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Transshipment in the United States

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U.S. International Trade Commission

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COMMENTS WELCOME

ABSTRACT: Data representing transshipment or re-exports are almost always excluded from analytical portrayals of international trade, yet transshipment is potentially an important phenomenon in understanding a number of economic questions, and is increasing in importance. Rapid technological change in areas such as containerization and hub-and-spoke routing has promoted the practice of transshipment. While there are significant gaps in the data, the share of re-exports in global exports has undoubtedly increased rapidly, from perhaps 1 in 20 in the mid-1980s to perhaps 1 in 6 today. Econometric analysis of U.S. domestic exports and foreign exports (re-exports) over pairs of U.S. ports and destinations suggests that re-exports are significantly more sensitive than domestic exports to factors influencing transaction costs, including distance, containerization, price-fixing liner agreements, and port efficiency and restrictive port policies in the importing country.

This paper represents solely the views of the authors and does not represent the views of the U.S. International Trade Commission or any of its Commissioners. Contact author: Michael J. Ferrantino (voice 1-202-205-3241, fax 1-202-205-2340, email Michael.Ferrantino@usitc.gov)

INTRODUCTION

Transshipment, also known as re-exporting[1], is the practice of routing an export shipment through an intermediate location before it reaches its final destination. While data on re-exports are incomplete, on any reckoning they have become increasingly important over time. Analysis of international trade data, whether for tabular, econometric, or modeling purposes, almost always excludes transshipments and relies on data on domestic exports, which make it appear as if the goods move from their origin or place or production to their final destination without making any stops on the way.[2] But this treatment of the data is likely to be inadequate for addressing a number of economic and policy issues. For example,

- There is a logistic revolution going on, which means more and more transshipment. The share of total shipments which are transshipments may have increased from one in 20 in the mid-1980s to one in six today, and is probably still rising. Transshipment is thus potentially important for understanding such phenomena as international vertical integration, outsourcing, and FDI.
- The benefits of trade facilitation, port reform, and maritime reform are likely to affect transshipment disproportionately. Transshipment is particularly sensitive to costs. These costs are likely high relative to tariffs.[3]
- Analysis of certain trade and environment questions, such as invasive species and oil spills, depends on actual shipping, not shipping of "domestic exports," so excluding re-exports is highly misleading.
- Similarly, analysis of trade in regions of the world where transshipment is important is misleading when transshipment is left out. These regions include at a minimum the Caribbean, West Africa, the Middle East, and "greater China," and (arguably) the European Union and NAFTA.
- Data on transshipment is weak, and the process of re-exporting and re-re-exporting may conceal the true origin of shipments. This is not only important for enforcement of trade policies. Financial abuses (over- and under-invoicing of cargo, smuggling, and security risks associated with shipping might all be disproportionately associated with transshipments.

This paper studies the question of transshipment from several perspectives. The first part describes some of the economic and technological changes that have increased the incentives for transshipment. The second part reviews some of the issues surrounding the available data on transshipment, drawing on both international and U.S. sources, to highlight some of the stylized facts of the temporal, geographical, and commodity distribution of transshipment. The final section contains a preliminary econometric analysis of U.S. domestic exports and foreign exports (re-exports) for pairs of U.S. ports and foreign destinations. The primary finding of this analysis is that variables found by other authors to increase shipping costs also tend to depress trade, and that their trade-depressing effect is markedly greater for re-exports than for domestic exports.

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[1] Throughout this paper the terms "transshipments" and "re-exports," or "transshipment" and "re-exporting," are used interchangeably. The term of art for re-exports in official U.S. trade data is "foreign exports."

[2] For example, the GTAP database excludes re-exports. For those with concerns that their data still may include some re-exports, GTAP provides guidance on how best to get rid of them at http://www.gtap.agecon.purdue.edu/databases/contribute/reexports.asp , downloaded on May 4, 2004.

[3] Fink, Mattoo, and Neaga (2001), figure 1, show that for most countries in 1998, transport charges on shipments arriving in the United States exceeded tariffs paid.

CONCEPTUAL ISSUES

What Is Transshipment?

Transshipment has become an integral part of the logistic strategy of many shipping companies. Indeed, from its origin to its final destination, any given cargo might have be transshipped three or four times. Transshipment can be viewed as routing goods in such a way that would decrease shipping costs, take advantage of economies of scale and improve the range of services or routes offered to customers. In particular, transshipment services provide shippers with additional routing options (especially towards final destinations at smaller ports) and reduced transit times.

Rationales For Transshipment

With the development of large oceangoing container ships, competitive forces to decrease container unit costs have led to the emergence of a worldwide hub-and-spoke system of shipping routes.[4] Cargo to a region is delivered first to a primary hub port using large ships and then transported or transshipped to its final destination (spokes) using smaller ships. Conversely, the hub can also serve as a transshipment point for cargo originating from its regional spokes and destined to other regions of the world.

Cazzaniga, Francesetti, and Foschi (2002) use simulations to show that maritime transport organized according to a hub-and-spoke system dominates point-to-point service. They find that this is particularly the case if vertical integration between services at sea and handling services on yard is achieved within the same company.

In the transshipment configuration, major routes (between regional hubs) are serviced by great ocean-going container liners allowing them to achieve considerable scale economies.[5] Smaller ships then provide faster feeder services on inter-regional short routes or other low traffic routes. It has been contended that transshipments offer an efficient way of serving smaller ports/countries and provide many more port-to-port connections to shippers than direct services (Damas, 2001). In fact, with the hub and spokes system, carriers can provide shipping service virtually between any two ports not connected by a direct service.

Determinants Of Transshipment

The level of transshipment through a given port or a country is in general the result of strategic decisions made by the shipping companies themselves. In order to satisfy the demands of carriers, transshipment ports need to satisfy a number of attributes:

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[4] Hoffmann (1998) illustrates the close connection between vessel sizes, mergers, and transshipment: ”As the maximum ship sizes go up, so does the economic incentive to transship containers from and to smaller vessels. More transshipment leads to a global maritime and feeder network. Global networks and bigger ships together require a high initial capital expenditure, which only very large commercial units can afford.”

[5] Given the different types of fixed costs, economies of scale can occur offshore (at vessel level) and onshore (at seaport level). See for example, Clark, Dollar, and Micco (2004), or Cazzaniga Francesetti and Foschi (2002). Some type economies of scopes are also achieved in that the use of large vessels along heavily-traveled routes allows a shipping company to limit the number of ships in use at any given time.

- Availability of an array of high-frequency feeder services, connecting the hub with its network of feeder ports.
- Convenient geographical location with access to major trade routes and other transshipment centers
- Efficient, highly productive and competitively priced port and terminal services,
- Availability of modern high-tech infrastructure (e.g., berths, gantry cranes, container storage space) as well as equipment that allows for a quick turnaround time of large vessels.

