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Estimating Hong Kong Re-export Markups and Reconciling Trade Statistics from China, Hong Kong and Their Major Trading Partners -- A Mathematical Programming Approach[1]

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ABSTRACT

This paper develops a mathematical programming model to simultaneously estimate re-export markups and reconcile bilateral trade statistics between China, Hong Kong, and their trading partners. The model is applied to sector level trade flows to resolve discrepant reporting in an efficient manner. Adjustments in trade flows are based upon statistical reporter's reliability information. The program is implemented in GAMS and retains many desirable theoretical and empirical properties. Estimates are used for generating trade flows and markups for Hong Kong's re-exports used in the forthcoming version 7 GTAP database. The model's flexibility has potential for expanded use in other regions where re-exports and associated markup cause discrepant trade flows.

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[1] The views expressed in this paper are those of the authors and do not represent the opinions of the institutions with which they are affiliated.

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I. Introduction

The U.S. Department of Commerce reported U.S. a trade deficit with China at $201.6 billion in 2005, while according to statistics provided by China's customs China's trade surplus with the United States was $114.2 billion, 57 percent of what the United States reported. The apparent inconsistency between China and their partner's reported trade statistics was once again brought into the spotlight.

Discrepancies in reported trade between the United States and China were first noticeable in the early 1980s. In 1982, for example, Chinese statistics showed the country had a trade deficit about US$2 billion with the United States while the U.S. reported it had accumulated a surplus with China of only US$403 million. In 1983, according to U.S. statistics, the United States started to show a trade deficit with China and it grew to $10 billion by 1990. According to Chinese Customs, however, China had a trade deficit with the United States up until 1992, turning to surplus only in 1993. As China takes a lead role as a global trading nation, the statistical discrepancy has widened dramatically. The widening gap is attracting growing attention from popular media, government agencies, and academics around the world.

One of the primary reasons for statistical discrepancies is the intermediary role of Hong Kong in China's external trade. A large share of China's trade with the world passes through Hong Kong, while current reporting practices in China and their trading partners do not fully reflect this fact. This creates a misleading picture of the origin and final destination of Chinese exports and imports, leading to conflicting official bilateral trade balances. China began to identify the final destinations of its goods shipped through Hong Kong in 1993, but the work is incomplete. This is in part because traders often do not know the final destinations when goods leave China. In these cases, they are recorded as exports to Hong Kong by the Chinese Customs. For this reason, in Chinese customs statistics Hong Kong is one of China's largest export destinations second to the Unites States. In fact, Hong Kong re-exports most its imports from China to other countries.

The initial investigation of this problem was conducted by the trade and investment working group under the China-U.S. Joint Commission on Commence and Trade (JCCT) in 1995. The report concluded that although "there are some differences in the statistical concepts and definitions used by the two countries," "the effects of these differences are small," and the shipment of goods via Hong Kong and other intermediate countries are the major cause of the statistical discrepancy, because the final destination frequently is unknown at the time the goods leave China, and "when goods of Chinese origin arrive in the United States, the entire value, including any markup (either simple markup or from further processing) by intermediates, is attributed to China." [2] Similar studies were also conducted by Statistics Canada on Canada-China bilateral merchandise trade from 1998 to 2003. It also identified indirect trade via Hong Kong and other countries as the main

[2] JCCT, Report of the "Trade Statistics Subgroup", Washington, DC, October 17, 1995, p. 2.

source of discrepancy between Canadian and Chinese trade statistics in both directions.[3] Fung and Lau (1998, 2001, 2003, 2004) conducted a series of studies to adjust official trade data reported by China and the United States. Their central claim is that neither the U.S. nor the Chinese official trade data are complete accurate in terms of reflecting the true bilateral situation similar to the JCCT report and suggested three necessary adjustments to arrive comparable measurements of the bilateral balance of merchandise trade.[4] Feenstra *et al.* (1999) developed a methodology to estimate Hong Kong's re-export markup and found that the U.S. official statistics count the total value of re-exports from Hong Kong originated in China as China's exports thereby ignoring the value-added in Hong Kong. This tends to overestimate U.S. trade deficit with China. China's trade statistics do not count all of its exports destined for the U.S. via Hong Kong, therefore it tends to underestimate its trade surplus with the United States. The study showed that with proper adjustment for value added in Hong Kong on re-export for Chinese goods it reduced (on average) 91 percent of the discrepancy between the official US and China statistics on US-China trade balance for the 1988 to 1996 period.

Schindler and Beckett (2005) extend Fung and Lau and Feenstra *et al*.'s method to adjust China's bilateral trade with its 69 trading partners. They found that China's trade surplus is larger than indicated in China's official statistics but significantly smaller than the statistics of its trading partners and the majority of the discrepancy is due to the role of Hong Kong as an intermediary in China's external trade. The literature to date consistently shows that the re-export activities in Hong Kong are the major contributing factor to the statistical discrepancy. However, there has not been a comprehensive approach fully utilizing official trade statistics from China, Hong Kong and their trading partners simultaneously in a consistent optimization framework. Constructing such a framework will not only provide an effective tool to reconcile China's trade with its partners systematically, help policy makers and the public better understand China's role in world trade, but also contributes to the methodological development for reconciling discrepancies in international trade statistics when transshipment and re-export activities become increasingly important and heavily diminish the ability of a country identifying its correct partner countries.

The objective of this paper is two-fold: first to develop and implement a formal model to estimate Hong Kong re-export markup and reconcile trade statistics from China, Hong Kong and their partners simultaneously in a consistent optimization framework, second to apply the model to 2004 bilateral world trade data in GTAP sector classification to produce Hong Kong re-exports adjusted trade flows contributing to version 7 GTAP database. In doing so, we further demonstrate the usefulness of such model in the preparation of consistent global trade data for future versions of GTAP database.

[3] International Trade Division, Statistics Canada, "Merchandise Trade Reconciliation Study: Canada-China, 2002 and 2003." Ottawa, August 2005.

[4] These adjustments are: (1) Freight along side (f.a.s.) – free on board (f.o.b) and cost, insurance and freight (c.i.f.), (2) re-exports through Hong Kong, (3) re-export markups by Hong Kong middlemen.

The paper is organized as follows. Section two specifies the optimization framework and discusses its theoretical and empirical properties. Section three outlines the major steps to implement the model with real world trade statistics, including the preparation of initial fob/cif ratio and Hong Kong's re-export markup estimates, aggregation issues and the choice and estimation of reliability weights for major variables in the model. Preliminary results from the model for 2004 at GTAP sector classification are presented and discussed in section four. The paper concludes with a discussion of future research directions.

II. The Mathematical Programming Model

2.1 Reconcile international trade statistics as an estimation problem solved by constrained matrix balancing procedures

Reconciling international trade statistics in an optimization framework is an application of the constrained matrix balancing procedure[5] (Bacharach, 1970) to solve over determined estimation problems. It involves obtaining best estimates of conflicting data from more than one source.

Procedures for matrix balancing can be classified into two broad classes -- bi-proportional scaling and mathematical programming. The scaling methods are based on the adjustments of the initial matrix by multiplying its row and column by positive constants until the matrix is balanced. It was developed by Stone and other members of the Cambridge Growth Project (Stone et al., 1963) and is usually known as RAS. The basic method was originally applied to known row and column totals but had been extended to cases where the totals themselves are not known with certainty (Senesen and Bates, 1988; Lahr, 2001). Mathematical programming methods are explicitly based on a constrained optimization framework, usually minimizing a penalty function, which measures the deviation of the balanced matrix from the initial matrix subject to a set of balance conditions.

[5]The constrained matrix balancing procedure appears as a core mathematical structure in diverse applications. These applications include the estimation of input-output tables (Bachem and Korte, 1981; Harrigan and Buchanan, 1984; Miller and Blair, 1985; Kaneko, 1988; Nagurney, 1989; Antonello, 1990) and inter-regional trade flows in regional science (Batten, 1982; Byron et al., 1993), balancing of social/national accounts in economics (Byron, 1978; Van der Ploeg, 1982, 1984,1988; Zenios, Drud, and Mulvey, 1989; Nagurney, Kim, and Robinson, 1990), estimating interregional migration in demography (Plane, 1982), the analysis of voting patterns in political science (Johnson, Hay, and Taylor, 1982), the treatment of census data and estimation of contingency tables in statistics (Friedlander, 1961), the estimation of transition probabilities in stochastic modeling (Theil and Rey, 1966), and the projection of traffic within telecommunication and transportation networks (Florian, 1986; Klincewicz, 1989). A survey of this literature can be found in Schneider and Zenios (1990).

