Coefficient Estimates, Historical Data

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
Top4Sales	0.0757**	0.0870	0.0065***	0.0138**	0.1458***	-0.0001	0.1479*
	(0.0304)	(0.0572)	(0.0021)	(0.0055)	(0.0531)	(0.0327)	(0.0798)
Non4Sales	0.0187*	0.0913**	0.0082***	0.0010	0.0372**	0.0609*	0.1206**
	(0.0098)	(0.0427)	(0.0022)	(0.0016)	(0.0176)	(0.0313)	(0.0507)
t statistic[a]	1.5813	0.0585	0.4386	1.9224	1.6485	1.3788	0.2649
p value (one sided)	0.0612	0.9768	0.8318	0.0311	0.0539	0.0881	0.3963
χ^2 statistic[b]	3.0479	0.2976	0.2313	2.1985	1.5062	1.7977	0.6898
p value	0.0808	0.5854	0.6306	0.1381	0.2197	0.1800	0.4062

Each column represents a separate regression. Observations are weighted by $\frac{1}{\mathbf{SectorSales}^2}$.

Each regression has 76 observations. Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

[b] χ^2 statistic is for a Breusch-Pagan test for heteroskedasticity with respect to sector size

Table 6. OLS Coefficient Estimates, Historical Data

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
Top4Sales	0.0696***	0.0657*	0.0094	0.0101***	0.1271***	-0.0261*	0.1032**
	(0.0196)	(0.0330)	(0.0071)	(0.0033)	(0.0400)	(0.0129)	(0.0442)
Non4Sales	-0.0037	0.0021	0.0076	-0.0002	-0.0005	0.0128**	0.0136
	(0.0037)	(0.0106)	(0.0103)	(0.0005)	(0.0103)	(0.0059)	(0.0143)
t statistic[a]	4.7962	2.3149	0.1668	3.9869	4.0067	3.4935	2.4656
p value (one sided)	0.0000	0.0131	0.4342	0.0002	0.0001	0.0006	0.0092
χ^2 statistic[b]	0.0016	0.2624	379.8574	0.0814	3.1068	0.4940	0.1958
p value	0.9683	0.6085	0.0000	0.7755	0.0780	0.4822	0.6581

Each column represents a separate regression.

Each regression has 76 observations. Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

[b] χ^2 statistic is for a Breusch-Pagan test for heteroskedasticity with respect to sector size

Table 7. Log Coefficient Estimates, Historical Data

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
ln(**Top4Sales**)	0.2587**	0.1662***	0.3670***	0.5867***	0.3649***	0.0924	0.1913**
	(0.1225)	(0.0569)	(0.1014)	(0.1276)	(0.0934)	(0.0884)	(0.0842)
ln(**Non4Sales**)	0.9681***	0.7646***	0.9032***	0.7697***	0.6766**	0.7726***	0.6809***
	(0.3030)	(0.0985)	(0.1841)	(0.2110)	(0.2502)	(0.1827)	(0.1807)
χ^2 statistic[b]	3.0382	1.3951	0.0124	0.7128	0.9602	5.5427	3.6174
p value	0.0813	0.2375	0.9114	0.3985	0.3271	0.0186	0.0572
				Slope Evaluated at Mean Values			
Top4Sales	0.0133	0.0666	0.0122	0.0046	0.0586	0.0424	0.1330
Non4Sales	0.0098	0.0604	0.0059	0.0012	0.0214	0.0699	0.0934
t statistic[a]	0.4929	0.2277	1.4950	3.2745	2.1511	0.6497	0.7545
p value (1-sided)	0.3125	0.4106	0.0717	0.0012	0.0190	0.2600	0.2277
				Slope Evaluated at Median Values			
Top4Sales	0.0099	0.0744	0.0131	0.0029	0.0667	0.0445	0.1461
Non4Sales	0.0060	0.0557	0.0052	0.0006	0.0201	0.0606	0.0847
t statistic[a]	0.7589	0.6345	1.8086	3.5225	2.4588	0.3691	1.0586
p value (1-sided)	0.2263	0.2648	0.0393	0.0006	0.0094	0.3571	0.1483

Each column represents a separate regression.

