Outsourcing Tariff Evasion:
A New Explanation for Entrepôt Trade

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Abstract

Traditional explanations for indirect trade through an entrepôt focus on savings in transport costs and the role of specialized agents in processing and distribution. We provide an alternative perspective based on the potential for entrepôts to facilitate tariff evasion. Using data on direct exports to mainland China and indirect exports via Hong Kong SAR, we find that the indirect export rate rises with the Chinese tariff rate, despite the absence of any legal tax advantage to sending goods via Hong Kong SAR. We present several robustness tests to rule out plausible alternative hypotheses based on existing explanations for entrepôt trade.

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1. Introduction

Indirect trade through an entrepôt is a common phenomenon in world commerce. For example, for every $100 that the United States exports to mainland China, approximately $23 goes through Hong Kong SAR. Globally, indirect trade as a share of the total trade is estimated to be around 17 percent (Andriamananjara, Arce, and Ferrantino, 2004). There are approximately thirty countries that are involved in a significant amount of indirect trade. Macao, Cyprus, Fiji, Senegal, Jordan, Armenia, Seychelles, Honduras, Benin, Montserrat, St. Lucia, and Singapore are some of the other prominent entrepôts through which indirect trade takes place.

Explanations in the literature for this high volume of indirect trade have focused on the presence of specialized agents that match buyers and sellers across markets (Feenstra and Hanson, 2004) and the economization of transport costs, which has a similar rationale to the hub-and-spoke pattern in airline traffic (Andriamananjara, Arce, and Ferrantino, 2004). These factors are undoubtedly responsible in part for the high rates of indirect trade. In this paper, we propose an alternative, previously undocumented explanation: the use of entrepôt economies to facilitate tariff evasion. As in the traditional argument for indirect trade, the evasion-based explanation posits a role for specialized agents that are better positioned to transport goods to their final destinations: In our explanation, the agents' advantage is in transporting goods without paying the required tariffs.[1]

This explanation has been made casually in the policy arena; most recently, the UNCTAD Trade and Development Report (2005) speculates that tariff evasion may be responsible for the rise in entrepôt trade. Further, there are also anecdotal accounts of

this role of trade intermediaries. For example, a report from the United States Department of Agriculture, describes the "unofficial channels" that are used to export food products to China: "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). However, there exists no systematic evidence on the use of entrepôt trade for tariff evasion purposes.

We examine this hypothesis in the context of Hong Kong SAR, 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. Since Hong Kong is legally a separate customs area, the identical Chinese tariff schedule is applied to imports from Hong Kong as to those from other economies during our sample period. In other words, there is no legal tax advantage of sending goods to China via Hong Kong.[2]

This paper builds a case for the evasion hypothesis using disaggregated data on indirect exports to China via Hong Kong SAR. Tariff evasion, by its very nature, is not directly observable. We are thus required to take an indirect approach in testing any hypothesis related to evasion. The methodology we use in this paper is straightforward: On a product by product basis, we compute indirect trade intensity – the ratio of indirect exports to China going through Hong Kong SAR to total exports to China – and examine whether 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. As there is no preferential tariff treatment for indirect

trade via Hong Kong SAR (or elsewhere), this forms the basis for the test of our 'outsourcing 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, i.e., a larger fraction of goods in high tariff product classes are shipped via Hong Kong SAR. 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, products with lower demand elasticities may be more likely to be transshipped). This is problematic if the latter is correlated with the tariff structure, leading to a spurious correlation between indirect trade intensity and tariff level. We therefore extend the analysis 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 look at sectors for which most importers receive legal tariff exemptions. Since there is little evasion-related motivation to undertake indirect trade in such industries, we do not expect to observe any correlation between tariffs and indirect export intensity; this is borne out by the data, as we do not find any tariff-indirect trade correlation for this set of products in our data.