An important advantage of mathematical programming models over scaling methods is its flexibility. It allows a wide range of initial information to be used efficiently in the data adjustment process. Additional constraints can be easily imposed, such as allowing precise upper and lower bounds to be placed on unknown elements. Inequality conditions or incorporating an associated term in the objective function are used to penalize deviations from the initial row or column total estimates when they are not known with certainty. Therefore, the mathematical programming approach provides more flexibility to the matrix balancing procedure. This flexibility is very important in terms of improving the information content of the balanced estimates as shown by Robinson, Cattaneo and El-said (2001).

The mathematical programming approach also permits one to routinely introduce relative degrees of reliability for initial estimates. The idea of including data reliability in matrix balancing can be traced over a half century to Richard Stone and his colleagues (1942) when they explored procedures for compiling national income accounts. Their ideas were formalized into a mathematical procedure to balance the system of accounts after assigning reliability weights to each entry in the system. The minimization of the sum of squares of the adjustments between initial and balanced entries in the system, weighted by the reliabilities or the reciprocal of the variances of the entries is carried out subject to linear (accounting) constraints. This approach had first been implemented by Byron (1978) and applied to the System of National Accounts of the UK by Ploeg (1982, 1984). Zenios and his collaborators (1989) further extended this approach to balance a large social accounting matrix in a nonlinear network-programming framework. Robinson and his colleagues (2001) provided a way to handle measurement error in cross entropy minimization via an error-in-variables formulation. Although computational burden is no longer a problem today, the difficulty of estimating the error variances in a large data set by such approaches still remains unsolved.

There is a large and growing literature on the use of matrix balancing procedures to estimate input/output tables or Social Accounting Matrix (SAM), but only few studies have used them to adjust/estimate bilateral trade statistics[6]. There are significant differences in the conditions for adjusting an unbalanced SAM and reconciling bilateral trade data, although there are similarities in terms of the general optimization framework and algorithms. First, SAMs are square matrix with their rows and columns represent the same accounts, so that all their row sums equal to corresponding column sums. While bilateral trade statistics are usually in the form of rectangular matrix, and their row and column sum represent different types of account (for example, reporter and partner sums or export and import totals),

[6] Waelbroeck(1964) applied the RAS procedure on trade flows for the world with the flows grouped into nine regions. Using 1938 trade flows as base, he estimated 1948, 1951-52, and 1959-60 trade flows. Mohr, Crown and Polenske (1987) discussed the problems encountered when the RAS procedure is used to adjust trade flow data. They pointed out that the special properties of interregional trade data increase the likelihood of non-convergence of the RAS procedure and proposed a linear programming approach that incorporates exogenous information to override the infeasibility of RAS problem.

therefore do not equal each other in general. Second, all SAMs usually have similar structure in terms of their zero and nonzero elements, while this structure may differ significantly from region to region in trade matrix, depending on the dominant trade pattern in the region under concern. Finally, in SAMs estimates of the same entries can often be obtained from income, expenditure or production data, and typically data gathered from one source is not consistent with that obtained from a different source. The common practice in removing the account inconsistencies is by assigning relative degrees of reliability to entries in the SAM and use constrained matrix balancing procedures with available information to adjust the data to ensure consistency in the accounts. While international trade statistics are often obtained from two or more sources, reporting countries and their partner's official trade flow statistics. In most cases, even with apparently "good" data from both sides, the discrepancies can be significant. This is because the exporter and importer may have very different reporting criteria and systems for valuation of bilateral trade. For example, the initial destination of a shipment may not be sole and the actual destination of its components; and the importer may not be able to assign a unique origin. Because international trade statistics are inherently inconsistent, a systematic procedure is needed to ensure the balance between imports and exports of multiple partners.

The TESSY (trade estimation system) used by UNSTAT is unique being the first mathematical procedure to find estimates of trade data by commodity and partner for non-reporting countries. It can calculate estimates for all the missing values in trade matrix, including missing commodity totals, partner totals. By scaling and re-scaling those estimates other than the "true reported" figures, a balanced trade matrix can be achieved. Baras and Panoutsopoulos (1993) developed a progressive elimination and quadratic programming procedure to estimate missing value in bilateral trade flows. They tested their procedure by using several selected countries. This was done in the case of only the commodity and partner totals was given and certain entries in the bilateral trade matrix are also known. Unfortunately, they devoted most of their efforts to fill the missing values in the trade matrix, did not pay any attention to how the reliability information regarding the initial trade statistics should be incorporated into the adjustment process. In addition, this approach has little to offer for dealing with the increasingly important phenomena of entrepot trade and transshipments. To the best of our knowledge, the formulation of international trade statistics reconciliation problem into an optimization framework in the context of China's trade with other nations via Hong Kong in this paper is the first attempt of this kind in both international trade and constrained matrix balance literature to date, which we now turn to.

2.2 General Assumptions and Mathematical Notations

Consider China and Hong Kong both engage in bilateral trade with N partner countries and each other on M commodities for time period T. Hong Kong is the only entrepot between China and the N partner countries engaging re-export activities to transship both China's and its N partner countries' exports to each others. Hong Kong earns a markup by conducting such activities. This is basically the difference between the price Hong Kong buys goods and what it sells the same goods for. All partner countries except one report their exports to and imports from China and Hong Kong. China and Hong Kong also report their exports to and imports from all their partner countries and trade flows

between them. In addition, Hong Kong reports the origin and destination of all commodities it re-exports bound for and coming from China and other partner countries. The markup from such activities is unreported, thus it must be estimated. Assuming all reporting countries, including China, can correctly identify the country of origin of their imports, the imports are directly from the partners or indirectly from Hong Kong. Reporters however can not determine the final destination when exports leave their ports (Schindler and Beckett, 2005). The notation used to describe the reported trade statistics and their relationships are as follows (expressed in annual values in this paper):

DX_{it}^{sr} = Direct exports of commodity 'i' from country 's' to country 'r' at time 't'. For 's' equals Hong Kong, it is domestic exports including earnings from re-export that commodity. For 'r' equals Hong Kong, it is partner countries' exports remain in Hong Kong

RX_{it}^{sr} = Indirect exports of commodity 'i'via Hong Kong from origin country 's' to destination country 'r' at time 't', including Hong Kong's re-export earnings

TX_{it}^{sr} = Total or actual exports of commodity 'i' from country 's' to country 'r' at time 't'. For 's' equals Hong Kong, it is its domestic exports plus re-exports

DM_{it}^{sr} = Direct imports of commodity 'i' by country 'r' from country 's' at time 't'. For 'r' equals Hong Kong, it is imports for domestic use, for "s" equals Hong Kong it is partner's imports originated from Hong Kong

TM_{it}^{sr} = Total imports of commodity 'i' by country 's' from country 'r' at time 't'.

RXM_{it}^{sr} = Hong Kong markup earnings by re-export commodity 'i' originated from country 's' to final destination country 'r' at time 't'

WEX_{it}^{s} = Total exports of commodity 'i' to the world by country 's' at time "t", including both direct and indirect exports to all countries

WMX_{it}^{r} = Total imports of commodity 'i' from the world by country 'r' at time "t", including both direct and indirect imports from all countries

XER_{it}^{r} = Statistical discrepancy of commodity 'i' in China and Hong Kong's east bound trade with partner country 'r' at time 't'

MER_{it}^{r} = Statistical discrepancy of commodity 'i' in China and Hong Kong's west bound trade with partner country 'r' at time 't'

cif_{it}^{sr} = fob/cif ratio for commodity 'i' shipped from country 's' to country 'r' at time 't'. It is a fixed parameter in the model.

