Offshoring Tariff Evasion: Evidence from Hong Kong as Entrepôt Trader

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Abstract

Traditional explanations for high rates of indirect trade have focused on the role of specialized agents in processing and distribution. We provide an alternative explanation based on the differential ability to evade tariffs from some trade entrepôt s. Using data on exports to mainland China, we find that the fraction of goods that are routed through Hong Kong (rather than sent directly) is positively correlated with the Chinese tariff rates, both in the cross section and in differences, even though there is no legal tax advantage to sending goods via Hong Kong. Further, this pattern holds for both differentiated and homogeneous products. As a control, we also examine indirect exports to China via Singapore, another entrepôt with less scope for evasion; there is no correlation between indirect export rates and tariff rates in this case.

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Key Words: Tax evasion, Indirect Trade, Corruption.

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Indirect trade through an entrepôt is a common phenomenon in world commerce. For example, for every $100 that the United States exports to China, approximately $20 goes through Hong Kong. There are thiry-some countries that do a significant amount of indirect exports. Macao, Cyprus, Fiji, Senegal, Jordan, Armedia, Seychelles, Honduras, Benin, Montserrat, St. Lucia, and Singapore are some of the other prominent entrepôts through which indirect trade takes place.

Why is there so much indirect trade? Explanations have traditionally focused on the presence of specialized agents that match buyers and sellers across markets (Feenstra and Hanson, 2004). This is undoubtedly responsible at least in part for the high rates of indirect trade; however, we suggest an alternative, previously undocumented explanation may also play a prominent role – the use of entrepôt economies to facilitate tariff evasion. As in the traditional argument for indirect trade, the evasion-based explanation also posits a role for specialized agents that are better positioned to transport goods to their final destinations without paying the required tariffs. That is, there may be a darker side to the middleman's role in trade.

We examine this hypothesis in the context of the Hong Kong, the world's largest entrepôt economy, where trade was 259 percent of GDP in 1998 (Feenstra and Hanson, 2004), and a common stopping point for goods both entering and leaving from mainland China. There exists some anecdotal evidence of the use of Hong Kong as an illicit entry point for goods into China. For example, a recent report from the United States Department of Agriculture describes the presence of such agents in the importation of food products: "Using unofficial channels, to bring in a 40 foot container of imported fresh fruit from Hong Kong to one of the cities in the Pearl River Delta costs approximately $4,000 to $6,000…This amount is usually much less than the price paid when using official channels." (USDA, 1997).

On a product by product basis, we compute indirect trade intensity – the ratio of indirect exports to China going through Hong Kong to the total exports to China – and examine if it has any systematic relationship with product-level tariff rates. The benefit of indirect trade for the purposes of evading tariffs is increasing in the value of tariffs evaded, and hence the

tariff rate[1]. As there is no preferential tariff treatment for indirect trade via Hong Kong (or elsewhere), this forms the basis for our test of our 'offshoring evasion' hypothesis. With disaggregated data (at HS 6-digit level) for the years 1996-2001, we find a clear positive association between tariff rate and intensity of indirect trade. This is consistent with the hypothesis that part of the role of the middlemen is to help evade tariff payments.

The use of indirect trade may be correlated with a good's need to be intermediated (for example, lower demand elasticity demand products may be more likely to be transshipped). This could be a problem if the latter is correlated with the tariff structure, leading to a spurious correlation between indirect trade intensity and tariff level. We therefore extend analyses by adding 6-digit HS fixed effects and also by differencing the data. This effectively deals with any characteristics of imports that are not time-varying. We find that the results remain statistically significant at the one percent level, though the point estimates are somewhat reduced.

We provide several additional robustness tests of our results. First, we compare our baseline results on Hong Kong to the case of Singapore. As Singapore has a reputation as a relatively low-corruption port of departure, it may discourage would-be tariff evaders from operating there. We find that there is a high correlation in the types of goods that are shipped via the two entrepôts, suggesting that there are indeed commonalities in the types of goods that generally require transshipment. However, we do not find any correlation between tariff rates and indirect trade via Singapore.

