

**Reported Trade Figure Discrepancy, Regulatory Arbitrage, and Round-tripping:
Evidence from the China-Hong Kong Trade Data**

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Abstract

This study uses reported trade figures from China and Hong Kong to examine the relationship among market impediments, trade figure irregularities, and tax-induced regulatory arbitrage. The empirical findings, consistent with our tax-induced regulatory arbitrage models and the round-tripping phenomenon (that is, moving funds across the mainland Chinese border through trade, typically to Hong Kong or an offshore tax haven, before re-entering China as foreign direct investment) in China, provide support for several conclusions. First, the spurious flows of funds to and from China, via the underreporting of exports and the overreporting of imports, closely follow the preferential tax incentives accorded to foreign investors. Second, the underreporting of exports is negatively related to export tax rebates. Third, the overreporting of imports is negatively related to import tariffs. Finally, both of these two appear to be most prevalent in state-owned enterprises.

Key words: regulatory arbitrage; round-tripping; tax evasion; trade figure discrepancies; trade mispricing.

JEL: F18, F23, F34.

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INTRODUCTION

Since late 1978, China has grown at an average rate of 9% per year under the guidance of market-liberalization policies (Fung et al., 2006). International trade, with the help of trade-related tax incentives, has also grown at a phenomenal rate in pace with economic development during the same period. During the course of this market-economic reform, the Chinese government has successfully attracted substantial foreign direct investment (FDI) to help stimulate the economy and hopes to attract further foreign investment by offering preferential tax treatment to foreign investors. Despite China's willingness to allow greater trade, yet it maintains controls on the flow of capital and on its exchange rate in order to insulate its domestic economy from external influence. Chinese firms find ways to circumvent the impediments of capital and currency controls; moreover firms have found innovative ways to profit from the growing economy because of incentives available for trade and foreign investment activities.

This study documents several persistent empirical irregularities in the reporting of China's trade figures and investment flow patterns. These irregularities are not easily explainable by the traditional trade theory. First, China's exports are understated in comparison to import figures reported by its trading partners. Second, China's imports are overstated in comparison to the export figures reported by its trading partners. Third, round-tripping (i.e., moving funds across the mainland Chinese border through trade, typically to Hong Kong or an offshore tax haven, before re-entering China as FDI) comprises a significant and integral part of inflows of FDI to China. These patterns occur in a regulated economic environment that offers export tax

rebates to encourage exports, import tariffs to discourage imports, and market impediments, such as differential tax treatment to domestic and foreign investors, currency inconvertibility, and capital controls.

Previous studies attempt to explain some of the above empirical irregularities. For example, Fisman and Wei (2004) present evidence that Chinese firms tend to underreport the value of imports to evade tariffs, but this does not explain the observed pattern in which the value of imports has been overreported. Prasad and Wei (2005) suggest several possible reasons for China's FDI inflow pattern, but they have not tested them empirically in a theoretical model. While Xiao (2004) estimates that round-tripping represents about 40% of China's FDI, Dollar and Kraay (2005) and Prasad and Wei (2005) estimate that round-tripping represents as much as one-third.¹ Even though these studies document the amount of FDI accounted for by round-tripping, no study to date has demonstrated exactly how capital leaves China, changes hands, and then returns to China as FDI.

Previous studies thus address the empirical irregularities as unrelated anomalies and do not attempt to examine whether these irregularities occur at the same time for a reason. More importantly, since these irregularities involve both trade and FDI transactions that may be intricately connected in a regulated economy, using a single trade or FDI theory alone may not satisfactorily address all issues concerned.

This paper uses a tax-induced regulatory arbitrage model that coherently incorporates trade, tax, and FDI in a market with impediments. Our model is an application of the transaction cost theory of the firm by Coase (1937) and an extension of Buckley and Casson (1976). It explains why multinational enterprises (MNEs), in particular, Chinese firms, engage in tax-

¹ Bermuda, British Virgin Islands, Cayman Islands, Hong Kong, Mauritius, and Samoa accounted for 58% of China's FDI inflows in 2006 (*China Statistical Yearbook*, 2007).

induced regulatory arbitrage (with round-tripping) that increases the firms' profitability and their flexibility in circumventing market impediments, which are prevalent in developing countries.

The transaction cost theory by Coase (1937) argues that firms act to minimize the impact of transaction costs, such as information asymmetries and other market impediments. Inspired by Coase (1937), the internalization theory of FDI proposed by Buckley and Casson (1976) posits that MNEs overcome market imperfections by creating their own market within the firm hierarchy.² More generally, firms circumvent market imperfections or impediments by arbitraging in different markets. Examples of different types of arbitrage include financial market arbitrage, tax arbitrage, regulatory arbitrage, and credit arbitrage (Shapiro, 2006).

Our study focuses on tax-induced regulatory arbitrage. Specifically, we develop a model to explain how Chinese tax incentives for trade and differential tax treatment between domestic and foreign investors are related to round-tripping FDI between mainland China and its trading partners. The thinking behind our model is as follows. Chinese firms engaged in exporting or importing can move funds across the border through trade figure manipulation (discussed later) and the funds re-enter China as FDI, enjoying preferential tax treatment. In view of the benefits from engaging in tax evasion related to round-tripping FDI, an exporting firm considers the tradeoff between the benefit of tax evasion (producing higher earnings) and the cost of losing export tax rebates and being caught for tax evasion when the firm underreports exports; an importing firm similarly considers the tradeoff between the benefits of tax evasion by round-tripping and the cost of paying more tariffs when the firm overreports imports.³ One unique feature of our model is that it incorporates tax incentives, trade figure discrepancies, and round-

² Likewise, Rugman (1985) argues that vertical integration, transfer pricing, and quality control are examples of market imperfections, which lead to internalization or multinational hierarchical activity.

³ Some studies list other reasons for round-tripping, such as leaving money overseas to reduce the currency risk due to inconvertibility of the Chinese currency and protecting the property rights (ownership) of export earnings (Fung et al., 2004; Xiao, 2004). We discuss other motivations in the Theoretical Models and Hypotheses section.

tripping in a unified way so that several observed empirical irregularities can be explained within one framework.

The contribution of this paper is threefold. First, it extends the extant FDI studies by developing a tax-induced regulatory arbitrage model in which corporations circumvent market impediments (e.g., government controls) and arbitrage the differential tax treatment by round-tripping FDI via trade figure manipulation. Second, it adds to the literature on trade mispricing and illicit financial flows by explaining documented discrepancies between actual and reported fund inflows and outflows in China in an integrated framework. In contrast to prior studies where the magnitude of trade mispricing was estimated using a broad-brush approach, which examines the omitted numbers in the balance of payments accounts, official reserves, and others,⁴ this study compares the reported trade data discrepancy at the product level and examine its relationship with import tariffs, export subsidies, and preferential taxes at the micro level. Third, with regard to the balancing act of the costs and benefits of tax evasion, this paper fits in well with the corporate tax evasion literature with stylized results from the Chinese economy, where the exchange rate is fixed and foreign investment is given preferential tax treatment. Chen and Chu (2005) show that a risk-neutral owner of a firm will evade taxes only if the expected gain from tax evasion is by a substantial margin greater than that from honest reporting. In the case of China, Fisman and Wei (2004) present evidence that Chinese firms tend to evade import tariffs by reclassifying the higher-taxed product categories as lower-taxed ones, in addition to underreporting the value of imports.

⁴ While the extant literature has documented significant trade misinvoicing for China trade, there is a dearth of analysis of the factors driving this phenomenon. For recent studies, see Kar and Cartwright-Smith (2008) and the *Christian Aid Report* (2009). Kar and Cartwright-Smith find high volume of illicit flows from China and call for an in-depth analysis of factors driving such outflows from China.

The rest of the paper is organized as follows. The next section first reviews the background literature that leads to the development of the model for our study, and then presents two tax-induced regulatory arbitrage models. Several testable hypotheses are derived. The Data section discusses the data and research methodology used in the empirical analysis. Results of the empirical tests and several robustness tests are presented and discussed in the Empirical Analysis section. The final section concludes the paper.

THEORETICAL MODELS AND HYPOTHESES

Review of literature pertaining to model development

Many approaches and trade theories have been advanced to explain the observed patterns in international trade flows. A conventional approach to explaining these patterns is grounded in the neoclassical trade theory, which was developed by Ricardo (1817/1950) and expanded separately by Heckscher (1919/1950), Ohlin (1933), and Vanek (1968) (henceforth, HOV). Neoclassical trade theory suggests that countries produce and export products in which they have a comparative advantage in exchange for products in which they do not have a comparative advantage, where comparative advantage is defined in terms of factor endowments, such as labor and capital (or technology). Although the HOV model is not supported well by empirical evidence, Trefler (1993) shows that a modification of the HOV model that allows for factor-augmenting international productivity differences explain reasonably well why countries export products that they do not have in abundance (but in which they have relatively high productivity), while importing products in which they are well endowed (but in which they have relatively low productivity).

More recently, intra-industry trade frequently occurs between countries, particularly rich countries, export and import more or less the same goods from one another, e.g., Sweden exports Volvos and imports BMWs. Krugman (1979) explains this type of foreign trade with the concept of economy of scale in which mass production diminishes the cost per unit produced, giving rise to concentrated production in a few factories and in a few countries.

Thus, trade theories, neoclassical or new, attempt to explain the observed trade patterns based on the principles of comparative advantage and economy of scale. Yet this trade-based approach will be handicapped in explaining the trade and investment patterns if (1) trade figures are not accurate, or (2) trade flows are related to FDI. It is estimated that 60% of world trade is directly or indirectly connected to FDI (Aizenman and Noy, 2006), and over 30% of world trade is within the same organizational entity (intra-firm trade) (Antras, 2003). If these estimates are correct, empirical results based on the reported trade figures will inevitably be different from what the trade theories predict because a large proportion of capital flows are also caused by FDI, not just by trade alone. Moreover, it has been observed that reported trade figures are far from accurate due to manipulation by reporting firms. Furthermore, trade figure manipulation may be related to FDI. Although trade theory cannot satisfactorily explain patterns of trade and investment flows, FDI theories may help explain the pattern of the international flow of funds.⁵

One FDI theory views MNEs as firms with market power that set up wholly owned subsidiaries in a foreign nation specifically for the purpose of taking advantage of ownership-

⁵ Dunning (1977, 1979) proposes an eclectic paradigm of international production, known as the OLI framework in the international business literature, combining ownership (O), location (L), and internalization (I) specific advantages of an MNE to explain why FDI occurs. The OLI framework suggests that FDI occurs if the MNE has a comparative advantage in these one of these three sets of factors. For example, among other things, China's preferential tax treatment of foreign investors represents an attractive location or country-specific advantage for MNEs. For this paper, however, the OLI framework, which was originally intended for MNEs investing in a foreign country, is not strictly applicable because round-tripping FDI originates from Chinese firms. We refer to this framework here only for referencing the concepts encapsulated in these sets of "advantages," which are commonly referred to in the FDI literature.

specific advantages, such as monopolistic access to raw materials and intangible assets (e.g., trade names or patents) (Hymer, 1976; Kindleberger, 1969).⁶ Market imperfections in fact are a sufficient condition for justifying the firm's move to a foreign country to make use of its monopolistic advantages.⁷ Inspired by Coase (1937), who argues that firms will act to minimize their transaction costs of doing business, Buckley and Casson's (1976) internalization theory suggests that a firm overcomes market imperfections through creating its own market by becoming an MNE engaging in international production and distribution, while Rugman (1985) argues that vertical integration, transfer pricing, and quality control are examples of internalization or multinational hierarchical activity. In addition to ownership- and internalization-specific advantages, FDI theories also suggest that firms combine them with location- or country-specific advantages (Dunning, 1981).