Indices 'i' defined over commodity set $I \in \{1, 2, \ldots, M\}$, indices 's' and 'r' defined over country set $W \in \{1, 2, \ldots, N, CH, HK\}$. All the trade flow variables have directions. The first superscripts always indicate the source country and the second always refer to destination countries. For exports (DX and TX), source country are the reporter, while for

imports (DM and TM), destination country are the reporter. Exports are valued at fob basis, imports are valued at cif basis.

Using notations defined above, the following 16 accounting identities describe the relationship among bilateral trade flow statistics reported by China, Hong Kong and their partner countries.

2.3 Eastbound flows: China and Hong Kong exports, partner imports

For all r $\in$ {1, 2, …, N} and all s $\in$ {1, 2, …, N, CH}:

$$TX_{it}^{CH,r} + DX_{it}^{HK,r} + XER_{it}^{r} = cif_{it}^{CH,r} TM_{it}^{CH,r} + cif_{it}^{HK,r} DM_{it}^{HK,r} \quad (1)$$

Equation (1) states that the sum of any particular partner's imports of China and Hong Kong originated products after fob/cif adjustment should equal to the sum of China's total exports and Hong Kong's domestic exports to that partner, plus a statistical discrepancy.

$$TX_{it}^{CH,r} = cif_{it}^{CH,HK}(RX_{it}^{CH,r} - RXM_{it}^{CH,r}) + DX_{it}^{CH,r} \quad (2)$$

Equation (2) defines that China's total exports to a particular partner equal China's direct exports plus Hong Kong's re-exports for China to that partner minus Hong Kong's re-export makeup adjusted by China-Hong Kong fob/cif ratio.

$$DX_{it}^{HK,r} = TX_{it}^{HK,r} - \sum\nolimits_{s}(RX_{it}^{sr} - RXM_{it}^{sr}) \quad (3)$$

Equation (3) defines that Hong Kong's domestic exports to a particular partner equals to its total exports to that partner minus its re-exports for all other countries to the particular partner and plus its markup earnings from re-exports[7].

$$DM_{it}^{HK,r} = TM_{it}^{HK,r} - \frac{\sum_{r}(RX_{it}^{sr} - RXM_{it}^{sr})}{cif_{it}^{HK,r}} \quad (4)$$

Equation (4) indicates partner's imports of Hong Kong's domestic products equals partners' total imports from Hong Kong minus Hong Kong's re-exports to the partner from all sources adjusted by Hong Kong re-export markup and fob/cif ratio from Hong Kong to the partner.

[7] The definition of this variable is different with domestic exports statistics published by Hong Kong authority, which is total exports minus re-exports without adjustment for markup.

$$DM_{it}^{CH,r} = TM_{it}^{CH,r} - \frac{cif_{it}^{CH,HK}(RX_{it}^{CH,r} - RXM_{it}^{CH,r})}{cif_{it}^{CH,r}} \quad (5)$$

Equation (5) indicates that partner's direct imports from China equals its total imports from China minus Hong Kong's re-exports for China to that partner adjusted by Hong Kong's re-exports markup and China to Hong Kong and China to partner cif/fob ratios.

2.4 Westbound flows: China and Hong Kong imports, partner exports

For all s $\in$ {1, 2, …, N} and all r $\in$ {1, 2, …, N, CH}:

$$cif_{it}^{s,CH} TM_{it}^{s,CH} + cif_{it}^{s,HK} DM_{it}^{s,HK} + MER_{it}^{s} = DX_{it}^{s,CH} + TX_{it}^{s,HK} - cif_{it}^{s,HK} \sum_{r=1}^{N} (RX_{it}^{sr} - RXM_{it}^{sr}) \quad (6)$$

Equation (6) states that the sum of China and Hong Kong's total imports of products originated from any particular partner after fob/cif adjustment should equal to the sum of that partner's direct exports to China and its total exports to Hong Kong, minus its re-exports via Hong Kong to other countries other than China plus a statistical discrepancy.

$$DM_{it}^{s,HK} = TM_{it}^{s,HK} - (\sum_{r} RX_{it}^{sr} - \sum_{r} RXM_{it}^{sr}) \quad (7)$$

Equation (7) requires Hong Kong's domestic use of imports plus its re-exports for a particular partner minus re-exports markup equals Hong Kong's total imports from that partner country.

$$DM_{it}^{s,CH} = TM_{it}^{s,CH} - \frac{cif_{it}^{s,HK}(RX_{it}^{s,CH} - RXM_{it}^{s,CH})}{cif_{it}^{s,CH}} \quad (8)$$

Equation (8) defines that China's direct imports from a partner equal China's total imports from that partner plus Hong Kong's re-exports to China for that partner minus Hong Kong's re-export earnings adjusted by partner to Hong Kong and partner to China fob/cif ratios.

$$TX_{it}^{s,CH} = DX_{it}^{s,CH} + cif_{it}^{s,HK}(RX_{it}^{s,CH} - RXM_{it}^{s,CH}) \quad (9)$$

Equation (9) reveals that partner's total exports to China equals partner's direct exports to China plus Hong Kong's re-exports to China for that partner adjust by Hong Kong's re-export markup and partner to Hong Kong's fob/cif ratio.

$$DX_{it}^{s,HK} = TX_{it}^{s,HK} - cif_{it}^{s,HK} \sum_{r} (RX_{it}^{sr} - RXM_{it}^{sr}) \quad (10)$$

Equation (10) defines that a partner's exports to Hong Kong for Hong Kong domestic use equals its total export to Hong Kong minus its re-exports via Hong Kong to all

destinations adjust by Hong Kong's re-export markup and partner to Hong Kong's fob/cif ratio.

2.5 China-Hong Kong bilateral trade

$$TX_{it}^{CH,HK} = DX_{it}^{CH,HK} - cif_{it}^{CH,HK} \sum_r (RX_{it}^{CH,r} - RXM_{it}^{CH,r}) \quad (11)$$

$$DX_{it}^{HK,CH} = TX_{it}^{HK,CH} - \sum_r (RX_{it}^{s,CH} - RXM_{it}^{s,CH}) \quad (12)$$

Equation (11) defines that China's actual exports to Hong Kong for Hong Kong domestic use equals its direct exports to Hong Kong minus Hong Kong's re-exports for China to all other trading partners adjusted by Hong Kong re-exports markup and China to Hong Kong fob/cif ratio. Equation (12) defines that Hong Kong's domestic exports to China equals its total exports to China minus its re-exports to China from all other partners adjust by its markup earnings.

$$DM_{it}^{CH,HK} = TM_{it}^{CH,HK} - \sum_r (RX_{it}^{CH,r} - RXM_{it}^{CH,r}) \quad (13)$$

$$TM_{it}^{HK,CH} = DM_{it}^{HK,CH} + \frac{\sum_r (RX_{it}^{s,CH} - RXM_{it}^{s,CH})}{cif_{it}^{HK,CH}} \quad (14)$$

Equations (13) defines Hong Kong's imports from China for domestic use equals its total imports from China minus its re-exports for China to all destinations adjusted by its markup earnings. While equation (14) defines China's total imports from Hong Kong equals its imports of goods with Hong Kong origin plus Hong Kong's re-exports to China from all sources adjusted by re-exports markup and Hong Kong to China fob/cif ratio.

2.6 Global balance and objective function

For all r $\in$ {1, 2, …, N, CH, HK}:

$$\sum_r TX_{it}^{CH,r} + \sum_r DX_{it}^{HK,r} = WEX_{it}^{HK} + WEX_{it}^{CH} \quad (15)$$

$$\sum_r TM_{it}^{s,CH} + \sum_s \sum_r (RX_{it}^{sr} - RXM_{it}^{sr}) + \sum_r DM_{it}^{s,HK} = WMX_{it}^{HK} + WMX_{it}^{CH} \quad (16)$$

Equation (15) states that the sum of after adjustment actual exports from China and Hong Kong to all its partners should still equal to the sum of their reported total exports to the world. It means the adjustment made by the model do not change the total exports to the world reported by China and Hong Kong, it merely estimate Hong Kong's re-export markup and rearrange the destinations of China's exports. Equation (16) states that China and Hong Kong's imports and Hong Kong's re-exports minus re-exports markup after

adjustment should still equal to the sum of China and Hong Kong's total imports from the world. The adjustments made by the model only change the markup estimates and rearrange the sources of China and Hong Kong's imports.