We provide two additional tests that specifically address alternative explanations based on the two traditional rationales for indirect trade. To examine whether specialized knowledge may be responsible for our results, we examine trade in homogeneous and

differentiated products separately based on the Rauch (1999) classification. Due to a middleman's specialized knowledge in differentiated products, we might expect a larger fraction of such goods to go through an entrepôt. Indeed, Feenstra and Hanson (2004) suggest that Hong Kong may play an important intermediary role for differentiated products, since such products may require greater quality sorting. In contrast, there may be less specialized product-specific knowledge involved for trade in homogenous products. We find a positive correlation between tariff rate and indirect trade intensity for both homogenous and differentiated products. Second, to assess the credibility of explanations based on transport costs, we include a control for total trade volume (a loose proxy for shipment size). This also does not affect our basic results. Collectively, these results reinforce our interpretation that tariff evasion is a significant motivation for the observed indirect trade.

We provide an illustrative calculation to gauge the quantitative importance of evasion-induced indirect trade. According to one specification that we present below, a ten percent increase in the tariff rate would lead to an increase in the indirect trade rate by 2.9 percentage points. Thus, an increase in the tariff rate from zero to 19 percent (the average statutory tariff rate in China in 2001) would lead to an indirect export rate of about 5.5 percent, suggesting that about a quarter of the indirect exports through Hong Kong may be accounted for by evasion motivations.

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. Relevant theoretic work and earlier empirical research are discussed in Slemrod and Yitzhaki (2000). A recent paper by Fisman and Wei (2004) provided an estimate of the

responsiveness of tax evasion at the Chinese borders to Chinese tariff rates. The current paper differs from Fisman and Wei (2004) in several important ways. Fist, while the earlier paper addresses a public finance question – the elasticity of evasion to tax rates, the current paper investigates a trade question – whether the prevalent entrepôt trade phenomenon in world commerce could be explained by tariff evasion. Second, the earlier paper does not automatically imply 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 earlier 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. Section 2 describes the datasets brought together for this research. Section 3 presents our estimation strategy and results. Section 4 concludes.

2. Data

Three data components are crucial for our empirical tests: (a) Chinese tariffs, (b) direct exports to China at a product level, and (c) indirect exports to China via Hong Kong at a product level.[3] The data on Chinese tariffs are taken from the World Bank's World Integrated Trade Solution (WITS) database, 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 to aggregate tariff rates up to the 6-digit level. As 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 tariff data is 1996, and all tariffs are year-end rates. Since the import and export data are cumulated for the entire year, matching imports with the appropriate tax rates is complicated by mid-year changes in the tariff structure. There were no tariff changes in 1996. Because tariffs were changed on October 1, 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 rate, 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 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* to China in year *t*.

Our indirect export data come from 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 rate, derived by summing up exports over all countries for a given industry-year:[4]

$$Indirect\_export\_rate_{it} = \frac{\sum_c Indirect\_exports_{ict}}{\sum_c (Indirect\_exports_{ict} + Direct\_exports_{ict})}$$

where *Indirect_exports_{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 discuss these tests.

The first two columns of Table 1 list the indirect export rates and tariff rates, by year, for 1996-2001. We observe a high rate of indirect exports on average: 22 percent for the full sample. The average tariff rate, while 18 percent for the full sample, declined over time, from 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 is the average for each tariff rate, conditional on having at least 10 observations per bracket. The correlation is 0.53. In Figure 1B, we show the relation between the change in tariff rate and the change in indirect export rate during 1996-2001. We see a similar pattern in this differenced relation – industries with the largest tariff declines also experienced the largest drops in indirect export rates.

3. Results

A. Benchmark Estimate

Our basic specification tests the hypothesis that higher tariff rates are associated with higher indirect exports, as predicted by our offshoring evasion hypothesis:

(1) $Indirect\_export\_rate_{it} = \alpha + \beta * Tariff_{it} + \delta_t + \varepsilon_{it}$

where δ_t is a year fixed effect and ε_{it} is the error term. The results for specification (1) appear in Table 2. In column (1) we present the basic specification (with year fixed effects, but no industry fixed effects), and find a point estimate on *Tariff* of approximately 0.25. In specification (2), we add industry-year fixed effects, with the industry defined at the 3-digit HS level. The slope estimate is now 0.29. This implies that a one percentage point increase in the tariff rate leads to a 0.29 percentage point increase in the indirect export rate. We regard this as our benchmark estimate. In terms of the economic significance of this effect, an increase in the tariff rate from zero to 19 percent (the mean tariff rate in the entire sample as reported in Table 1) leads to an increase in the indirect export rate by 19*0.29 = 5.5 percent, all else equal. The average indirect export rate in our sample is 0.23 (Table 1). Evasion-motivated entrepôt trade thus explains almost a quarter of total indirect trade.