While the internalization theory predicts that MNEs would arise that solve the product market imperfections, Mehta and Fung (2004) suggest that the product market, the financial market, and the foreign exchange market are parts of a hierarchy in which impediments in any one market will compel or prompt arbitrage activities that seek economic gains by participating in other markets or by creating new products and markets.⁸

Firms can use different types of arbitrage to exploit market imperfections. Financial market arbitrage entails the transfer of funds among units in the MNE in order to circumvent exchange controls, earn higher risk-adjusted yields on excess funds, reduce their risk-adjusted cost of borrowed funds, and tap previously unavailable capital sources (Shapiro, 2006). For

⁶ The economy of scale in Krugman's (1979) new trade theory is an ownership or firm-specific advantage.

⁷ Market impediments can also include non-economic factors. Filatotchev et al. (2007) find that cultural factors, historic ties, and equity stakes play an important role in affecting the decision to undertake FDI in emerging markets.

⁸ The creation of the Eurodollar market was the result of market impediments caused by government policy, i.e., the Interest Equalization Tax (IET) imposed in 1963 by the U.S. government on foreign investors. Similarly, Fung et al. (2004) suggest that the non-deliverable forward market for the Chinese currency is the result of inconvertibility of the Chinese currency.

example, MNEs can use the covered interest arbitrage strategy to benefit from a lower cost of financing while covering the foreign exchange risk.⁹

Shapiro (2006) also suggests other types of arbitrage activities that MNEs can use to circumvent market impediments and increase profitability. For instance, credit arbitrage occurs when an affiliate of an MNE borrows from external sources, negating the effect of credit restraint or controls in its country of operation, where local credit markets are made inaccessible to MNEs by the host government. Tax arbitrage involves the shifting of gains or losses from one tax jurisdiction to another to profit from differences in tax rates or, in the case of China, shifting between two different sets of tax rates applicable to different entities, domestic and foreign, within the same tax jurisdiction. Regulatory arbitrage aims at enhancing returns by getting around government regulations. For example, Chinese firms engaging in round-tripping to avoid capital controls are involved in regulatory arbitrage. Also, MNEs have the ability to disguise the true profitability of their subsidiaries and reallocate the profits among units with transfer pricing.¹⁰

The brief review of tax and regulatory arbitrage highlights the importance of taxes as incentives or deterrents for MNEs considering FDI. It is thus reasonable to expect that favorable tax treatment will attract FDI, while high tax rates along with strict capital control (including repatriation of profit) will discourage FDI. Because many factors influence the location and volume of FDI, the impact of taxation on FDI can only be empirically determined. Previous

⁹ Aliber (1978) shows how arbitrageurs exploit differential rates in the interest rate and foreign exchange markets in a covered interest arbitrage.

¹⁰ Transfer pricing entails shifting the corporate profits from a high- to a low-tax jurisdiction through the manipulation of prices of goods and services charged for intra-firm transactions. In a typical transfer pricing scheme, affiliates of an MNE charge each other a lower than the fair market price for intra-firm transactions. This type of ‘misinvoicing within the same invoice’ as a matter of agreement between buyer and seller as a form of transfer pricing will not produce any discrepancy in the reported export and import values as pointed out by Kar and Cartwright-Smith (2008). Thus, transfer pricing cannot be used to explain the discrepancies in reported trade figures in this study, which is the main focus of the current study.

studies (e.g., Altshuler, Grubert, and Newlon, 2001) suggest that FDI is sensitive to taxation. In particular, countries with lower tax rates receive much more FDI than do countries with higher tax rates (Grubert and Mutti, 1991, 2000). Moreover, Grubert and Mutti (1991, 2000) find evidence that the FDI-location decision made by U.S. MNEs is consistent with income-shifting behavior, and Altshuler and Grubert (2005) find that income shifting has increased among U.S. manufacturing firms during recent years. Furthermore, for a given country, FDI is greater in years during which associated tax burdens are lighter (Boskin and Gale, 1987; Hartman, 1984; Slemrod, 1990). These results indicate that in determining the location and amount of FDI, MNEs have become more sensitive to differences in tax rates as they can now move capital across national borders much more easily due to technological advances and the loosening of trade restrictions and capital controls in recent years. Gordon and Hines (2002) points out that even though many other important variables determine FDI, which may overshadow the importance of taxation, the impact of taxation on FDI is so great that it stands out as a significant factor in most empirical studies.

A strand of international tax literature pertaining to MNEs is tax avoidance. Evidence from previous studies indicates that U.S. MNEs have used sophisticated tax avoidance schemes to shift taxable income from high-tax countries to low-tax countries, including changing the timing of income recognition for tax purposes (Grubert 1998, 2001; Hines, 1995; Hines and Hubbard, 1990), paying royalty to the parent company (Grubert, 1998; Hines, 1995), and establishing affiliates in tax haven countries and using transfer pricing (Clausing, 2000; Harris et al., 1993).

A number of studies examine the transfer pricing of MNEs in China (e.g., Chan and Chow, 1997a, 1997b, and Ho and Lau, 2002). They find that transfer pricing manipulations in

China were motivated by the differential between the income tax rate in China and the income tax and import tariff rates in the tax domiciles of MNEs. In addition, Chan and Chow (1997b) find that contrary to popular allegation, in aggregate foreign funded enterprises employ transfer pricing to siphon profits out of China, foreign funded enterprises in China paid more for both their imports and exports than their domestic counterparts. In contrast, our model focuses on the regulatory arbitrage induced by the tax rate differential within China, i.e., the differential in those rates applicable to Chinese domestic companies and preferential tax treatment applicable to foreign funded enterprises in China.

The current study is closely related to the literature on trade mispricing, which is believed to be a major conduit for illicit financial flows (typically outflows) from developing countries. Trade mispricing includes (a) transfer pricing, where the misinvoicing occurs within the same invoice as a matter of agreement between buyer and seller and no difference between export and import values occurs, (b) trade misinvoicing, where misinvoicing occurs on different invoices (i.e., import prices reported by the importing country do not match those values reported by the exporting country), and (c) other illicit trades. Prior studies estimate the magnitude of trade mispricing using a broad-brush approach, which examines the omitted numbers in the balance of payments accounts, official reserves, and others.¹¹ In contrast, the current study compares the reported trade data discrepancy at the product level, and relates it to the product-level import duties and export subsidies, and industry-level preferential taxes. While previous studies document the amount and pattern of trade mispricing around the world and a significant amount in China in particular, an in-depth analysis of the factors driving such outflows from China is

¹¹ Recent studies, such as Kar and Cartwright-Smith (2008) and the *Christian Aid Report* (2009), using different methodologies, attempt to quantify trade mispricing in China as an estimate of illicit financial outflows. Since the focus of the current study is solely on trade misinvoicing while previous studies on trade mispricing that includes all types of illicit financial flows, estimates from the current study are not strictly comparable to those from previous studies.

called for in previous studies. For example, Kar and Cartwright-Smith (2008, p. 24) propose that “the volume of illicit flows from China is so high that there is a strong case for future research to carry out an in-depth analysis of the (i) factors driving such outflows from China and (ii) possible destinations and types of investments where such outflows are being absorbed.” Our study attempts to fill this important void.

The literature discussed in this section motivates us to develop a regulatory arbitrage model to explore the interconnectedness among trade figure discrepancies, tax incentives, and round-tripping FDI.

Model Development

Exporting firm

Consider an exporting firm that sells goods in an offshore market. In an effort to encourage firms to export, the Chinese government gives out export tax rebates. The rebate rate varies, depending on the type of product exported.¹² We assume that the exporting firm is motivated to find a way to keep its export earnings offshore (outside China) for several reasons. First, the exporting firm can avoid currency conversion restrictions at home and convert its earnings into any currency. Second, earnings kept offshore can be returned home through a foreign entity (but acting on behalf of the exporting firm) as foreign investment, which enjoys preferential taxation. In other words, some of the export earnings will return to China through different means, while some will remain offshore. How much of the underreported earnings stay outside China and how they eventually return to China via round-tripping is not known and must be assumed in any theoretical model. It is reasonable to expect that the money involved in underreported export earnings will return to China as FDI inflows via round-tripping if three

¹² For tax rebate policy changes in China, see Cui (2003).

conditions are met: (1) the future tax payable on the money returned is minimal; (2) the money returned is deemed legitimate and private (see discussion below); and, (3) most important, the money returned is not subject to capital controls. Since FDI inflows meet all three conditions, it is reasonable to assume that all underreported exports earnings will return to China as FDI. In reality, other factors affect the actual percentage returning to China. For example, when the real estate markets are hot in Hong Kong, it is observed that hot money flows in and remain there before it eventually returns to China. Because we are not interested in estimating the parameters but in testing for the presence of such an effect, for the sake of simplicity, our model assumes that underreported export earnings will all return.¹³

To make the money remaining offshore look legitimate, the exporting firm understates its export earnings to the authorities so that the remitted earnings match the reported export earnings at home. This is typically done with the help of an intermediary, a trading agent of the exporting firm that acts as a bridge between the exporting firm and the ultimate buyers (trading partners). Typically, the agent is a firm set up outside China by the exporting firm (for private enterprises) or by some managers of the exporting firm (for state-owned enterprises) who run the round-tripping scheme, and thus we assume that there is no search fee involved.¹⁴

Thus, we formulate a model of the behavior of an exporting firm as follows:

$$CX = [(X - x) - C](1 - t) + (X - x)\delta + x[1 + r(1 - bt)] - P \quad (1)$$

¹³ It is noted that the relaxation of this assumption will not affect the outcome of the theoretical model because the amount of export earnings understatement, x , in equation 1 (below) can simply be adjusted by a fraction that indicates the percentage of underreported earnings returning to China.

¹⁴ Should there be any search fees for the agent, it can easily be incorporated into the model in equation 1. The fee is a fixed cost that does not vary with the dependent variable in equation 1, so leaving it out of the model will not significantly affect the result.

where CX represents the after-tax incremental cash flows of an exporting firm; X is the level of true (actual) export earnings; x is the amount of export earnings understatement.¹⁵ C is the cost of business operations; t is the corporate tax rate; and δ is the export tax rebate rate. The x amount of the export earnings understatement that returns to China is invested for a return, $r(x)$. Thus, x , the money invested in China, is designated as FDI because the money is remitted from an offshore market.