In addition, China and Hong Kong's total exports to and imports from the world should satisfy following conditions: total world exports by all trading countries equals total world imports after fob/cif adjustment.

$$\sum_s WEX_{it}^{s} = \sum_r cif_{it}^{r} WMX_{it}^{r} \tag{17}$$

Given above clearly defined accounting relationship among trade flow statistics, what remains to mathematically formulate the reconciliation problem in an optimization framework is the construction of a criteria for changing the reported statistics to conform the know linear accounting constraints. Either a cross-entropy (Harrigan & Buchanan, 1984, Golan et al., 1994) or a quadratic objective penalty function can be specified. We choose to use a quadratic function as follows for computation efficiency reasons[8]:

$$Min \qquad S = \frac{1}{2}\left\{\begin{array}{l} \sum_t \sum_{i\in M}\sum_{s\in W}\sum_{r\in W} \dfrac{(DX_{it}^{sr} - DX0_{it}^{sr})^2}{wdx_{it}^{sr}} + \sum_t \sum_{i\in ms\in W}\sum_{r\in W} \dfrac{(DM_{it}^{sr} - DM0_{it}^{sr})^2}{wdm_{it}^{sr}} \\ + \sum_t \sum_{i\in M}\sum_{s\in W}\sum_{r\in W} \dfrac{(TX_{it}^{sr} - TX0_{it}^{sr})^2}{wtx_{it}^{sr}} + \sum_t \sum_{i\in ms\in W}\sum_{r\in W} \dfrac{(TM_{it}^{sr} - TM0_{it}^{sr})^2}{wtm_{it}^{sr}} \\ + \sum_t \sum_{i\in ms\in W}\sum_{r\in W} \dfrac{(RXM_{it}^{sr} - RXM0_{it}^{sr})^2}{wrxm_{it}^{sr}} + \sum_t \sum_{i\in M} (xer_{it}^2 + mer_{it}^2) \end{array}\right\} \tag{18}$$

Where variables with a 0 in the end denote initial estimates for that variable, and an additional "w" before the variable in lower case indicates the reliability measure for that variable.

In short, the reconciliation problem is to modify a given set of bilateral trade flow statistics with equation (18) as objective function and equations (1) to (16) as constraints.

2.7 Properties of the reconciliation model

There are desirable analytical properties of the optimization model specified above. Firstly, it is a separable nonlinear programming problem subject to linear constraints. There are different statistical interpretations underlying the model by choices of different reliability weights. When weights are all equal to one, the solution of this model gives a constrained

[8] The quadratic function has a numerical advantage in implementing the model. It is easier to solve than the entropy function in very large models because they can use software specifically designed for quadratic programming. As showed by Canning and Wang (2005), the quadratic function is equivalent to the entropy function in the neighborhood of initial estimates, under a properly selected weighing scheme.

least square estimator. When initial estimates are taken as the weights, the solution of the model gives a weighted constrained least square estimator, which is identical to the Friedlander-solution, and a good approximation of the RAS solution. If the weights are proportional to the variances of the initial estimates and the initial estimates are statistically independent, the solution of the model yields best linear unbiased estimates of the true unknown matrix (Byron, 1978), which is identical to the Generalized Least Squares estimator if the weights are equal to the variance of initial estimates (Stone, 1984, Ploeg, 1984). Furthermore, as noted by Stone et al. (1942) and proven by Weale (1985), in cases where the error distributions of the initial estimates are normal, the solution also satisfies the maximum likelihood criteria.

Secondly, the estimates of markups and trade flow adjustments are made in a consistent simultaneous manner. The model re-directs sources and destinations of China's and Hong Kong's exports and imports, estimates Hong Kong's re-export markup, allocates statistical discrepancies to trade flows among China, Hong Kong and their trading partners, and adjust bilateral trade balance for China and all its partners simultaneously. In doing so it imposes global consistency to the adjusted trade flow data, which is a necessary condition for any world trade data set can be used for global general equilibrium trade policy analysis.

Thirdly, as proven by Harrigan (1990), in all but the trivial case, the adjusted estimates derived from entropy or quadratic loss function will always better approximate the unknown true values than do the associated initial estimates. This is because adding valid constraints or further restricting the feasible set through the narrowing of interval constraints cannot move the adjusted estimates away from the true values, unless the additional constraints are non-binding (have no information value). The optimization process has the effect of reducing, or at least not increasing, the variance of the estimates. This property is simple to show by using matrix notation. Define $\mathbf{W}$ as the variance matrix of initial estimates $\overline{\mathbf{D}}$, $\mathbf{A}$ as the coefficient matrix of all linear constraints. The least squares solution (equivalent to the quadratic minimand as noted above) to the problem of adjusting $\overline{\mathbf{D}}$ to $\mathbf{D}$ that satisfies the linear constraint, $\mathbf{A} \bullet \mathbf{D} = \mathbf{0}$ can be written as:

$$\mathbf{D} = (\mathbf{I} - \mathbf{W}\mathbf{A}^T(\mathbf{A}\mathbf{W}\mathbf{A}^T)^{-1}\mathbf{A})\ \overline{\mathbf{D}} \qquad (19)$$

Thus,

$$\text{var}(\mathbf{D}) = (\mathbf{I} - \mathbf{W}\mathbf{A}^T(\mathbf{A}\mathbf{W}\mathbf{A}^T)^{-1}\mathbf{A})\mathbf{W} = \mathbf{W} - \mathbf{W}\mathbf{A}^T(\mathbf{A}\mathbf{W}\mathbf{A}^T)^{-1}\mathbf{A})\mathbf{W} \qquad (20)$$

Since $\mathbf{W}\mathbf{A}^T(\mathbf{A}\mathbf{W}\mathbf{A}^T)^{-1}\mathbf{A})\mathbf{W}$ is a positive semi-definite matrix, the variance of adjusted estimates will always be less, or at least not greater than the variance of the initial estimates as long as $\mathbf{A} \bullet \mathbf{D} = \mathbf{0}$ holds. This is the fundamental reason why such a reconciliation framework will provide better adjusted trade statistics. Imposing equation (1) to (16) will definitely improve, or at least not worsen the initial statistics, since we are sure from international economics that those constraints are consistency requirements and must be true for any well defined trade statistics.

Finally, the choice of weights ($wdx_{it,}^{sr}\, wtx_{it,}^{sr}\, wdm_{it,}^{sr}\, wtm_{it,}^{sr}\, wrxm_{it,}^{sr}$) in the objective function has very important impacts on the model solution. The model uses these weights to determine by how much an initial estimate may be changed. For instance, using the initial trade statistics as weights has the advantage that each entry of the trade flow data is adjusted in proportion to its magnitude in order to satisfy those consistency constraints. The variables can not change signs and the larger the trade flows the more adjustment takes place. However, the adjustment relates directly to the size of the initial trade statistics, and does not force the unreliable trade data to absorb the bulk of the required adjustment. Furthermore, only under the assumptions: (1) the initial estimates for different trade flows are statistically independent, and (2) each error variance is proportional to the corresponding initial estimates, this commonly used weighing scheme (underlying RAS) can obtain best unbiased estimates, while those assumptions often not hold for the international trade data. Therefore, the efficiency of the model will be improved if the error structure of the initial trade statistics is available. Because using such a weighting scheme makes the adjustment independent of the size of the initial trade data. The larger the variance, the smaller its contribution to the objective function, and hence the lesser the penalty for each adjusted trade statistics to move away from their initial value (only the relative, not the absolute size of the variance affects the solution). A small variance of the initial trade statistics indicates, other things equal, it is a very reliable reported data and thus should not change by much, whilst a large variance of the initiate estimates indicates an unreliable report data and may be adjusted considerably, i.e. adjust the trade data in an unreliable reported route more than the reliable report one, thus providing an attractive but feasible weighing mechanism in reconciliation of bilateral trade statistics.