Admittedly, those attributes also apply to direct shipping. However, since the main purpose of transshipment is to decrease overall as well as per unit shipping costs, transshipment will tend to be more sensitive to them.[6]

TRANSSHIPMENT – SOME STYLIZED FACTS

Transshipment Around The World

Unfortunately, there is not a single comprehensive data source covering the world's re-exports. The U.N. COMTRADE data offers data on exports, re-exports, and gross exports (conceptually, exports plus re-exports), but most of the data on re-exports are missing. Of the 210 reporters in the COMTRADE system (including historical reporters), 118 have never reported data on re-exports. Moreover, the reporters are not consistent; the best cross-section (1995) has only 42 independent reporters. There is no reporting for the European Union (except for some United Kingdom observations in the 1960s), Japan, or Singapore, and very little for Latin America. North America, Hong Kong, Oceania, and much of Africa (particularly in the 1970s) have at least some data, and some very small countries, mainly islands, have long time series.

Tables 1-3 give a variety of data on the principal transshippers of the world, culled from a variety of sources. According to Table 1, the world's largest transshippers are, in order, the European Union, Hong Kong, the United States, Singapore, and the United Arab Emirates; it is not clear where Japan should go. While the EU probably is in fact the world's largest transshipper, the data for the EU are not comparable. They are imputed from the estimates of Gros (2002), who uses input-output data from GTAP, interpreting the use of imports in the activity of exporting as transshipments. Table 2 works out the implications of the Gros estimates country-by-country. The concept of transshipment for the EU depends on whether the entire customs union or individual members are considered as the unit of analysis, with the share of re-exports in total exports obviously being higher at the individual country level.[7]

Table 3 lists a number of smaller exporters for which the share of re-exports in total exports in the most recent years' data exceeds 20 percent, as well as a couple of countries for

[6] The freight rates on the transshipment route would tend to be lower than those on direct service routes given that the latter is in general faster. Direct service on low traffic routes also tend to be less frequent than transshipment connections.

[7] Kusters and Verbruggen (2001) note that analysis of the trade situation of the Netherlands can be grossly misleading if re-exports are not distinguished from domestic exports.

which re-exports are reputed to be important, but for which COMTRADE gives no data.[8] (This last category is not necessarily exhaustive.) This list is heavy on islands, West African countries, and countries around the Arabian Peninsula (note that the UAE and Saudi Arabia are among the billion-dollar re-exporters). The example of Armenia suggests that transshipment may be important elsewhere in Central Asia. For these economies, as for Hong Kong and Singapore, the failure to take re-exports into account may be misleading for a number of purposes.

Figure 1 provides an attempt to make some sense out of the COMTRADE data. The lower line, in which the share of re-exports in gross exports rises from very low levels in the 1960s to nearly 5 percent currently, is based only on reported data, and is thus significantly too low as well as biased by the appearance and disappearance of reporters over time. The upper line is constructed by filling in missing observations for reporters with the average for all available years, and then assuming that never-reporters have the same propensity to re-export as reporters. The first assumption biases the imputation against finding an upward trend. The second may bias the imputation downwards if the rate of re-exportation in the EU is anywhere near that suggested by Gros. Nonetheless, one finds both a strong upward trend in the data and a significant level. The imputed share of shipments which are re-shipped to another location may have increased from one in twenty shipments in the mid-1980s to one in six today, and may still be rising.

The impression given by Figure 2 is reinforced by the relatively good data for the world's second- and third-largest transshippers, Hong Kong and the United States. The share of re-exports in Hong Kong's gross exports, traditionally around 20-25 percent of the total, has increased steadily, with the onset of the increase coinciding with the emergence of an active Chinese market economy c. 1978, and now exceeds 90 percent. Similarly, for the United States, the share of re-exports in gross exports has increased from around 1 percent in the 1960s to 10 percent in 2003. These trends provide powerful evidence of the market impact of the technological changes discussed in the previous section, such as hub-and-spoke logistics and containerization.

Transshipment and the United States – Trends

U.S. Foreign Exports – Destinations and Commodities

Table 4 shows the main destinations for U.S. foreign exports (the term used in U.S. official data for re-exports). By and large the main destinations for re-exports parallel those for U.S. domestic exports. The share of re-exports in total exports is particularly high for Canada and Mexico, the NAFTA partners which are strategically situated relative to the United States; for Hong Kong, itself a re-exporter, and for Israel. The United States may benefit as a re-exporting hub to Israel because of U.S. policies which prohibit enforcement of the Arab boycott against firms doing business with Israel. For fourteen of the fifteen top destinations for U.S. foreign exports, the re-export share has increased in recent years. In the last six years, the share of re-exports in total U.S. exports has more than tripled for the destination of Mexico, and more than quadrupled for the destination of China.

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[8] For example, http://www.photius.com/wfb/wfb1999/oman/oman_economy.html lists Oman's second-leading export, after petroleum, as "re-exports," and http://www.mapquest.com/atlas/?region=djibouti lists "re-exports" and coffee "in transit" among Djibouti's leading exports. Both sources retrieved April 29, 2004.

Countries for which the share of transshipments in total U.S. exports are unusually high are shown in Table 5. The 1996-2002 averages in most cases represent persistent behavior, though in some cases (e.g. Swaziland and the West Bank) the foreign exports are concentrated in a few years of data. The appearance of Hong Kong, Singapore, and a large number of island countries on the list, many of which are re-exporters themselves, suggests that a significant amount of trade may in fact pass through four or more countries (the domestic exporter, re-exporter, re-re-exporter, and final importer). One wishes for re-export data on Switzerland and Liechtenstein in this connection.

Tables 6-8 explore the commodity composition of U.S. foreign exports. Whether considered by commodities or by countries, the share of U.S. total exports which are re-exports is increasing over time. The large and increasing amounts of re-exports in HTS 85 (including semiconductors and telecommunications equipment) and HTS 84 (including computers) suggest that increasing economies in logistics are an important part of the spread of vertical integration, "slicing up the value chain," outsourcing, and other phenomena affecting the information technology sectors.

Table 7, which lists the categories of merchandise for which U.S. exports are most likely to be re-exports, is particularly interesting. It includes an evocative list of goods such as art and antiques; coffee, spices, and cocoa; watches, jewelry, feather, hats, handbags and musical instruments, as well as electronics. Such a list of goods may suggest either a Christmas catalogue or the types of trading that a spy-novel villain might use as a legitimate cover. The list is heavily oriented toward consumer goods, particularly luxury consumer goods, which perhaps have a high value-to-weight ratio and can thus bear the cost of re-exporting, as in fact many of these goods have done since the Age of Discovery.