We assume that the return on investment is a diminishing function of the investment, x , i.e., $r_x < 0$ and $r_{xx} < 0$. The first condition implies a diminishing return to the foreign investment. The second condition implies a diminishing marginal return with an increase in foreign investment. Foreign investment enjoys a tax break, which is a reduction in the corporate tax rate, t , for a foreign entity. The reduction in the corporate tax rate depends on the tax bracket, b , to which a foreign-funded enterprise belongs. The tax bracket, b , is between 0 and 1. If b equals 1, the foreign investment enjoys no tax break; if it is 0, the foreign entity pays no taxes.

P is the amount of the penalty for underreporting exports and misleading the export authority.¹⁶ We assume that $P_x(x) > 0$ and $P_{xx}(x) > 0$. The first inequality implies that the marginal cost of underreporting and misleading the exports authority is positive. The second inequality implies a higher marginal cost of underreporting exports as export earnings manipulation increases.

Differentiating CX with respect to foreign investment, x , gives the first-order condition as:

¹⁵ In this paper, the terms “understatement” and “underreporting” (“overstatement” and “overreporting”) have the same meaning. However, in contexts where confusion could arise, we carefully choose the term that clarifies its meaning.

¹⁶ The penalty, P , can be defined as a variable with a probability of being caught times the penalty rather than a fixed dollar amount. Because the probability of being caught does not change with the dependent variable in the model and will not affect the model solution, we use a fixed penalty amount in the interest of simplicity. We thank an anonymous reviewer for suggesting this clarification.

$$CX_x = -(1-t) - \delta + [1 + r(1-bt)] + x(1-bt)r_x - P_x(x) = 0 \quad (2)$$

Solving equation (2) yields:

$$r(1-bt) + t = \delta + P_x(x) - x(1-bt)r_x \quad (3)$$

The equilibrium condition in equation (3) suggests that the exporting firm is trading off the benefits of the after-tax return of the foreign investment from round-tripping, $r(1-bt)$, and the tax shield of underreporting exports, t , against the loss of the export tax rebate, δ , the cost of penalty in round-tripping, $P_x(x)$, and the diminishing returns from investment ($x(1-bt)r_x$).

By differentiating the first-order condition with respect to the export tax rebate, δ , we obtain the relation between x and δ at the equilibrium condition:

$$-1 + r_x(1-bt)\left(\frac{dx}{d\delta}\right) + r_x(1-bt)\left(\frac{dx}{d\delta}\right) + xr_{xx}(1-bt)\left(\frac{dx}{d\delta}\right) - P_{xx}(x)\left(\frac{dx}{d\delta}\right) = 0$$

Rearranging the terms, we have:

$$\frac{dx}{d\delta} = \frac{1}{(1-bt)(2r_x + xr_{xx}) - P_{xx}} < 0 \quad (4)$$

The denominator of equation (4) is negative because of our assumptions of the return, r , and the penalty cost, P .¹⁷

Result 1: In China, an increase in export incentives reduces the amount of exports underreported. Alternatively, export incentives are negatively related to export underreporting.

¹⁷ If the marginal cost of penalty is high enough, the denominator on the right-hand side of the equation is sure to be negative.

Similarly, differentiating the first-order condition with respect to the tax bracket, b , for a foreign investor gives us the relation between the foreign investment, x , and the tax bracket, b (i.e., a high tax bracket, b , implies less tax break for foreign investors). That is,

$$(1-bt)r_x \left(\frac{dx}{db} \right) - rt + r_x(1-bt) \left(\frac{dx}{db} \right) + xr_{xx}(1-bt) \left(\frac{dx}{db} \right) - P_{xx}(x) \left(\frac{dx}{db} \right) = 0$$

Rearranging terms, we obtain

$$\frac{dx}{db} = \frac{rt}{(1-bt)(2r_x + xr_{xx} - P_{xx}(x))} < 0 \quad (5)$$

Result 2: The amount of foreign investment secured through export underreporting is positively related to tax breaks for foreign investment.¹⁸

Importing firm

Importing firms have the same motivations for keeping money offshore as exporting firms do. In order to have money available outside the jurisdiction of the Chinese government, an importing firm overstates the import invoice and pays the seller more than the actual amount due in the offshore market. An agent who receives the excess payment on behalf of the Chinese importing firm in the offshore market (e.g., Hong Kong or Thailand) could either leave it in a tax haven or return it to China as FDI. Thus, an importing firm can effectively circumvent capital controls and convert a controlled, nonconvertible currency into a freely convertible currency offshore through an international trade transaction. This scheme has a cost. As the importing firm overpays for goods purchased, it has to pay extra tariffs. To reduce this burden and maximize the

¹⁸ Relaxation of the assumption that not all of the understated amount returns to China as FDI does not affect our results. If a partial amount of the understatement returns to China, the two results (Results 1 and 2) will still hold as before with a slightly different scaling factor (See also footnote 11).

gains from round-tripping, the importer finds ways to reduce the tariff burden. Fisman and Wei (2004) provide empirical evidence that Chinese firms evade taxes by underreporting imports as well as by shifting items in higher-tariff categories to lower-tariff categories.

In our model Chinese importing firms evaluate the tradeoff between the benefit of a tax break on foreign investment from round-tripping and the cost of import tariffs if the imports are overstated. We hypothesize that round-tripping is part of the tax-induced regulatory arbitrage for Chinese firms to capture the tax differential between foreign and domestic investments. Thus, on the one hand, Chinese firms have incentives to send excess money offshore by overstating the import invoice and return the money to China as FDI. On the other hand, importing firms also have incentives to underreport imports or to misclassify imports from higher-tax product categories to lower-tax ones to reduce tariff payments.

We formulate the after-tax cash flows of the importing firm as follows:

$$CM = [S - (M + m)](1 - t) - (M + m)i + m[1 + r(1 - bt)] - P(m) \quad (6)$$

where CM is the after-tax cash flows for an importing firm with sales revenue, S . The importing firm imports an actual amount of M , but overreports it by an amount, m . The reported imports amount is $M + m$. Thus, the trading partner of the importing firm receives the M amount, and the m amount is in the hands of an agent of the importing firm. The importing firm with the aid of the agent then forms a company offshore with a registered capital of m , the amount by which imports have been overstated. This offshore company, with capital originating in China, then invests its money in China; the investment is now qualified as FDI and enjoys preferential tax treatment.

The importing firm faces an import tariff rate, i . The return on investment of the importing firm, r , is a function of m . We assume that $r_m(m) < 0$ and $r_{mm}(m) < 0$.

Differentiating the after-tax cash flows of the importing firm, CM , with respect to the overstated imports, m , and setting it to 0 yields the first-order condition:

$$CM_m = -(1-t) - i + [(1+r(1-bt))] + m(1-bt)r_m - P_m = 0 \quad (7)$$

The optimal condition for m can be obtained by solving equation (7). We have:

$$t + r(1-bt) = i + P_m - m(1-bt)r_m \quad (8)$$

Differentiating the first-order condition, CM_m , with respect to i and setting it to zero yields the relation between the amount of the overstated imports, m , and the tariff rate, i , at the equilibrium condition:

$$-1 + (1-bt)r_m \frac{dm}{di} + (1-bt)r_m \frac{dm}{di} + m(1-bt)r_{mm} \frac{dm}{di} - P_{mm} \frac{dm}{di} = 0$$

We rearrange terms to obtain:

$$\frac{dm}{di} = \frac{1}{(1-bt)(2r_m + mr_{mm}) - P_{mm}(m)} < 0 \quad (9)$$

Result 3: The amount of the overstatement of imports is negatively related to the tariff rate.

Differentiating the first-order condition, CM_m , with respect to the tax bracket, b , yields the relation between the amount of import overstatement, m , and the tax bracket, b (i.e., a high tax bracket implies less tax break for foreign investors), at the equilibrium condition:

$$\frac{dm}{db} = \frac{rt}{(1-bt)(2r_m + mr_{mm}) - P_{mm}(m)} < 0 \quad (10)$$

Result 4: FDI in an import overreporting scheme is positively related to tax breaks for foreign investment.

If the cost of the penalty, P , is linear with overstated imports or understated exports ($P_{mm} = 0$ in equation (10) or $P_{xx} = 0$ in equation (5)), FDI through exporting and importing firms (i.e., the signs of dx/db and dm/db in equation (5) and (10), respectively) depends primarily on the return function.

When an exporting firm is state-owned, public assets are being transferred to managers (who are private individuals) through the underreporting exports. Underreporting exports and linking up with an agent offshore facilitate the transfer of public assets to private hands. In this case, equation (1) will become:

$$CX = \alpha \{ [(X-x) - C](1-t) + (X-x)\delta \} + x[1+r(1-bt)] - P \quad (11)$$

In this model, controlling managers of state-owned enterprises have α percent of the firm's incremental cash flows and full ownership of the value of the export understatement, which returns to China as FDI. We can reasonably assume α is a low number if the scheme is sustained for a long time.

Thus, differentiating equation (11) with respect to investment secured through export underreporting, x , gives:

$$CX_x = -\alpha(1-t) - \alpha\delta + [1+r(1-bt)] + x(1-bt)r_x - P_x(x) = 0 \quad (12)$$

Differentiating equation (12) with respect to α and rearranging terms yields:

$$dx/d\alpha = (\delta + (1-t)) / [(1-bt)r_x + xr_{xx}] < 0. \quad (13)$$

Result 5a: This result implies that the lower the personal ownership of the managers in the firm, the greater the amount of foreign investment that state-owned enterprises amass through export

underreporting. Put another way, controlling managers tend to misappropriate wealth from the state-owned enterprises through round-tripping.

Result 5b: Using the same analysis, it can be shown that controlling managers of the importing firm overstate their imports in order to transfer public assets to private hands. In short, $dm/da < 0$, implying that controlling managers of state-owned importing firms are likely to overstate imports in order to engage in round-tripping, which has the same wealth misappropriation effect as in the case of exports.

Research hypotheses

Based on the discussion of our models above, we develop six hypotheses (i.e., two sets of three hypotheses) regarding Chinese exports understatement (HE) and Chinese imports overstatement (HI).

HE-1. The extent of export understatement is negatively related to export incentives. That is, the greater the export incentives, the lower the incentives for Chinese exporters to underreport exports (from Result 1).

HE-2. The extent of export understatement is positively related to China's preferential incentives for firms involved in FDI. That is, the greater the FDI incentives, the greater the incentives for Chinese exporters to underreport exports (from Result 2).

HE-3. The extent of export understatement is positively related to state ownership. That is, the greater the level of state ownership, the greater the incentives for Chinese exporters to underreport exports (from Result 5a).

- HI-1. The extent of import overstatement is negatively related to import tariffs. That is, the higher the import tariffs, the lower the incentives for Chinese importers to overreport imports (from Result 3).
- HI-2. The extent of import overstatement is positively related to China's preferential incentives for firms involved in FDI. That is, the greater the FDI preferential incentives, the greater the incentives for Chinese importers to overreport imports (from Result 4).
- HI-3. The extent of import overstatement is positively related to state ownership. That is, the greater level of state ownership, the greater the incentives for Chinese importers to overreport imports (from Result 5b).