Advantages of such an optimization framework in adjusting international trade statistics are also significant from empirical perspective. Firstly, it offers great convenience and details. Hong Kong's re-export markup rate, each country's transshipments via Hong Kong as percent of the country's total exports and imports, and adjusted bilateral balance of trade among China, Hong Kong and their partner countries by each covered commodity are all part of the model solution.

Secondly, it provides considerable flexibilities. It permits a wider variety and volume of information to be brought into the reconciliation process. For example, the ability of introducing upper and/or lower bounds is one of the flexibilities not offered by commonly used scaling procedures such as RAS. Therefore, it is very easy to restrict the value of the adjusted trade statistics to nonnegative in the reconciliation process. This is a very desirable property of adjusting bilateral trade flow data. It is also very flexible regarding to the required known information. For example, it allows the possibility that some of the bilateral trade statistics are missing and the total exports and imports by China and Hong Kong to the world do not known with certainty. In real world, missing bilateral trade value is common and a country’s total exports or imports generally lie in a range. By incorporation of associated terms similar to bilateral trade variables in the objective function to penalize solution deviations from the world totals from statistical sources, allows reconciliation of these world totals together with bilateral trade flows.

Finally, various relative measure of the reliability of the initial data can be easily included in the reconciliation process, because the choice of values for those reliability weights in the objective function is also very flexible. As noted before, these weights should reflect the relative reliability of the original trade statistics. The interpretation is straightforward. Statistics with higher reliability should be changed less than statistics with a lower reliability, thus the best available information can always be used to insure that statistics reported by reliable trade routines are not perturb by the reconciliation process as much as statistics reported by unreliable trade routines.

III. Link the Model with Trade Statistics from the Real World

To apply the model specified above to bilateral trade statistics from the real world, there are five key steps in the implementation process and they are discussed one by one in details below.

3.1 Obtain initial estimates for all bilateral trade variables in the model from observed or derived trade statistics

In east bound trade, initial estimates can be directly obtained from existing bilateral trade statistics for four sets of variables in the model. They are China's direct exports to partner countries ($DX0_{it}^{Ch,r}$), Hong Kong's total exports to partner countries ($TX0_{it}^{s,HK}$), and partner's total imports from China ($TM0_{it}^{s,CH}$) and imports of product originated from Hong Kong ($DM0_{it}^{s,HK}$). Similarly, there are also four sets of variables have initial estimates directly from existing data in westbound trade. They are partner countries total exports to Hong Kong and direct exports to China ($TX0_{it}^{s,HK}$ and $DX0_{it}^{s,CH}$), and China and Hong Kong's total imports from partner countries ($TM0_{it}^{s,CH}$ and $TM0_{it}^{s,HK}$). All China and Hong Kong reported trade statistics are obtained from China Custom authorities and Hong Kong Census and Statistical Department in HS 8-digit details. All partner countries reported data are downloaded from UN COMTRADE at HS 6-digit level.

We also obtain initial estimates of Hong Kong's re-exports by origin and destination ($RX0_{it}^{sr}$) from Hong Kong re-exports statistics provided by Hong Kong Census and Statistical Department in HS 8-digit details. However, there are still nine sets of variables need initial estimates before the model can be implemented. There are four sets each for eastbound and westbound trade respectively, plus Hong Kong re-export markup ($RXM0_{it}^{sr}$). However, if we can obtain initial estimates for $RXM0_{it}^{sr}$ and also know fob/cif margin for all bilateral routines, then rest of the eight set variables all can be derived from existing trade statistics based on accounting identities specified in the optimization model.

The four sets unobservable variables in eastbound trade are China's total exports to partner countries ($TX0_{it}^{Ch,r}$), Hong Kong's domestic exports to partner countries

($DX0_{it}^{HK,r}$),[9] partner countries' direct imports from China ($DM0_{it}^{CH,r}$), and partner countries' total imports from Hong Kong ($TM0_{it}^{HK,r}$). Their initial estimates can be derived from observed data according to equation (2), (3), (4) and (5) respectively. The four sets unobservable variables in westbound trade are Hong Kong's imports from partner countries for domestic use ($DM0_{it}^{s,HK}$), China's direct imports from partner countries($DM0_{it}^{s,CH}$), and partner countries' total exports to China and their exports for Hong Kong's domestic market ($TX0_{it}^{s,CH}$ and $DX0_{it}^{s,HK}$). Their initial estimates can be computed from observed data according to equation (7), (8), (9) and (10) respectively.

The initial estimates for bilateral trade variables between Hong Kong and China can be obtained from existing trade statistics reported by China and Hong Kong or calculated from observed trade data in the same fashion as unobserved variables in east and west bound trade according to equations (11) to (14). The observed statistics are $DX0_{it}^{CH,HK}$, $TX0_{it}^{HK,CH}$, $TM0_{it}^{CH,HK}$, and $DM0_{it}^{HK,CH}$. The only difference is that $TX0_{it}^{CH,HK}$ is China's actual exports to Kong Kong, equals its direct exports to Hong Kong minus all its re-export to other countries via Hong Kong.

In summary, there are eight sets variables each in both eastbound and westbound as well as China and Hong Kong bilateral trade, four of them in each direction can be obtained directly from existing reported trade statistics. While for the remaining four sets unobservable variables we have four sets of equations in each trade direction, therefore, as long as we can obtain estimates for Hong Kong's re-exports markup ($RXM0_{it}^{sr}$) and fob/cif margins (cif_{it}^{sr}), all variables in the optimization model specified in this paper are fully initialized.

3.2 Calculate initial Hong Kong re-export markups

The initial estimation of Hong Kong re-export markups follows the spirit of Feenstra *et al* (1998, 1999), the SAS programming procedures of which are documented in Chapter 2 of Yao (2000). While Feenstra *et al* (1998, 1999) only reports overall markups for China trade with the US and a few other selected countries, Yao (2000) is able to produce markups at as detailed as 6-digit HS commodity and individual country levels. Yao (2000) also provides the markups tailored for trade data reconciliation in the GTAP version 5 database. This paper uses the same methodology and updated SAS procedures to estimate the average 2002-04 markups and their standard deviations as the initial inputs for the mathematical programming model.

The key features of Feenstra *et al* (1998, 1999) include:

[9] Although Hong Kong Census and Statistics Department also publishes Hong Kong's domestic exports to all its partner countries, but the definition is different with what we defined in this paper. We include Hong Kong's re-exports markup into Hong Kong's domestic exports.

1. They use very detailed China and Hong Kong trade data at the commodity level (SITC for early years and 6-digit HS for 1994 and onward) and country level. As a result, the markup estimates are also at the same detailed levels. The overall markups are just weighted average of those disaggregate markups.
2. The Hong Kong import data does not have information on the final destination countries but with China trade data, which identifies the final destination countries and origin countries that go through Hong Kong, they are able to produce better markup estimates for China-originated goods, but for China-bound goods, the markups estimates do not show any regular patterns.
3. The markup estimates are sensitive to outliers. By assuming that normally Hong Kong cannot re-export significantly more than its imports in the same year, records with re-export quantity more than double import quantity are treated as outliers and thus are deleted from the markup calculations.
4. Three methods produce three sets of markups and their aggregate values coincide with findings from JCCT (1995), which are based on the analysis of Hong Kong trade data only, Hong Kong Census surveys and Fung and Lau (1998) interviews. They reconcile all three sets of markups with precise economic interpretations. Specifically, **Method A** markups refer to those based on destination generic Hong Kong import unit value but destination specific Hong Kong re-export unit value, and coincide with JCCT (1995) findings; **Method B** markups are based on Hong Kong import and re-export unit values both of which are destination generic, and coincide with Hong Kong Census survey results; and coinciding interview results reported in Fung and Lau (1998), **Method C** markups are based on Hong Kong import unit value (adjusted with China export data) and Hong Kong re-export unit values, both of which are destination specific and therefore are more accurate for China-US trade.

