

Avoidance Behaviors of Exporters and Importers: Evidence From the U.S.-China Trade Data Discrepancy¹

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Abstract: Since the late 1990s, reported U.S. imports from China and Hong Kong have regularly and increasingly exceeded reported exports of China and Hong Kong to the United States. This discrepancy, which is not caused by re-exporting through Hong Kong, varies by product categories, and in some cases takes the opposite sign. In this paper, we focus on China's direct exports to the United States. Using a model that allows for simultaneous misreporting to two authorities, we find strong statistical evidence of under-reporting exports at Chinese border to avoid paying value-added tax (VAT). We also provide evidence of tariff evasion at the U.S. border, in particular for related-party transactions, and indirect evidence of transfer pricing and evasion of Chinese capital controls.

Keywords: trade data discrepancy, tax evasion, export VAT rebates, transfer pricing

I. Introduction

The growing trade relationship between the United States and China has drawn increasing attention. In this context, it has been noted that China reported exports to the United States are routinely smaller than U.S. reported imports from China. Re-exportation through Hong Kong has been accepted by many researchers as a sufficient explanation for the data problem. However, as the role of Hong Kong as an entrepôt for China-U.S. trade

¹ The views expressed in this paper are solely those of the authors, and are not meant to represent in any way the views of the U.S. International Trade Commission or any of its Commissioners. The authors thank Huang Guohua of China Customs; Liu Dong of the Chinese Embassy in Washington, DC; and Glenn Barresse, Timothy Baxter, and David Dickerson of the U.S. Census Bureau with assistance on data; Aaron Hedlund, Kendall Dollive, and Elaine Aguasvivas for research assistance; and participants at presentations at Georgia State University, Georgia Institute of Technology, George Washington University, and the Southern Economic Association for helpful comments. Xuepeng Liu thanks the Coles College of Business at Kennesaw State University for partial financial support. Any remaining errors or omissions remain the responsibility of the authors

has decreased, it has become increasingly apparent that a sizable amount of the discrepancy has other origins. Even when the role of Hong Kong is very carefully accounted for, taking into account transport costs and the difference in geographical definitions, U.S. reported imports from China and Hong Kong have grown persistently larger than the sum of China's and Hong Kong's reported exports to the United States. The difference in 2007 was nearly \$52 billion, declining slightly in 2008 to 49 billion. This suggests that traders may be systematically misstating the value of shipments, either understating them to China's customs authorities, overstating them to U.S. authorities, or both. There are a variety of patterns of tax avoidance, tariff evasion, and avoidance of capital controls that could give rise to such discrepancies. Our analysis uses a match of special U.S. Census and China Customs data to focus on direct trade that does not pass through Hong Kong.

II. Economic Incentives for Misreporting

Our theoretical framework broadly follows the transfer pricing literature, with one important modification. Instead of modeling a transfer price that is reported to both authorities, we allow for the possibility of separate misreporting to the authorities in the exporting and importing countries. We use the subscripts X and M to define information pertaining to the exporting country (China) and the importing country (United States), respectively. Define the deviations in prices reported to the exporters' customs authority and importers' customs authority, respectively, as

$$\delta_X = P_X - P \quad \text{and} \quad \delta_M = P_M - P$$

where P represents the true price of the traded products. Let Q represent the quantity of goods traded, τ_X and τ_M the corporate income tax rates in the exporting and importing country, TAR the tariff rate in the importing country, and θ the VAT rate in the exporting country. Let ρ_X and ρ_M represent the basic value of economic return (profit) to the exporter and the importer, in the absence of any avoidance or evasion behavior. The value-added is $(\rho + w)$, where w represents the wage bill. The shadow price of being able to avoid the capital control in either direction is expressed by λ . When incentives are such as to encourage net unrecorded capital inflow into the exporting country, $\lambda > 0$, and when they are such as to encourage net unrecorded capital outflow, $\lambda < 0$. We assume that both the exporter and the importer minimize the costs of taxes, tariffs, and enforcement penalties, adjusted in the exporter's case for the net benefits of avoiding capital controls. Thus, the exporter's cost function is

$$\min_{\theta_X} C_X = \theta(\rho_X + w + \delta_X Q) + \tau_X(\rho_X + \delta_X Q) + \frac{a_X}{2} \left(\frac{\delta_X}{P} \right)^2 PQ - \lambda \delta_X Q \quad (1)$$

while the importer's cost function is

$$\min_{\theta_M} C_M = \tau_M[\rho_M - \delta_M Q - TAR(P + \delta_M)Q] + TAR(P + \delta_M)Q + \frac{a_M}{2} \left(\frac{\delta_M}{P} \right)^2 PQ \quad (2)$$

Optimization of the exporter's problem yields expressions for the reporting deviation and the reported price as

$$\delta_X = \frac{(\lambda - \theta - \tau_X)}{a_X} P \quad \text{and} \quad P_X = \left(1 + \frac{(\lambda - \theta - \tau_X)}{a_X} \right) P \quad (3)$$

while optimization of the importers' problem yields the corresponding expressions

$$\delta_M = \frac{\tau_M - TAR(1 - \tau_M)}{a_M} P \quad \text{and} \quad P_M = \left(1 + \frac{\tau_M - TAR(1 - \tau_M)}{a_M} \right) P \quad (4)$$

