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ABSTRACT

In this paper, we examine Hong Kong's role in intermediating trade between China and the rest of the world. Hong Kong distributes a large fraction of China's exports. Net of customs, insurance, and freight charges, re-exports of Chinese goods are much more expensive when they leave Hong Kong than when they enter. Hong Kong markups on re-exports of Chinese goods are higher for differentiated products, products with higher variance in export prices, products sent to China for further processing, and products shipped to countries which have less trade with China. These results are consistent with quality-sorting models of intermediation and with the outsourcing of production tasks from Hong Kong to China. Additional results suggest that Hong Kong traders price discriminate across destination markets and use transfer pricing to shift income from high-tax countries to Hong Kong.

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1. Introduction

It is standard in international economics to assume that trade occurs between producers and final users. A firm in the home country hires local resources to produce a good, which it sells directly to consumers in a foreign country. This view of international exchange underlies nearly all major trade models, but how goods are actually traded appears to be more complicated. Entrepôt economies such as Hong Kong and Singapore are an important feature of global exchange (Findlay and Wellisz, 1993; Sung, 1997). These trading centers specialize in matching buyers and sellers in different markets. In particular, they intermediate a substantial fraction of trade between Asia and the rest of the world. In 1998, the ratio of total trade to GDP was 259% in Hong Kong and 269% in Singapore.

In this paper, we examine Hong Kong's role in re-exporting goods from China to the rest of the world. In this arrangement, traders in Hong Kong import goods from China and then distribute them to a final destination. By definition, goods for re-export cannot be subject to substantial manufacturing operations, but this does not exclude simple processing, such as sorting or packaging, or service activities, such as marketing or transport. Over the period 1988-1998, 53% of Chinese exports were shipped through Hong Kong in this manner. Net of customs, insurance, and freight charges, Chinese goods are much more expensive when they leave Hong Kong than when they enter. For the 1988-1998 period, the average markup on Hong Kong re-exports of Chinese goods was 24%. The income flow from these entrepôt activities is large. In 1996, re-exports of Chinese goods equaled 52% of Hong Kong GDP (Hsieh and Woo, 1999). In that same year, Hong Kong markups on these re-exports totaled 10% of GDP, while manufacturing accounted for only 7% of GDP (Young, 1999).[1]

[1] Enright et al. (1997) estimate that export-import services, in total, were 18% of Hong Kong GDP in 1994.

Using detailed trade data from Hong Kong and China, we shall examine the factors that influence the share of Chinese goods that are re-exported through Hong Kong and the markup Hong Kong applies to these goods.[2] One compelling hypothesis is that Hong Kong traders have an informational advantage in trade between China and the rest of the world. This advantage may be due to Hong Kong's proximity to mainland China, especially the southern coastal provinces where export production is concentrated (Sung, 1991). Building on these links, Hong Kong traders may specialize in identifying Chinese producers who can meet foreign quality standards and in finding markets for Chinese goods.[3] In their role as middlemen, traders may earn informational rents, which could account for the markups they charge. This quality-sorting view of entrepôt activities relates closely to recent theories of search and intermediation (Townsend, 1978; Rubinstein and Wolinsky, 1987; Biglaiser, 1993; Spulber, 1996), and to general equilibrium models of international trade with information costs (Casella and Rauch, 1997; Rauch and Casella, 1998, Wan and Weisman, 1999).

Traders are often more than middlemen. Many firms that import goods from China for re-export engage in *outward processing* (Sung, 1991). Before importing goods from China, they may purchase raw materials on the world market, process these materials in Hong Kong or elsewhere, and export the unfinished goods to China for yet further processing. Hong Kong's re-exports may then be the final leg in a much longer journey. In 1998, outward-processing trade accounted for 48% of Hong Kong exports to China and 83% of Hong Kong imports from China. Quality sorting and outward processing are often complementary activities and we

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[2] Hong Kong's intermediary services go well beyond entrepôt trade. Firms in Hong Kong broker foreign direct investment in and international loans to China, and advise foreign firms doing business in China (Sung, 1991). See Wan and Weisman (1999) for a model of how intermediation by Hong Kong affects China's export activity.

[3] In a related view, Naughton (1999) suggests Hong Kong firms engage in "property rights arbitrage": they use their specific knowledge of business conditions in China and the security of property rights in Hong Kong to broker deals with agents who want access to China's market but are wary about its insecure property rights.

attempt to control for this in our empirical work. We also control for other behavior which may influence re-export activity, including transfer pricing, circumventing trade barriers, and hubbing in international shipping.

To preview some of our results, Hong Kong markups on re-exports of Chinese goods are higher for differentiated products, products with higher variance in export prices, products sent to China for further processing, and products shipped to countries which have less trade with China. These results are consistent with quality-sorting models of intermediation. Markups are lower for products shipped longer distances, consistent with Young (1999); higher for products subject to Multi-Fiber Arrangement (MFA) quotas; and higher for products shipped to countries with higher corporate tax rates. These last two results suggest that firms may use re-exporting to transfer income from abroad to the low-tax jurisdiction of Hong Kong.

Our work adds to a growing empirical literature on informational costs and trade. Young (1999) presents evidence on entrepôt trade involving Hong Kong, the United States, and the Netherlands. He finds that transport costs do not appear to account for increases in the prices of goods as they pass through international hubs. This paper extends his findings by examining the impact of product quality, outward processing, transfer pricing, and trade barriers on entrepôt activity. Related literature includes Gould (1994), Head and Ries (1998), and Rauch and Trindade (1999), who find that bilateral trade volumes are higher between countries which share large immigration flows and/or ethnic business networks.

In the next section, we describe the data used in the analysis, and in section 3 we discuss formal theories of middlemen and how they apply to the Hong Kong. These are used to motivate our empirical specification, the results from which are presented in section 4. Conclusions are given in section 5.

2. Background and Data

Hong Kong's position as an entrepôt dates back to China's cession of the Island to Britain in 1842 (Sung, 1991). Trade between Hong Kong and China was mostly dormant during the rigid Chinese communist rule of 1949 to 1978. The opening of China to foreign trade and investment in the late 1970s has lead to dramatic changes in both economies. Before 1980, Hong Kong grew largely through producing and exporting labor-intensive manufactures, such as apparel, textiles, footwear, toys, and consumer electronics (Findlay and Wellisz, 1993; Berger and Lester, 1997). Learning about the production and marketing of these goods, which also account for a large fraction of China's current exports, may have helped Hong Kong become a middleman for global trade (Hamilton, 1999).

Since 1980, Hong Kong has begun to specialize more heavily in business services, particularly those related to trade and investment in China. China's export manufacturers are concentrated in southern coastal provinces, especially Guandong which borders Hong Kong (Sung, 1997).[4] Over the last two decades, many Hong Kong manufacturing firms have moved their production facilities to Guandong, which they manage from headquarters in Hong Kong (Kwok and So, 1995).[5] Hong Kong firms typically supply plants in China with raw materials and often ship the goods through Hong Kong for inspection, finishing, or packaging before exporting them to a final destination (Sung, 1991; Kwok and So, 1995). As Hong Kong has

[4] Until the early 1990s, China had two regimes for exporters (Naughton, 1996). Those doing outward processing for foreign buyers could import inputs duty free and export abroad directly. Other exporters faced barriers on imported inputs and had to export through state-controlled foreign trade corporations. In 1992, the government began to lift these restrictions. Since Hong Kong returned to Chinese rule in 1997, it continues to be open to foreign trade and investment, as part of the "one country, two systems" policy.

[5] Hsieh and Woo (1999) find that outsourcing to China has been associated with a rise in the relative demand for skilled labor in Hong Kong, consistent with the observation that Hong Kong firms tend to move labor-intensive manufacturing operations to China while keeping skill-intensive management operations in Hong Kong.

shifted production to China, manufacturing has become a less important part of the Hong Kong economy, declining from 24% of GDP in 1980 to 7% of GDP in 1996 (Enright et al., 1997).

Outward processing is not the sole, or even most well-established, motivation for Hong Kong re-exports of Chinese goods. Many re-exporters own no manufacturing facilities; rather, they serve as middlemen in transactions between buyers and sellers located in distinct foreign markets. One well-known Hong Kong trading house is Li & Fung, which specializes in trading, distribution, and retailing. In 1998 it had global sales of $2 billion and offices in over 20 countries. The typical arrangement is for a foreign manufacturer or retailer to approach Li & Fung with a product they would like to purchase or have produced. In simple transactions, Li & Fung is purely a matchmaker: "The idea is that maybe foreigners don't know which factory to go to, so you perform an introductory role, maybe a quality-control role and there it stops," says its managing director (Slater and Amaha, 1999: 11). In more complex transactions, Li & Fung oversee the entire fabrication of a good, from purchasing raw materials and planning production to monitoring manufacturing among the 7,500 independent plants to which it subcontracts orders. In return for its trading services, Li & Fung is reported to earn commissions of 7%-12% on each order it fills (Slater and Amaha, 1999).

2.1 Data Sources and Issues

The trade data we use for the analysis come from two sources: Hong Kong imports, exports, and re-exports from disaggregate electronic data provided by the Hong Kong Census and Statistics Office; and China imports and exports from disaggregate electronic data provided by the Customs General Administration, People's Republic of China. We also use data from the World Bank on country GDP and exchange rates and from PriceWaterhouse on country corporate income tax rates. The data span the period 1988-1998. Chinese and Hong Kong

trade data are available by either disaggregate SITC or harmonized system (HS) categories. To concord these data, we aggregate up to four-digit SITC products.

We construct two measures of entrepôt activity in Hong Kong: (1) the fraction of total Chinese exports that are re-exported by Hong Kong, to which we refer as the *re-export share*; and (2) the log difference in average price (unit-value) of Chinese re-exports between when they enter and when they leave Hong Kong, to which we refer as the *re-export markup*. Both series are calculated by year, four-digit SITC product, and destination market, over 1988-98.