DATA

Trade flow data

The trade flow data in this paper were collected from the United Nations Statistical Division's Commodity Trade (COMTRADE) database, which contains data on exports and imports by commodity that is classified by the six-digit Harmonized Commodity Description and Coding System (HS) and by partner country for each individual country. Access to the COMTRADE database was facilitated by a data inquiry tool, the World Integrated Trade Solution (WITS) developed by the World Bank, in close collaboration with the United Nations Conference on Trade and Development (UNCTAD), to create easy retrieval of information on trade and tariffs compiled by various international organizations.¹⁹

¹⁹ The WITS web site is <http://wits.worldbank.org>. In addition to the United Nations Statistical Division's Commodity Trade (COMTRADE) database (<http://data.un.org/wiki/ComTrade.ashx>), WITS can get access to the United Nations Conference on Trade and Development (UNCTAD) Trade Analysis Information System (TRAINS) that contains information on imports and various tariffs and non-tariff measures for 119 countries, the World Trade Organization (WTO) Integrated Database (IDB) that contains imports by commodity and by partner country, and

To detect discrepancies between the trade flow figures reported by China and the figures reported by Hong Kong, we first matched the value of the direct trade flows of the two related parties at the six-digit HS level after eliminating indirect trade flows through Hong Kong as an entrepôt.²⁰ We then compared China's reported trade figures to those reported by Hong Kong, whose trade figures are believed to be accurate and are not susceptible to manipulation since there is no incentive for firms to misreport the trade figures in Hong Kong, where there is no tariff (Fung, 2005).

We define the *gap* between two trading partners as the difference between the value of one party's imports and the value of the counterparty's exports with China. Thus, China's *export gap* is defined as the difference between the value of imports reported by Hong Kong and exports reported by China, while China's *import gap* is defined as the difference between the value of imports reported by China and exports reported by Hong Kong. The export sample for 2000 consists of China's exports to Hong Kong (reported by China) and Hong Kong's imports from China (reported by Hong Kong), with 3,754 observations that have complete information on China's export tax rebate rates. The import sample for 2000 consists of China's imports from Hong Kong (reported by China) and Hong Kong's exports to China (reported by Hong Kong), with 2,203 observations that have complete tariff and value-added tax rates.

MFN applied tariffs for over 80 countries, and the Consolidated Tariff Schedule (CTS) database that contains WTO bound tariffs, initial negotiating rights, and other indicators.

²⁰ In estimating the global volume of trade mispricing, Kar and Cartwright-Smith (2008) exclude the Hong Kong data from the database, IMF Direction of Trade Statistics (DOTS) because trade partner countries of China often mislabeled the exports originating in Hong Kong as coming from China and vice-versa. This 'mislabeling' problem arising from the Hong Kong re-export trade has severe implications for estimating the trade mispricing between China and its trading partners (not Hong Kong). However, this potential problem does not affect the current study since our focus is on the trade mispricing (more specifically, misinvoicing) between China and Hong Kong, and not between China and other trade partners. There is no reason to believe that such 'mislabeling of Hong Kong's exports by China's trade partners will systematically bias our results in one way or another. Moreover, the COMTRADE database provides detail entrepôt trade by product and by trading partner country, allowing us to exclude Hong Kong's re-export trade from our sample. Other trade databases such as the IMF DOTS, which record aggregated data at national or regional group level, would not allow separation of the re-exports from direct exports/imports.

Figure 1 shows that the trade statistics reported by mainland China and those by Hong Kong differ substantially. In Figure 1-1, the exports to Hong Kong for the period 1996–2004 as reported by China are consistently lower than those reported by Hong Kong. For 2004, China’s exports to Hong Kong were reported as \$98.71 billion, whereas the imports from China were reported by Hong Kong as \$113.01 billion, a difference of \$14.3 billion. The export gap (i.e., Hong Kong imports less China exports) is even greater earlier, with a peak in 2000 of \$47.2 billion, implying that the Chinese figure is 52% lower than the Hong Kong figure. This huge gap in the reported trade figures seems to be explainable by statistical errors, the entrepôt trade between China and Hong Kong, or the FDI round-tripping. Fung (2005), however, rules out the first two as the culprits for the huge gap. First, statistical error cannot explain the huge gap because random reporting errors would be expected to occur in both directions. The statistics in Table 1, however, indicate that the gap is mostly positive and consistently large in size, making it difficult to attribute the gap to pure statistical errors. Second, the huge discrepancy persists even after accounting for the entrepôt trade flows. This leaves us with the third possible explanation: round-tripping-related investment flows, which have not been officially accounted for.

[Insert Figure 1–1 here]

Panel A of Table 1 shows export understatement in nine of the ten product categories aggregated at the first-digit HS level. Understatement is pervasive in almost all product categories, which would make it less likely to be a result of misclassification of product categories across the board. Panel B of Table 1 lists the categories with the highest understatement amounts.

[Insert Table 1 here]

The pattern in Figure 1-2 (China’s imports from Hong Kong) contrasts with that in Figure 1-1, in which China’s import figures are typically higher than those reported by Hong Kong. For 2004, Hong Kong’s exports to China were recorded as \$4.88 billion, whereas China’s imports from Hong Kong were reported as \$11.80 billion, an overstatement of \$6.92 billion, or 142% of the Hong Kong figure.²¹ The overstatements were \$5.44 billion in 2002 and \$6.41 billion in 2003. Overall, there seems to be an overstatement problem of Chinese imports for the period 1999–2004.

[Insert Figure 1–2 here]

Panel C of Table 1 shows the overstatement in eight of the ten product categories aggregated at the first-digit HS level. As in the export sample, it appears unlikely that overstatement is the result of misclassification of product categories. Panel D of Table 1 lists the product categories with the highest levels of overstatement.

To address scale issues, we controlled for the size effect of the variable, *gap*, in two ways. First, *sgap* is defined as the *gap* divided by the average of one party’s exports and the counterparty’s imports:

$$sgap = \frac{gap}{\frac{imports + exports}{2}} \quad (14)$$

²¹ Kar and Cartwright-Smith (2008) estimate a total of trade mispricing at \$253.26 billion in 2004 for all China’s trading partners excluding Hong Kong. Our estimate of \$21.22 billion (the sum of export understatement of \$14.3 billion and import overstatement of \$6.92 billion) is about 8.4% of China’s trade mispricing estimated by Kar and Cartwright-Smith. Our estimate seems to be in line with theirs given that Hong Kong’s trade accounted for 9.8% of China’s total trade amount in 2004 (based on statistics from *China Statistical Yearbook*, 2005). The *Christian Aid Report* (2009) estimates trade mispricing at \$27.03 billion in 2005 arising from the bilateral trade between China and the United States and European countries. Given that the US and EU trade accounts for about 32.9% of China’s total trade amount in 2004, this estimate seems to be conservative as compared to the \$253.26 billion estimate for all China’s trading partners given by Kar and Cartwright-Smith (2008) and the \$21.22 billion estimate for China and Hong Kong in our study. This comparison should be made with a caveat that the estimate from the current study is solely for trade misinvoicing whereas estimates from the two previous studies are for trade mispricing. Thus, the estimate from the current study may serve as an estimate for the lower bound of the trade mispricing problem in China.

We also took a logarithmic transformation for *gap*. To maintain the original sign and order, we defined *lgap* as the natural logarithm of the absolute value of *gap*, multiplied by the sign function.

$$lgap = sign \times \log(| gap |) \quad (15)$$

where sign is +1 if the *gap* is more than 0, and -1 if the *gap* is less than 0. One advantage of this function is that it retains the monotonic property; i.e., the transformation does not alter the order of the original variable.²²

Rebates and tariffs: Trade policy variables

Export tax rebates are one of the most important preferential economic policies the Chinese government has implemented to encourage exports. In this study, export tax rebates for each product category (*rebate*) were taken from *Export Rebate: Policies and Practices* (2000).²³ Data on Chinese tariffs were collected from the *Chinese Imports Tariff Schedule* (2004).²⁴ Following Fisman and Wei (2004), we measured the import stage taxation at the product level, *tax_import*, as the sum of tariffs and VAT. In addition, Fisman and Wei (2004) find that import tax evasion takes place by intentionally misclassifying more highly taxed imported products as lower-taxed ones. To account for this possible practice in our import sample, we followed their method and defined *average_tax* as the average level of tax for all

²² The monotonic property may be distorted for *gap* values between -\$1 and \$1 when the natural logarithm is taken for the absolute value, but in our sample we have no observation whose *gap* value falls within this range.

²³ The main purpose of the export tax rebate policy is to avoid double taxation on export goods and to enhance the country's competitiveness in foreign markets. Under both the GATT (General Agreement on Tariffs and Trade) and the WTO (World Trade Organization), export tax rebates are not considered a subsidy as long as the tax rebate does not exceed the amount of tax paid to domestic tax authorities (Cui, 2003).

²⁴ Data were obtained from www.ce68.com.

other products in a product's four-digit HS product category, weighted by the export value reported by Hong Kong.

Tax break: Proxy for preferential incentives for foreign direct investment

According to the Chinese Ministry of Commerce, the bulk of Chinese FDI, nearly half, comes from Hong Kong. Many believe that part of the reported FDI from Hong Kong is in fact capital originating in mainland China, but disguised as Hong Kong investment to make it appear foreign, and thus qualify for a tax break and other benefits accorded to foreign investments. We hypothesized that round-tripping FDI takes place via the underreporting of exports or overreporting of imports. That is, capital originating in China is sent and parked in Hong Kong for future return to China as foreign capital with the help of trade figure manipulation. We tested our hypothesis of round-tripping via trade figure manipulation by using a proxy for China's preferential incentives for FDI firms.²⁵ The proxy, *tax_break*, is the difference between the average effective VAT (value-added tax) rate for China-funded enterprises and the effective VAT rate for foreign-funded enterprises in each industry.²⁶

The effective VAT rate is the ratio of the VAT payable over total sales. Information on paid VAT is available separately for China-funded and foreign-funded enterprises. To compute the VAT payable by China-funded enterprises for each industry, the output and the input taxes need to be computed separately for the current period. The difference between them is the amount of VAT payable. The output (input) VAT rate varies from 13% to 17%. The basic rate is set at 17%, with a lower rate at 13% for basic foodstuffs, utilities, newspapers, and agricultural

²⁵ China's preferential policies and tax incentives for foreign direct investment are presented in the Appendix.

²⁶ Although Hong Kong and Macau are part of China, for statistical reporting and tax purposes, they have always been considered "foreign" by the Chinese authorities. As such, we use "foreign-funded enterprises" to refer to 'real' foreign-funded enterprises and those enterprises funded by Hong Kong, Macau, and Taiwan, allowing readers to reconcile the figures with China's official statistics at the expense of a slight misnomer.

production inputs. After deducting the appropriate input tax, the average effective VAT rate for China-funded enterprises in all industries is estimated to be about 8% of the sales volume.²⁷

The Chinese government has also implemented a variety of tax incentives to attract FDI. For example, technology transfer and technological development by foreign enterprises and enterprises with foreign investments are exempt from VAT. Foreign-funded enterprises invested in projects in the exempt categories are entitled to a full refund of the VAT on Chinese-made equipment purchased. Thus, we estimated the effective VAT rate for foreign-funded enterprises in each industry as the ratio of the total VAT paid by these enterprises over total sales of these enterprises, where sales and value-added taxes data for each industry are obtained from the *China Statistical Yearbook*.