B. Six-digit fixed effects and long differencing

As a robustness check, we also define an industry fixed effect at the 6-digit level (the most disaggregated level possible), a total of approximately 3600 fixed effects. This absorbs all between product variation in tariffs, so that any relation between tariffs and indirect export rates is being identified entirely from within-good variation in tariffs. Further, given the fact that tariffs were sometimes changed mid-year, generating identification from the year-to-year correlation between tariffs and indirect export rates may add a lot of noise. The result is reported in Column 3 of Table 2. The point estimate on tariffs declines to 0.11, but is still significant at the one percent level.

Finally, in column (4), we consider a differenced version of specification (1), given by:

(2) $(Indirect\_export\_rate_{i2001} - Indirect\_export\_rate_{i1996}) = \alpha + \beta*(Tariff_{i2001} - Tariff_{i1996}) +$

$\delta_t + \varepsilon_{it}$

We emphasize that, relative to the fixed-effects method, this long-differenced approach is less vulnerable to noise from the timing of tariffs and sluggish responses to tariff changes, while still absorbing all between industry variation. The point estimate is 0.17, and is statistically significantly different from zero at the one percent level[5].

C. Other Extensions and Robustness Checks

The relationship between tax rates and the extent of indirect trade could be non-linear. 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.[6]

One possible concern with our results is that there may be a 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 elasticity goods. Further, one might consider demand elasticities as part of the product fixed effects. Our results above are robust to the inclusion of 6-digit product fixed effects and to differencing, which implies that the results are identified from time variation in tariff rates; this allows us to effectively net out any product characteristics that are not time-varying.

We also consider the fraction of goods that enter China with tariff exemptions. It may be easier to obtain tariff exemptions by routing goods through Hong Kong, and the incentive to obtain exemptions is increasing in the tariff rate. This would then be a case of using Hong Kong middlemen for legal tariff avoidance rather than illegal tariff evasion. However, if this were the case, then we would expect to see very little effect of the tariff rate on the indirect 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).[7] 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*). In the first column of

Table 3 we report a specification that includes the interaction of *Exemption* and *Tariff*.

The coefficient on the interaction term is negative and significant at the 5 percent level,

implying a lower sensitivity of indirect trade to tariff rates for high exemption industries.

As an alternative, we examine a subset of the sample with relatively few legal

exemptions and another subset with a high rate of legal exemptions. Specifically,

regressions in columns (2) and (3) correspond to the sample of products below the 10th

percentile of *Exemption* (less than 16%) and above the 90th percentile (greater than or

equal to 99.6%) respectively. It is clear from these results that industries with low

exemption rates are driving our results: *Tariff* is positive and highly significant for the

sample of products below the 10th percentile of *Exemption*, while the coefficient on *Tariff*

is negative and insignificant for products above the 90th percentile.

D. Differentiated versus homogeneous products

Finally, we run tests that try to directly address specific alternative explanations

based on the two traditional rationales for entrepôt trade. First, as a test of the imperfect

information or quality sorting explanation, we examine whether there is 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 that may require quality sorting. This would be of concern if differentiated

products have higher tariff rates. Note that our fixed effects and differenced models deal

with this to a large extent, since product differentiation is not time-varying. To bolster our

case, we further examine whether the basic cross-sectional correlation differs according to 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);[8] we also cluster at the 4-digit SITC level to account for the coarser industry classification. In Table 4 we present results with the sample split by Rauch's classification. We find that the positive correlation holds for both differentiated and non-differentiated products. The point estimate of the slope is somewhat smaller for the homogenous products, consistent with the view that some of the indirect trade for differentiated products is not related to tariff evasion. However, if we pool the sample and include an interaction between tariff rates and a dummy variable for differentiated products, this interaction term is not significant.