It is worth discussing the re-export data in some detail. Re-exports are observed twice, once when they enter Hong Kong as imports and again when they leave Hong Kong as exports. In the mean time, they are held in possession by Hong Kong firms but cannot be subject to "substantial transformation".[6] At the time re-exports enter the country, Hong Kong identifies the *country of origin* but *not the country of final destination*, in part because this may not yet be determined. At the time re-exports leave the country *both origin and destination countries* are identified. Thus, there is some mismatch between the import and re-export data. Letting the unit-value of Hong Kong imports from China be denoted by PM_i, and unit-value of Hong Kong re-exports of Chinese goods to country j be denoted by PX_{ij}, the markup is computed as:[7]

$$\text{Markup}_{ij} = \ln(PX_{ij}) - \ln(PM_i) \quad . \qquad (1)$$

Notice that in (1) import unit values do not vary across destination markets, which may introduce systematic bias into the measure. We also calculated an *adjusted* markup, which corrects the import unit values – calculated from the Hong Kong data – for possible

[6] A good is subject to "transformation" in Hong Kong if any process "has changed permanently the shape, nature, form, or utility of the product" (Hsia, 1984). Note that goods in transit and goods entered for transshipment on a through bill of lading do not clear customs in Hong Kong, and thus are not counted as re-exports.

[7] Actually, the unit-values PX_{ij} and PM_i are computed at the 5-digit SITC or 6-digit HS level, and then aggregated to the 4-digit SITC before applying formula (1). See the Appendix for details.

variation in import prices by country of destination – using data on *direct* Chinese exports. This method is described in Feenstra, Hai, Woo and Yao (1998, 1999). We implement this method for the dataset used in this paper, disaggregated by 4-digit SITC and all countries of destination, but it has practically no effect on our regression results. Accordingly, we report those results in an Appendix.

The *re-export shares*, which are the other measure of entrepôt activity, are constructed by combining the Chinese and Hong Kong trade data. Specifically, we sum the *direct* Chinese exports to each destination market (which do not pass through Hong Kong), with the value of Chinese *re-exports* through Hong Kong to each destination market, to obtain the total exports from China of each product. Then the Chinese re-exports through Hong Kong are expressed relative to this total, to obtain the re-export share.

Data on direct Chinese exports are useful for another purpose, as well. Chinese authorities distinguish trade based on outward processing, and trade related to multinational firms, from all other trade. The outward-processing designation comes from the fact that China permits the duty-free import of goods used to manufacture exports (Sung, 1991). These goods are treated as under contract with a foreign firm, such that the foreign firm is considered to be the entity which owns the goods, and their value is recorded when they enter and when they leave China. Chinese trade data also identify that value of exports by multinational firms, whose official designation is foreign-invested enterprises (FIEs). FIE exports are of interest since many of these firms are either headquartered in Hong Kong or have operations there. In the empirical analysis, we use the value of Chinese exports that are related to outward processing, or exported by FIEs, as additional explanatory variables.

2.2 Hong Kong Re-Exports of Chinese Goods

Table 1 shows China exports and the share of Hong Kong re-exports of Chinese goods in China exports by year. Total China exports have risen dramatically over time and shipments through Hong Kong are substantial part of this total. The re-export share of total Chinese exports increases from 43.1% in 1988 to 61.1% in 1993 and then declines to 45.4% by 1998. The decline in the later period may be due in part to recent increases in exports by Chinese regions relatively distant from Hong Kong (Sung, 1997). Outward processing accounts for a large fraction of China's exports, especially those shipped through Hong Kong. For goods China exports to Hong Kong, outward processing accounts for 73.8% of shipments in 1998, up from 49.7% in 1988, while for goods China exports directly, outward processing accounts for 40.7% of shipments in 1998, up from 12.8% in 1988. Multinational firms account for a rising fraction of Chinese exports. The share of FIEs in total China exports rises from 4.7% in 1988 to 41.9% in 1998. The FIE share in China exports to Hong Kong is larger than the FIE share in direct China exports in every year, which may be attributable to the central role that Hong Kong plays in coordinating activities in China by FIEs.

Table 2 shows the distribution of direct Chinese exports and Hong Kong re-exports of Chinese goods across one-digit SITC industries. Re-exports are concentrated in SITC 8, light manufactured articles, whose major sub-sectors are apparel and footwear. This industry accounts for 57.5% of total re-exports over the sample period (where shares are stable over time). Machinery and transport equipment (SITC 7) and manufactured materials (SITC 6), which includes textiles, are also important sources of re-exports, accounting for 22.4% and 14.0% of total re-exports respectively. SITC 7 and 8 are the two industries in which re-exports account for the largest fraction of total exports, with re-export shares of total Chinese exports

equal to 69.5% and 70.1% respectively. These are also the two industries in which outward-processed goods and exports by FIEs dominate China's shipments to Hong Kong.

In contrast to re-exports, *direct* Chinese exports are spread relatively evenly across industries. Light manufactured articles (apparel, footwear) account for only 27.9% of direct exports. Food, mineral fuels, chemicals, and crude material, which account for very small fractions of total re-exports, are relatively large sources of direct exports. In all industries outward processing and exports by FIEs account for a lower fraction of China's direct exports than of China's exports to Hong Kong.[8]

To examine the distribution of exports across sectors in more detail, Table 3 lists the two-digit SITC industries that account for an average of at least 2% of either total direct exports or total re-exports over the sample period. Apparel and textile yarn fabrics are major sources of both direct exports and re-exports. Industries which are an important for re-exports but not direct exports include toys and games, televisions and radios, footwear, electrical machinery, luggage, and office machines. These are also industries for which outward processing dominates China's shipments to Hong Kong. Industries which are important for direct exports but not re-exports include fuel oils, vegetables and fruit, fish, and inorganic chemicals.

It appears that the industries that rely most heavily on re-exports are those that produce differentiated products, such as apparel, footwear, toys, and consumer electronics. For many differentiated goods product quality is often difficult to observe or verify, which may create demand for intermediaries to resolve informational problems in exchange. These also tend to be goods whose production stages span both high-skill activities, such as product design, and

[8] Note, however, that some firms registered as FIEs in China do so only to receive favorable tax treatment, and achieve this by having a partner in Hong Kong. This so-called "round tripping" creates an artificial correlation between FIE activity and trade through Hong Kong.

low-skill activities, such as simple assembly, which makes them suitable for outward processing. Differentiated goods are frequently produced in small batches, which mitigates in favor of shipping through hubs, but they are also high-value-to-weight items, which mitigates against using hubs. Additionally, apparel and textiles are subject to MFA quotas in many countries during the sample period. Shipping these goods through Hong Kong may be a means of circumventing binding quotas on Chinese exports.

Table 4 shows the distribution of direct exports and Hong Kong re-exports across regions and the average share of re-exports in total exports by region. To the extent quality sorting is a motivation for re-exporting goods through Hong Kong, we would expect to see a higher fraction of re-exports going to rich regions, which have a relatively strong demand for differentiated goods. To the extend that transport costs are a motivation for re-exporting goods, we would expect to see a higher fraction of re-exports going to distant regions, for which the extra distance of shipping goods through a hub would add relatively little to cost.

For both direct exports and re-exports, the major destinations are, not surprisingly, the relatively large markets of North America, Western Europe, and East Asia. The regions for which re-exports account for most trade include the relatively rich and distant regions of North America (71.4%) and Western Europe (62.1%), the relatively rich and near region of Oceania (61.2%), and the relatively poor and distant regions of Latin America (65.0%) and Africa (49.9%). This variation in re-export shares across regions suggests that both quality sorting and transport costs may be important for entrepôt trade.

2.3 Markups on Hong Kong Re-Exports of Chinese Goods

Figures 1-3 present estimates for markups on Hong Kong re-exports of Chinese goods. There are a moderate number of markups with extreme values, which may reflect errors in

reporting or transcribing trade quantities or values. In the figures reported below, we address this problem by trimming from the data the highest and lowest 2.5% of markups.

Figure 1 shows the distribution of markups by year using box plots. The midline in the box shows the median, the box shows the inter-quartile (25^{th}-75^{th} percentile) range, and the upper and lower horizontal lines extend to 1.5 times the inter-quartile range above or below the box. Individual points are observations above or below this range. Median markup values range from 0.28 to 0.34 and are relatively stable over time. A substantial fraction of markups are *negative*, even after trimming extreme observations. Figure 2 shows the distribution of markups by one-digit SITC industry. Markups appear to be largest for light manufactured articles (SITC 8) and machinery and transport equipment (SITC 7) and lowest for mineral fuels (SITC 3) and animal and vegetable oils (SITC 4). Figure 3 shows the distribution of markups by region. Markups appear to be highest in the rich regions of North America, Oceania, and Western Europe and lowest in the poor regions of Africa and Latin America.

There are several possible explanations for negative markups. One is that they are a real feature of the data, in which case any explanation of markups must account for why they exist. As we discuss in the next section, quality-sorting models of intermediation predict that negative markups will occur with positive probability. A second explanation for negative markups is that they are a byproduct of measurement error, and in particular, the bias introduced by calculating markups using export unit values which are specific to the destination market and import unit values which are not. Even when we attempt to correct for this bias, as described in the Appendix, negative values are a prominent feature of the data.

Two other types of measurements errors that could produce negative markups are time lags in import and export activity, and errors in classifying imported and re-exported goods. In

the first case, suppose Hong Kong imports Chinese goods in one year and exports them in the following year. Then the import unit values and the export unit values used to calculate re-export markups for a given year would be based on disjoint sets of goods. Alternatively, if imports and re-exports of the same good are classified in different SITC industries, markups would also be inaccurate. We checked for both these possibilities, by calculating two-year moving averages (weighted by relative export values) for markups by four-digit SITC product and destination-country, and by calculating annual markups by three-digit industries. In both cases, negative markups remained a prominent feature of the data after this time-series or cross-sectional averaging. We accept, therefore, that negative markups on disaggregate products may be a genuine feature of data, and attempt to explain these theoretically in the next section.