Finally, we constructed *tax_break* for each industry as the average effective VAT rate for China-funded enterprises (8%) less the effective VAT rate for foreign-funded enterprises in the corresponding industry. That is, a firm enjoys tax benefits when the value of *tax_break* is positive.

State capital

Using data from the *China Statistical Yearbook*, we constructed a variable, *state*, for each of the 29 manufacturing industries in our sample to measure the percentage of state capital (e.g., state-owned enterprises) over the total non-foreign capital (the sum of state and private capital). We use this variable to test whether a higher level of state ownership is associated with greater incentives for Chinese firms misreporting their trade figures.

Control variables²⁸

²⁷ This rate is taken from “Briefing of VAT under China’s Tax System” accessed at www.itdweb.org.

In addition to the key hypothesis testing variables, we use several control variables to account for the systematic differences in our sample that potentially affect the gap. First, *size*, measured by the total value of exports (imports) for each industry for the export (import) sample, is used to account for the possibility that the greater the size of an industry, the greater the amount of export or import misreporting. The natural logarithm of size is used in all regressions. Second, *foreign* is constructed as the percentage of sales of foreign-funded enterprises over the industry total sales (the sum of sales of all enterprises - state, private, and foreign - in an industry) in separating the possible different impact of trade figure misreporting by foreign-funded enterprises from those by state-owned enterprises, since foreign-funded enterprises have less incentive in trade figure misreporting.²⁹ Third, a dummy variable, *complex*, is added to control for possible correlation between product complexity and tax incentives; it is equal to 1 if the industry produces complex products and 0 otherwise. Specifically, *complex* is equal to 1 for products in the following industries: communication equipment; computers and other electronic equipment; electrical machinery and equipment; pharmaceuticals; petroleum, coking and processing of nuclear fuel; chemical products; special purpose machinery; and transport equipment.

Summary statistics

Table 3 provides the summary statistics for variables in the sample of Chinese exports to Hong Kong and Chinese imports from Hong Kong. A total of 3,754 observations in six-digit HS product categories with complete data are included in the export sample. Panel A shows that the average export amount of a product category reported by China is \$11.52 million, compared to \$22.89 million reported by Hong Kong. The understatement is an export gap (Hong Kong

²⁸ We thank an anonymous reviewer for suggesting these control variables for robustness.

²⁹ We also ran all the tests using an alternative definition for '*foreign*' defined as the percentage of foreign capital over total capital in an industry. Results are qualitatively the same.

imports less Chinese exports) of \$11.37 million. The average export rebate rate is 14%, with a maximum of 17% and a minimum of zero. This suggests that some export products obtain a full refund of the VAT, while some receive a fraction of the refund or nothing.

The average *tax_break* is 5%, suggesting that the effective VAT rate is 3% on average for the FDI firms, implying a five-percentage-point savings over the average effective VAT rate for all Chinese firms, which is in general 8%.³⁰ The percentage of state capital, *state*, is on average 65% of the total non-foreign capital, whereas foreign sales, *foreign*, is on average 32% of the industry total sales. The average size of an exporting industry is \$11.97 billion. About one-fourth (25%) of export products are classified as complex manufactured products.

[Insert Table 3 here]

Panel B provides the descriptive statistics for a sample of 2,203 observations in six-digit HS product categories for the Chinese import data. The average import amount of a product category reported by China is \$3.9 million, compared to \$2.97 million reported by Hong Kong. The overstatement is an import *gap* (Chinese imports less Hong Kong exports) of \$0.93 million. The average import tax rate (tariff rate plus VAT rate on the imports) is 34%, with a maximum of 84% and a minimum of 13%. The average import tax rate for other products within the same four-digit category (i.e., *average_tax*) is also 34%. The average *tax_break* is 5%, a result similar to that of the export sample. The state capital, *state*, is averaged 60% of the total non-foreign capital for all industries, whereas foreign sales, *foreign*, accounts for an average of 35% of the total industry sales, which is similar to that for the export sample. The average size of an importing industry, *size*, is \$10.31 billion. Over one-fourth (28%) of import products are classified as complex manufactured products.

³⁰ Note that the effective rate for the tobacco industry is 9%, resulting in a negative tax break at -1%.

EMPIRICAL ANALYSIS

Empirical analysis is conducted based on the following general specification:

$$sgap_i(lgap_i) = \alpha + \beta \times trade_policy_i + \gamma \times tax_break_i + \lambda \times state_i + \delta \times control_variables_i + \varepsilon_i \quad (16)$$

where *sgap* and *lgap* are the dependent variables and *i* refers to a product category. The key hypothesis testing variables are the trade policy variable, FDI preferential policies (*tax_break*), and state capital (*state*). Specifically, the *trade_policy* variable refers to either the export tax rebate (*rebate*) for the export sample, or the *import_tax*, defined as the sum of tariffs and VAT (value-added tax) for the import sample.

For the export sample, we test if export understatement is related to *rebate*, *tax_break*, and *state*. Our model predicts a negative sign for β according to HE-1, a positive sign for γ according to HE-2, and a positive sign for λ according to HE-3. Panel A of Table 4 reports the results of the regression for the export sample. Results with *sgap* as the dependent variable are summarized in Models 1 and 2, where several control variables are included in Model 2 in the regression analysis. All *t*-statistics in the regression are based on robust standard errors, accounting for the clustering of standard errors at the industry level.³¹

Results from both models support our hypotheses, HE1, HE2, and HE3, which are related to the export sample. Consistent with the theoretical predictions, the *sgap* is significantly negatively associated with export tax rebates, suggesting that understatement is less severe for products with a higher export tax rebate incentive (i.e., in support of HE-1). For example, the tax rebate coefficient in Model 1 is -2.52 , implying that one standard deviation increase in *rebate* will be translated into a reduction of 0.08 (-2.52×0.03) in *sgap*, or \$1.4 million ($-0.08 \times (\$22.89\text{mn} + \$11.52\text{mn})/2$) in *gap*, on average, for a product category, holding other

³¹ Regressions with clustering at the 4-digit product level yield similar results, but not reported here to conserve space.

things constant, where \$22.89mn and \$11.52mn are, respectively, the Hong-Kong reported import and China reported export figures for an average product category (Panel A of Table 3). The *tax_break* coefficient (12.39) is positive and significant, confirming our prediction that understatement is greater for products with a higher tax break for foreign investments. The result implies that for one standard deviation increase in *tax_break*, there is an associated increase of 0.12 (12.39×0.01) in *sgap*, or \$2.06 million ($0.12 \times (\$22.89\text{mn} + \$11.52\text{mn}) / 2$) in *gap*, on average, for a product category, holding other things constant. Thus, for the total export sample of 3,754 product categories, the increase in export understatement associated with one standard deviation increase in *tax_break* is a sizable \$7.73 billion ($\$2.06\text{mn} \times 3754$). These results are consistent with the conjecture that firms tend to report lower exports and take advantage of preferential FDI policies through round-tripping (i.e., in support of HE-2). When the *state* variable is used to examine whether the magnitude of export understatement is greater for sectors with high levels of state ownership, the results show that the sign for this variable is positive and statistically significant (i.e., in support of HE-3).³²

[Insert Table 4 here]

For a robustness check, we repeated the same set of tests using *lgap* as the dependent variable in Models 3 and 4. Results presented in Tables 3 and 4 show that this alternative dependent variable yields similar results for the three variables of interest with higher adjusted R^2 than Models 1 and 2. Overall, results in Panel A of Table 4 suggest that Chinese export firms seem to have engaged through round-tripping in a tradeoff between the cost of losing tax rebates if they underreport exports values and the benefits of qualifying for preferential FDI tax breaks.

³² Since a higher percentage of state capital implies a lower percentage of foreign capital, the significant positive coefficient on the *state* variable suggests that a greater percentage of state-owned enterprises in an industry is associated with more severe mis-statement problem, or a greater percentage of foreign enterprises is associated with less severe mis-statement problem.

For the import sample, our model predicts a negative sign for β (*tax_import*) according to HI-1, a positive sign for γ (*tax_break*) according to HI-2, and a positive sign for λ (*state*) according to HI-3. Panel B of Table 4 reports the regression results. The negative β coefficient of Model 1 (-1.27) confirms that *tax_import* is negatively related to import overstatement (i.e., in support of HI-1). That is, one standard deviation increase in *tax_import* will have a reduction of 0.12 (-1.30×0.09) in import overstatement (*sgap*). This result lends support to our tax-induced regulatory arbitrage model, in which firms try to minimize import tariffs while round-tripping. Moreover, as our theoretical model predicts, the coefficient γ of *tax_break* is found to be positive and strongly significant even after controlling for *tax_import* (supporting HI-2). The result implies that for one standard deviation increase in *tax_break*, there is an associated increase of 0.08 (7.97×0.01) in *sgap*, or \$0.27 million ($0.08 \times (\$3.9\text{mn} + \$2.97\text{mn}) / 2$) in *gap*, on average, for a product category, holding other things constant. Thus, for the total import sample of 2,203 product categories, the increase of import overstatement associated with one standard deviation increase in *tax_break* across all product groups is a significant amount of \$594.81 million ($\$0.27\text{mn} \times 2203$). The coefficient for the *state* variable (0.82) in Model 1 is significant. Results for Model 2 including control variables are similar to those for Model 1, indicating robustness in these results. In Models 3-4, where *lgap* is the dependent variable, similar results obtain for all variables in terms of direction and significance with higher adjusted R^2 than Models 1 and 2.

To summarize, the results in Panel B are consistent with our tax-induced regulatory arbitrage hypothesis. While importers have incentive to report lower values of imports to evade tariffs and taxes, they need to balance the benefits obtaining from import overreporting in a tax-induced regulatory arbitrage through round-tripping. Overall, evidence seems to support the

tradeoff hypothesis that importers weigh the benefits of FDI incentives (if they report more than the actual value of imports) against the costs of higher import tariffs.³³

Robustness Test: Hong Kong (2004)

As a robustness check, we examined China-Hong Kong trade data for 2004 when the Closer Economic Partnership Arrangement (CEPA), which aims to foster a closer economic relationship between mainland China and Hong Kong, took effect. The pact promises to increase access to mainland markets for the Hong Kong service industries, to cut tariffs on Hong Kong-manufactured exports to China, and to improve bilateral cooperation in trade and investment between mainland China and Hong Kong. CEPA was expected to have an impact on the trade and investment behavior of firms in both parties to the agreement. We hypothesize that if our tax-induced regulatory arbitrage model with round-tripping is robust, results found previously in the above analyses on import overstatement should persist even after CEPA went into effect.

As shown in Panel A of Table 5, the average value of the exports of a product category to Hong Kong reported by China is \$26.53 million, \$3.85 million lower than the figure reported by Hong Kong and lower than the understatement (\$11.37 million) in 2000. Panel B shows that the average value of imports reported by China is \$7.13 million, while Hong Kong exports reported total \$3.73 million, approximately half the level reported by China. The average import gap for the import sample is \$3.4 million, about four times the overstatement in 2000.