Our results are unlikely to be explained by a motivation to save on transport costs. To see this, we note that such an explanation would require a number of steps. First, shipment size, and hence the benefits from transshipment, is positively correlated with the indirect trade ratio. Second, there must be a correlation between tariff rates and shipment size. One possible channel is that shipment sizes are correlated with overall rates of trade, which in turn may be correlated with tariffs due to political economy considerations. While this seems implausible, since transport costs are a first-order concern in trade in general, we try to control for this possibility by including the fraction of the total value of trade in year y accounted for by industry i (FRACTION) in column 4 of Table 4. Trade volume is indeed correlated with the indirect trade ratio: the coefficient FRACTION is significant at the one percent level. However, the coefficient on tariff rates

is completely unchanged; this is not surprising, since trade volume is uncorrelated with tariff rates.

4. Conclusion

In this paper, we hypothesize that tariff evasion is an important motivation for the widely observed phenomenon of indirect trade in world commerce by studying indirect exports to China via Hong Kong. To build a case for this view, we compute a measure of indirect trade intensity product by product (at the HS 6-digit level) – the ratio of indirect trade to total trade – and examine 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 robustness checks and extensions of the basic analysis help to further bolster our interpretation.

Our paper makes both conceptual and methodological contributions. We highlight the possibility that the desire to circumvent high barriers to cross-border commerce can generate a role for middlemen in international trade. Our approach could be applied to a variety of other contexts. While data on direct trade and tariffs are available for many countries, good-quality data on disaggregated indirect trade are hard to come by. Replicating the specification in this paper for other countries when relevant data become available is a potentially interesting extension for future work. This would allow for an evaluation of whether the evasion-motivated indirect trade that we document here is particularly prevalent in high-tariff, weak-governance economies. In addition, it may ultimately be possible to evaluate, for example, the extent to which different source

countries are prone to tariff evasion by comparing the relationship between tariffs and

indirect trade across exporting countries. We leave these topics for future research.