We also provide two tests based on sample splits of the data. First, we examine industry classes where the vast majority of incoming goods are tariff-exempt, and hence there is little evasion-related reason to undertake indirect trade; we do not find any tariff-indirect trade correlation for this set of products in our data.

Second, we examine trade in homogeneous and differented products separately based on the Rauch (1999) classification. The basic idea is that there may be economic rationales, unrelated to evasion, for trade in differentiated products to go through an entrepôt , as a middleman's specialized knowledge on a differentiated product could help mediate the trade. Indeed, Feenstra and Hanson (2004) suggest that Hong Kong may play an important

[1] If we assume that the potential punishment does not increase linearly (see, for example, Slemrod and Yitzhaki, 2002), we expect the rate of transshipping (relative to direct shipment) to be increasing in the tariff rate – there is a greater incentive to evade tariffs on high tariff goods.

intermediary role for differentiated products, since such products may require greater processing and quality sorting. In contrast, there may be less specialized product-specific knowledge involved for trade in homogenous products. We find a positive (and statistically indistinguishable) correlation between tariff rate and indirect trade intensity for both homogenous and differentiated products. This further bolsters the interpretation that tariff evasion is a significant motivation for the observed indirect trade.

To get a sense of quantitative importance of corruption-induced indirect trade, we provide an illustrative calculation. According to one specification that we present below, a ten percent increase in tariff rate would lead to an increase in the indirect trade ratio by 2.5 percentage points. Thus, an increase in the tariff rate from zero to 16 percent (the average statutory tariff rate in China in 2001) would lead to an indirect export ratio of about 4%, which is about 25% of the indirect exports from the U.S. to China through Hong Kong, or half of the total indirect trade by Macao.

In addition to bringing new insight to the literature on indirect trade, we also contribute to the growing empirical literature on tax evasion and smuggling. Earlier work includes a study on the effects of pre-shipment inspection on evasion (Yang, 2004) and the effect of tariff rates on evasion (Fisman and Wei, 2004). While the current paper is related to Fisman and Wei (2004), we note that it is fundamentally different in several ways that warrant a brief discussion. The two papers seek to explain very different phenomena. The Fisman-Wei paper estimates the elasticity of tax evasion with respect to tax rates, which is a public finance question. The current paper seeks to establish outsourcing of tariff evasion as an important explanation for the prevalent entrepôt trade phenomenon in the world commerce. The result of the Fisman-Wei paper is not a sufficient condition for the result in this paper: It is logically possible that entrepôt trade is unrelated to evasion even if there is evasion at the Chinese border. The Fisman-Wei paper, however, is a necessary condition: the Chinese border has to be corruptible for Hong Kong to serve as an intermediate step to evade tariffs.

The rest of this paper proceeds as follows: In Section 1, we provide our conceptual framework; Section 2 describes the datasets brought together for this research; Section 3 presents our estimation strategy and results, and Section 4 concludes.

1. Empirical Framework

For expositional purposes, we assume in this section that tariffs may only be evaded by routing goods through Hong Kong and that traders are risk-neutral. We describe the cost-benefit trade-off associated with evasion for a typical trader in industry i as being given by:

Benefit = $\tau_i V$

Cost = $C + \gamma\, \tau_i V + \eta_i$

Here, τ_i is the tariff rate for industry i. The cost includes a fixed, a variable and a random components: C is the fixed cost, $\gamma < 1$ describes the variable cost, η_i represents the random component. A representative trader (of good i) would choose to evade tariff if and only if the benefit of doing so exceeds the cost, or

$$\eta_i \leq (1-\gamma)\, \tau_i V - C$$

Assuming that η_i is i.i.d, across all traders and has a cumulative distribution function F, then the fraction of exports in industry i that may be re-routed to Hong Kong to evade tariffs is given by:

(1) $(\text{Indirect Export Ratio})_i = F(\,(1-\gamma)\, \tau_i V - C\,)$

If we further assume that F has a uniform distribution, we may express this as a linear regression:

(2) $(\text{Indirect Export Ratio})_i = \alpha + \beta * \tau_i + \varepsilon_i$, where $\beta > 0$

Intuitively, if it is relatively inexpensive to evade tariffs by using Hong Kong as an entrepot, a larger fraction of trade will be done that way if the tariff rate is higher.[2]

[2] This paper has not formally examined the issue of possible endogeneity of the tariff rate. If the government were to set the tariff rates with revenue maximization in mind, it may set relatively high rates on products that are

If the random cost, η_i, does not follow a uniform distribution, or if the cost of evasion is non-linear in the tariff rate, then the indirect trade ratio could be a non-linear function of the tariff rate.