Therefore the percentage difference in observed reporting prices can be written as

$$Discrepancy = \frac{\delta_M - \delta_X}{P} = \frac{P_M - P_X}{P} = \frac{\tau_M - TAR(1 - \tau_M)}{a_M} - \frac{(\lambda - \theta - \tau_X)}{a_X} \quad (5)$$

The observed reporting gap as defined in equation (5) is negatively associated with importing countries' tariff (TAR), but positively associated with exporting country's net VAT tax rate θ and the corporate income tax rate in both the importing and exporting countries (τ_M and τ_X). The misreporting in absolute value on each side is negatively associated to the corresponding degree of enforcement (a_M and a_X). Thus, differences in the observed gap for different firm types or different categories of transaction may arise from different degrees of enforcement pertaining to those types of firms or transactions. The sign of the observed discrepancies is complicated by the presence of capital control in the exporting country. When importers' data larger than exporters' data, such as the case of China-U.S. eastbound trade, ($P_M - P_X > 0$ and $\delta_M - \delta_X > 0$), the size of the observed gap will be larger when incentives favor unrecorded capital outflow from China, and will be smaller when incentives favor unrecorded capital inflow.

The VAT rebate policy on exports in China is complicated and has been changing constantly over time. However, the main method of computing the rebate is rather stable. The official formula used to calculate VAT payable for general trade and processing exports with imported materials is as follows:

$$VAT \text{ Payable} = \text{Output VAT} - (\text{Input VAT} - \text{NCNR}) \quad (6)$$

in which Output VAT = Domestic sales amount * VAT levy rate (there is no output VAT on exports); Input VAT is the VAT paid on domestically acquired inputs; and NCNR (the noncreditable and nonrefundable amount) is defined as

$$\text{NCNR} = (X - \text{BIM}) * (t - r) \quad (7)$$

in which X denotes the value of exports; BIM represents bonded (or tax-free) imported materials; t is VAT levy rate; and r is VAT rebate rate. Thus, for the case of exports, the total VAT bill reduces to NCNR – Input VAT. The above formula implies that exporters may have incentive to under-report export (X) if $(t - r)$ is positive, which is true for the partial rebate regime in China.

To assess evasion of capital controls, we calculate the net capital flight from China as a residual, and the first difference or change in U.S.-China eastbound direct trade statistical discrepancy (GAP), which is defined as $\ln(M/X)$ (see second column of Table 1). As expected, the two series are positively correlated with a correlation coefficient of 0.48. The pattern presented here is broadly suggestive of a situation in which under-invoicing of exports from China prior to 2001-2002 may have contributed to an expansion of the observed data discrepancy, while over-invoicing of exports from 2003 onward may have contributed to a narrowing of the discrepancy.

Since U.S. corporate income taxes are larger in magnitude than U.S. tariffs, in almost all cases the incentive is to under-report at the U.S. border (see Equation 6 above).

III. Econometric Analysis

We relate China-U.S. trade statistics discrepancies to the economic incentives of misreporting and other possible determinants. Our base econometric specification is given as follows:

$$GAP_{it} = \beta_o + \beta_1 VAT_{it} + \beta_2 Tariff_{it} + \beta_3 Related_share_{it} + \mathbf{X}\boldsymbol{\gamma} + a_i + a_t + e_{it} \quad (8)$$

where β is the coefficient to be estimated; VAT is Chinese VAT rate on exports net of rebate; $Tariff$ is U.S. tariff rate on imports from China; $Related_share$ is the share of related party trade in total U.S. imports from China; $\mathbf{X}$ is a vector of other explanatory variables including Chinese export shares by trade regimes and firm types and their interactions with other variables, as well as the interaction between tariff and related party share; a_i is product fixed effect at HS 6-digit level; a_t is year dummy; and e_{it} is the error term.

The results generally support our misreporting incentive model. All variables have the signs predicted by theory. The coefficients of China's net VAT rate are always positive and highly significant across different specifications. Thus, avoiding VAT tax may be one of the primary economic incentives for firms operating in China to under-report their exports to Chinese Customs authorities. These estimates are economically large. The results imply that one percentage increase in China's net VAT rate (due to reduction of VAT rebate rate) will cause about a 3.73 percent increase in GAP (i.e., $\exp^{(3.66/100)} - 1 = 3.73\%$). Based on the total direct exports from China to the U.S. in 2008 (230.4 billion in current dollars), this amounts to 1.37 billion dollars loss in Chinese VAT revenue for the direct trade with U.S. in 2008 alone. Supplementary analysis by quantile regression suggests that the effect of VAT on GAP is highly variable, with higher values of GAP associated with higher values of the coefficient on VAT.

The related-party share variable is always positive and significant at a 10% level in Table 3. This suggests that multinational firms are more likely than national firms to engage in mis-invoicing, *ceteris paribus*. The result can also be interpreted as evidence for traditional transfer pricing, under which imports are over-valued at the U.S. border to transfer taxable income from the country with high rates (United States) to the country with lower rates (China). Related-party transactions have a data discrepancy at least 18.6 percent greater than arms' length transactions. This result is economically large. Our results imply that China reported exports are smaller for normal exports than for processing exports, and for domestic firms than for foreign-invested enterprises.