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Figure 1A – Correlation between tariffs and Hong Kong Indirect export rates, 1998
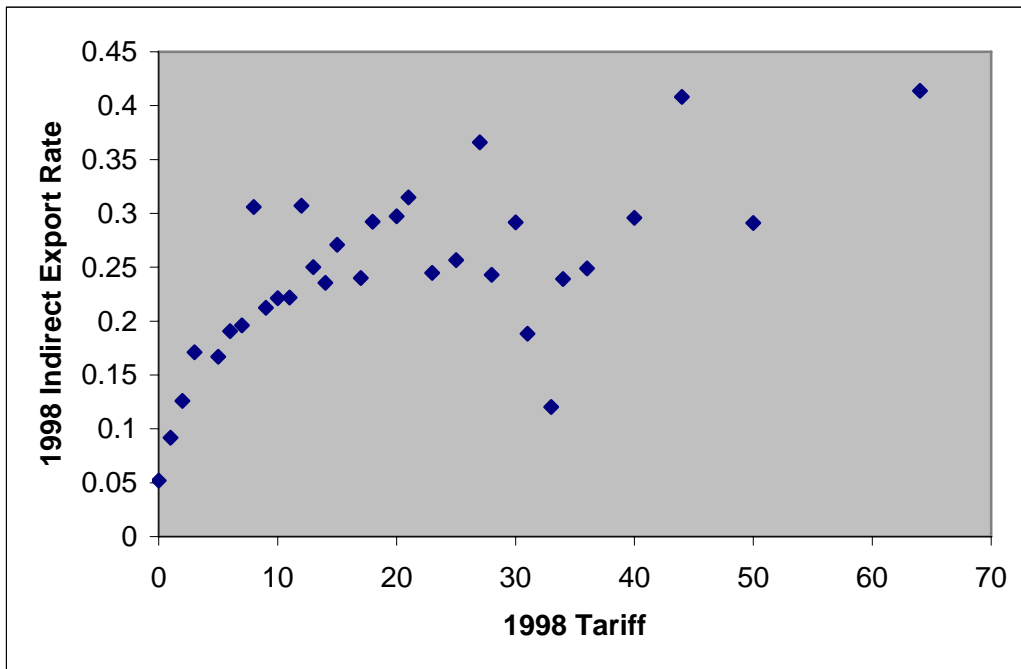
Figure 1B – Correlation between changes in tariffs and changes Hong Kong Indirect export rates, 1996-2001
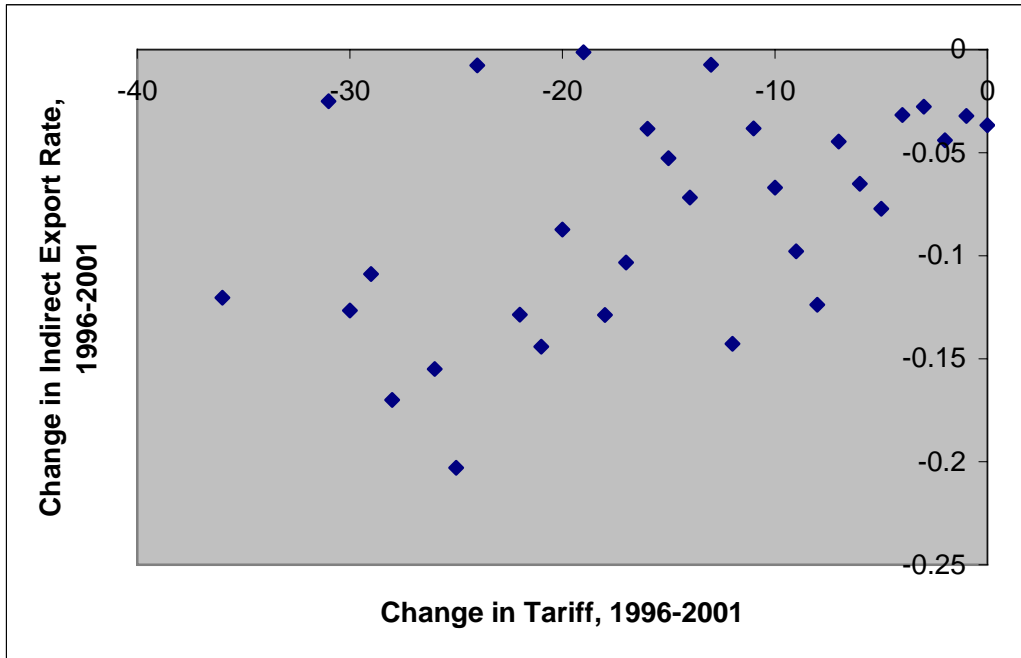
Endnotes

[1] As such, we hypothesize that the evasion-motivated indirect trade is likely to be particularly important for exports to countries with high tariffs and weak public governance. We intend to test this conjecture in future work.

[2] Since January 1, 2004 (outside our sample), China has reduced tariff rates to zero on many direct imports from Hong Kong. MFN rates continue to apply to indirect imports from other countries passing through Hong Kong.

[3] These data requirements preclude the expansion of our analyses to a broader set of countries. First, the UNCTAD TRAINS database described below has significant gaps for many countries. Second, we require data on re-exports as reported by the entrepôt country itself, since data on re-exports generally do not list the intermediate country.

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

[5] Because of noise, the fit of the regressions may be considered poor. One way to deal with noise is aggregation. We have followed this approach, using as the outcome variable the mean value of the indirect trade rate for each tax rate. With 53 distinct tax rates, there are 53 observations per year. With this aggregation, the positive relationship between tariff level and indirect export rate remains, with similar point estimates and an increase in the adjusted R^2 to 0.26.

[6] We obtain qualitatively similar results using a spline regression by quartiles. At the higher end of the tariff schedule, a greater fraction of tariff evasion may take the form of outright smuggling, which is not recorded in our data. This could generate the pattern that legally recorded indirect trade as a share of total trade does not rise as fast as the tariff rate at very high tariff rates. We thank Martin Feldstein for suggesting this possibility.

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

[8] The concordance is available at

http://data.econ.ucdavis.edu/international/usixd/wp5515d.html.