2. Data

The data on Chinese tariffs and taxes are taken from the World Bank's World Integrated Trade Solution (WITS), derived from the UNCTAD TRAINS (Trade Analysis and Information System) database, which gives tariff rates at the 8-digit HS level. Since our import/export data are at the 6-digit level, we need some way of aggregating the tariff rates up to the 6-digit level. Since there is relatively little variation in tax rates at the 8-digit level within a 6-digit category, we are able to restrict ourselves to the sample for which there are uniform rates at this level of aggregation.

The earliest year for which we have detailed data on tariffs is 1996, and our data reflect year-end tariff rates. Since the import and export data are cumulated for the entire year, matching imports with the appropriate tax rates is challenging if the tariff structure were changed mid-year. In 1997, tariffs were changed on October 1, and tariffs did not change during 1998. For 1997, we take a weighted average of year-end 1996 and 1997 tariffs as our measure of the 1997 tariff rate. Since the tariff changes of 1998-2001 were all implemented on January 1, the tariff rate is uniform throughout those years. We define $Tariff_{it}$ as the tariff rate on incoming goods in industry i in year t.

To calculate our indirect export ratio, we require countries' own reports of direct exports to China, as well as Hong Kong's reports of indirect exports. The direct export data come from WITS, which in turn gets its export statistics from the United Nations' Comtrade

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somehow physically more difficult to evade tariff, then the true effect of tariff on indirect trade would be even bigger than documented here.

database. These data are collected by the United Nations Statistical Division from individual countries' trade records, and include information on imports and exports for each country, recorded according to the 6-digit Harmonized Commodity Description and Coding System (HS). For most of our regressions, we focus on countries where export data are available for the entire period, and further omit Africa and the Middle East because of very low export rates. This yields a final set of the 29 countries listed in appendix Table A1. We define $Direct_exports_{ict}$ as the value in US dollars of direct exports in industry i from country c in year t.

Our indirect export data come from the Smartal Solutions, the official provider of Hong Kong export statistics. These data provide Hong Kong's reported indirect exports to China, by country of origin, at the 6-digit HS level for 1996-2001. Since tariff rates vary only at the industry-year level, we generate an aggregate indirect export ratio, derived by summing up exports over all countries for a given industry-year:[3]

$$Indirect_export_ratio_{it} = \frac{\sum_c Indirect_exports_{ict}}{\sum_c (Indirect\ exports_{ict} + Direct_Exports_{ict})}$$

Where $\text{Indirect_exports}_{\text{ict}}$ are indirect exports from country c in industry i and year t.

Our robustness checks will require several additional datasets; for clarity of presentation, we will describe these additional data items when we reach these tests.

In the first two columns of Table 1 we list the Hong Kong indirect export ratios and tariff rates, by year, for 1996-2001. Note that there is a high rate of indirect exports on average: 22 percent for the full sample. The average tariff rate, while 18 percent for the full

[3] This is to avoid complications associated with clustering of standard errors across two types of groups, as suggested by Bertrand, et al (2004). We obtain virtually identical results if the regressions are done at the industry-country-year level of aggregation.

sample, declined throughout the sample period, from approximately 23 percent in 1996 to 15 percent in 2001.

In Figure 1A we show the basic relationship between tariffs and indirect export rates for 1998, where the indirect export rate shown is the average for each integer tariff rate, conditional on having at least 10 observations per tariff rate. The correlation is 0.53, and the graph shows this positive correlation. In Figure 1B, we show illustrate the relation between the change in tariff rate during 1996-2001 and the change in indirect export ratio over the same period. We see a similar pattern in this differenced relation – industries with the largest tariff declines also experienced the largest drop in indirect export ratio. We now turn to the results section to examine these relations in a regression framework.