Markups are defined as the share of the value added by Hong Kong middleman in the total re-export value, or M_2 in Feenstra *et al* (1998). Let the unit-value of Hong Kong re-export be denoted by PMi=VMi/QMi where VMi is the value and QMi is the quantity of imports, and i denotes the HS codes. Let the unit-value of Hong Kong re-exports be denoted by PXi=VXi/QXi, where VXi is the value and QXi is the quantity of re-exports. Thus the relationship between the aggregate markup (RXM) and disaggregate markup (RXM_i) can be shown by the following formulas,

$$RXM = \frac{\sum_i \left(PX_i QX_i - PM_i QX_i\right)}{\sum_i PX_i QX_i} = \sum_i \left(1 - \frac{PM_i}{PX_i}\right)\left(\frac{PX_i QX_i}{\sum_j PX_j QX_j}\right) = \sum_i RXM_i \left(\frac{PX_i QX_i}{\sum_j PX_j QX_j}\right) \quad (21)$$

The above formula shows that when using this definition, re-export values should be used as compatible weights.

For the purpose of using the programming model to solve for the final markup estimates, standard deviations are needed which measure the scope of variations of the estimates,

and will inform the model how much adjustment should be allowed. The weighted variance and standard deviation of the markups are given as:

$$Var(RXM) = \frac{\sum_i PX_i QX_i (RXM_i - RXM)^2}{\sum_j PX_j QX_j}, \text{ and } STD(RXM) = \sqrt{Var(RXM)} \qquad (22)$$

Again, re-export values are chosen as weights.

In data preparation, we first add up the annual data on Chinese exports, Hong Kong imports and re-exports over the years 2002, 2003 and 2004 respectively. So the markups should be interpreted as the weighted average over the three years. Both China and Hong Kong data are in 8-digit HS codes, but only comparable at 6-digit level. When calculating the Method A markups, only Hong Kong data is used and therefore, markups are at the 8-digit HS level. But in Method C markup estimation, we need to combine the Chinese export data with Hong Kong data. Because China and Hong Kong trade data are comparable only at the 6-digit HS level, Method C markups are estimated at 6-digit HS level. As final outputs, markups are aggregated into GTAP sectoral and trade region levels. However, to fully reflect the extent of markup spread over commodities, their variances and standard deviations are calculated over 6-digit HS codes for a given pair of origin and destination countries at the GTAP trade region level.

All initial markup estimates are Method A markups except for China originated goods, which have Method C markups. Though theoretically Method C could also apply to China bound goods when the unit values of Hong Kong re-exports to China are adjusted with Chinese import data, we choose not to do so because Method A markups for China bound goods do not show any regular patterns over years and it is not worth the efforts to improve it with Method C.

3.3 Bilateral trade cost and estimates of fob/cif margins

A fundamental factor behind bilateral trade patterns are trade cost. However bilateral trade costs are largely unobservable due to insufficient data coverage for bilateral trade flows. Attempts to extract bilateral costs from econometric-based models in explaining trade patterns are a common approach with implicit transactions costs.

The foundation for empirical estimation of trade cost is found in the gravity model. Generalized gravity equations are now viewed as being consistent with economic theory. Not surprisingly, applied gravity work has experienced a veritable renaissance. See, Anderson (1979), Bergstrand (1985 and 1989), Harrigan (1994), Deardorff (1998), Baier and Bergstrand (2001), Feenstra et al. (2001), Eaton and Kortum (2002), Anderson and van Wincoop (2003), and Haveman and Hummels (2004). Tinbergen (1962) posited that the same basic functional form could be applied to international trade flows. Linneman (1966) provided an economic foundation for the basic gravity model, showing that it is a reduced form from a partial equilibrium model of export supply and import demand.

The general form of the gravity model, as applied to international economics, is as follows:

$$V_{ij} = f(Y_i, Y_{j,} R_{ij})$$

where V_{ij} is the value of trade between countries i and j, Y_i is the exporter's size denoting its willingness to supply goods to the world market, Y_j is the importer's size denoting its ability to demand imports from the world market, and R_{ij} measures other factors that affect bilateral trade, including impediments (such as transportation costs) as well as inducements (such as geographic contiguity).

A basic gravity equation found in the literature is

$$X_{ij} = C\frac{Y_i Y_j}{D_{ij}}$$

where X_{ij} is the value of exports from country i to country j, Y_i and Y_j refer to national income, D_{ij} is a measure of distance between the two trading partners, and C is a constant of proportionality. Applied researchers often augment the basic model to include an array of variables to account for additional determinants affecting partner trade, such as the presence or absence of preferential trade agreements. The traditional gravity equation takes the following form:

$$x_{ij} = \alpha_1 y_i + \alpha_2 y_j + \sum_{k=1}^{K} \beta_k \ln(Z_{ij}^k) + \varepsilon_{ij} \qquad (23)$$

where x_{ij} is the log of exports from i to j, y_i and y_j are the log of GDP of the exporter and importer, Z_{ij}^k is a set of other observable factors k (k= 1,……, K) impeding or inducing bilateral trade, and ε_{ij} is the error term. The gravity equations we estimated are based upon a synthesis of various determinants of trade.

The gravity model approach provides a rudimentary relationship of trade costs, bilateral trade volume, distance, and country specific factors. However, since our primary interest here is not attempting to explain drivers of trade, but the relationship between one component among the set of trade affecting factors (Z_{ij}^k), which is bilateral transportation costs. The gravity model specification indirectly suggests that costs are a function of trade volume x_{ij} , country-specific factors, and bilateral distance D_{ij}.

The gravity model provides us with the rationale for estimating transport cost function that can be used to generate bilateral *f.o.b./ c.i.f.* margins that varies by commodity, volume of merchandise trade, country-specific effects, and various genre of transaction costs. We surmise that unobservable costs such as shipping costs and insurance can be predicted using observable bilateral distances and trade volumes.

Bilateral transportation margins are country, commodity, and port specific. It includes freight and insurance which are not part of most country's official trade statistics. Although it is technically possible to estimate transportation margins based on fob/cif values reported by different partner pairs, such data do not represent the true transport margins even after

corrected for biases in reporting. This is due to inconsistencies caused by errors and valuation methods of different countries. It is common to find exports (fob value) exceeding the corresponding import value (cif value). Ideally fob/cif margins should vary based on port capacity, distance between countries, the volume of trade, and the corresponding freight rate for the industry in question. Variations in margins by route are often caused by differences in the volume shipped and differences in port efficiencies. In addition, the cost associated with insurance and the mode of transportation such as air or vessel is also important.

$$\ln m_{kij} = \gamma_k C_k + \phi_d \ln D_{ij} + \phi_f \ln F_{ijt} + \phi_v \ln \mathrm{V}_{\mathrm{ijt}} \qquad (24)$$

The variable C_k is a dummy variable identifying the k^{th} commodity to capture commodity specific attributes of costs. For example bulk commodities with low unit values such as coal and minerals are generally more expensive in terms of the share cost from transportation than with high unit value goods such as electronics. The coefficients ϕ_d , ϕ_f , and ϕ_v are estimated in logarithmic form to measure the effects of distance, freight cost, and volume of trade for bilateral margin m_{kij} . Transport margins are generally a decreasing function of the total volume of trade for a given flow due to economies of scale.

In more recent versions of the GTAP database, bilateral transport margins are based reference countries where actual bilateral margins for countries are reported. The U.S. trade data is one source where transport costs are reported on a bilateral basis and at the most detailed commodity classification level. Using sources such as this, bilateral margins are extrapolated to cover all bilateral trade flows using the margin function (equation 24). Missing margins can be projected where transportation cost are not available from the trade data by using observable right-hand side variables.

Because time and data limitations, this is the approach used to provide initial estimates of fob/cif margins. However, in future versions of this paper we will provide an updated estimated margins function from an econometrically based model to better represent all relevant factors that determine the fob/cif margins.

3.4 Determine appropriate country and commodity aggregation level based on the issue at hand and data availability

Because one of the objectives of this study is to produce Hong Kong re-exports adjusted trade flows contributing to version 7 GTAP database, therefore trade data reported by China, Hong Kong and their partners were aggregated from 8 and 6 digit HS to the 42 GTAP commodities respectively.