3. Theory and Empirical Specification

3.1 Theory

Quality Sorting: Casual evidence suggests that Hong Kong traders play a quality-sorting role in the re-export of goods from China to the rest of the world. These traders arrange to buy large batches of production from China, whose quality may be difficult to confirm *ex ante.* After receiving the goods, traders are in a position to assess quality, and then ship the goods to destination countries based on their quality characteristics. Specific knowledge about Chinese producers and about demand conditions across destination markets may allow traders to earn informational rents, which are reflected in the markups they apply. Traders may also have information about demand conditions in destination markets that suppliers lack, in which case asymmetric information is two sided.[9]

[9] Re-exporting goods through Hong Kong allows traders to inspect goods and evaluate their quality. It also allows them to protect information from producers (buyers) about the identities of buyers (producers) (Sung, 1991). Case

This quality-sorting view of entrepôt trade is similar to theories of intermediation, in which middlemen arise to resolve informational problems in exchange (Rubinstein and Wolinsky, 1987; Biglaiser, 1993; Spulber, 1996; Gehrig, 1993; Yawas, 1996). Biglaiser's (1993) concept of "middlemen as experts" seems particularly relevant to the Hong Kong case. His model predicts both the markup that middlemen charge and the fraction of trade that they intermediate.[10] We review briefly the main elements of this framework.

In the model, a fixed number of buyers and sellers enter the market each period. Agents are impatient and so prefer to conduct trade without delay. A subset of sellers are endowed with one unit of a high-quality good and the remaining sellers are endowed with one unit of a low-quality good. Buyers are homogeneous, have unit demands, and value quality. The quality of a good is observable only to the seller. Buyers and sellers face a fixed cost of meeting each other. Given quality is unobserved, sellers have an incentive to claim their good is of high quality. Buyers are thus unwilling to believe a good is high quality without proof.[11]

Middlemen provide the service of sorting out high-quality goods. They become "experts" by investing in an inspection technology, which allows them to detect, but not verify to others, the quality of a good. The technology permits a middleman to inspect a good at a unit cost. In one set of equilibrium strategies, middlemen announce to buyers that they sell high-quality goods only. They pay high-quality prices for all goods they buy, but, given the per-good inspection cost, inspect only a random subset of these goods. All high-quality sellers

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study evidence suggests that producers in developing countries are often poorly informed about how international markets work. Morawetz (1981) documents how Colombian apparel producers, who had little experience in export markets, often failed to obtain payment on orders from foreign buyers in a timely fashion or internalize the importance of meeting quality standards for the marketability of export goods.

[10] Most other models of middlemen are based on costly search. In these models, markups may not have closed-form solutions (Yawas, 1996) or may be functions of search probabilities (Rubinstein and Wolinsky, 1987; Gehrig, 1993), which are difficult to interpret.

sell their goods to middlemen. Some low-quality sellers sell their goods as such directly to buyers. But, since middlemen inspect goods with probability less than one, other low-quality sellers sell their goods to middlemen, trying to pass them off as high-quality. Low-quality goods that are inspected by middlemen are returned to sellers, but those that are not are inadvertently sold to buyers as high-quality goods. To make credible the claim of selling high-quality goods only, each middleman offers a warranty: any buyer who unintentionally buys a low-quality good from him today may exchange it tomorrow for a high-quality good. The long-lived presence of each middleman in the market makes the warranty credible. Middlemen resell low-quality returns as such, and so at a loss (since they were bought at a high-quality price). The theory thus predicts that some goods will be sold at a negative markup.

The model approximates the activities of Hong Kong trading houses, such as Li & Fung, which help foreign buyers find low-cost/high-quality producers for their goods. One can think of the inspection technology as capturing market-specific knowledge that traders acquire through experience, research, or kinship networks (Rauch, 2000). The markups middlemen charge and the share of goods that are sold through middlemen are both increasing in the fraction of goods which are high quality. Re-export markups and re-export shares thus should be higher for products for which quality is more variable and harder to observe. In the estimation, we associate variability and unobservability of quality with product differentiation. We might also expect asymmetric information to be less severe in thicker markets, and so expect re-export markups and re-export shares to be smaller in larger destination markets or to market which engage in higher levels of trade.

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[11] Absent middlemen, verification takes the form of delay. By waiting to sell their goods, high-quality sellers signal their type. In a separating equilibrium, low-quality sellers sell their goods immediately and high-quality sellers sell their goods after a delay that is sufficiently long to deter low-quality sellers from mimicking them.

A simple extension of the model yields additional insights.[12] Suppose there are two types of buyers, "high-income" buyers who value quality, as in Biglaiser's model, and "low-income" buyers who do not. Markets which have a relatively high share of high-income buyers will purchase a relatively large share of high-quality goods. Buyers in these markets will thus make a relatively large fraction of their purchases from middlemen and the goods they buy will have relatively high markups. In this case, we expect re-export markups and re-export shares to be higher in markets with higher-income consumers. Negative markups will thus predominantly occur in low-income markets, where buyers purchase a disproportionate share of "return" goods which middlemen sell at low prices. These predictions are consistent with the variation in markups across regions evident in Figure 3.

In industries where demand for goods is uncertain, we might expect that traders help pool risk by purchasing goods from a large number of producers and distributing these goods across many destination markets. Risk pooling may yield predictions for re-export markups and shares that are similar to the quality-sorting model. In particular, under risk pooling we might expect re-export markups to be higher where price variance is higher or markets are thinner. While the specifications we estimate cannot differentiate between quality-sorting and risk-pooling explanations of re-export activity, there are reasons to doubt that risk-pooling can account for the behavior of Hong Kong traders. One is that most traders are small (Sung, 1991 and 1997), which would limit their ability to pool risk. Another is that in China's main export industries production orders tend to originate not with Hong Kong traders, but with large retail buyers. In apparel, footwear, and consumer electronics, production orders flow from retailers in the United States and elsewhere to traders who then farm out orders to suppliers. Gereffi

[12] These results are available on request.

(1994) refers to this phenomenon as "buyer-driven commodity chains", which predominate in consumer-goods industries where sales by retailers are large relative to production in individual plants. Abernathy et al. (1999) document how large retailers coordinate global apparel and textile production by sourcing orders through traders, allowing them to reduce time lags between production and sales and cut inventories. The role of traders in this environment appears not to be pooling risk but matching small producers to larger buyers and finding producers who can meet the cost, delivery, and quality standards of foreign retailers.

Transport Hubs: Firms may ship exports from China through Hong Kong in order to take advantage of hubbing in international shipping. Similar to passenger air travel, it may be efficient for exporting firms in a particular country to ship goods in bulk to an international hub, where they are unloaded, combined with other goods going to the same destination market, and then loaded onto a new ship for the final leg of travel. As already stated, goods whose presence in Hong Kong is due solely to hubbing should, in principle, not appear in re-export data. Goods in transit do not clear customs in Hong Kong and so are not counted as re-exports. Clearing customs involves costly delay, so we expect there to be an economic rationale for re-exporting over transshipping. Hubbing provides no such rationale, as goods may benefit from hubbing without clearing customs.

Since re-export markups are calculated net of freight and insurance charges, it might seem that they would be orthogonal to transport costs. In perfectly competitive markets, buyers pay the full transport cost. There are two important exceptions to this logic, which we control for by including measures of transport costs in the estimation. One is where traders have market power in the sale of re-exported goods. In this case they may absorb some of the transport costs by way of price discrimination. A second exception is where there is a

"Washington apples" effect (Alchian and Allen, 1964, pp. 74-75), in which fixed costs associated with transport (e.g., loading and unloading) induce firms to export relatively high-value goods. Here, high markups may be a byproduct of the fact that at each hub firms select relatively high-value items to ship on to the next destination. By implication, the goods being shipped the longest distances should have the highest markups since they are more likely to pass through multiple hubs and thus be subject to the fixed costs associated with loading and unloading multiple times. Young (1999) finds no evidence of this effect in the transshipment of goods through international ports. Our results confirm his findings.

Taxes, Tariffs, and Quotas: A further set of motivations for entrepôt trade relate to taxes and trade barriers. Given lower corporate taxes in Hong Kong, firms with a business presence in both Hong Kong and China may attempt to transfer profits to Hong Kong by setting an artificially low price on Chinese exports to Hong Kong.[13] This incentive exists regardless of the good being produced or where it is ultimately sent and so may affect the level of re-export shares and export markups, but not their variation across products or destination markets. One exception is where a Hong Kong firm also has a business presence in the destination market. For destination markets with lower corporate tax rates than Hong Kong, firms may have an incentive to set an artificially low price on exports from Hong Kong in order to transfer profits abroad. We control for this possibility by including corporate tax rates in destination markets in the empirical analysis. Since transfer pricing is more likely to be issue for multinationals, we include the share of China exports that are due to FIEs as an independent variable.

[13] In the context of outward processing, a related practice is underinvoicing (Sung, 1991). Firms may underreport the value of goods imported into China for further processing to minimize the import duties for which they are liable (though in principle duties are not applied to imports used to produce exports). When the processed goods are then exported from China to Hong Kong, their import price in Hong Kong will be artificially low.

For some items, destination-market trade barriers depend on whether a good originates in Hong Kong, China, or some other country. Apparel and textiles, which are subject to MFA quotas during the sample period, are one example. These quotas tend to bind on Hong Kong and China in each year. We control for the presence MFA quotas in the analysis.

3.2 Empirical Specification

Using data on Hong Kong re-exports of Chinese goods and China direct exports by product (*i*), destination market (*j*), and year (*t*), we estimate two equations. The first has as its dependent variable the re-export markup, as in (1). The second equation has as its dependent variable the re-export share, the share of Chinese exports re-exported through Hong Kong.

The regression equations take the following form:

$$y_{ijt} = V_{ijt}\gamma + X_{it}\beta + Z_{jt}\phi + \varepsilon_{ijt} \qquad (2)$$

where y_{ijt} is the dependent variable; V_{ijt} is a vector of product and destination-market characteristics, which include indicators of whether a particular country applies MFA quotas on a particular product; X_{it} is a vector of product characteristics, which include the variance in export prices across destination markets within the same three-digit industry, the prevalence of differentiated goods in industry output, the share China industry exports that are associated with outward processing, and the share of China industry exports by foreign-invested enterprises; [14] and Z_{jt} is a vector of destination-market characteristics, including log GDP, log per capita GDP, log China exports to the destination market, the log nominal exchange rate in the destination market, corporate tax rates in the destination market, and log distance from

[14] The variance in export prices, the value of exports to the destination market, the outward processing share of China exports and the FIE share of China exports are each calculated *excluding* the observation in question (and so vary across destination markets, products, and time).