At the other extreme, Table 8 lists the kinds of goods which are likely to be shipped only once. This list is heavy in unprocessed primary goods, products mainly of agricultural and extractive activities. However, even for these goods, the importance of transshipment has increased, reflecting the general logistic revolution. Indeed, while gold jewelry and coin (in HTS 71) has always been transshipped, one of the categories of goods for which the rate of transshipment has increased most rapidly in recent years is lead and lead products, not shown in the table.

It is perhaps not a coincidence that the "heavy" primary goods for which U.S. exports tend to be domestic exports tend to be shipped by different methods than highly processed manufactures. Primary goods tend to travel by tramp shipping, with irregularly scheduled shipments driven by demand, or by land modes such as rail and truck. (Tanker shipping is, in effect, a specialized form of tramp shipping. Such shipments leaves the United States primarily through the Great Lakes and Gulf of Mexico ports, and (over land) across the Canada and Mexico borders. The waterborne shipments tend to have a low rate of containerization. The economics of liner shipping, on regularly scheduled routes similar to airlines, is very different.

Liner shipments, which operate primarily on the Atlantic and Pacific coasts, are highly containerized and tend to be much more high-value: the value-to-weight ratio is over 100 times as large for U.S. foreign exports leaving Miami than for those leaving Detroit. Such high-priced shipments also attract attempts to charge high prices for cargo. Fink, Mattoo, and Neaga (2002) have demonstrated the extent of price increases induced by the presence of price-fixing liner conference agreements, whose prevalence varies by geography.

Does the United States Transship to Transshippers?

Some insights into the possible "pull" phenomenon of double or multiple transshipment is provided in Figure 3, which plots the 1996-02 average re-export share of U.S. exports against the re-export share of the countries receiving imports of U.S. re-exports, for those countries for which COMTRADE data are available. While there is no direct data on re-re-exporting, the pattern is suggestive. There is no simple relationship between U.S. re-exports to a destination and that destination's own re-exports. The suggestion is that locations like Hong Kong and Antigua and Barbuda may well re-re-ship cargo that has been already re-shipped through the United States. The United States itself is likely to be the primary entryway into other locations, for logistic reasons. And locations such as St. Lucia, Taiwan, and St. Vincent and the Grenadines may well receive a lot of U.S. merchandise and transship it to somewhere else.

Other indirect evidence of the possibility of re-re-shipment comes from data compiled by the U.S. Department of Transportation Maritime Administration, or MARAD (2002) on intra-NAFTA re-shipments. These cover a number of flows not appearing in the data already discussed. U.S. exports through Canada, through Detroit, Chicago, Buffalo and other locations, rose from $5.7 billion in 1990 to $9.2 billion in 2000, while U.S. imports transshipped through Canada tripled from $6.2 billion in 1990 to $19.1 billion in 2000. U.S. exports and imports via Mexico in 2000 were $71 million and $3.3 billion respectively, moving largely through. Laredo, San Diego and El Paso. The route through Canada is used primarily for U.S. trade with Europe and the Mediterranean, while the route through Mexico is used primarily for imports from the Far East. Machinery and electrical equipment figure heavily in U.S. trade which passes through Canada and Mexico. The MARAD data fill in a significant part of the picture, as the origin of goods re-exported is generally not known otherwise. MARAD also reports some information on Canadian and Mexican cargo transshipped through U.S. ports.

ECONOMETRICS

Specification

The determinants of U.S. domestic exports and U.S. transshipments are examined within the framework of a standard gravity model. In addition to the usual explanatory variables of distance and country size found in the gravity-model literature, our model explores other determinants within the context of the preceding discussion above. That is to say, the level of shipments, but especially transshipments, will be determined by those factors that affect overall as well as per-unit shipping costs. As mentioned above, the development of large oceangoing containerships serviced by liners has lead to considerable scale economies. These factors are reflected in variables such as the degree of containerization or the extent of liner services on particular shipping routes. In addition, various other factors identified in the literature [Fink, Mattoo, and Neagu (2002); Clark, Dollar, and Micco (2004)] that affect shipping costs and efficiency, such as port efficiency, port economies, or the existence of various regulatory maritime policies, are also examined in this analysis.

The model examines shipments of domestic exports and transshipments between most U.S. customs districts and 52 selected trading partners for 2003.[9] Gravity equations for each type of export shipment are depicted in equations (1) and (2):

$$\begin{aligned} DOMX_{ij} &= \alpha_0 + \alpha_1 DIST_{ij} + \alpha_2 GNI_j + \alpha_3 TEX_i + \alpha_4 CON_i + \alpha_5 LIN_i + \alpha_6 PORT_j \\ &\quad + \alpha_7 PRFX_j + \alpha_8 COPA_j + \alpha_9 CRES_j + \alpha_{10} CHND_j + \alpha_{11} MAPT_j \end{aligned} \tag{1}$$

$$\begin{aligned} TRAN_{ij} &= \beta_0 + \beta_1 DIST_{ij} + \beta_2 GNI_j + \beta_3 TEX_i + \beta_4 CON_i + \beta_5 LIN_i + \beta_6 PORT_j \\ &\quad + \beta_7 PRFX_j + \beta_8 COPA_j + \beta_9 CRES_j + \beta_{10} CHND_j + \beta_{11} MAPT_j \end{aligned} \tag{2}$$

Where:

DOMX: Value of U.S. domestic exports from customs district *i* to trading partner *j* (in logarithm of current U.S. dollars).
TRAN: Value of U.S. transshipments from customs district *i* to trading partner *j* (in logarithm of current U.S. dollars).
DIST: Distance between U.S. customs districts *i* and trading partner *j* (in logarithm of nautical miles).
GNI: Gross national income of trading partner *j* (in logarithm of current U.S. dollars).
TEX: Total exports to the world from customs district *i* (in logarithm of current U.S. dollars).
CON: Value of containerized shipments as a share of the value of total shipments for customs district *i*.
LIN: Value of liner shipments as a share of the value of total shipments for customs district *i*.
PORT: Port efficiency index for trading partner *j*, continuous on (1,7),
PRFX: Index reflecting the presence of a liner conference and/or other price-fixing agreement for trading partner *j*, semicontinuous on [0,1].
COPA: Index reflecting the presence of cooperative working agreements or liner agreements other than price-fixing agreements, or trading partner *j*, semicontinous on [0,1].
CRES: Dummy variable reflecting the existence of policies reserving international cargo for domestic carriers, for trading partner *j*, dichotomous on [0,1].
CHND: Index measuring restrictions on foreign suppliers of cargo-handling services for trading partner *j*, semicontinuous on [0,1]. A higher value indicates a more restrictive policy.
MAPT: Index reflecting the extent to which shippers are required to purchase mandatory port services for trading partner *j*, semicontinuous on [0,1].