3. Results

Our basic specification is based on equation (2) above, with a year fixed effect, δ_t, included:

(3) $Indirect_export_rate_{it} = \alpha + \beta * Tariff_{it} + \delta_t + \varepsilon_{it}$

The results for specification (3) appear in Table 2. In column (1) we present the basic specification, and find a point estimate on *Tariff* of approximately 0.27, implying that a one percentage point increase in tariffs leads to a 0.27 percentage point increase in the indirect export rate. In specification (2), we add industry- year fixed effects, with the industry defined at the 3-digit HS level, and obtain very similar results. In column (3), we allow for year fixed effects, as well as 6-digit HS fixed effects. This implies that any relation between tariffs and indirect export ratios is being identified entirely from within-good variation in tariffs. While

the point estimate on tariffs declines to 0.11, it is still significant at the 1 percent level. Finally, in column (4), we consider a differenced version of specification (2), given by:

$$(4)\quad (Indirect_export_rate_{i2001} - Indirect_export_rate_{i1996}) = \alpha + \beta*(Tariff_{i2001} - Tariff_{i1996}) + \delta_t + \varepsilon_{it}$$

Relative to the fixed-effects approach, this long-differenced approach is less likely to be affected by noise resulting from the timing of tariffs, and sluggish responses to tariff changes. We find that the point estimate on the change in tariffs is closer to the cross-sectional results than the coefficient reported in column (3).

There are a number of ways of considering the magnitude of these effects. First, as we see in the summary statistics, the median indirect export rate for our data is 0.12, and the standard deviation is 0.23. Holding all else equal, we find that going from the 25th percentile of tariff rate (10 percent) to the 75th percentile (25 percent) results in an increase in indirect export rate of approximately 0.04, a large number when compared to either the level or extent of variation in overall indirect export rates. We may also try to interpret these results in terms of the amount of evasion induced by increased tariff rates. There is obviously no evasion-based incentive to indirect export for goods with no tariffs, so that we may use this as a baseline. If we attribute the correlation between tariffs and indirect export rates entirely to evasion, the linear model then implies an additional one percentage point in evasion through indirect exporting for each additional four percentage point increase in tariffs. We may then derive a very rough guess of the additional evasion facilitated through indirect exporting by:

$$(5)\quad Evasion = \sum_i 0.27*Tariff*(Indirect\ exports)$$

We may deflate this by the total volume of exports (i.e., *Indirect exports* + *Direct Exports*):

$$(6)\ \ Evasion\ Rate = \frac{Evasion}{\sum_i (Indirect\ exports_i + Direct_Exports_i)}$$

Using data from 1998, this rough calculation implies that an additional two percent of goods enter China through evasion due to the ability to route goods through agents in Hong Kong.

As noted in Section 1 above, either a non-linear cost of evasion or a non-uniform distribution of firms' cost of evasion will generate a non-linear relationship between tax rates and the extent of indirect trade through Hong Kong. In Table 2, column (5) we include a quadratic term, $Tariff^2$, that allows for a non-linear relationship between tariffs and indirect trade. We find that $Tariff^2$ is highly significant and negative, implying a diminishing effect of increasing tariffs on indirect trade; the magnitudes of *Tariff* and $Tariff^2$ imply that the effect of increased tariffs diminishes to zero at a tariff rate of 57 percent, the 99th percentile of tariffs in the data.[4]

The main concern with the above results is that there may be some correlation between the goods for which middlemen have a comparative advantage in legal intermediation and the Chinese government's choice of tariff structure. It is not immediately clear whether this would lead to an overestimate or underestimate of the effect – traditional explanations of optimal tax setting focus on demand elasticities, and it is not obvious that goods routed through Hong Kong would necessarily be low demand elasticity goods. Further, our results above are robust to the inclusion of 6-digit fixed effects and to differencing, which implies that the results may be identified off time variation in tariff rates; this allows us to effectively net out any product

[4] We obtain qualitatively very similar results using a spline regression by quartiles.

characteristics that are not time-varying. We still present a pair of robustness checks that further address the issue of tariff endogeneity, using two types of 'control' regressions.