³³ If our theory is correct, we should observe similar over- or underreporting patterns in China's trade flows with other countries, particularly countries with high FDI in China. Thus, as a robustness check, we tested our hypotheses using another sample: China-Thailand trade flows in 2000, the same year as in the China-Hong Kong trade flows analyzed above. Results in the China-Thailand sample are similar to those in the China-Hong Kong sample and are consistent with the round-tripping argument. Results are available from authors upon request.

These data suggest that the import overstatement problem has become more severe, but the export understatement problem has lessened since 2000. The substantial decrease in import tariffs and taxes may explain the widening import gap when the average import tax was reduced from 34% in 2000 (Table 3B) to 27% in 2004 (Table 5B). Likewise, the maximum *tax_import* was reduced to 52% in 2004, thirty-two percentage points lower than that in 2000 (84% in Table 3B), reflecting China's efforts to reduce import tariffs upon its entry to the World Trade Organization (WTO).

[Insert Table 5 here]

Panel A of Table 6 presents the regression results for the export sample for 2004. Model 1 reports the test results on *rebate*, *tax break*, and *state* variables, while Model 2 reports the results with control variables. The results are consistent with those for the sample for 2000. All coefficients on *rebate*, *tax_break*, and *state* have the expected signs and are significant in both models, regardless of whether *sgap* or *lgap* is used as the dependent variable.

Could trade and tax policies explain the phenomenal import overstatement in 2004? Panel B of Table 6 presents the regression results for the import sample for 2004. Coefficients on *tax_import* are consistently negative and strongly significant for all specifications, regardless of whether *sgap* or *lgap* is used as the dependent variable. The coefficients of *tax_break* are positive and significant in Models 1-4. The import overstatement is strongly positively related to state ownership in all models. These results are consistent with our hypothesis that tax-induced regulatory arbitrage has been prevalent in China via round-tripping, a trade-tax-investment strategy in a market where there are impediments, and round-tripping appears to be associated with enterprises where state ownership is greater.

[Insert Table 6 here]

Further test of the impact of CEPA on Chinese firms' behavior³⁴

Under CEPA, import tariffs on certain commodities were to start being phased out in 2004 and all import tariffs were to be abolished by the end of 2006. Phase I product categories that would have import tariffs removed in 2004 include electrical and electronic products, plastic articles, textiles and clothing, chemical products, pharmaceuticals, clocks and watches, cosmetics, and metal products (Fung and Zhang, 2007). This phase-out arrangement provides us with an opportunity to test for any impact from CEPA on the practice of import overreporting. Specifically, we expect the removal of tariffs to increase import overstatement because firms no longer have to worry about the additional cost of inflating import values. Instead, firms would tend to maximize the overstatement so that they could send more money offshore for round-tripping. By comparing the imports overstatement figure of Phase I products for 2000 to that for 2004, we can estimate the overall change in overreporting when all products became tariff-free in 2006.

Panel A of Table 7 reports the changes in the import gap for the entire sample, Phase I sample, and non-Phase I sample. The import gap, on average, increased significantly in both groups as indicated by the significant t-tests (in the last column). The increase in the import gap for Phase I sample, \$6.59 million, is particularly noteworthy, because it is more than five times the change in the import gap (\$1.25 million) of the non-Phase I sample.

[Insert Table 7 here]

Panel B of Table 7 shows the result for the regression, where the dependent variable is the change in the import gap between 2000 and 2004. Model 1 uses the change in *sgap* as the dependent variable and includes the change in import tax (*tax_import*), the change in *tax_break*, and the change in *state* as independent variables. Model 2 includes all variables in Model 1 with

³⁴ We thank an anonymous reviewer for inspiring us to conduct this further test.

additional control variables (the change in *average_tax*, the change in *size*, and the change in *foreign*). Models 3 and 4 have the change in *lgap* as the dependent variable. Results show a negative and significant effect of the change in *tax_import* across all four models, while a positive and significant coefficient for the change in *tax_break*, change in *state*, and change in *size*. The coefficient for the change in *foreign* is negative in Models 2 and 4, suggesting that the increase in the percentage of foreign sales is associated with a lower level of misreporting over time, but the coefficient is statistically insignificant. Overall, the evidence supports our conjecture that CEPA has a positive impact on the import gap after controlling for other factors. The removal of import tariffs seems to have encouraged Chinese firms to increase the amount of import overstatement.

CONCLUSION

This study examines several empirical irregularities (export underreporting, import overreporting, and the significant presence of round-tripping FDI) in the trade and investment flow statistics pertaining to China. Theoretical models are developed to explain these irregularities by hypothesizing tax-induced regulatory arbitrage at work in a market with various structural impediments via trade figure manipulation and round-tripping FDI. Our models demonstrate a tax-trade-investment strategy manifested in round-tripping arbitrage through a nexus of market imperfections, synthesizing the stylized patterns with regard to trade figure discrepancies and round-tripping in China.

Empirical results based on China's exports and imports data with Hong Kong provide strong support for all six hypotheses that we tested on the pattern of irregularities: (1) export understatement is negatively related to export tax rebates (HE-1); (2) import overstatement is

negatively related to import tariffs (HI-1); (3) the underreported amount of export earnings is positively related to variables that proxy for tax breaks offered to foreign investors (HE-2), while the overreported amount of imports is also positively related to variables that proxy for tax breaks offered to foreign investors (HI-2); and (4) export understatement and import overstatement appear to be significant in the Chinese state-owned enterprises (HE-3 and HI-3). The empirical results are robust to different specifications with various control variables.

Consistent with HE1, export understatement is found negatively related to export tax rebates, suggesting that the exporting firms try to reduce export understatement in order to reap more gains from tax rebates when export tax rebate is higher. The empirical result suggests that a firm's decision to underreport exports is based on the expected tradeoff between the benefits of tax breaks on its own investment coming from abroad (from round-tripping) and the loss of the export tax rebate if the firm underreports exports. Our results also show that Chinese firms systematically underreport exports to Hong Kong even though the export tax rebates do offset some of the incentive to do so. The analysis supporting HE-2 is consistent with the conjecture that a portion of FDI (i.e., the round-tripping FDI) in China may be in part due to the underreporting of China's export earnings. We believe that export underreporting will continue as long as exporting firms are motivated to send money offshore.

On the import side, we find that import overstatement is linked to trade policy (HI-1) and the preferential incentives for firms involved in FDI (HI-2), providing support for the regulatory arbitrage for Chinese firms to capture the tax differential between foreign and domestic investments. These results are consistent with the conjecture that money sent offshore resulting from the overstatement of imports will return to China as FDI from a foreign entity. Overall, our results suggest that Chinese importing firms evaluate the tradeoffs between the benefits of tax

breaks on foreign investment from round-tripping and the cost of import tariffs if they overreport imports. We believe regulatory arbitrage will continue as long as market impediments such as currency inconvertibility and capital controls exist in China.

This paper contributes to the literature in two important ways. First, it provides a crucial link between China's trade figure discrepancies and its FDI (from round-tripping). That is, it contributes to the traditional trade and FDI theories in explaining the stylized patterns that cannot be explained completely by existing theories. Second, this paper demonstrates how MNEs utilize tax-induced regulatory arbitrage to circumvent market imperfections in a developing economy where there are preferential incentives accorded by the host country to foreign investors. It also shows that under certain imperfect market conditions, preferential treatment for foreign investors may attract capital inflows but at the risk of being used for other unintended purposes by domestic as well as foreign firms.

Our results indicate that state-owned enterprises appear to engage in significant export underreporting and import overreporting, implying a high possibility of outflow of state capital through trade transactions. This situation warrants close examination by Chinese policymakers, if mitigating the outflow of state capital is a top policy priority.

A caveat to our study is that results are based only on the manufacturing industries. Despite the importance of the manufacturing sector in the Chinese economy, it is possible that foreign hot money flowing into China ends up in other sectors of the economy, e.g., the real estate market. Our study does not examine the impact of these short-term capital flows, which warrants further study. In addition, the gradual removal of differential tax treatment between domestic and foreign firms is expected to have an impact on FDI in China, which we leave for future research.

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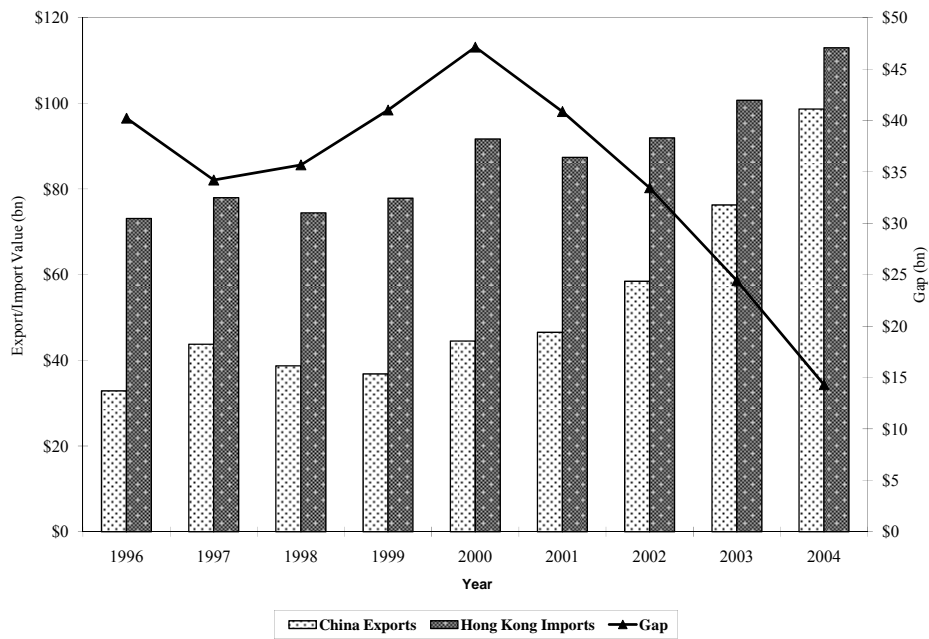
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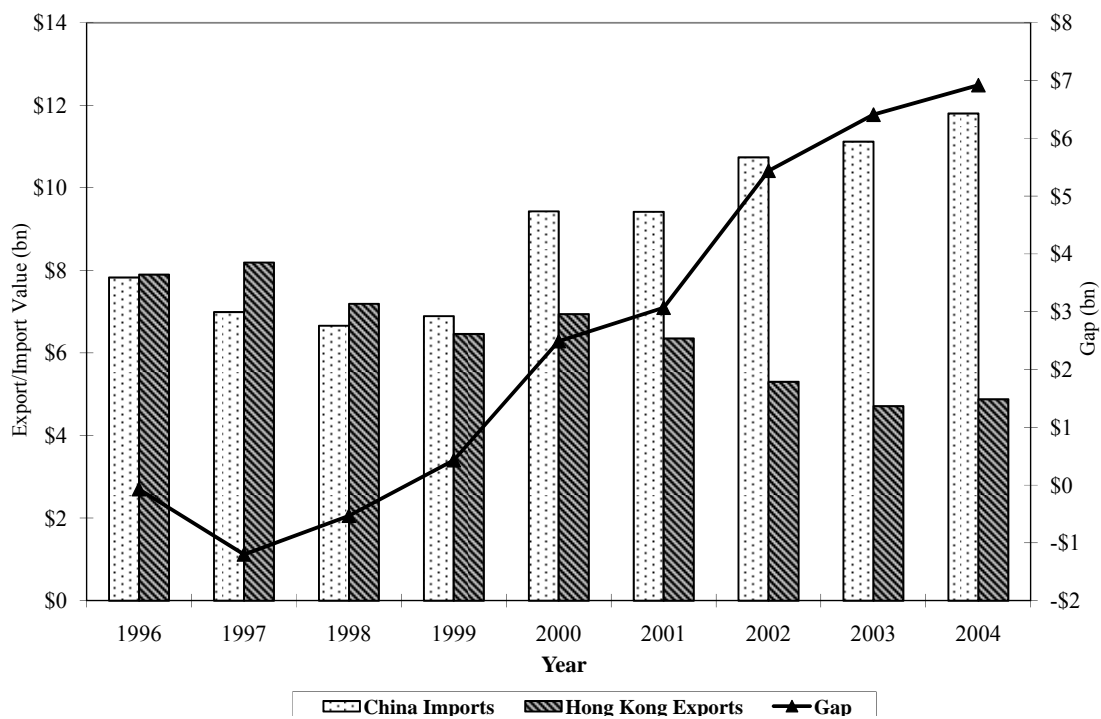
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**Figure 1-1. Trade Figure Discrepancies
(Mainland China's Exports to Hong Kong)**