The sources of the data are provided in the Appendix. In particular, PORT is taken from from Clark, Dollar, and Mico (2004), while PRFX, COPA, CRES, CHND, and MAPT come from Fink, Mattoo, and Neaga (2001). Of these variables, PORT is continuous on (1,7), CRES is dichotomous on [0,1], and the others are semi-continuous on [0,1]. PORT has been found to be associated with lower shipping rates, PRFX and MAPT are associated with higher shipping rates, while results on COPA, CRES, and CHND are weaker or counterintuitive. Using different measures than those used here, Fink et al. also find higher shipping rates over longer distances, and lower shipping rates in the presence of containerization and liner imports.

[9] Tables A-1 and A-2 in the appendix list trading partners and customs districts.

The variables DIST, GNI, and TEX can be interpreted in the tradition of gravity models, as being one distance variable and two activity variables, one for the importing country and the other for the exporting port. TEX might also be considered as a port-efficiency variable for U.S. ports if economies of scale are thought to be important. The other variables reflect information on the relative port efficiency of U.S. customs districts (CON, LIN) or on the relative port-efficiency or openness of U.S. trading partners (PORT, PRFX, COPA, CRES, CHND, MAPT). Ports or customs districts with larger levels of total U.S. exports to the world are more likely to experience economies of scale, therefore, we expect the coefficient of TEX to be positive. Similarly, U.S. ports with higher degrees of container and liner trade are also more likely to experience economies of scale, and we expect the coefficients for LIN and PORT to be positive.

Trading partners with ports that are more efficient are more likely to facilitate both direct shipments and transshipments, and we expect the sign on PORT to be positive. However, the existence of various restrictions on transport, cargo manipulation, or port services will deter the level of shipments and transshipments, and we expect the coefficients on PRFX, COPA, CRES, CHND, and MAPT to be negative. We expect that for all of these explanatory variables transshipments will be more responsive than direct shipments, because the existence of transshipments is largely motivated by opportunities to economize on transactions costs.

Since the share of shipments which go by liners and the share of shipments which are containerized are highly correlated across U.S. ports, we do not use them in the same specification but rather consider them to be proxies for each other, and run two sets of specifications, one which omits the container share and the other which omits the liner share.

Results

The regression results are summarized in Table 9. Given that the sample contains 1,282 observations when the liner share is used and 1,687 observations when the container share is used, it is reasonably parsimonious. The results are mainly robust to whether containerization or linearization is used to capture the difference between the Atlantic/Pacific ports and the ports of the Great Lakes, Gulf Coast, and NAFTA land borders. The most striking feature of the results is the extent to which transshipments are more sensitive to cost variables than are domestic shipments. Focusing on the results using the “liner” variable, as these have better fit, the elasticity of exports with respect to distance is 46 percent greater for transshipments than for domestic exports. Characterizing the other variables according to levels rather than elasticities, the effect of linearization is 52 percent greater, of port efficiency 250 percent greater, and of price-fixing agreements over 400 percent greater, with respect to transshipments rather than with respect to domestic shipments. For distance, containerization, linearization, port efficiency, and price-fixing agreements, the effect is of the expected sign and the difference between the coefficients generally passes conventional statistical tests. A weaker result of the same type is found for restrictions on cargo-handling services, whose trade-depressing effect is 57 percent larger for transshipments but which are of marginal statistical significance. As in Fink, et al., cooperative agreements have a counterintutitive sign and are associated with more rather than less trade, as they were associated with lower rather than higher shipping prices in the previous study.

Conclusion

The results of this exercise are satisfyingly strong, and suggest significant welfare gains from policies to lower transport and port costs and increase competitiveness. We suspect these gains are particularly important for developing-country imports. Some of our explorations in the data show that for smaller developing economies, exports in general, and re-exports in particular, tend to be highly concentrated in a few U.S. ports, and that some ports (e.g. New York, Miami, Los Angeles, San Francisco) specialize in the re-export trade.

Many of the findings of this paper could be refined by the use of better data, which is abundantly available. We have not made use of commodity variation in the current work, though there is likely some economic determinant underlying the list of "Christmas shopping" or "James Bond" commodities which are heavily transshipped. Moreover, we have not utilized the MARAD data extensively at all, which contain a wealth of information on mode of shipping, routing, etc, at an underlying level.

Appendix – Data Sources

Data on U.S. total exports, domestic exports, and foreign exports are original U.S. Department of Commerce data and can be accessed via the U.S. International Trade Commission's Dataweb (http://dataweb.usitc.gov). Foreign exports are calculated as the difference between total exports and domestic exports. The distances between U.S. ports and foreign countries were calculated by the authors using the latitude and longitude of the U.S. port and largest city in the foreign country, and the great circle formula. These are used as a proxy for direct shipping distances, which in some cases are proprietary, because they were relatively inexpensive to generate. The distance measures are available from the authors.

Gross national income is taken from the World Bank's World Development Indicators and is for 2002. The value share of exports from each U.S. port which are containerized, and the share carried on liners, are calculated from data of the U.S. Maritime Administration and are also for 2002. The port efficiency variable is taken from Clark, Dollar and Mico (2004) and comes originally from Global Competitiveness Report, various years (1996-2000). The variables describing price-fixing agreements, cooperative agreements, cargo reservation policies, policies with respect to cargo-handling services and mandatory port services are taken from Fink, Mattoo, and Neagu (2001). These variables are described in more detail by the authors. The liner and containerization variables have been calculated by the authors and are not necessarily the same as those in Fink et al. The variables pertaining to price-fixing agreements and cooperative agreements are the country averages reported in the paper, and not the dichotomous values for country-port pairs used by the authors in their regressions.

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Table 1

Principal Transshipping Countries Of The World

Large-Value Transshippers

Country(Year)	*Re-exports (billion U.S. dollars)*	*Re-exports as percentage of gross exports*	*Source*
European Union (2002)	512.1	22.0	Imputed from Gros (2002)
Hong Kong (2002)	183.3	91.6	U.N. Comtrade
United States (2003)	72.3	10.0	U.S. Commerce Department
Singapore (2002)	58.3	46.6	WTO (2003)
United Arab Emirates (2001)	8.0	25.0	U.N. Comtrade
Taiwan (2001)	3.5	2.7	U.N. Comtrade
Australia (1999)	3.4	6.5	U.N. Comtrade
Saudi Arabia (2002)	1.1	1.5	U.N. Comtrade
Japan?	NA	NA	

Table 2

Breakdown for European Union (2002), using Gros (2002) shares for 1997

Country(Year)	*Measure*	*Re-exports (billion U.S. dollars)*	*Re-exports as percentage of gross exports*
European Union	intra-EU	712.5	31
European Union	extra-EU	512.1	22
Germany	Total*	159.9	27
Belgium	Total*	105.6	49
France	Total*	76.1	25
Italy	Total*	73.7	29
Netherlands	Total*	67.4	41
United Kingdom	Total*	66.4	23
Ireland	Total*	38.9	44
Spain	Total*	31.4	25
Sweden	Total*	28.3	35
Austria	Total*	20.9	31
Denmark	Total*	15.6	28
Finland	Total*	14.7	33
Portugal	Total*	7.9	30
Luxembourg	Total*	4.2	49
Greece	Total*	1.5	14