There are 215 countries identified in the GTAP global bilateral trade data base, while only 157 countries reported at least one year of their exports to or import from China and Hong Kong during 2002 to 2004.[10] To determine the country aggregation used in our

[10] There are about 100 countries reported their trade with China and Hong Kong in 2004 in current WITS with missing data for China's several important trading partners such as

optimization model, we first aggregate all the non-reporting country into one block to be consistent with the model assumption that only one partner country do not report their trade with China and Hong Kong. Then use the difference between China reported imports (exports) and the sum of all partner reported exports (imports) adjusted by associate fob/cif margin to approximate the partner reported data for this aggregate non reporting country block. Then we use two cut off criteria to separate the 157 reporting country into two blocks. The first block has 96 countries, including all single countries in version 6 GTAP database and the sum of exports from China and Hong Kong to the world greater than 300 million dollars in 2004 identified either by China and Hong Kong reported data or their partner reported data. The selected model country list and initial value of corresponding model variables for eastbound and westbound trade are listed Table 1 and Table 2 respectively. The second block is consisted of 61 remaining reporting countries. Their names are listed in Appendix Table A1.

(**Insert Table 1 and Table 2 here**)

Although the initial estimates listed in Tables 1 and 2 still suffered from several unsolved data problems, they still show several interesting features of the data. First, reported westbound trade seems less problematic than reported eastbound trade, which reflected by the statistical discrepancies are more volatile in eastbound trade. Although the overall discrepancies are 3.9 percent in eastbound trade and 2.5 percent in westbound trade, there are 20 of the 97 reported bilateral routines in the model with more than hundred percent statistical discrepancies in the eastbound trade, while only two routines in the westbound trade see such large discrepancies. In the other hand, there are only six bilateral routines in eastbound trade with less than five percent discrepancies, while about 20 routines in the westbound trade have small discrepancies. Second, trade with developing country partners shows greater discrepancies than developed countries in general, reflecting the poor quality of data reported from those nations. Finally, extremely large discrepancies are usually come from partners only have small trade values with China and Hong Kong, such as Benin, Kyrgyz Republic in eastbound trade and Cambodia and Lithuania in westbound trade. The combined exports reported by China and Hong Kong are less than one billion in 12 of the 20 bilateral routines with more than hundred percent discrepancies in eastbound trade.

There are three types of balance of trade reported in Table 1. They are China and Hong Kong officially reported trade balance with their partner countries (difference between China and Hong Kong reported exports and imports before any adjustment), partner countries officially reported trade balance with China and Hong Kong (difference between partner reported exports to and imports from China and Hong Kong before any adjustment), and balance of trade after initial Hong Kong re-exports and fob/cif adjustments. While only adjusted trade balance are listed in Table 2 but calculated in an

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Indonesia, Thailand and Viet Nam. Therefore, additional data for 2002 to 2004 pulled directly from UN COMTRADE database were also used and growth rates between 2002 and 2003 were calculated at the 6-digit HS level to project missing data in 2004 before being aggregated into GTAP sectoral classifications.

opposite direction, i.e. they should have a same absolute value with what reported in Table 1, but with an opposite sign. As expected, China's trading partners reported much larger trade deficits with China than China reported as trade surpluses with its partners. The value reported by partner is $283 billion, while the official statistics from China are only $81 billion. More strikingly, if excluding Hong Kong, other partners reported a deficient with China at $282.4 billion, while China also reported a trade deficient of $7.6 billion with these partners! Most the initial adjusted trade balance fills between those two numbers. For example, the United Stases reported a $174 billion trade deficit with China, while China only report about 80 billion trade surplus with the United States. This number after initial adjustment become 108.8 billion, 36 percent higher than the Chinese data, but 37 percent lower than data reported by the United States.

With all variables in the model has an initial value now, there is only one issue left before we can solve the optimization model: How the reliability weights in the objective function ($wdx_{it,}^{sr} wtx_{it,}^{sr} wdm_{it,}^{sr} wtm_{it,}^{sr} wrxm_{it,}^{sr}$ in equation 18) should be determined, which will determine which and how much of the initial estimates should be adjusted and it is the topic in next section.

3.5 The choice and estimation of reliability weights

From statistical theory point of view, the best way to systematically assign reliability weights in the objective function is to obtain estimates of the variance-covariance matrix of the initial trade flow statistics. Then the inverted variance-covariance matrix may be justified as the best index of the reliability of entries in the trade flow matrix. However, as we discussed earlier, one of the major difficulties to apply constrained matrix balance procedure in data reconciliation is the lack of data to estimate the variance-covariance matrix associate with the initial estimates. For example, the common practice in SAM balancing exercises is assign different degree of subjective reliabilities to the initial entries of the matrix follow the method proposed by Stone (1984),[11] almost no attempt to date has been made to statistically estimate data reliability such as error variance of the initial estimates from historical data, except Weale (1989), who developed a statistical method that uses time series information on accounting discrepancies to infer data reliability in a system of national accounts. A similar statistical method can be used to the reporting discrepancies of bilateral trade data to derive those variances associated with international trade statistics.

Trade data reported by each country and its partners are often used in international economic literature to check the quality of trade statistics. Theoretically, export statistics from one country to its partner countries should match the import statistics from their partner countries. This often refers to as mirror statistics. An approximate match of mirror statistics implies trade data reported via that routine are reliable. Therefore, an analysis of discrepancies between two "reported" trade data of the same trade flows may provide a means of determining data reliability and mirror trade statistics are used as major

[11] Stone proposed to estimate the variance of x^0_{ij} as $var(x^0_{ij}) = (\theta_{ij} x^0_{ij})^2$, where θ_{ij} is a subjective determined reliability rating, expressing the percentage ratio of the standard error to the initial estimates of x^0_{ij}.

data source to estimate the variance of reported bilateral trade statistics or to construct some sort reliability index in this study.

Auto regression with dummy variables

Assuming the discrepancies in any pair of mirror trade statistics are a function of a systematic bias, last period's discrepancies and K dummy variables plus an error term as follows:

$$e_{it} = a_i e_{it-1} + b_i^0 + \sum_{k=1}^{n} b_i^k D^k + \mu_{it} \quad (25)$$

where e_{it} is the mirror trade statistics discrepancies at year t, b_i^0 is the symmetric bias, and μ_{it} is the random error term, $D^{k'}$s are dummy variables represent events have a significant impact on the reporting practice in the two data reporting countries such as change of commodity classifications, implementing better custom information systems or enforcing effective anti-smuggling programs. The autocorrelation coefficient a_i and the variance Var(μ_{it}) can be taken as indicators of magnitude of the measurement errors. The variance of initial trade statistics thus may be derived as follows:
since e_{it-1} and μ_{it} are independent,

$$V(e_{it}) = V(a_i e_{it-1} + b_i^0 + \sum_{k=1}^{n} b_i^k D^k + \mu_{it}) = V(a_i e_{it-1}) + V(\mu_{it}) = a_i^2 V(e_{it-1}) + V(\mu) \quad (26)$$

At stationary assumption in long run, $V(e_{it})=V(e_{it-1})$

$$V(e_{it}) - a_i^2 V(e_{it}) = V(\mu) \quad (27)$$

Therefore

$$V(e_{it}) = V(\mu) \Big/ (1 - a_i^2) \quad (28)$$

As long as we have enough historical mirror trade statistics and sufficient knowledge on the change in related country's trade reporting system to estimate V(e_{it}) for each pair of mirrored trade variables in our optimization model, then they can be assigned as weights in equation (18), the objective function.

Reliability indexes

As described earlier, in adjusting inconsistent bilateral trade flow statistics to satisfy the consistency requirements, it is crucial for the reconciliation procedure to be biased towards changing the unreliable route more than the reliable route. For example, past statistical information suggested that the US-Japan trade is one of the most consistently reported trade flow. Thus, less or no adjustment is needed on this particular route while more adjustment should occur where there is less certain. Because a small discrepancy in

mirror trade statistics may indicate a reliable trade routine, while a large discrepancy may indicate unreliable reported data, mirror statistics and their discrepancies also directly provide useful information to construct some sort of reliability index to inform the model how the initial estimates should be adjust in the reconciliation process.