**Figure 1-2. Trade Figure Discrepancies
(Mainland China's Imports from Hong Kong)**

Table 1. Trade Figure Discrepancies between China and Hong Kong (2000): China Exports. Panel A reports the trade figures of China exports to Hong Kong reported by the two economies and the discrepancies are aggregated at the first-digit HS level, in millions of U.S. dollars. Panel B lists the top ten products (at the six-digit HS level) with the greatest export understatement. Exports, imports, and gap are measured in millions of U.S. dollars.

Panel A: China's Exports to Hong Kong 2000 (in millions of US\$)

HS Code	Obs.	Imports reported by Hong Kong	Exports Reported by China	Gap
0xxxxx	227	1,231.0	837.2	393.8
1xxxxx	119	445.0	405.0	40.0
2xxxxx	456	1,893.6	1,889.6	4.0
3xxxxx	311	3,876.1	1,943.3	1,932.8
4xxxxx	281	6,316.0	2,331.1	3,984.9
5xxxxx	428	4,400.7	3,764.2	636.5
6xxxxx	412	17,624.8	7,950.9	9,673.9
7xxxxx	349	2,520.2	3,219.1	-698.9
8xxxxx	824	33,076.1	16,881.8	16,194.3
9xxxxx	347	14,531.8	4,033.5	10,498.3
Total	3754	85,915.3	43,255.7	42,659.6

Panel B: China Export Understatement: Top Ten Products (in millions of US\$)

Rank	Imports reported by Hong Kong	Exports reported by China	Gap	Product Name (from data source)
1	1,521.8	46.1	1,475.7	Travel containers with outer face of plastic sheeting or of textile materials
2	987.4	33.9	953.5	Radio-broadcast receivers
3	2,779.6	1,845.3	934.3	Digital automatic data processing machines:parts and
4	960.8	104.8	856.0	Articles for funfair, table or parlor games
5	1,191.3	354.8	836.5	Reception apparatus: parts
6	1,247.2	412.1	835.1	Digital automatic data processing machines:input or output
7	846.4	48.9	797.5	Telephone sets with cordless handsets
8	1,482.8	738.3	744.5	Audio or video recording apparatus: parts and accessories
9	766.5	74.6	691.9	Handbags, of plastic sheeting or of textile materials
10	800.9	120.2	680.7	Cameras

Table 1 (Cont.). Trade Figure Discrepancies between China and Hong Kong (2000): China Imports.

Panel C reports the trade figures of China imports from Hong Kong reported by China, by Hong Kong, and the discrepancies, Gap (China *imports* less Hong Kong *exports*) are aggregated at the first-digit HS level, in millions of U.S. dollars. Panel D lists the top ten products at the six-digit HS level with the greatest import overstatement. Exports, imports, and gap are measured in millions of U.S. dollars.

Panel C: China's Imports from Hong Kong 2000 (in millions of US\$)

HS Code	Obs.	Imports Reported by China	Exports reported by Hong Kong	Gap
0xxxxx	38	3.7	2.3	1.4
1xxxxx	51	12.8	15.1	-2.3
2xxxxx	80	126.2	104.8	21.4
3xxxxx	197	939.7	674.1	265.6
4xxxxx	186	455.0	390.5	64.5
5xxxxx	306	1,009.6	376.6	633.0
6xxxxx	264	837.5	2,221.8	-1,384.3
7xxxxx	263	540.7	237.5	303.2
8xxxxx	562	3,926.2	1,847.2	2,079.0
9xxxxx	256	744.1	678.0	66.1
Total	2203	8,595.5	6,547.9	2,047.6

Panel D: China Import Overstatement: Top Ten Products (in millions of US\$)

Rank	Imports reported by China	Exports reported by Hong Kong	Gap	Product Name (from data source)
1	384.0	48.5	335.5	Monolithic integrated circuit
2	219.1	8.1	211.0	Hybrid integrated circuits
3	166.2	24.0	142.2	Plastics: waste: of other plastics
4	146.0	13.7	132.3	Monolithic digital integrated circuit
5	109.3	0.1	109.2	Woven fabrics of synthetic filament yarn: dyed
6	105.4	1.4	104.0	Digital automatic data processing machines:storage units
7	208.2	104.8	103.4	Digital automatic data processing machines:parts and accessories
8	147.3	51.8	95.5	Optical appliances and instruments: other
9	113.0	25.0	88.0	Electric motors of an output not exceeding 37.5 watts
10	110.5	25.6	84.9	Copper waste and scrap

Table 2. Definition of Variables.

Variables	Definition
<i>gap</i>	The difference between the import value of one party and the export value of the counterparty, i.e., Hong Kong imports less China exports for China exports analysis; China imports less Hong Kong exports for China imports analysis.
<i>sgap</i>	The <i>gap</i> divided by the average of one party's exports and imports of the counterparty.
<i>lgap</i>	The natural logarithm of the absolute value of <i>gap</i> , multiplied by the sign function, where sign is equal to +1 if <i>gap</i> is greater than 0, and -1 if <i>gap</i> is less than 0.
<i>rebate</i>	The rate that Chinese government returns to exporting enterprises for the value-added tax (VAT) they pay in the production and distribution process.
<i>tax_break*</i>	The difference between the average VAT rate and the effective VAT rate for FDI firms.
<i>tax_import</i>	The sum of tariffs and VAT.
<i>state*</i>	The percentage of state capital over non-foreign capital (the sum of state capital and private capital).
<i>average_tax</i>	The average level of tax for all other products in a product's four-digit HS product category weighted by the exports value reported by Hong Kong.
<i>size*</i>	The total value of exports of an industry for the export sample and the total value of imports of an industry for the import sample. The natural logarithm of size is used in the regressions.
<i>foreign*</i>	The percentage of sales of foreign-funded enterprises over industry total sales (the sum of sales of state, private, and foreign enterprises).
<i>complex*</i>	A dummy variable which equals 1 if the industry produces complex products, and 0 otherwise. Specifically, complex is equal to 1 for the following industry groups: communication equipment; computers and other electronic equipment; electrical machinery and equipment; pharmaceuticals; petroleum, coking and processing of nuclear fuel; chemical products; special purpose machinery; and transport equipment.

* denotes variables taken at the industry level; others are taken at the product level.

Table 3. Summary Statistics (China—Hong Kong 2000).

Panel A: China Exports (N=3754)					
	Mean	Median	Max	Min	Stddev
Hong Kong Imports (mn)	22.89	1.07	2779.59	0.00	103.81
China Exports (mn)	11.52	0.78	1845.26	0.00	58.18
<i>gap</i> (mn)	11.37	0.11	1475.70	-856.70	68.72
<i>sgap</i>	0.28	0.34	2.00	-2.00	1.11
<i>lgap</i>	3.76	11.62	21.11	-20.57	13.27
<i>rebate</i>	0.14	0.15	0.17	0.00	0.03
<i>tax_break</i> *	0.05	0.06	0.08	-0.01	0.01
<i>state</i> *	0.65	0.66	0.99	0.23	0.22
<i>size</i> * (bn)	11.97	6.38	37.43	0.30	11.36
<i>foreign</i> *	0.32	0.27	0.72	0.01	0.16
<i>complex</i> *	0.25	0.00	1.00	0.00	0.43

Panel B: China Imports (N=2203)					
	Mean	Median	Max	Min	Stddev
China Imports (mn)	3.90	0.29	384.00	0.00	16.57
Hong Kong Exports (mn)	2.97	0.10	386.96	0.00	16.51
<i>gap</i> (mn)	0.93	0.06	335.52	-350.96	16.46
<i>sgap</i>	0.50	0.75	2.00	-2.00	1.22
<i>lgap</i>	4.50	11.03	19.63	-19.68	11.76
<i>tax_import</i>	0.34	0.33	0.84	0.13	0.09
<i>tax_break</i> *	0.05	0.06	0.08	-0.01	0.01
<i>state</i> *	0.60	0.58	0.99	0.23	0.22
<i>average_tax</i>	0.34	0.33	0.84	0.13	0.09
<i>size</i> * (bn)	10.31	5.03	36.48	0.16	9.84
<i>foreign</i> *	0.35	0.33	0.72	0.01	0.16
<i>complex</i> *	0.28	0.00	1.00	0.00	0.45

* denotes variables taken at the industry level; others are taken at the product level.

Table 4. Multivariate Regression Results (China—Hong Kong 2000): Panel A shows the results for China's exports to Hong Kong, and Panel B shows the results for China imports from Hong Kong, in 2000. All *t*-statistics, reported immediately beneath the coefficient estimates, are based on robust standard errors accounting for the clustering of standard errors at the industry level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A: China Exports (N=3754)				
Dependent Variable:	<i>sgap</i>		<i>lgap</i>	
Model:	1	2	3	4
Constant	-0.30	-0.30	-6.59	-6.99
(t-stat.)	-1.29	-0.91	-1.96**	-1.51
<i>rebate</i>	-2.52	-2.61	-16.45	-24.21
	-2.63***	-2.07**	-1.66*	-1.88*
<i>tax_break</i>	12.39	17.39	180.18	195.66
	3.82***	3.46***	4.55***	3.40***
<i>state</i>	0.47	0.35	5.41	4.63
	3.50***	2.19**	2.64***	1.65*
<i>size</i>		-0.01		0.21
		-0.23		0.26
<i>foreign</i>		-0.49		-0.37
		-1.60		-0.11
<i>complex</i>		0.22		1.76
		1.43		0.82
Adj. R-squared(%)	2.35	3.07	2.54	2.82
F-value	10.65***	6.43***	14.13***	8.36***

Panel B: China Imports (N=2203)				
Dependent Variable:	<i>sgap</i>		<i>lgap</i>	
Model:	1	2	3	4
Constant	0.14	-0.35	0.68	-4.55
(t-stat.)	0.40	-0.88	0.18	-1.14
<i>tax_import</i>	-1.30	-1.48	-14.31	-11.38
	-1.95**	-2.34**	-2.34**	-1.96**
<i>tax_break</i>	7.97	8.91	82.14	94.54
	2.03**	2.05**	1.85*	2.24**
<i>state</i>	0.65	0.56	7.44	6.18
	1.98**	1.71*	2.00**	1.84*
<i>average_tax</i>		0.31		-2.14
		0.44		-0.37
<i>size</i>		0.13		1.30
		1.81*		2.19**
<i>foreign</i>		-0.22		-1.09
		-0.60		-0.32
<i>complex</i>		-0.07		-0.04
		-0.45		-0.03
Adj. R-squared(%)	2.62	3.22	3.55	4.47
F-value	3.01***	4.67***	5.11***	6.03***

Table 5. Summary Statistics (China—Hong Kong 2004).