* = intra- and extra-EU combined

Table 3

Some Smaller Transshippers For Which Re-Exports Are A Large Share of Gross Exports

Country(Year)	*Re-exports (miillion U.S. dollars)*	*Re-exports as percentage of gross exports*	*Source*
Armenia (2002)	95	21.4	U.N. Comtrade
Antigua and Barbuda (1999)	11	77.3	U.N. Comtrade
Bahamas (2001)	147	67.7	U.N. Comtrade
Barbados (2002)	54	25.1	U.N. Comtrade
Cape Verde (2000)	38	77.4	U.N. Comtrade
Cyprus (2002)	457	54.7	U.N. Comtrade
Djibouti	NA	NA	See text
Eritrea (2002)	39	75.9	U.N. Comtrade
Fiji (2002)	111	22.7	U.N. Comtrade
Macao (2002)	517	21.9	U.N. Comtrade
Mali (2001)	41	46.8	U.N. Comtrade
Montserrat (2002)	14	99.8	U.N. Comtrade
Niger (2000)	142	42.8	U.N. Comtrade
Oman	NA	NA	See text
St. Lucia (2002)	19	30.8	U.N. Comtrade
Senegal (2002)	276	39.7	U.N. Comtrade
Seychelles (2002)	18	47.5	U.N. Comtrade
Togo (1999)	95	27.9	U.N. Comtrade

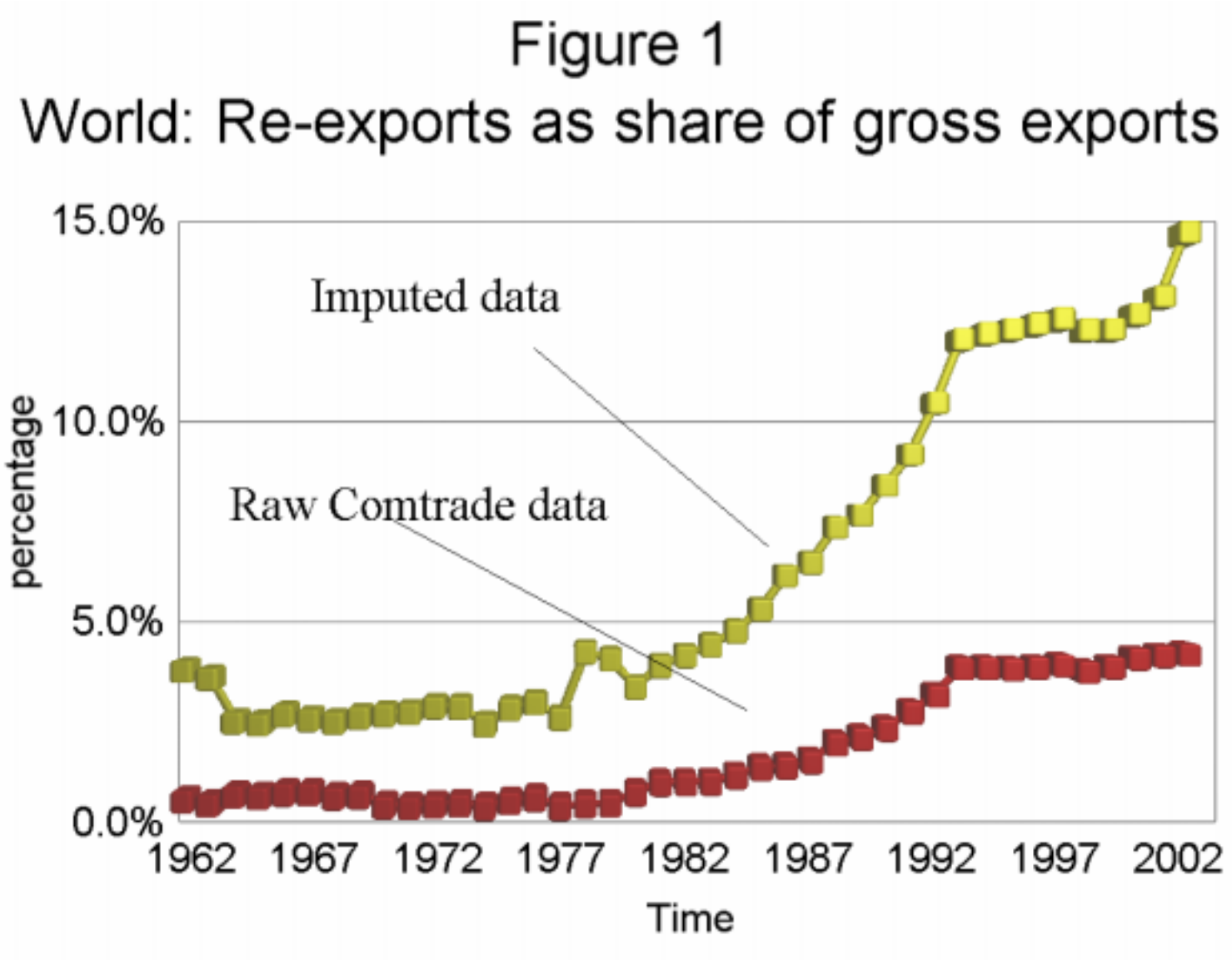
Figure 1
World: Re-exports as share of gross exports
15.0%
10.0%
5.0%
0.0%
percentage
Imputed data
Raw Comtrade data
1962
1967
1972
1977
1982
1987
1992
1997
2002
Time