Each regression has 76 observations. Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

[b] χ^2 statistic is for a Breusch-Pagan test for heteroskedasticity with respect to sector size

Table 8. Computed Marginal Propensities to Import

	China	Asia	Mexico	Central America	Non-Rich, Non-Oil	Rich	World
				Estimates			
Top4 MPI	0.1405***	0.1321***	0.0309*	0.0081**	0.2337***	-0.0162	0.2354***
	(0.0300)	(0.0486)	(0.0176)	(0.0036)	(0.0399)	(0.0331)	(0.0618)
Non4 MPI	-0.0287	0.0542	-0.0074**	0.0015	-0.0400**	0.1306***	0.1228**
	(0.0302)	(0.0439)	(0.0031)	(0.0016)	(0.0161)	(0.0488)	(0.0574)
t statistic[a]	3.1118	0.9181	1.8561	1.7055	5.5257	1.1907	1.0294
p value (1-sided)	0.0013	0.1808	0.0338	0.0462	0.0000	0.0300	0.1534
	Predicted Import Growth: Actual vs. Counterfactual Changes in Size Distribution						
Actual	0.7138	0.3379	0.3142	0.3280	0.5181	0.1361	0.3130
Counterfactual	0.5151	0.2498	0.2038	0.2062	0.2959	0.1854	0.2626
Difference	0.1987	0.1027	0.1104	0.1218	0.2222	-0.0493	0.0504

Each column represents a separate computation.

Point estimates and standard errors obtained from delete-one jackknife resampling. See text for details.

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] t statistic is for a test of $H_0 : \beta \leq \gamma$ except for Rich, where $H_0 : \beta \geq \gamma$. (β is the coefficient on **Top4Sales** and γ is the coefficient on **Non4Sales**.)

Table A-1. NAICS Sectors, 1997–2002

NAICS	Description
441110	New car dealers
441120	Used car dealers
441210	Recreational vehicle dealers
441221	Motorcycle dealers
441222	Boat dealers
441229	All other motor vehicle dealers
441310	Automotive parts and accessories stores
441320	Tire dealers
442110	Furniture stores
442210	Floor covering stores
442291	Window treatment stores
442299	All other home furnishings stores
443111	Household appliance stores
443112	Radio, television, and other electronics stores
443120	Computer and software stores
443130	Camera and photographic supplies stores
444110	Home centers
444120	Paint and wallpaper stores
444130	Hardware stores
444190	Other building material dealers
444210	Outdoor power equipment stores
444220	Nursery and garden centers
445110	Supermarkets and other grocery (except convenience) stores
445120	Convenience stores
445210	Meat markets
445220	Fish and seafood markets
445230	Fruit and vegetable markets
445291	Baked goods stores
445292	Confectionery and nut stores
445299	All other specialty food stores
445310	Beer, wine, and liquor stores
446110	Pharmacies and drug stores
446120	Cosmetics, beauty supplies, and perfume stores
446130	Optical goods stores
446191	Food (health) supplement stores
446199	All other health and personal care stores

Table A-1. NAICS Sectors, 1997–2002 – Continued

NAICS	Description
447110	Gasoline stations with convenience stores
447190	Other gasoline stations
448110	Men's clothing stores
448120	Women's clothing stores
448130	Children's and infants' clothing stores
448140	Family clothing stores
448150	Clothing accessories stores
448190	Other clothing stores
448210	Shoe stores
448310	Jewelry stores
448320	Luggage and leather goods stores
451110	Sporting goods stores
451120	Hobby, toy, and game stores
451130	Sewing, needlework, and piece goods stores
451140	Musical instrument and supplies stores
451211	Book stores
451212	News dealers and newsstands
451220	Prerecorded tape, compact disc, and record stores
452110	Department stores (excluding leased departments)
452910	Warehouse clubs and superstores
452990	All other general merchandise stores
453110	Florists
453210	Office supplies and stationery stores
453220	Gift, novelty, and souvenir stores
453310	Used merchandise stores
453910	Pet and pet supplies stores
453920	Art dealers
453930	Manufactured (mobile) home dealers
453991	Tobacco stores
453998	All other miscellaneous store retailers (except tobacco)
454110	Electronic shopping and mail order houses
454210	Vending machine operators
454311	Heating oil dealers
454312	Liquefied petroleum gas (bottled gas) dealers
454319	Other fuel dealers
454390	Other direct selling establishments