Hong Kong to the destination market; and ε_{ijt} is an error term assumed to be i.i.d. Table 5 gives summary statistics on the regression variables.

Destination-country trade barriers influence the incentive to re-export Chinese goods through Hong Kong if they are more restrictive on imports from China than on imports from other countries. Such instances occur frequently with MFA quotas on apparel and textiles.[15] Where MFA quotas bind on imports from China, traders have an incentive to disguise re-exports as originating in a country other than China. Though importing countries go to elaborate lengths to determine the country of origin for imports, the presence of MFA quotas may still influence re-export behavior. We include as a regressor an indicator variable for whether a product is subject to MFA quotas and the destination country is one that applies MFA quotas (Canada, European Union, Norway, and the United States).

The variance in export prices is meant to capture differences in the variability of quality across products. We expect industries with higher variability in export prices across destination markets to also have higher variability in the quality of goods that are sold and thus be subject to higher informational costs. Similarly, the prevalence of differentiated products in an industry is meant to capture the potential for informational problems in exchange, and so the likelihood that middlemen will be active in intermediating trade. Differentiated products tend to be goods whose quality is difficult to establish objectively (e.g., the style of a woman's high-heel shoe versus the size and weight of a grain of rice) and for which information about the manufacturer may be important in assessing a good's market value. Many differentiated goods are branded and thus subject to definitions of quality which are manufacturer specific. This may make it difficult to establish industry-wide norms for product quality in these goods. The

absence of well-accepted or easily-applicable quality standards creates a role for middlemen to provide independent evaluations of product quality and manufacturer reliability.

We measure product differentiation using Rauch's (1999) classification of SITC products into homogeneous goods, reference-priced goods, and differentiated goods. Rauch constructs this classification based on how the majority of five-digit products inside a three or four-digit SITC industry are sold. Homogeneous goods are those sold on organized international exchanges, such as commodities markets; reference-priced goods are those whose prices are listed in published international trade journals, such as the *Chemical Marketing Reporter*; and differentiated goods are all other goods. The sale of homogeneous and reference-priced goods tend to occur through exchanges in which the identity of buyers and sellers is either well-known or unimportant. Differentiated goods, on the other hand, are presumably ill-suited to the impersonal exchange of such standardized markets.[16]

As for the other regressors, the share of outward processing in China exports controls for the extent of outward processing in an industry and the share of FIE exports in China exports controls for the impact of multinational firms on re-export behavior. Goods sent to China for processing may be subject to a wider array of service activities in Hong Kong and so may exhibit higher re-export markups. GDP and per capita GDP reflect market size and average consumer income, which influence quality-sorting motivations for entrepôt trade. Corporate tax rates control for the impact of transfer pricing on re-export behavior. The nominal exchange rate controls for pricing-to-market behavior. The value of exports to the

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[15] The Uruguay Round of the GATT (1994) eliminated the MFA. Countries will gradually convert quotas into tariffs and then eliminate the tariffs altogether by 2005.

[16] To control for ambiguities in designating industries into one of the three categories, Rauch uses two schemes to aggregate five-digit product categories to the three or four-digit level. We report results for an aggregation scheme based on a "conservative" designation of whether homogeneous goods dominate the three or four-digit industry. Our results using a scheme based on a "liberal" designation are very similar to those we present in section 4.

destination market controls for two possibilities: that informational problems are less severe in markets that have more trade with China, in which case re-export markups and re-export shares should be decreasing in export volumes; or that there are economies of scale in shipping, such that price-discriminating traders would set lower markups to higher-cost, lower volume markets. Distance controls for the influence of transport costs on re-exports.

Finally, note that some of our regressors – the product-differentiation variables, the outward-processing share, and the FIE share – vary across products but not destination markets. Moulton (1986) shows that in this instance standard errors on coefficient estimates are likely to be biased downwards. In all specifications, we adjust the standard errors for correlation in the disturbances across observations within the same four-digit SITC category. This raises estimated standard errors substantially. We also adjust for heteroskedasticity. In addition, markup regressions are weighted by the value of Hong Kong re-exports, and re-export share regressions are weighted by the value of Chinese exports (Hong Kong re-exports plus direct China exports). All regressions include year dummy variables and some regressions include country dummy variables.[17] To control for changes in re-export behavior over time, due to China gaining experience in world markets or policy changes in China (see note 4), we report results for the full sample, 1988-1998, and split samples, 1988-1993 and 1994-1998.

4. Estimation Results

In this section, we report estimation results for OLS regressions using either the markup on Hong Kong re-exports of Chinese goods or the share of China exports re-exported by Hong Kong as the dependent variable. See Table 5 for descriptions of the regression variables.

4.1 Re-export Markups

Table 6 shows estimation results for re-export markups. The first two columns show results excluding country dummies; the second four columns show results including them. We begin by examining coefficient estimates for product-market characteristics. Consider first the results on the variance of export prices. Markups are higher for products with higher variance in export prices, where this relationship is reasonably precisely estimated in all regressions. This suggests that products with greater variability in quality have higher re-export markups. Similarly, markups are higher for differentiated products than for referenced-priced goods or goods sold on organized exchanges. The coefficient estimates on the differentiated-product variable, which is precisely estimated, indicate that, relative to industries that produce homogenous goods, industries that produce differentiated goods have re-export markups that are 9%-13% higher. Coefficient estimates on the referenced-priced variable are small and imprecisely estimated. These results are consistent with quality-sorting theories of intermediation, which predict that markups will be higher for goods which are more subject to informational problems in exchange.

It also appears that goods involved in foreign outsourcing have higher markups. The coefficient on the share of industry exports subject to outward processing is positive and precisely estimated. This may indicate that components sent to China for processing into final goods are more likely to be subject to additional value added in Hong Kong – in the form of packaging, labeling, or related activities – where this then results in higher export prices and so higher markups on re-exports. Alternatively, Chinese firms dependent on outward-processing contracts for access to foreign markets may be at a relative informational disadvantage in

[17] To control for cases of extreme measurement error in the dependent variable, observations with the 2.5% highest

international exchange, which results in their receiving lower prices from traders in Hong Kong (which then means higher markups on re-exports). Consistent with this reasoning, the coefficient on the foreign-invested enterprise share of industry exports is negative – suggesting that foreign firms in China receive higher prices for their exports in Hong Kong than do other firms – but it is not estimated precisely.

Coefficients on the variable MFA, which takes a value of one if the good is an apparel or textile item covered by the MFA and the destination country applies MFA quotas, are positive and precisely estimated. Markups on MFA goods are 20%-22% higher than on other goods. One interpretation of this result is that Hong Kong traders are able to charge higher markups on goods subject to binding quotas in destination markets. Higher markups may derive from traders' control over quota rights in destination markets or from their ability to find other means (e.g., smuggling) of delivering goods to market. Alternatively, higher markups on MFA goods may reflect the tendency for apparel and textile items to have quality levels which are harder to observe and so be more likely to be intermediated by middlemen. A yet further possibility is that the MFA effect on markups indicates transfer pricing. Firms in China that hold quota rights – the right to export MFA goods to specific countries – may earn rents, which they transfer to Hong Kong by exporting goods at artificially low prices.

We see more evidence on the relationship between transfer pricing and markups in the coefficient estimate on corporate tax rates in column (2). Markups are higher in markets where corporate tax rates are higher. Higher markups mean higher export prices, through which traders may transfer income from high-tax countries to Hong Kong.[18] Since corporate tax rates

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and lowest values for markups are trimmed from the sample.

[18] In unreported results we examine whether the positive correlation between corporate tax rates and markups is stronger in products where foreign-invested firms have a larger presence and find no such effect.

vary relatively little over time, it is not surprising that this correlation disappears once we control for country fixed effects. Since we lack data on corporate tax rates for many countries, we do not include this variable in all specifications.

In regressions without country dummies, we include a variable for whether the destination markets is Taiwan. While China has relatively lax restrictions on trade and investment with Taiwan, Taiwan restricts direct trade and investment with China (though indirect trade and investment flows are large) (Naughton, 1997). We thus expect Hong Kong to intermediate a large fraction of China's exports to Taiwan, and this prior is confirmed. Given strong cultural ties and increasingly strong business ties between Taiwan and China, we do not expect Hong Kong traders to have the same informational advantage relative to Taiwan as they do relative to other countries, which should then be reflected in lower markups on re-exports to Taiwan. Consistent with this reasoning, re-export markups are on average 26% lower for goods shipped to Taiwan. In unreported results we examine whether markups are also lower for the major economies of Southeast Asia (Indonesia, Malaysia, the Philippines, Singapore, Thailand), which have large communities of overseas Chinese active in international commerce (Naughton, 1997), but find no such effect.

We turn next to results on other country characteristics. The coefficient estimate on the volume of exports indicates that markups are lower for products shipped to countries which have higher aggregate Chines imports. This is consistent with the idea that higher trade volumes reduce informational problems and so the markups traders are able to charge. Since export volumes vary little across observations with the same destination, it is not surprising that the variable becomes statistically insignificant when country dummies are added to the regression. For the 1988-1993 period (column 5), we find that even controlling for country

fixed effects markups are negatively correlated with country export volumes, but this effect is reversed in the 1994-1998 period (column 6).

Coefficients on the distance terms imply markups rise and then fall as distance from Hong Kong rises. Over 95% of the observations are to the right of maximum point of the implied distance function, which means that for most data points markups decrease in distance to destination markets. Similar to Young (1999), we find no evidence that export prices rise with distance, as would be implied by a "Washington apples" effect. That markups decrease in distance may indicate that Hong Kong traders price discriminate by setting lower markups in markets where transport cost are higher.