First, we consider the relationship between tariff rates and indirect exports for Singapore, the other large Asian trade entrepôt. We obtain data on Singapore indirect exports to China through the Singapore Trade Statistics CD ROM's for 1999-2001. Unfortunately, earlier years are unavailable, and we do not have a breakdown by origin of exports, thus limiting our sample to three years. Hence, we are required to aggregate both direct exports and Hong Kong indirect exports over all exporters worldwide. We define these aggregate indirect export ratios for Hong Kong and Singapore as $Ratio_HK_{it}$ and $Ratio_SGP_{it}$ respectively. The analog to equation (4) is then:

$$(7)\quad Ratio_Country_{it} = \alpha + \beta * Tariff_{it} + \delta_{HS3,t} + \varepsilon_{it}$$

where $Country \in \{SGP, HK\}$ and $\delta_{HS3,t}$ is a 3-digit HS industry-year fixed effect.[5] We present the results for Singapore in Table 3, column (1). We find no relation between tariff rates and the fraction of goods routed through Singapore. In column (2), we limit the sample only to products where both ratios were positive in at least one year of 1999-2001, and obtain similar results. This could be the result of the different sample and calculations used, due to the limitations imposed by the Singapore trade data. To address this possibility, we report regressions for Hong Kong in columns (3) and (4); we find coefficients that are virtually identical to those reported in Table 2, so the differential results for Singapore are unlikely to be

[5] We obtain similar results if we only use year effects, although the implied effect is somewhat larger (point estimate of about 0.38) for Hong Kong than the results reported below.

the results of the sample change. Finally, in columns (5) and (6) we report the results of the regression:

$$(8)\ \ Ratio_HK_{it} = \alpha + \beta_1 * Tariff_{it} + \beta_2 * Ratio_SGP_{it} + \delta_{HS3,t} + \varepsilon_{it}$$

Interestingly, we find that there is a high correlation between goods that are routed through Hong Kong and those that are sent via Singapore, as revealed in the significant coefficient on *Ratio_SGP*. This suggests that there are indeed some industry-specific characteristics that lend themselves to indirect export. However, we do not find that the inclusion of *Ratio_SGP* as a control affects the relationship between *Tariff* and *Ratio_HK*.

We provide two additional robustness checks based on sample splits of the data. First, we consider the fraction of goods that enter China with tariff exemptions. One explanation for the observed relationship between tariffs and indirect export rates that does not involve any illicit behavior is that it is easier to obtain tariff exemptions by routing goods through Hong Kong, and the incentive to obtain exemptions is increasing in the tariff rate. However, if this were the case, then we would expect to see very little effect of the tariff rate on the export rate for industries where very few exemptions are allowed. We use imports broken down by exemption classification taken from *Chinese Customs Statistics 1998* (Economic Information Agency, 2001).[6] These data are at the 8-digit HS level, which we aggregate to the 6-digit level; we then calculate a measure of exemption intensity given by the ratio of the value of imports that enter China tariff-free to the total value of imports for each 6-digit category (*Exemption*). We use cut-offs at the 5th percentile (0.06) and 10th percentile (0.16) of

[6] Unfortunately, due to the very high cost of obtaining these data, we have purchased on a single year of data.

Exemption to look at goods for which exemption-seeking is unlikely to be the primary motive for indirect exporting. These results are reported in columns (1) and (2) of Table 4 based on the formulation given in equation (4); in both cases the point estimate is actually higher than for the full sample results. As an additional check on the data, we also report results where we look only at cases where *Exemption* is above the 90th and 95th percentile (0.996 and 0.999 respectively), where there would clearly be no tariff-based incentive for indirect exporting; we find no relation between tariffs and indirect export rates for these subsamples.

Finally, we test for a differential correlation between tariffs and indirect trade rates for differentiated versus non-differentiated products, as classified by Rauch (1999). Feenstra and Hanson (2004) suggest that Hong Kong may play an important intermediary role for differentiated products, since such products may require greater processing and quality sorting. This may be of concern if differentiated products have higher tariff rates. While our fixed effects and differenced models deal with this to a large extent, since product differentiation is not time-varying, we further examine whether the basic cross-sectional correlation differs by whether the incoming good is differentiated.