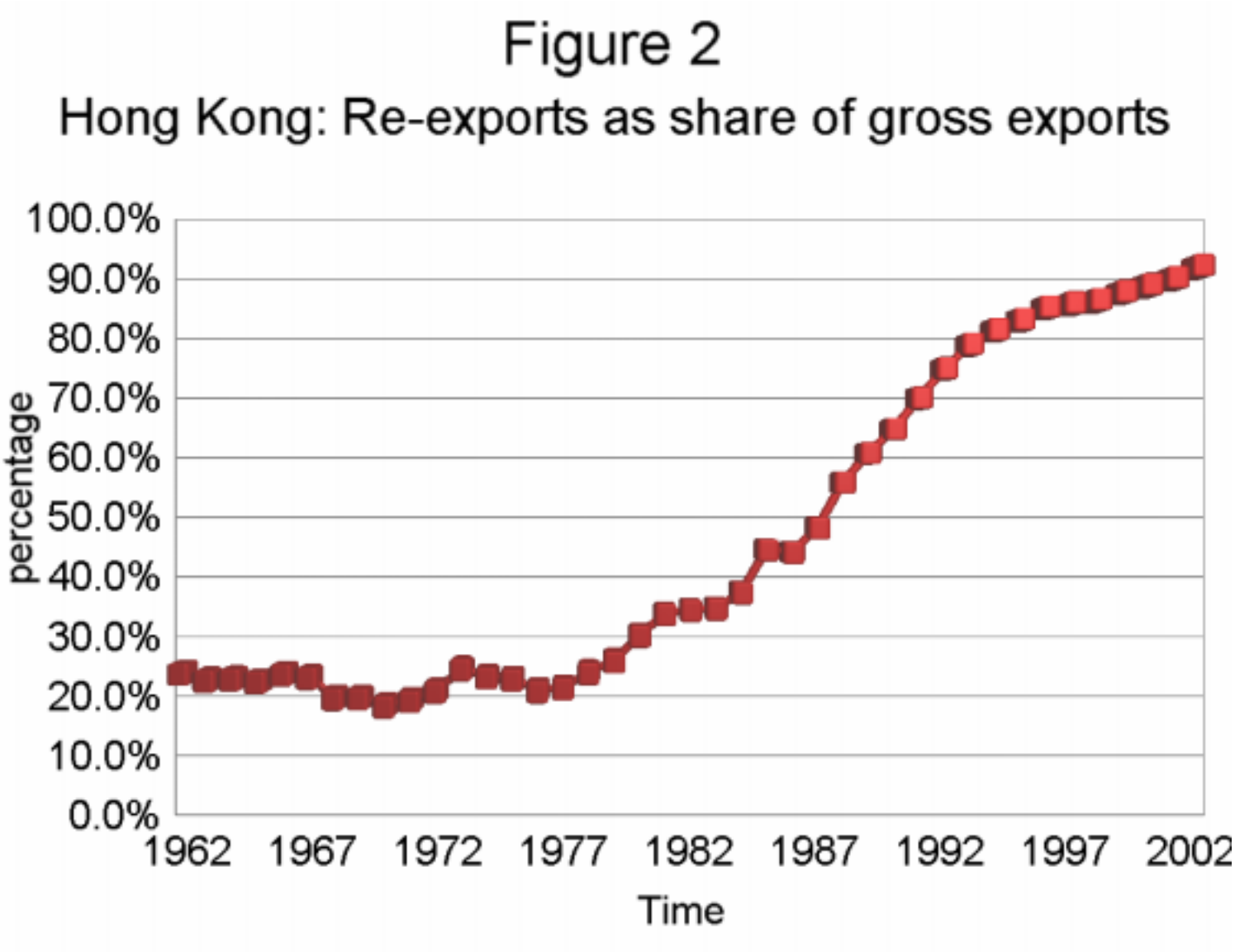
Figure 2
Hong Kong: Re-exports as share of gross exports
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
percentage
1962
1967
1972
1977
1982
1987
1992
1997
2002
Time

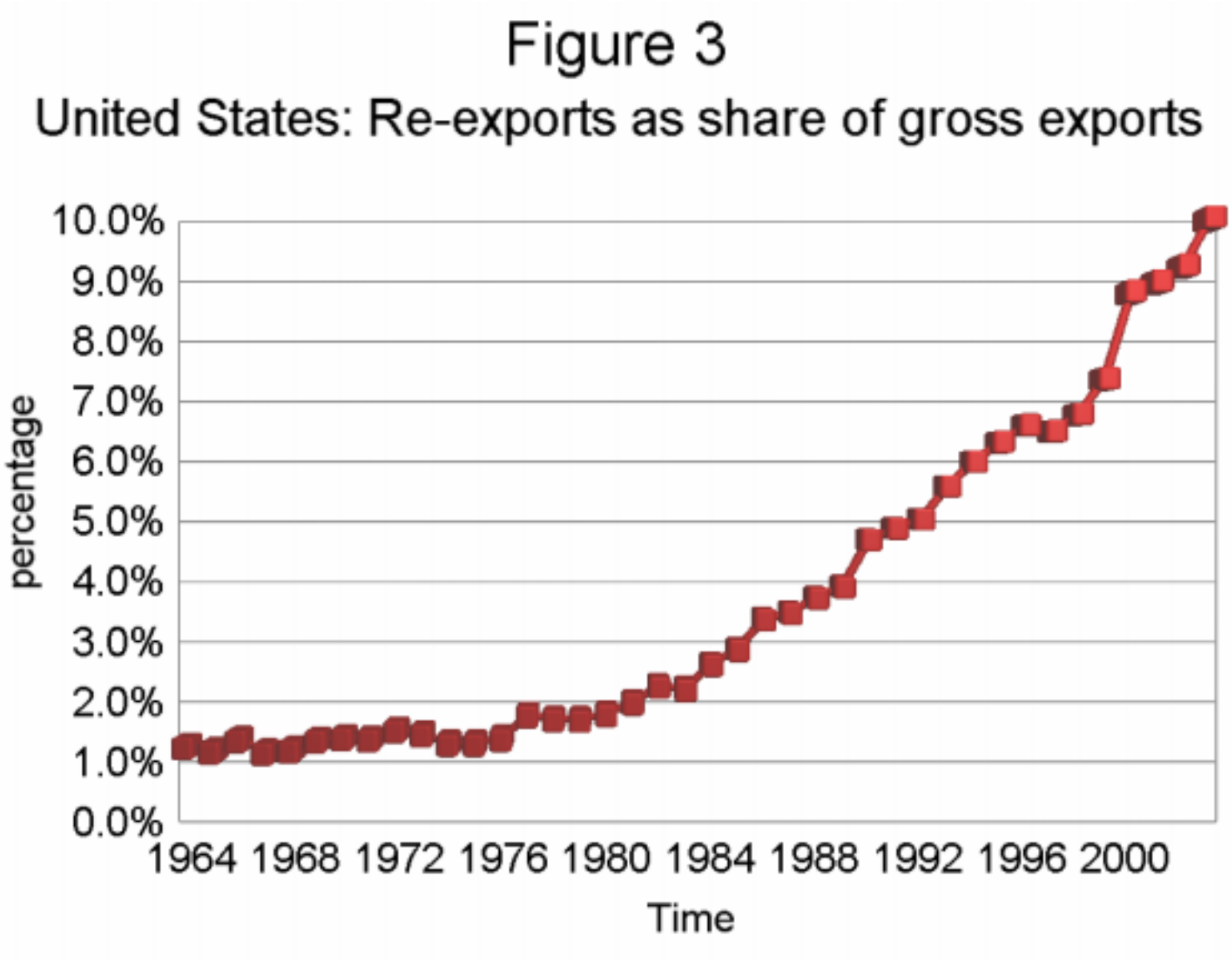
Figure 3
United States: Re-exports as share of gross exports
10.0%
9.0%
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
percentage
1964 1968 1972 1976 1980 1984 1988 1992 1996 2000
Time