Turning to the GDP variables, in the first two columns markups are higher in countries with higher per capita GDP or higher total GDP. The first result is consistent with quality-sorting theories of intermediation, but the second is not. We expect informational problems to be less severe in thicker markets, which would then be reflected in a negative correlation between markups and market size. With the inclusion of country dummies, we find that for the first half of the sample period (column 5) there is the expected positive correlation between markups and per capita GDP and negative correlation between markups and total GDP. These effects disappear in the later time period (column 6). Given the results appear to depend on the time period, it is not surprising that for the full sample period with country dummies there is a weak correlation between markups and GDP and per capita GDP (columns 3 and 4).

In specifications with country dummies, we include the nominal exchange rate in the destination market as a regressor. The dummies control for initial relative-prices in Hong Kong and each destination market, which let us see whether traders price to market by changing prices as the exchange rate changes. There is a negative correlation between markups and

exchange rates, which means markups fall when destination-market currencies fall relative to the Hong Kong dollar. The negative coefficient on the nominal exchange rate implies that traders lower Hong Kong dollar export prices to a particular market when a nominal depreciation causes local currency prices to rise, such that traders offset a portion of rising local currency prices through lower markups. The elasticity of markups with respect to the exchange rate is small, but precisely estimated. This sensitivity of markups to local currency prices is consistent with traders having market power in the products they distribute.

In unreported results, we experimented with alternative specifications and sample restrictions to gauge the robustness of the coefficient estimates. The results are unaffected by dropping observations whose export quantities greatly exceed their import quantities, which is an indication of measurement error; dropping the share of outward processing in China exports to Hong Kong, whose inclusion may introduce simultaneity into the estimation; or controlling for industry fixed effects. Coefficient estimates on the industry variables are also robust to replacing country dummy variables with country-by-year fixed effects. We also experimented with interacting the regressors, but obtained imprecise estimates on most interaction terms and so do not report them. The Appendix reports results in which we adjust re-export markups for possible bias in their construction. These results are quite similar to those in Table 6.

4.2 Re-export Shares

Table 7 shows results for the re-export share regressions. Columns (1)-(2) exclude country dummies from the estimation, while columns (3)-(6) include them. There are several differences in the regressors for the re-export share regressions and those for the markup regressions in Table 6. Since re-export activity is highly correlated with outward-processing

trade, we do not include the outward-processing share of China exports as a regressor. Doing so would likely introduce simultaneity into the estimation. We also exclude the export-price variance as a regressor, since we have non-missing observations on the variable for only half of the observations on re-export shares. Also, the FIE share of industry exports is calculated based on total China exports, rather than on China exports to Hong Kong as in Table 6.

We again begin with results on product-market characteristics. Consistent with the results on re-export markups, re-export shares are higher for differentiated products. Coefficient estimates on the differentiated product variable, which are precisely estimated, imply that re-export shares are 21%-30% higher for differentiated goods. Reference-priced goods, on the other hand, appear to be no more likely to be re-exported through Hong Kong than are homogeneous goods. This result supports the idea that middlemen are more likely to intermediate trade where quality is harder to observe.

Re-export shares are higher for products where multinational firms have a larger presence. The coefficient estimates show that re-export shares are 55%-78% higher in products where all exports are by FIEs compared to products where FIE exports are zero. Since we do not find that re-export markups are higher for products dominated by FIEs (see Table 6), the positive correlation between re-export shares and the FIE export share may reflect Hong Kong's role in coordinating FIE production and distribution in China.[19] This role results from a stark pattern of specialization between the two countries, in which China specializes in labor-intensive production and Hong Kong specializes in skill-intensive management and marketing.

[19] As mentioned in note 8, the correlation between FIE and re-export shares may also reflect "round tripping", whereby firms in China establish a partnership with a firm in Hong Kong in order to obtain tax benefits.

Since the activities done in Hong Kong come at the beginning and end of FIEs' value-added chain, it is natural that Hong Kong distributes FIE exports from China.

Re-export shares are lower for goods subject to MFA quotas. The MFA dummy is negative and precisely estimated in all cases. This finding is not what we would expect if re-exporting goods through Hong Kong was a means of evading trade barriers on Chinese goods. One interpretation is that MFA quotas are more binding for Hong Kong than mainland China. Another is that China circumvents MFA quotas through channels other than Hong Kong.

Re-export shares are lower to countries which have higher aggregate imports of Chinese goods. One interpretation of this result is that higher trade volumes increase information flows between economies and so reduce the need for middlemen to intermediate exchange. Another interpretation is that higher trade volumes permit producers in China to ship goods directly, rather than shipping them through a transport hub like Hong Kong.

Turning to country characteristics, coefficient estimates on distance and distance squared imply that re-export shares first fall and then rise as distance from Hong Kong rises. All data points in the sample are to the right of the minimum of the implied distance function, which suggests re-export shares are globally increasing in distance. This is consistent with two interpretations. One is that more distant markets are at a greater informational disadvantage in trade with China and so are more dependent on middlemen in Hong Kong to intermediate exchange. A second is that re-exporting goods through Hong Kong, which requires additional unloading and reloading, is relatively less costly for goods shipped longer distances.

Consistent with the idea that Hong Kong offers access to Chinese goods for countries that restrict direct trade with China, the dummy variable for Taiwan is positive and precisely estimated. We also include a dummy variable for Korea, which has embargoed direct trade

with China in the past. Similar to the Taiwan case, these observations also have higher re-export shares. Interestingly, re-export shares are also higher for the major economies of Southeast Asia. This may reflect the existence of production networks within Asia, in which Southeast Asian countries import goods from China, process them further, and then ship them on to destination markets (Naughton, 1997).

In columns (1) and (2) re-export shares are positively correlated with per capita GDP and total GDP. When country dummy variables are included in columns (3) and (4), neither correlation is manifest. These results do not support quality-sorting theories of intermediation, which suggest that re-export shares would be higher for richer markets and smaller for larger markets. We do find support for this prediction in the later time period, 1994-1998, in column (6), in which re-export shares are positively correlated with per capita GDP and negatively correlated with total GDP with both effects precisely estimated.

To shift income from high-tax destination markets to Hong Kong through transfer pricing, we would expect re-export shares to be positively correlated with corporate tax rates. We find weak evidence for this in column (4), in which controls for country fixed effects are included, but not in column (2), in which controls for country fixed effects are excluded.

Finally, in columns (3)-(6) we find a positive correlation between re-exports and nominal exchange rates. Given country dummies are in the regression, this result implies that, for a given destination market, China exports a higher fraction of its foreign shipments through Hong Kong when the nominal exchange rate in that market depreciates relative to the Hong Kong dollar. Stated differently, China exports a higher fraction of its foreign shipments of a good through Hong Kong when local currency prices of that good rise. One interpretation of this result is that within product categories, goods re-exported through Hong Kong tend to have

lower demand elasticities than goods China exports directly. While a rise in local currency prices may diminish both types of exports, it would tend to diminish low-demand-elasticity goods less, thus leading to a rise in re-export shares. We might expect this to be the case if re-exported goods are those for which quality is a relatively important attribute.

In unreported results, we experimented with alternative specifications and sample restrictions to examine the robustness of the coefficient estimates. The coefficient estimates are unaffected by dropping observations whose export quantities greatly exceed their import quantities, which is an indication of measurement error; controlling for industry fixed effects; or estimating the regressions separately by year or industry. Coefficient estimates on the industry variables are also robust to replacing country dummy variables with country-by-year fixed effects. Similar to the re-export markup regressions, we experimented with interacting the regressors and again obtained imprecise estimates on most interaction terms.

5. Conclusions

In this paper we examine Hong Kong's role in the distribution of China's exports. China ships a substantial fraction of its exports through Hong Kong and Hong Kong appears to add value to these goods through a range of intermediation activities. The variation in Hong Kong markups on the re-export of Chinese goods and in the share of China's exports that are re-exported through Hong Kong are consistent with quality-sorting theories of intermediation and with the existence of international outsourcing networks. Markups are higher for differentiated products and products with higher variance in export prices. These are goods for which we expect quality to be relatively difficult to observe or verify, and so more likely to require the services of middlemen to resolve informational problems in exchange. Markups are also higher for goods which have been sent to China for further processing.

Hong Kong traders appear to have market power in the goods they distribute, as evidenced by their apparent ability to price discriminate across destinations. Markups on Hong Kong re-exports of Chinese goods fall when local currency prices rise in a destination market (due to a depreciation in the nominal exchange rate) and are lower in markets where transport costs are higher. There is some evidence that Hong Kong traders shift income from high-tax destination markets to Hong Kong through transfer pricing, as re-export markups are higher where corporate income tax rates in destination markets are higher.

Were Hong Kong's re-exports of Chinese goods merely a case of hubbing in international shipping, we might dismiss it as having no bearing for why countries trade and how trade impacts domestic economies. But Hong Kong's role in distributing China's exports is multifaceted and clearly goes far beyond that of a simple transshipment point in world trade. Hong Kong traders influence product prices in destination markets, the allocation of production activities across countries, and how trade responds to income taxes and trade barriers. This suggests that entrepôt economies, as well as intermediaries in exchange more broadly, play a fundamental role in how international markets operate. While we have examined a single case of entrepôt trade, there is little reason to believe that Hong Kong is unique. Hong Kong stands out in part because it was until recently a city-state. Other cities, such as Amsterdam, London, Los Angeles, New York, Shanghai, and Tokyo, also provide a wide range of intermediary services related to international finance and trade. Our results support the conclusion that entrepôt centers have a substantial effect on the prices and therefore the magnitude of trade flows, which merits increased attention to their role in international trade.