Rauch's classification is at the 4-digit SITC level, which we match based on the concordance in Feenstra (1996);[7] we also cluster at the 4-digit SITC level to account for the coarser industry classification. In Table 5 we present results with the sample split by Rauch's classification; tariff rates are similarly correlated for both differentiated and non-differentiated products (the sample is considerably smaller because many of our products did not receive classifications). If we pool the sample and include an interaction between a dummy variable for product differentiation and tariff rates, this interaction term is not significant.

[7] The concordance is available at http://data.econ.ucdavis.edu/international/usixd/wp5515d.html.

4. Conclusion

This paper documents that tariff evasion is an important motivation for the widely observed phenomenon of indirect trade in world commerce by studying the indirect exports to China via Hong Kong. To build a case for this interpretation, the paper computes a measure of indirect trade intensity – the ratio of indirect trade to total trade – and examines whether it is systematically related to product-level tariff rates. We find clear evidence of a positive, statistically significant relationship, both in levels and differences.

A number of extensions of the basic analysis help to further bolster our interpretation. For example, were it not for tariff evasion, specialized knowledge by middlemen should be much less valuable for homogenous than for differentiated products. Yet we find a similar positive correlation between indirect trade and tariff rates for the two groups of products. Also, for the subset of products for which tariff exemptions are widely granted (and therefore illegal tariff evasion at the border is less profitable), there is no correlation between tariff and indirect trade intensity.

Our paper makes both conceptual and methodological contributions. We highlight the possibility that there may be a darker side to the role of middlemen in international trade, which should be taken into account in considering the effects of trade intermediation. Further, our approach could be applied to a variety of other contexts. In addition to the extension to other countries and regions, it may ultimately be possible to evaluate, for example, the extent to which different source countries are prone to tariff evasion, by comparing how the relationship between tariffs and indirect trade varies across countries. We leave this for future research.

Figure 1A – Correlation between tariffs and Hong Kong Indirect export rates, 1998