Table 4
U.S. Foreign Exports and Total Exports – By Country

Leading destinations for U.S. foreign exports - 2002

Country	1996 U.S. foreign exports $ billion	2002 U.S. foreign exports $ billion	1996 U.S. foreign exports as percentage of total exports	2002 U.S. foreign exports as percentage of total exports
Canada	13.461	18.256	10.2	11.4
Mexico	2.075	11.455	3.7	11.7
Japan	3.951	3.167	5.8	6.2
United Kingdom	2.238	3.010	7.2	9.0
Hong Kong	1.638	2.584	11.7	21.6
Germany	1.283	1.758	5.5	6.6
Israel	0.940	1.735	15.6	24.6
Taiwan	1.492	1.608	8.1	8.7
Singapore	2.008	1.503	12.0	9.3
China	0.177	1.500	1.5	6.8
France	0.884	1.497	6.1	7.9
Korea	1.150	1.445	4.3	6.4
Netherlands	1.131	1.342	6.8	7.3
Belgium	0.916	1.311	7.3	9.8
Brazil	0.779	1.201	6.1	9.7

Table 5

Countries for which the share of U.S. exports in total exports is high

Country	1996-2002 total U.S. foreign exports $ billion	1996-2002 U.S. foreign exports as percentage of total exports
Swaziland	0.071	30.0
Mauritius	0.046	22.8
Israel	9.387	19.1
West Bank	0.010	19.0
St. Vincent and the Grenadines	0.229	18.0
British Indian Ocean Territories	0.037	16.2
Hong Kong	13.387	14.0
Switzerland	7.988	13.5
Liechtenstein	0.011	13.2
Kuwait	0.861	11.4
Comoros	0.0003	11.1
Canada	121.546	11.0
Anguilla	0.018	10.7
Singapore	12.111	10.2
Papua New Guinea	0.024	9.6

Table 6

Leading categories of U.S. foreign exports by HTS chapter - 2002

HTS Chapter	1996 U.S. foreign exports $ billion	2002 U.S. foreign exports $ billion	1996 U.S. foreign exports as percentage of total exports	2002 U.S. foreign exports as percentage of total exports
85 – Electrical machinery	15.375	21.630	15.8	18.6
84 – Other machinery, incl. computers	8.448	14.547	6.9	11.2
71 – Precious metals and stones, etc.	3.331	4.977	27.3	36.8
90 - Optical and scientific instruments	1.674	3.137	5.5	7.6
87 - Motor vehicles and parts	2.191	3.072	3.9	4.9
88 - Aircraft and parts	1.136	1.853	3.5	4.2
97 - Works of art and antiques	0.784	1.581	46.9	61.8
98 - Special classifications	1.781	1.430	9.2	6.3
39 - Plastics and plastic products	0.316	0.905	1.6	3.3
95 - Toys, games, and sporting goods	0.340	0.676	8.5	18.6
94 - Furniture and fixtures	0.243	0.631	5.1	11.0
08 - Fruit and nuts	0.435	0.498	10.5	11.7
29 - Organic chemicals	0.292	0.492	1.8	2.5
73 - Articles of iron or steel	0.215	0.481	2.9	6.0
48 - Paper and paperboard	0.159	0.356	1.6	3.4

Table 7

Categories for which the share of U.S. foreign exports in total exports is high - 2002

HTS Chapter	1996 U.S. foreign exports as percentage of total exports	2002 U.S. foreign exports as percentage of total exports
97 - Works of art and antiques	46.9	61.8
91 - Clocks, watches, and parts	32.6	43.5
09 - Coffee, tea, mate and spices	47.0	38.0
71 – Precious metals, stones, etc.	27.3	36.8
67 - Feathers, wigs, fake flowers, etc.	18.6	31.9
64 - Footwear and parts	13.5	26.0
65 - Umbrellas, whips, walking sticks	21.4	23.3
42 - Leather goods and travel goods	8.5	19.6
85 – Electrical machinery	15.8	18.6
65 - Headgear and parts thereof	5.7	18.6
95 - Toys, games, and sporting goods	8.5	15.7
45 - Cork and articles thereof	6.2	13.9
80 - Tin and articles thereof	12.7	13.3
18 - Cocoa and cocoa preparations	14.0	13.1
92 - Musical instruments and parts	7.3	12.5

Table 8

Categories for which the share of U.S. foreign exports in total exports is low - 2002

HTS Chapter	1996 U.S. foreign exports as percentage of total exports	2002 U.S. foreign exports as percentage of total exports
10 – Cereals	0.1	0.6
23 – Food waste and animal feed	1.2	0.6
24 – Tobacco	0.5	1.1
01 - Live animals	0.5	1.2
15 - Fats and oils	0.8	1.3
19 - Preps. of cereal, flour, milk, etc.	1.5	1.3
02 - Meat and meat offal	0.5	1.3
27 – Mineral fuels	1.4	1.4
12 - Oil seeds, misc. grains and seeds	0.5	1.6
25 - Ores, slag, and ash	6.1	1.6
60 - Knitted or crocheted fabrics	1.3	1.7
34 - Soap, waxes, candles, etc.	1.2	1.7
25 - Salt, sulfur, lime, cement, etc.	1.6	1.9
55 - Manmade fibers, yarns, fabrics	1.0	2.1
41 - Hides, skins, and leather	2.1	2.2