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Table 1: Direct Exports and Re-exports of Chinese Goods, 1988-1998

Year	Total China Exports (billions US$)	Re-Export Share of Total China Exports	Outward Processing Share of China			Foreign-Invested Enterprise Share of China		
			Direct Exports	Exports to Hong Kong	Total Exports	Direct Exports	Exports to Hong Kong	Total Exports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
88	38.7	43.1	12.8	49.7	32.1	1.2	8.5	4.7
89	46.3	51.5	19.7	56.9	40.3	3.1	13.4	8.3
90	55.4	55.2	21.9	58.5	43.4	4.2	16.7	10.9
91	67.8	59.1	24.9	61.5	47.1	6.5	19.1	13.5
92	84.7	60.1	24.8	63.1	47.9	8.6	20.8	15.2
93	98.0	61.3	24.4	67.2	49.4	17.8	35.1	27.1
94	120.2	57.7	27.4	62.1	47.7	19.8	35.2	28.5
95	151.6	53.3	32.7	65.8	50.1	21.9	40.6	31.3
96	161.0	49.8	38.1	76.0	54.3	31.3	49.8	39.0
97	181.3	46.9	39.6	69.9	52.7	33.3	47.1	39.1
98	177.7	45.4	40.7	73.8	54.7	36.4	49.7	41.9

Notes: Column (1) shows total China exports (direct exports plus re-exports through Hong Kong) in billions of current U.S. dollars; column (2) shows Chinese re-exports through Hong Kong as a share of total Chinese exports; columns (3)-(5) shows the share of exports related to outward processing in direct Chinese exports to countries other than Hong Kong, Chinese exports to Hong, and total Chinese exports; and columns (6)-(8) show the share of exports by foreign-invested enterprises in direct Chinese exports, Chinese exports to Hong Kong, and total Chinese exports.

Table 2: Direct Exports and Re-Exports of Chinese Goods by SITC Industry

	SITC Industry	Industry Share of Direct Exports	Industry Share of Re-Exports	Re-Export Share of Total Exports	Outward Processing Share of Direct Exports	Outward Processing Share of Exports to Hong Kong	FIE Share of Direct Exports	FIE Share of Exports to Hong Kong
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	Food, Live Animals	11.5	1.9	14.2	8.9	16.0	14.4	16.1
1	Beverages, Tobacco	0.6	0.3	35.1	6.7	17.0	6.7	4.2
2	Crude Materials	6.1	1.9	22.0	2.8	11.6	7.9	10.5
3	Mineral Fuels	10.0	0.1	0.6	3.9	15.8	1.2	25.3
4	Animal, Vegetable Oils	0.1	0.0	17.1	15.1	72.5	18.2	73.6
5	Chemical Products	7.7	1.9	21.9	12.9	27.6	7.9	21.4
6	Manuf. Materials	21.9	14.0	41.6	28.0	42.1	11.2	25.3
7	Mach., Transport Equip.	11.5	22.4	69.5	44.7	84.4	27.9	49.2
8	Light Manuf. Articles	27.9	57.5	70.1	43.9	71.4	23.4	35.5
9	Misc. Manuf. Items	2.5	0.1	62.8	20.3	45.7	4.5	2.3

Notes: This table shows each one-digit SITC industry's share of total Chinese direct exports in column (1) and of total re-exports of Chinese goods through Hong Kong in column (2). Column (3) shows the share of re-exports in total Chinese exports for each industry. For each industry, column (4) shows outward-processing exports as a share of direct China exports (to countries other than Hong Kong), column (5) shows outward-processing exports as a share of China exports to Hong Kong, column (6) shows exports by foreign-invested enterprises (FIEs) as a share of direct China exports, and column (7) shows FIE exports as a share of China exports to Hong Kong. All figures are averages over the 1988-1998 period.

Table 3:
Direct Exports and Re-Exports of Chinese Goods for Selected Two-Digit Industries

SITC	Industry	Industry Share of Direct Exports	Industry Share of Re-Exports	Re-Export Share of Total Exports	Outward Processing Share of Direct Exports	Outward Processing Share of Exports to Hong Kong	FIE Share of Direct Exports	FIE Share of Exports to Hong Kong
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
03	Fish	2.9	0.6	16.9	17.5	23.2	26.2	23.5
05	Vegetables, Fruit	3.6	0.9	19.6	4.6	6.2	13.0	12.2
33	Fuel Oils	8.2	0.1	0.8	5.7	28.8	0.6	4.8
52	Inorganic Chemicals	2.1	0.3	12.2	5.3	7.0	4.2	9.2
65	Textile Yarn Fabrics	10.2	8.7	48.6	26.5	37.8	9.1	27.1
66	Nonmetal. Minerals	2.2	1.1	37.5	8.5	29.2	18.8	24.8
67	Iron, Steel	2.7	0.2	8.6	43.1	55.5	4.4	13.1
69	Metal Products	3.7	2.3	41.0	29.2	55.3	10.3	23.6
75	Office Machines	0.6	3.4	88.1	81.3	97.5	63.0	56.2
76	TVs, Radios	1.5	9.3	86.2	75.7	93.2	51.8	58.6
77	Elec. Machinery	2.5	7.1	78.1	50.2	80.0	35.2	41.8
83	Luggage	0.8	5.5	88.5	50.9	85.4	26.8	31.4
84	Apparel	17.2	17.4	53.5	43.5	56.8	21.2	27.3
85	Footwear	2.7	7.8	76.7	52.5	85.0	29.0	55.3
88	Cameras, Watches	0.4	3.2	89.9	58.1	86.2	36.7	46.5
89	Toys, Games	4.9	21.0	82.9	42.5	78.0	25.7	36.5

Notes: The two-digit industries listed above are ones which account for at least 2% of direct Chinese exports or 2% of re-exports of Chinese goods through Hong Kong on average or the period 1988-1998. See notes to Table 3 for definitions of column headings.

Table 4: Direct Exports and Re-Exports of Chinese Goods by Region

Region	Region Share of Direct Exports	Region Share of Re-Exports	Re-Export Share of Total Exports
	(1)	(2)	(3)
Africa	3.2	2.6	49.9
East Asia	36.8	18.0	35.6
Eastern Europe	4.2	0.9	24.8
Latin America	2.5	4.2	65.0
Middle East	4.0	2.6	42.8
North America	16.7	37.3	71.4
Oceania	1.7	2.4	61.2
South Asia	2.7	1.0	30.6
Southeast Asia	11.2	6.0	37.8
Western Europe	16.9	24.9	62.1

Notes: This table shows each region's share of Chinese direct exports in column (1) and of total re-exports of Chinese goods by Hong Kong in column (2). Column (3) shows the share of re-exports in Chinese exports to each region. All figures are averages over the period 1988-1998.

Table 5: Summary Statistics

Variable	Definition	Mean	Std. Error	N
Re-Export Markup	% markup on Hong Kong re-export of Chinese goods	0.357	0.358	172,109
Re-Export Share	Share of China exports re-exported through Hong Kong	0.528	0.388	345,134
Export Price Variance	Log variance in export price for other all goods in three-digit industry	3.520	3.598	172,109
Differentiated	Equals one if differentiated good	0.734	0.442	345,134
Reference Priced	Equals one if reference-priced good	0.206	0.404	345,134
Outward Processing Share	Share of outward processed goods in China exports to Hong Kong	0.549	0.319	172,109
Foreign-Invested Enterprise Share (a)	Share of exports by FIEs in China exports to Hong Kong	0.322	0.241	172,109
Foreign-Invested Enterprise Share (b)	Share of exports by FIEs in total China exports	0.257	0.226	345,134
MFA	Equals one if MFA product and country applies MFA quotas	0.033	0.178	345,134
Export Volume	Log value of China exports to country	21.624	2.083	345,134
Per Capita GDP	Log per capita GDP	8.694	1.092	345,134
GDP	Log GDP	25.361	1.947	345,134
Distance	Log great circle distance from Hong Kong	8.897	0.705	345,134
Taiwan	Equals one if Taiwan	0.018	0.132	345,134
Southeast Asia	Equals one if Indonesia, Malaysia, Philippines, Singapore or Thailand	0.088	0.283	345,134
Korea	Equals one if South Korea	0.018	0.133	345,134
Corporate Tax Rate	Highest marginal corporate income tax rate in country	0.386	0.109	280,419
Exchange Rate	Log currency units per Hong Kong dollar in destination market	0.789	2.820	333,076

Notes: Observations are over four-digit SITC industries and countries to which Hong Kong ships re-exports of Chinese goods and/or to which China exports directly. Markups are weighted by the value of re-exports; the re-export share is weighted by the value of total China exports of good to destination market; and all other variables are unweighted.

Table 6: Estimation Results for Re-export Markups

Time Period	88-98	88-98	88-98	88-98	88-93	94-98
	(1)	(2)	(3)	(4)	(5)	(6)
Export Price Variance	0.018	0.018	0.019	0.019	0.017	0.020
	(1.91)	(1.88)	(1.96)	(1.93)	(2.20)	(1.85)
Differentiated	0.128	0.128	0.110	0.115	0.094	0.122
	(2.51)	(2.62)	(2.26)	(2.36)	(2.30)	(1.97)
Reference Priced	0.043	0.038	0.030	0.028	0.026	0.041
	(0.93)	(0.87)	(0.67)	(0.65)	(0.67)	(0.62)
Outward Processing Share	0.102	0.104	0.108	0.108	0.114	0.089
	(2.08)	(2.12)	(2.31)	(2.30)	(2.25)	(1.28)
Foreign-Invested Enterprise Share	-0.10	-0.113	-0.109	-0.116	-0.051	-0.138
	(-0.99)	(-1.12)	(-1.12)	(-1.18)	(-0.63)	(-1.01)
MFA	0.208	0.201	0.212	0.210	0.224	0.198
	(5.66)	(5.43)	(5.17)	(5.13)	(4.92)	(4.61)
Export Volume	-0.021	-0.027	0.001	-0.002	-0.059	0.070
	(-3.67)	(-4.53)	(0.08)	(-0.13)	(-2.61)	(2.22)
Per Capita GDP	0.092	0.117	0.143	0.093	1.023	-0.272
	(7.44)	(8.66)	(0.85)	(0.53)	(3.21)	(-0.78)
GDP	0.040	0.041	0.012	0.053	-1.000	0.325
	(6.59)	(6.71)	(0.07)	(0.31)	(-2.90)	(0.95)
Distance	0.731	0.496				
	(2.88)	(2.09)				
Distance Squared	-0.050	-0.036				
	(-3.45)	(-2.63)				
Taiwan	-0.264	-0.264				
	(-3.25)	(-3.20)				
Corporate Tax Rate		0.141		-0.069		
		(3.25)		(-0.48)		
Exchange Rate			-0.022	-0.022	-0.045	-0.045
			(-3.26)	(-3.04)	(-4.57)	(-1.57)
Country Dummies	No	No	Yes	Yes	Yes	Yes
Adj. R Squared	0.177	0.18	0.223	0.219	0.237	0.222
Observations	172,109	147,170	165,435	142,124	77,984	87,451