Panel A: China Exports (2004) (N=3720)					
	Mean	Median	Max	Min	Stddev
Hong Kong Imports (mn)	30.38	1.46	7069.92	0.00	181.87
China Exports (mn)	26.53	1.47	7708.93	0.00	198.64
<i>gap</i> (mn)	3.85	0.02	1250.71	-3765.90	108.67
<i>sgap</i>	0.09	0.07	2.00	-2.00	1.06
<i>lgap</i>	1.14	9.70	20.95	-22.05	14.00
<i>rebate</i>	0.12	0.13	0.17	0.00	0.03
<i>tax_break*</i>	0.06	0.06	0.07	-0.01	0.01
<i>state*</i>	0.54	0.56	1.00	0.14	0.21
<i>size*</i> (bn)	28.21	12.91	106.12	0.51	29.69
<i>foreign*</i>	0.45	0.42	0.86	0.01	0.16
<i>complex*</i>	0.25	0.00	1.00	0.00	0.43

Panel B: China Imports (2004) (N=1208)					
	Mean	Median	Max	Min	Stddev
China Import (mn)	7.13	0.49	872.20	0.00	36.38
Hong Kong Export (mn)	3.73	0.12	295.01	0.00	19.48
<i>gap</i> (mn)	3.40	0.13	670.65	-275.22	30.28
<i>sgap</i>	0.64	0.93	2.00	-1.99	1.17
<i>lgap</i>	5.63	11.75	20.32	-19.43	11.80
<i>tax_import</i>	0.27	0.27	0.52	0.13	0.06
<i>tax_break*</i>	0.06	0.06	0.08	-0.01	0.01
<i>state*</i>	0.48	0.39	1.00	0.14	0.23
<i>average_tax</i>	0.27	0.27	0.52	0.13	0.06
<i>size*</i> (bn)	24.48	13.64	100.18	0.26	26.47
<i>foreign*</i>	0.49	0.48	0.82	0.00	0.16
<i>complex*</i>	0.25	0.00	1.00	0.00	0.43

Table 6. Multivariate Regression Results (China—Hong Kong 2004): Panel A contains results for Chinese exports to Hong Kong in 2004, and Panel B contains results for Chinese import from Hong Kong in 2004. All *t*-statistics, reported immediately beneath the coefficient estimates, are based on robust standard errors accounting for the clustering of standard errors at the industry level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A: China Exports (N=3720)				
Dependent Variable:	<i>sgap</i>		<i>lgap</i>	
Model:	1	2	3	4
Constant	-0.38	-0.59	-5.64	-9.19
(t-stat.)	-1.49	-1.75*	-1.69*	-2.15**
<i>rebate</i>	-3.26	-3.42	-26.80	-33.04
	-4.21***	-3.42***	-3.02***	-3.00***
<i>tax_break</i>	10.09	8.21	120.46	72.71
	3.76***	1.89*	3.17***	1.71*
<i>state</i>	0.45	0.55	5.17	6.44
	2.35**	1.81*	2.02**	1.73**
<i>size</i>		0.08		1.13
		1.33		1.42
<i>foreign</i>		-0.12		2.73
		-0.46		0.76
<i>complex</i>		-0.17		-1.80
		-0.90		-0.74
Adj. R-squared(%)	1.98	2.22	1.19	1.56
F-value	12.30***	7.44***	7.64***	7.20***

Panel B: China Imports (N=1208)				
Dependent Variable:	<i>sgap</i>		<i>lgap</i>	
Model:	1	2	3	4
Constant	-0.67	-0.99	-7.53	-9.77
(t-stat.)	-1.24	-1.91*	-1.37	-1.65*
<i>tax_import</i>	-2.60	-4.10	-27.18	-33.14
	-2.99***	-2.39**	-3.43***	-2.26**
<i>tax_break</i>	22.89	17.91	226.65	188.55
	4.10***	1.85*	3.71***	1.87**
<i>state</i>	1.27	1.09	13.90	11.90
	3.74***	3.40***	3.88***	3.40***
<i>average_tax</i>		1.87		8.74
		1.13		0.60
<i>size</i>		0.17		1.46
		1.77*		1.73*
<i>foreign</i>		-0.33		-3.91
		-0.73		-0.86
<i>complex</i>		-0.23		-1.88
		-1.02		-0.76
Adj. R-squared(%)	10.91	11.91	12.10	12.80
F-value	11.79***	7.23***	11.04***	7.90***

Table 7. A Comparison of China-Hong Kong Import Figures between 2000 and 2004. Panel A presents the descriptive statistics of the change in China imports figures, the change in Hong Kong exports figures, and the difference between these two figures (Change in *gap*) for China's imports from Hong Kong between 2000 and 2004. Figures are in millions of US dollars. The t-values are for the t-tests that changes in *gap*, import and export figures are not significantly different from zero. Panel B presents the results on a multivariate regression of the change in *gap* (Δs_{gap} and Δl_{gap}) on the change in *tax_import* and other control variables between 2000 and 2004. Changes in *tax_import* are changes in *tax_import* between 2000 and 2004. Other control variables include changes in *tax_break*, *average_tax*, *state*, *size*, and *foreign* between 2000 and 2004. All *t*-statistics, reported immediately beneath the coefficient estimates, are based on robust standard errors accounting for the clustering of standard errors at the industry level. ***, **, and * denotes significance at the 1%, 5% and 10% level, respectively.

		N	Sum	Mean	Median	Max	Min	t-value
Full Sample	Change in Gap	1058	1927.07	1.82	0.06	136.11	-37.05	5.60***
	Change in China Import Figure	1058	983.35	0.93	-0.02	224.79	-31.48	2.79***
	Change in Hong Kong Export Figure	1058	-943.72	-0.89	-0.1	109.73	-148.51	-3.74***
Phase I Sample	Change in Gap	114	751.45	6.59	0.63	136.11	-26.54	2.99***
	Change in China Import Figure	114	544.89	4.78	0.07	224.79	-31.48	1.95**
	Change in Hong Kong Export Figure	114	-206.56	-1.81	-0.11	109.73	-148.51	-1.05
Non-Phase I Sample	Change in Gap	944	1175.62	1.25	0.05	92.02	-37.05	5.12***
	Change in China Import Figure	944	438.46	0.46	-0.03	98.11	-24.9	2.07**
	Change in Hong Kong Export Figure	944	-737.16	-0.78	-0.1	36.32	-92.5	-4.68***

Panel B: Multiple Regression on the Effect of CEPA (N=1058)

Dependent Variable	Δs_{gap}		Δl_{gap}	
	1	2	3	4
Model #				
Constant	0.01	-0.15	-0.21	-1.97
	0.03	-0.73	-0.16	-0.87
Change in <i>tax_import</i>	-1.53	-2.55	-12.94	-18.01
	-2.05**	-2.52**	-1.73*	-1.95**
Change in <i>tax_break</i>	27.17	24.45	249.04	222.21
	2.41***	2.09**	2.18*	1.90*
Change in <i>state</i>	0.73	0.75	8.93	9.34
	1.86*	1.85*	2.40**	2.34**
Change in <i>average_tax</i>		0.53		-1.25
		0.56		-0.14
Change in <i>size</i>		0.29		2.7
		2.10**		1.93*
Change in <i>foreign</i>		-0.61		-4.43
		-0.61		-0.51
Adj. R-squared(%)	2.01	2.71	1.44	1.81
F-value	5.93***	4.17***	7.93***	4.18***

Source: China's data are from China Ministry of Commerce,

<http://www.mofcom.gov.cn/>.

Hong Kong's data are from Census & Statistics Department, Hong Kong,

www.censtatd.gov.hk/hong_kong_statistics/statistical_tables/index.jsp?subjectID=3.

Appendix: Preferential Policies and Tax Incentives for Foreign Direct Investment (FDI) (as of the End of 2007)

Foreign direct investment incentives in China include significant reductions in national and local income taxes, land fees, import and export duties, and priority treatment in obtaining basic infrastructure services. There are also special preferences for projects involving high-tech and export-oriented investments. Priority sectors include transportation, communications, energy, metallurgy, construction materials, machinery, chemicals, pharmaceuticals, medical equipment, environmental protection, and electronics. Tax incentives are among the most prominent investment promotion policies.

1). *Income tax*

a. General rate of income tax

- i) The income tax rate on enterprises with foreign investment is 33%.
- ii) The income tax rate on enterprises with foreign investment located in special economic zones, new- and high-tech industrial zones, or economic and technological development zones is 15%.

b. Tax reduction and exemption

- i) Production enterprises with foreign investments made for a ten years are exempt from income tax for the first two years and enjoy a 50% reduction for the next three years.
- ii) Enterprises with foreign investment engaged in agriculture, forestry, and animal husbandry, and enterprises with foreign investment established in remote and underdeveloped areas, may, upon approval, be allowed a 15% to 30% reduction in the income tax for another ten years after the tax exemption and reduction period described above.
- iii) The income tax on enterprises with foreign investment located in mid-west China that are engaged in projects encouraged by the government is 15% for another three years following the expiration of the five-year period of tax exemption and reduction.
- iv) Enterprises with foreign investment that adopt advanced technology shall be exempt from income tax for the first two years and allowed a 50% reduction for the next six years.
- v) In addition to the two-year tax exemption and three-year tax reduction treatment, foreign-invested enterprises producing for export enjoy a reduced income tax of 50% as long as their annual export accounts for 70% or more of their sales volume.
- vi) Foreign investors in an enterprise with foreign investment that reinvests its share of profit obtained from the enterprise in a project with an operation period of at least 5 years benefit from, upon approval, a 40% refund of the income tax already paid on the reinvested amount.

2). *Circulation-stage tax (value-added tax)*

- a. Technology transfer and technological development by foreign enterprises and enterprises with foreign investment are exempted from value-added tax.
- b. For foreign-invested enterprises engaged in projects in the encouraged or restricted-B categories, the value-added tax on China-made equipment purchased by the enterprises within their total amount of investment shall be fully refunded for qualified equipment.

3). *Tax policy for the software industry and the integrated circuit industry*

- a. Value-added tax rates: 3% and 6%.
- b. In addition to a 15% reduced rate of income tax, after approval of the application, there is an exemption from tax for the first five years and a reduced corporate tax rate of 7.5% for the following five years.