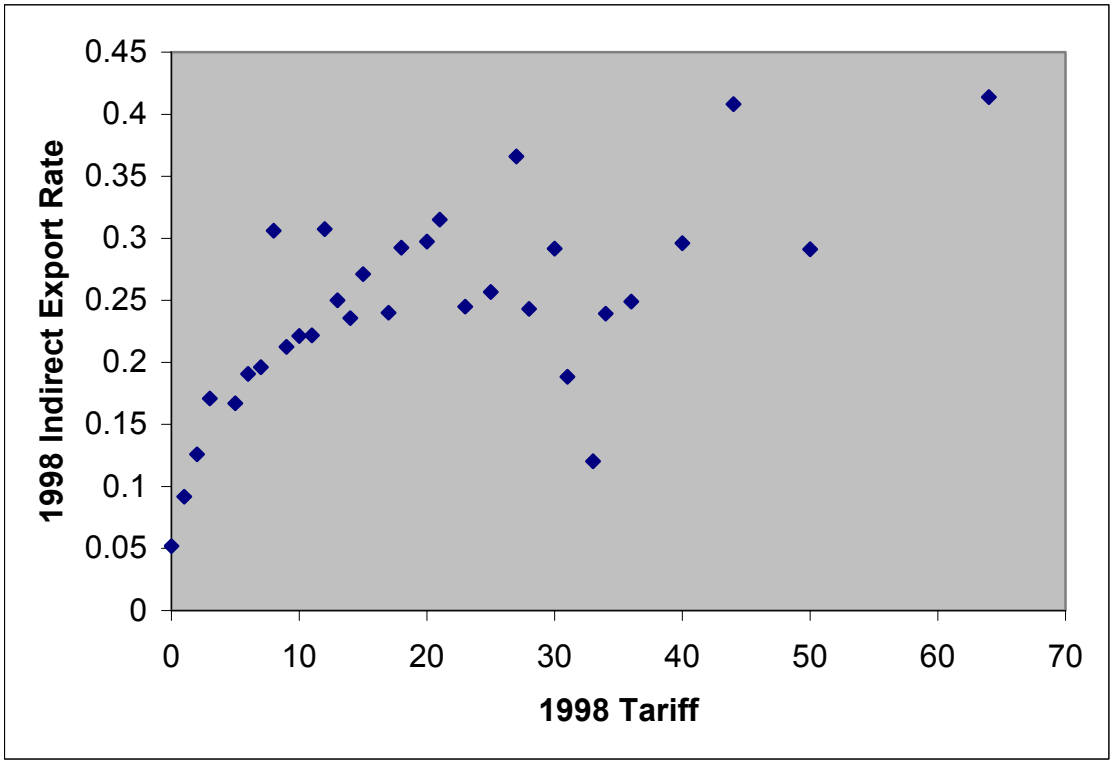

Figure 1B – Correlation between changes in tariffs and changes Hong Kong Indirect export rates, 1996-2001

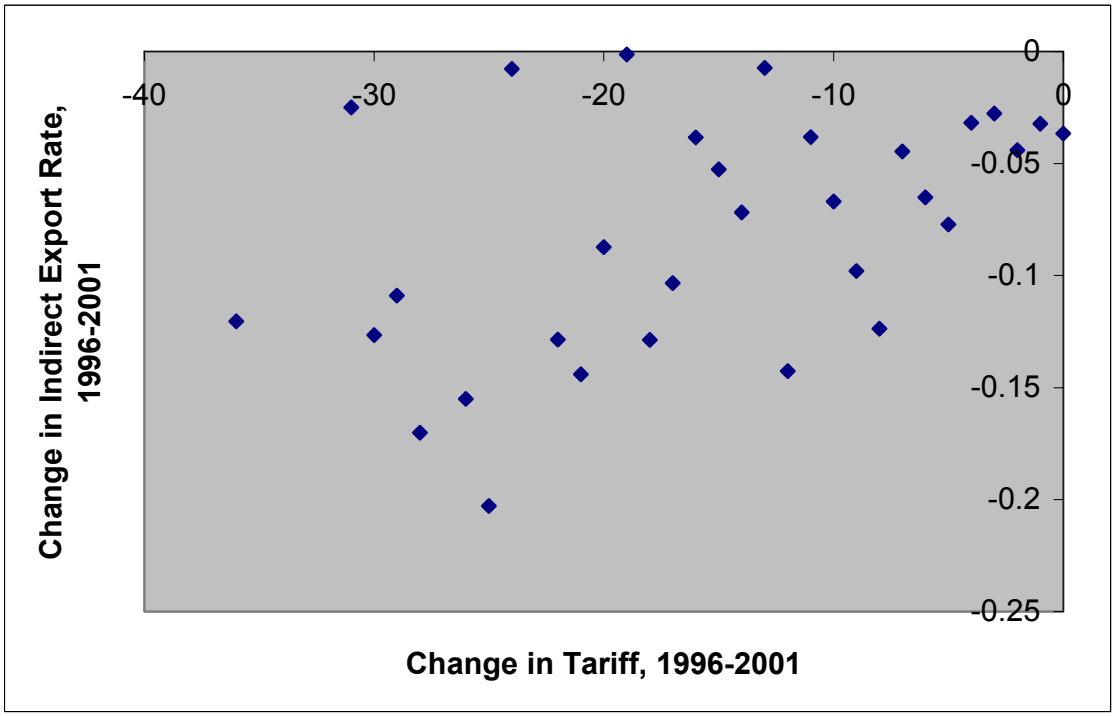

Table 1 - Indirect Export Ratios and Tariff Rates, by year, 1996-2001

Year	Hong Kong Indirect export Ratio	Tariff Rate	Singapore Indirect export Ratio
1996	0.260	0.236	
	(4502)	(4502)	
1997	0.229	0.221	
	(4537)	(4537)	
1998	0.239	0.175	
	(4585)	(4585)	
1999	0.225	0.171	0.052
	(4624)	(4624)	(2161)
2000	0.218	0.169	0.053
	(4658)	(4658)	(2082)
2001	0.202	0.158	0.049
	(4671)	(4671)	(2145)
Total	0.229	0.188	0.051
	(27577)	(27577)	(6388)

Notes: For Singapore, the indirect export ratio is for all countries, while for Hong Kong, the values listed are for the sample of 29 countries listed in Table A1. The Singapore indirect export rates are only for products for which Singapore indirect exports a positive amount to China. For further details on the construction of these variables, please see the text.