Table 7: Estimation Results for Re-export Shares

Time Period	88-98	88-98	88-98	88-98	88-93	94-98
	(1)	(2)	(3)	(4)	(5)	(6)
Differentiated	0.292	0.295	0.284	0.291	0.301	0.212
	(6.29)	(6.26)	(6.35)	(6.37)	(6.09)	(5.60)
Reference Priced	0.062	0.057	0.049	0.047	0.097	-0.060
	(1.56)	(1.43)	(1.26)	(1.22)	(2.21)	(-2.33)
Foreign-Invested	0.672	0.659	0.648	0.643	0.783	0.551
Enterprise Share	(11.90)	(11.62)	(11.60)	(11.34)	(11.52)	(7.74)
MFA	-0.088	-0.096	-0.110	-0.112	-0.121	-0.089
	(-2.22)	(-2.43)	(-2.72)	(-2.76)	(-2.79)	(-1.95)
Export Volume	-0.043	-0.042	-0.092	-0.094	-0.039	-0.056
	(-2.97)	(-2.99)	(-7.99)	(-7.19)	(-3.09)	(-3.12)
Per Capita GDP	0.055	0.057	-0.197	-0.217	-0.541	0.569
	(2.49)	(2.51)	(-1.69)	(-1.79)	(-3.21)	(3.48)
GDP	0.030	0.028	-0.093	-0.096	0.013	-0.604
	(2.52)	(2.37)	(-0.87)	(-0.85)	(0.07)	(-3.75)
Distance	-1.610	-1.380				
	(-5.78)	(-5.19)				
Distance Squared	0.103	0.091				
	(6.53)	(5.98)				
Taiwan	0.370	0.422				
	(5.81)	(6.67)				
Southeast Asia	0.199	0.205				
	(7.79)	(7.91)				
Korea	0.170	0.181				
	(3.88)	(3.93)				
Corporate Tax Rate		-0.015		0.146		
		(-0.44)		(1.56)		
Exchange Rate			0.014	0.016	0.030	0.020
			(3.04)	(3.45)	(4.81)	(1.71)
Country Dummies	No	No	Yes	Yes	Yes	Yes
Adj. R Squared	0.485	0.495	0.543	0.544	0.593	0.515
Observations	345,134	280,419	333,076	272,095	145,656	187,420

Notes on Tables 6-7

T statistics are in parentheses. Observations with the 2.5% highest and lowest values for the dependent variable have been trimmed from the sample. Data availability on additional regressors restricts the sample size in some specifications. Standard errors are adjusted for heteroskedasticity and correlation in the disturbances across observations within four-digit industries.

For Table 6, the sample is 172,109 observations on markups of Hong Kong re-exports of Chinese goods by destination country and four-digit SITC industry for the period 1988-1998. Regressions are weighted by the value of re-exports.

For Table 7, the sample is 345,134 observations on the share of total Chinese exports that are re-exported through Hong Kong by destination country and four-digit SITC industry for the period 1988-1998. Regressions are weighted by the value of total Chinese exports.

Appendix: Calculation of Re-export Markups

Let the unit-value of Hong Kong imports from China be denoted by $PM_i = VM_i/QM_i$, where VM_i is the value and QM_i is the quantity of imports, and i denotes the SITC or HS category. Let the unit-value of Hong Kong re-exports of Chinese goods to country j be denoted by $PX_{ij}=VX_{ij}/QX_{ij}$, where VX_{ij} is the value and QX_{ij} is the quantity of re-exports to the country. The *unadjusted* markup, shown in equation (1), compares the log difference in PX_{ij} and PM_i. To merge these data with other data used in the estimation, we aggregate the data up to the level of four-digit SITC categories. We thus weight unit values by their share of the total quantity of four-digit exports. The complete expression for the unadjusted markup for four-digit industry i and country j is:

$$\text{Markup}_{ij}=\log\left(\sum_{i\in k} PX_{ij}\frac{QX_{ij}}{\sum_{m\in k} QX_{mj}}\right)-\log\left(\sum_{i\in k} PM_i\frac{QX_{ij}}{\sum_{m\in k} QX_{mj}}\right). \qquad \text{(A1)}$$

The Hong Kong data are at the six-digit SITC level for 1988-1991 and the five-digit SITC level for 1992-1998, which we aggregate to five-digit SITC level for 1988-1992 so that they could be merged with the Chinese data. The Chinese export data are at the five-digit SITC level for 1988-1991 and the six-digit Harmonized System level for 1992-1998.

Notice that in (A1) import unit values do not vary across destination markets, which may introduce systematic bias into the measure. Consider Hong Kong re-exports of women's dress shoes produced in China. For re-exports to, say, France, we calculate the unadjusted markup by comparing the import unit value of shoes imported by Hong Kong from China for re-export across *all* destination markets with the unit value of Hong Kong re-exports of Chinese shoes to *France*. If China exports higher fashion, and more expensive, shoes to France than it does to Mexico, then the estimated markup on Chinese shoes re-exported to France may be too high, since some low-price shoes destined for Mexico are included in the average import price (by extension, the markup on Chinese shoes re-exported to Mexico may be too low).

We address this problem by combining Hong Kong and Chinese trade data. For exports to Hong Kong, Chinese data in some cases show the quantity and value of goods that are to be re-exported by *ultimate* destination market. From Chinese data we calculate the unit value for a product exported to a particular country (e.g., France) through Hong Kong and the unit value for the product exported through Hong Kong averaged across all destination markets. The ratio of these two unit values reflects the average price difference for a given product that is specific to a particular country (France). Using this ratio, we correct the import unit values calculated from the Hong Kong data for variation in product prices by country of destination. We refer to markups calculated in this manner as *adjusted* markups. Limited data allows us to calculate adjusted markups for only one-third of the observations in the sample.

Let P_{ij} and Q_{ij} denote the unit-value and quantity of Chinese goods that are exported to country j via Hong Kong, and let PHK_i and QHK_i denote the unit-value and quantity of all Chinese exports to Hong Kong within this SITC or HS category. Both these unit-values are

obtained from the Chinese data. After merging the Chinese and Hong Kong data, we calculate the adjusted markup by replacing PM_i in (A1) with:

$$PM_{ij}^{*} = \left(\frac{Q_{ij}}{QX_{ij}}\right)\left(\frac{P_{ij}}{PHK_i}\right)PM_i + \left(1-\frac{Q_{ij}}{QX_{ij}}\right)PM_i \ . \qquad \text{(A2)}$$

To interpret this formula, the term $(P_{ij}/PHK_i)PM_i$ takes the unit-value of Hong Kong imports from China (PM_i), and increases it by the ratio of the Chinese unit-value of exports to Hong Kong destined for country j to the unit-value of total exports to Hong Kong (P_{ij}/PHK_i). The latter ratio is computed from Chinese trade data, which may be incomplete in its reporting of goods bound for Hong Kong. Because of this, we weight the first term by the ratio of the quantity of Chinese exports to Hong Kong destined for country j (Q_{ij}) to total Hong Kong re-exports from China to country j (QX_{ij}).[20] The final term in (A2) reflects the remainder of the quantity weighting, and for these goods we simply use the unit-value of Hong Kong imports from China (PM_i) as the estimate of the unit-value for Hong Kong imports from China that are bound for country j.

To control for the possibility that bias in the calculation of unadjusted markups may influence our empirical results, we re-estimate the re-export markup regressions reported in Table 5 using adjusted markups as the dependent variable. Appendix Table A1 reports the results. The sample is 68,628 observations on unadjusted markups of Hong Kong re-exports of Chinese goods by destination country and four-digit SITC industry for the period 1988-1998. We are able to calculate adjusted markups for only about one-third of the observations in the unadjusted markup sample. Regressions are weighted by the value of re-exports. See the notes to Table 5 for more details on the estimation.

Most results in Table A1 are qualitatively very similar to those for unadjusted markups in Table 6, but with a loss in precision on the coefficient estimates that is consistent with the smaller sample sizes. In unreported results, we experimented with alternative specifications and sample restrictions to gauge the robustness of the coefficient estimates. The results are unaffected by dropping observations whose export quantities greatly exceed their import quantities, which is a possible indication of extreme measurement error; dropping the share of outward processing in China exports to Hong Kong, whose inclusion may introduce simultaneity into the estimation; controlling for industry fixed effects; or estimating the regressions separately by year or industry. Coefficient estimates on the industry variables are also robust to replacing country dummy variables with country-by-year fixed effects.

[20] If this ratio ever exceeds unity, then we replace it with the value of unity.