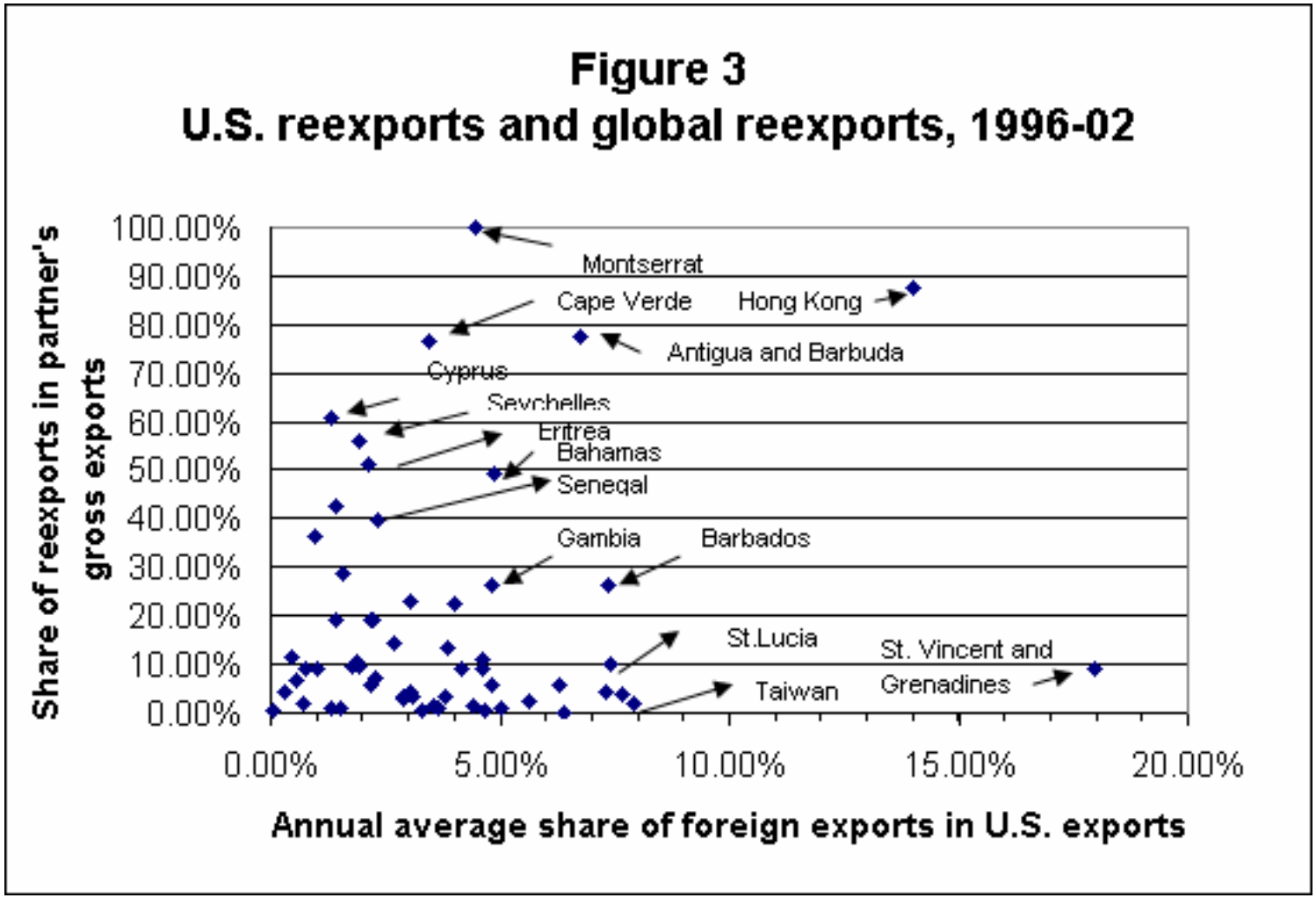
Figure 3
U.S. reexports and global reexports, 1996-02
Share of reexports in partner's gross exports
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Montserrat
Cape Verde
Hong Kong
Antigua and Barbuda
Cyprus
Seychelles
Eritrea
Bahamas
Senegal
Gambia
Barbados
St.Lucia
St. Vincent and Grenadines
Taiwan
0.00%
5.00%
10.00%
15.00%
20.00%
Annual average share of foreign exports in U.S. exports

Table 9: Determinants of U.S. Domestic Exports and Transshipments

Variable	Domestic Exports	Trans-shipments	Domestic Exports	Trans-shipments
Intercept	-39.90	-68.69	-43.68	-78.43
	(-13.81)**	(-18.21)**	(-15.11)**	(-20.72)**
Distance (ln)	-0.64	-1.07	-0.56	-0.82
	(-4.11)**	(-5.25)**	(-3.62)**	(-4.00)**
Gross national income of partner countries (ln)	1.37	1.71	1.29	1.67
	(18.23)***	(17.47)***	(16.93)***	(6.74)***
Total exports by US port (ln)	1.03	1.76	1.26	2.12
	(15.55)***	(20.24)***	(19.31)***	(24.73)***
Containerization by US port (%)	4.69	6.43		
	(10.54)***	(11.07)***		
Liner volume by US port (%)			3.08	4.69
			(10.33)***	(12.01)***
Port efficiency of partner	0.25	0.76	0.20	0.70
	(2.47)***	(5.81)***	(2.00)**	(5.30)***
Price-fixing agreements	-0.41	-1.67	-0.29	-1.52
	(-1.61)	(-4.98)***	(-1.13)	(-4.47)***
Cooperative agreements	0.14	0.82	0.24	0.79
	(0.51)	(2.35)**	(0.90)	(2.23)**
Cargo reservation	-0.56*	-0.40	-0.31	-0.35
	(-1.70)	(-0.94)	(-0.92)	(-0.79)
Cargo-handling services	-0.37	-0.60	-0.53	-0.83*
	(-1.15)	(-1.42)	(-1.60)	(-1.92)
Mandatory port services	0.45	0.19	0.22	-0.10
	(0.92)	(0.29)	(0.45)	(-0.15)
F-statistic	100.83***	124.03***	110.98***	151.32***
Observations	1,687	1,687	1,282	1,282
Adjusted R^2	0.38	0.42	0.46	0.54

T-statistics in parentheses.
* Significant at the 10 percent level (one-tail test).
** Significant at the 5 percent level (one-tail test).
***Significant at the 1 percent level (one-tail test).

Source: Authors' calculations

Table A-1: Trading Partners

Argentina	Germany	Poland
Australia	Greece	Portugal
Belgium	Hong Kong	Russia
Bolivia	Hungary	Singapore
Brazil	Iceland	Slovakia
Bulgaria	India	South Africa
Canada	Indonesia	Spain
Chile	Ireland	Sweden
China	Italy	Taiwan
Colombia	Japan	Thailand
Costa Rica	Korea	Turkey
Czech Republic	Malaysia	Ukraine
Denmark	Mauritius	United Kingdom
Ecuador	Mexico	Venezuela
Egypt	Netherlands	Vietnam
El Salvador	New Zealand	Zimbabwe
Finland	Peru	
France	Philippines	

Table A-2: U.S. Customs Districts

Anchorage, AK	Honolulu, HI	Philadelphia, PA
Baltimore, MD	Houston-Galveston, TX	Port Arthur, TX
Boston, MA	Laredo, TX	Portland, ME
Buffalo, NY	Los Angeles, CA	Providence, RI
Charleston, SC	Miami, FL	San Diego, CA
Charlotte, NC	Milwaukee, WI	San Francisco, CA
Chicago, IL	Minneapolis, MN	San Juan, PR
Cleveland, OH	Mobile, AL	Savannah, GA
Columbia-Snake, OR	New Orleans, LA	Seattle, WA
Dallas-Fort Worth, TX	New York, NY	St. Albans, VT
Detroit, MI	Nogales, AZ	St. Louis, MO
Duluth, MN	Norfolk, VA	Tampa, FL
El Paso, TX	Ogdensburg, NY	US Virgin Islands
Great Falls, MT	Pembina, ND	Washington, DC