Table 2 - Effect of Tariff Rate on Hong Kong Re-export Rate

	(1)	(2)	(3)	(4)	(5)
Tariff	0.250***	0.286***	0.113***		0.705***
	(0.027)	(0.044)	(0.040)		(0.100)
Δ5Tariff				0.169***	
				(0.047)	
Tariff^2					-0.616***
					(0.134)
Fixed Effects	Year	Year-Industry (3-digit HS)	Year and Ind (6-digit HS)	Year	Year-Industry (3-digit HS)
Observations	27577	27577	27577	4411	27577
R-squared	0.02	0.17	0.71	0.00	0.17

Notes: Robust standard errors in parentheses, with clustering at the 6-digit HS level. Dependent variable in specifications (1) - (3) is *Re-export_ratio.* In specification (4) the dependent variable is the five year difference in *Re-export_ratio*. For further details, please see the text. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3 - Effect of Tariff Rate on Singapore & Hong Kong Indirect Export Rates

Country	Indirect Exports via Singapore			Indirect Exports via Hong Kong		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff	0.003	-0.008	0.276***	0.268***	0.276***	0.270***
	(0.011)	(0.028)	(0.057)	(0.085)	(0.057)	(0.084)
SGP Indirect_export_ratio					0.259***	0.226***
					(0.042)	(0.047)
Observations	14828	5994	14828	5994	14828	5994
R-squared	0.09	0.18	0.22	0.25	0.22	0.26

Notes: Robust standard errors in parentheses, with clustering at the 6-digit HS level. All regressions include industry-year fixed effects, at the 3-digit HS level. Dependent variable in all specifications *Indirect_export_ratio*, for the country listed. For further details, please see the text. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4 - Effect of Tariff Rate on Hong Kong Indirect Export Rates: Tariff Exempt Industries

Sample	*Exemption*<5th percentile	*Exemption*<10th percentile	*Exemption*>90th percentile	*Exemption*>95th percentile
	(1)	(2)	(3)	(4)
Tariff	0.384*	0.440***	-0.174	-0.279
	(0.198)	(0.147)	(0.220)	(0.296)
Fixed Effects	Year-Industry (3-digit HS)			
Observations	1262	2526	2526	1262
R-squared	0.48	0.38	0.36	0.42

Notes: Robust standard errors in parentheses, with clustering at the 6-digit HS level. Dependent variable in all specifications *Indirect_export_ratio*. For further details, please see the text. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5 - Effect of Tariff Rate on Hong Kong Indirect Export Rates: Differentiated vs. Undifferentiated Products

Sample	Undifferentiated Products	Differentiated Products	All Products
	(1)	(2)	(3)
Tariff	0.173**	0.280***	0.182***
	(0.084)	(0.096)	(0.064)
Differentiated			0.087
*Tariff			(0.073)
Fixed Effects		Year-Industry (3-digit HS)	
Observations	6375	12605	18980
R-squared	0.21	0.19	0.18

Notes: Robust standard errors in parentheses, with clustering at the 4-digit HS level. Dependent variable in all specifications *Indirect_export_ratio*. For further details, please see the text. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A1 - List of countries

Country	Annual Observations
Argentina	356
Australia	1,250
Austria	1,789
Canada	1,089
Czech Republic	645
Denmark	797
Finland	961
France	2,209
Germany	2,890
Great Britain	2,246
Greece	204
Hungary	290
Indonesia	1,292
Ireland	448
Italy	2,418
Japan	3,649
Korea	3,363
Mexico	257
Netherlands	1,453
New Zealand	426
Norway	564
Poland	107
Portugal	335
Slovenia	135
Spain	1,279
Sweden	1,390
Switzerland	1,791
Turkey	467
United States	3,569

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