Table A-2. SIC Sectors, 1987–1992

SIC	Description
521	Lumber and other building materials dealers
523	Paint, glass, and wallpaper stores
525	Hardware stores
526	Retail nurseries, lawn and garden supply stores
527	Mobile home dealers
531	Department stores
533	Variety stores
539	Miscellaneous general merchandise stores
541	Grocery stores
542	Meat and fish (seafood) markets
543	Fruit and vegetable markets
544	Candy, nut, and confectionery stores
545	Dairy product stores
546	Retail bakeries
549*	Miscellaneous food stores
551	New and used car dealers
552	Used car dealers
553	Auto and home supply stores
554	Gasoline service stations
555	Boat dealers
556	Recreational vehicle dealers
557	Motorcycle dealers
559	Automotive dealers, not elsewhere classified
561	Men's and boys' clothing stores
562	Women's clothing stores
563	Women's accessory and specialty stores
564	Children's and infants' wear stores
565	Family clothing stores
566	Shoe stores
569	Miscellaneous apparel and accessory stores
571	Furniture and home furnishings stores
572	Household appliance stores
573	Radio, television, computer, and music stores
581	Eating and drinking places
591	Drug and proprietary stores
592	Liquor stores
593*	Used merchandise stores
594	Miscellaneous shopping goods stores
596	Non-store retailers
598	Fuel dealers
599*	Miscellaneous retail stores

* Omitted from analysis due to missing data

Table A-3. Product Definitions

Description
Groceries & other food items for human consumption off the premises
Packaged liquor, wine, & beer
Cigars, cigarettes, tobacco, & smokers' accessories, excluding sales from vending machines
Drugs, health aids, beauty aids, including cosmetics, vitamins, diapers, hearing aids
Soaps, detergents, & household cleaners
Paper & related products, including paper towels, toilet tissue, wraps, bags, foils, etc.
Men's, Women's, & children's wear
Footwear, including accessories
Sewing, knitting materials & supplies, needlework goods, including fabrics, patterns, etc.
Curtains, draperies, blinds, slipcovers, bed & table coverings, including sheets & towels
Major household appliances, including vacuum cleaners, sewing machines, refrigerators, freezers, room air conditioners, dishwashers, ranges, microwaves, washers & dryers, etc.
Small electric appliances, including mixers; blenders; can openers; toasters; coffee makers; fry pans; & personal care appliances, such as hair dryers, curling irons, shavers, etc.
Televisions, video recorders, video cameras, video tapes, DVDs, etc.
Audio equipment, musical instruments, radios, stereos, compact discs, tapes, sheet music
Furniture, sleep equipment & outdoor/patio furniture
Flooring & floor coverings
Computer hardware, software, & supplies, including computer game software
Kitchenware & home furnishings, including cookware, cooking access, dinnerware, glassware, giftware, decorative accessories & lighting, clocks, mirrors, closet & bathroom accessories
Jewelry, including watches, watch attachments, novelty jewelry, etc.
Books
Photographic equipment & supplies
Toys, hobby goods, & games, including stuffed animals, video & electronic games, electronic game devices, & wheel goods, except bicycles
Optical goods, including eyeglasses, contact lenses, sunglasses, etc.
Sporting goods, including saddlery, boats, personal watercraft, snowmobiles, all terrain vehicles (ATVs), golf cars, & other motorized sport vehicles, bicycles, parts & accessories
Recreational vehicles, including camping trailers, travel trailers, truck campers, motor homes
Hardware, tools, & plumbing & electrical supplies, including ceiling fans & light fixtures
Lawn, garden, & farm equipment & supplies; cut flowers; plants & shrubs; fertilizers; etc.
Dimensional lumber & other building/structural materials & supplies
Paint & sundries
Manufactured (mobile) homes
Wallpaper & other flexible wall coverings
Autos, cars, vans, trucks, motorcycles, motor bikes & other powered transportation vehicles
Automotive fuels
Automotive lubricants, including oil, greases, etc.
Automotive tires, tubes, batteries, parts, accessories
Household fuels, including oil, LP gas, wood, coal
Pets, pet foods, & pet supplies
All other merchandise