Table A1: Estimation Results for Adjusted Re-export Markups

Time Period	88-98	88-98	88-98	88-98	88-93	94-98
	(1)	(2)	(3)	(4)	(5)	(6)
Export Price Variance	0.009	0.009	0.011	0.011	0.010	0.011
	(1.26)	(1.25)	(1.44)	(1.42)	(1.96)	(1.27)
Differentiated	0.201	0.201	0.196	0.199	0.152	0.225
	(4.08)	(4.08)	(3.93)	(3.99)	(2.69)	(3.77)
Reference Priced	0.065	0.058	0.071	0.070	0.080	0.048
	(1.57)	(1.42)	(1.59)	(1.56)	(1.71)	(0.67)
Outward Processing	0.077	0.081	0.101	0.099	0.138	0.045
Share	(1.04)	(1.07)	(1.42)	(1.38)	(1.70)	(0.50)
Foreign-Invested	-0.190	-0.202	-0.211	-0.215	-0.170	-0.209
Enterprise Share	(-1.95)	(-2.09)	(-2.34)	(-2.40)	(-1.44)	(-1.90)
MFA	0.151	0.146	0.158	0.156	0.204	0.127
	(4.53)	(4.33)	(4.46)	(4.40)	(3.77)	(3.37)
Export Volume	-0.025	-0.030	0.018	0.019	-0.061	0.115
	(-3.59)	(-4.39)	(0.55)	(0.56)	(-1.44)	(2.22)
Per Capita GDP	0.132	0.159	-0.422	-0.418	0.318	-0.747
	(8.15)	(11.06)	(-1.65)	(-1.65)	(0.86)	(-1.87)
GDP	0.039	0.039	0.546	0.541	-0.363	0.848
	(6.73)	(6.65)	(2.11)	(2.06)	(-1.02)	(2.50)
Distance	0.499	0.247				
	(1.16)	(0.63)				
Distance Squared	-0.037	-0.022				
	(-1.49)	(-0.97)				
Taiwan	-0.268	-0.287				
	(-2.68)	(-2.84)				
Corporate Tax Rate		0.065		-0.064		
		(1.11)		(-0.40)		
Exchange Rate			-0.026	-0.023	-0.021	-0.051
			(-2.09)	(-1.59)	(-0.95)	(-1.77)
Country Dummies	No	No	Yes	Yes	Yes	Yes
Adj. R Squared	0.200	0.204	0.250	0.248	0.298	0.246
Observations	68628	63804	65506	60891	22868	42638

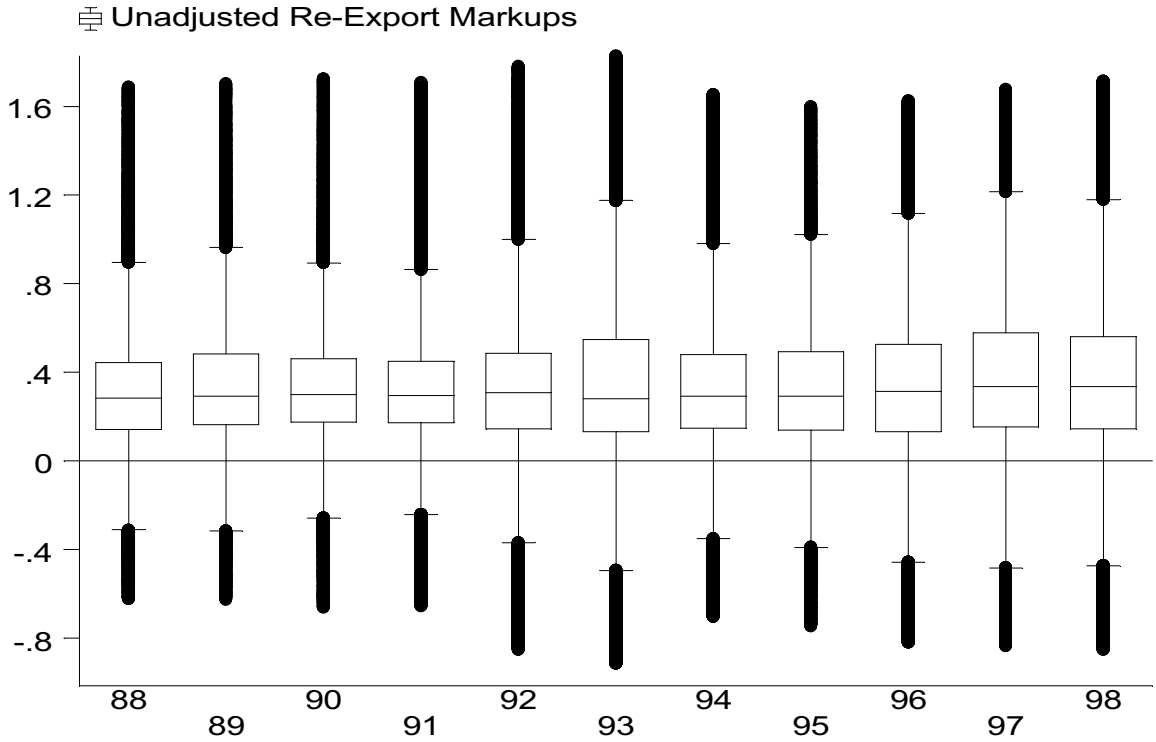

Figure 1: Re-Export Markups by Year

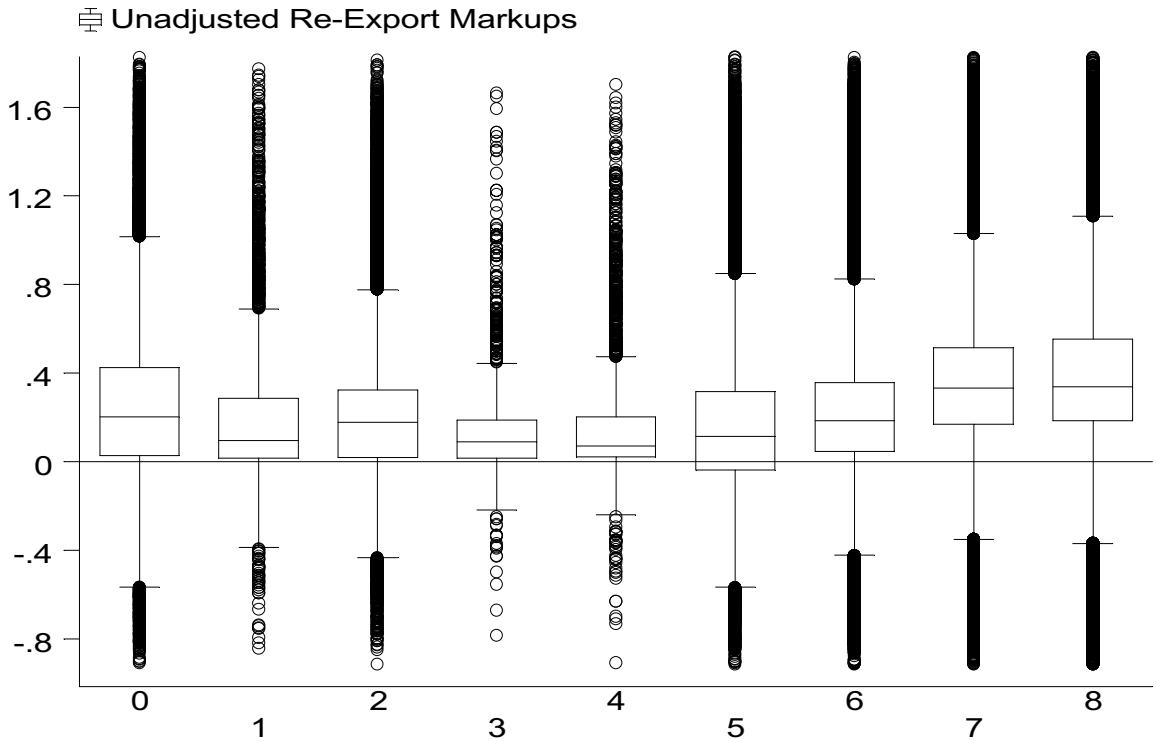

Figure 2: Re-Export Markups by SITC Industry

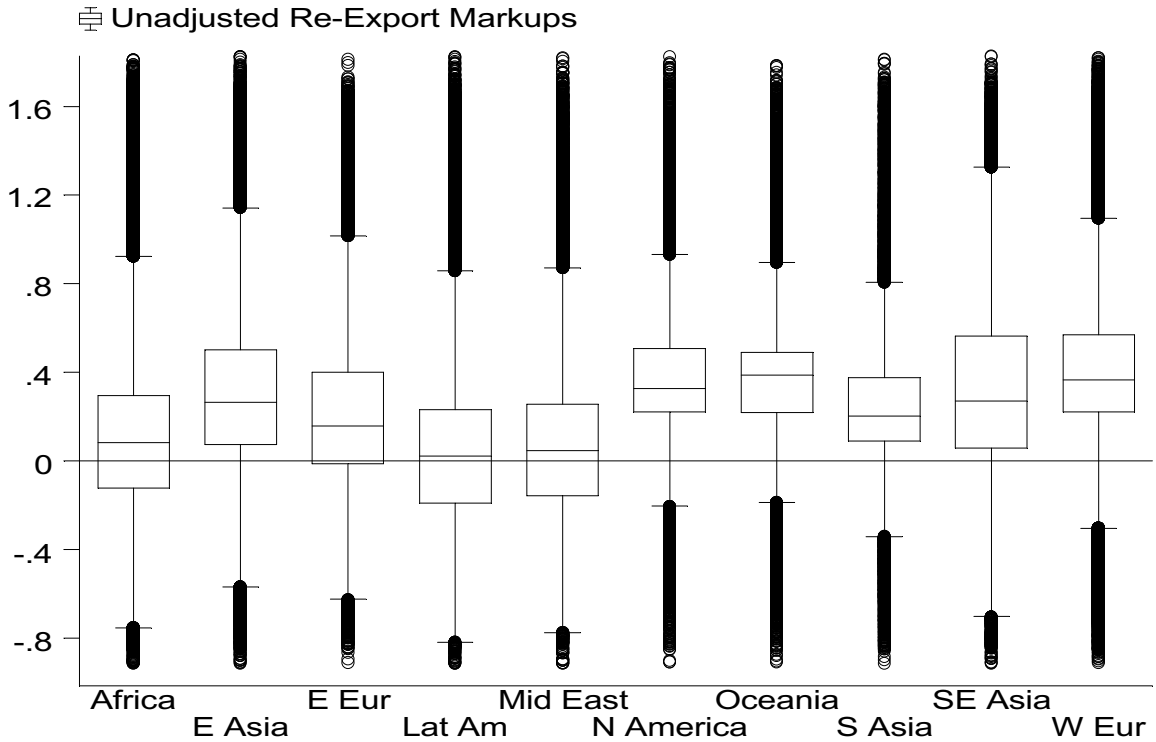

Figure 3: Re-Export Markups by Region