In fact, when we assign initial estimates for the 16 sets of trade flow variables in both east bound and westbound trade in the optimization model either directly from reported trade statistics or by derivation from them, we also obtain 8 sets of mirrored trade data. The discrepancies computed from each mirrored pair divided by corresponding sum of mirrored flows[12] thus can be used to construct an index which reflects the reliability of the associate initial estimates of the reported trade flows in some extent, although we are not sure how large the associated variance really may be. Using mathematical notations:

$$PDX_{it}^{cs} = PDM_{it}^{cs} = ABS(\frac{cif_{it}^{cs} DM0_{it}^{cs} - DX0_{it}^{cs}}{DX0_{it}^{cs} + cif_{it}^{cs} DM0_{it}^{cs}}) \tag{29}$$

$$PTX_{it}^{cs} = PTM_{it}^{cs} = ABS(\frac{cif_{it}^{cs} TM0_{it}^{cs} - TX0_{it}^{cs}}{TX0_{it}^{cs} + cif_{it}^{cs} TM0_{it}^{cs}}) \tag{30}$$

$$PDX_{it}^{sc} = PDM_{it}^{sc} = ABS(\frac{cif_{it}^{sc} DM0_{it}^{sc} - DX0_{it}^{sc}}{DX0_{it}^{sc} + cif_{it}^{sc} DM0_{it}^{sc}}) \tag{31}$$

$$PTX_{it}^{sc} = PTX_{it}^{sc} = ABS(\frac{cif_{it}^{sc} TM0_{it}^{sc} - TX0_{it}^{sc}}{TX0_{it}^{sc} + cif_{it}^{sc} TM0_{it}^{sc}}) \tag{32}$$

Where indexes "c" is indexed over set {CH, HK} and variable with a prefix "P" are reliability index for that variables.

All these reliability indexes defined above usually have a value between 0 and 1. A smaller value of the indexes indicates the initial estimates are relatively reliable for the associated trade routine. The weights in the objective function (equation 18) of the model can be assigned by multiplying these indexes by their corresponding initial values, e.g., $wtx_{it}^{sr} = PTX_{it}^{sr} \times TX0_{it}^{sr}$. With such a weighting scheme, we also make the model to be biased towards changing those unreliable initial data more than those reliable ones in the reconciliation process, although just roughly.

[12] There is also a consensus in trade statistics reconciliation work to use import data as a bench mark for comparison of most commodities. Import data usually are considered to be more reliable than export data because imports have to be reported in sufficient details to allow Customs to apply tariffs, taxes, trade agreements or other regulatory controls. For the same reason, Customs offices generally more attentive to goods entering the country as opposed leaving the country.

IV. Preliminary Results from the Model

The implemented optimization model is coded in GAMS(Brooke *et al*, 2005), with about 2.5 million equations and variables in its current aggregation. It was solved using barrier method of the Cplex solver (GAMS Development Corporation, 2005). There are 13 input data files, all automatically produced by two SAS programs.

Aggregated adjusted estimates for eastbound and westbound trade are listed in Tables 3 and 4 respectively. Detailed results by countries and sectors are available from the author upon request.

(**Insert Table 3 and Table 4 here**)

4.1 Adjusted Hong Kong re-export markup rate

Comparing the model adjusted data with the initial estimates, the first notable change is the post adjusted Hong Kong re-export markup rate are higher than the initial estimates. The weighted average markup rates in eastbound trade increased from 31.0 percent to 40.2 percent, the same numbers in westbound trade increased from 9.2 percent to 12.2 percent. Although whether these adjustments are the right adjustment is subject to further investigation because there are some data and logical issues still unsolved in the model that we will discuss later, the adjustments seem move to the right direction. Based on the most recent Canada-China merchandise trade reconciliation study published by Statistics Canada in 2005, Hong Kong's re-export markups rate in eastbound trade is about 40 and 38 percent during 2002 and 2003 respectively, while the initial markup rate for Hong Kong re-exporting Canada originated goods to China is only 29 percent, and the post adjustment markup rate increase to 37 percent. The initial markup estimates for Hong Kong re-exporting Canada originated good to China is 5.1 percent, while the post adjusted rate increase to 8.7 percent, which is very close to the 9.2 percent Hong Kong re-exports markup rate in westbound trade during 2002 and 2003 reported by Statistics Canada. The upward adjustment for the overall markup rate may caused by omitting a significant portion of the initial markup rates with negative sign computed directly from the detailed trade data when we initialize the model, because the counter intuitive nature of these negative markups. Feenstra and Hanson (2004) reported Hong Kong's re-export markup has a mean of 0.375 with a standard error of 0.358 based on official data from China and Hong Kong covering period 1988-1998. They also reported the presence of negative markups are a genuine feature of their data, similar to what had be found by Feenstra *et al* (1999) in China-US westbound trade. However, we strongly believe there should be a positive markup in either direction of trade because in the real world no business can still exist for a decade with consistent loss, there must be some institutional and measurement factors distorting the reported trade data which need further investigation. While the model developed in this paper provides a solid way to estimate a final positive markup rate for both directions of re-exports.

(Inset table 5 here)

Table 5 presents the initial and model adjusted Hong Kong re-exports as percentage of China's total exports and imports as well as Kong Kong's re-exports markup rate and their associated weighted standard deviations by each of the 42 GTAP sectors. Generally speaking, the model tends to adjust Hong Kong's re-exports markup rate for finished products upward but reduce the initial markup rate of most intermediate and primary products downward with some exceptions. For example, there is a slightly downward or no adjustment for primary commodities (GTAP sector 1 to 24) except animal products in eastbound re-exports, while significant upward adjustments occur to some finished commodities with product differentiations, such as leather, toy and sporting products (GTAP sector 29), other transport equipment (GTAP sector 39), electronic equipment (GTAP sector 40), and other manufactures (GTAP sector 42).

4.2 Hong Kong re-exports earnings and retained imports

The first panel of table 6 summaries Hong Kong's earnings from its re-export China originated goods to other countries, from re-exports other countries' products to China, and from transshipment of commodities among other countries by the 42 GTAP sectors. It shows that Hong Kong's re-export activities and their associated earnings are mainly concentrated on few finished manufacturing products. In eastbound trade, these products are electronic equipment, other manufactures, other machinery and equipment, leather and sporting goods, textiles and wearing apparel. While electronic and other machineries are major commodities in transshipment from other countries to China. Qualities of these products are usually more difficult to observe and more likely to require the service of intermediation to resolve information problems in trade (Feenstra and Hanson, 2004). Therefore, these estimates seem make good economic sense.

(Inset table 6 here)

The second panel of table 6 lists initial and adjusted estimates of Hong Kong's retained imports from all its trading partners excluding and including China by GTAP sectors. The initial estimates seem very close to the estimates published by Hong Kong Census and Statistics Department at aggregate level if excluding imports from China (68.7 and 70 billion U.S dollars respectively), while the model adjusted estimates are significantly larger when including goods from China. However, carefully comparing estimates including and excluding China, we find the differences are mainly caused by few sectors and directly related to our current treatment of Hong Kong re-export China originated products to China in the model.

In Hong Kong re-exports statistics, there are re-exports for China originated commodities back to China.[13] The volume of such round tripping trade flows worth about 34.8 billion

[13] This may be quite true in real world trade. For example, shipments of forest products from northwest port of Dalian to Hong Kong by sea first, then transport to factories use these products in Shenzhen by truck may be a lot cheaper than direct transport the products from inland China to Shenzhen. However, the data show that the majority of

in 2004 based on Hong Kong re-exports statistics and 36.9 billion in China Custom reported imports through Hong Kong. Although we tried different ways, the current model still can not handle such trade properly yet, the 34.8 billion Hong Kong re-exports are simply eliminated from the initial estimates of Hong Kong's re-exports, total exports and imports. There is no adjustment has been made to China's direct exports to Hong Kong, however, because there is no records in China officially reported exports through Hong Kong back to China. It is very possible that the exporters misreported to Chinese Customs that such exports are bound for some other final destinations via Hong Kong for incentive reasons, such as export rebate, but in fact these exports went back to China eventually as shown in both Hong Kong's re-exports and China's official imports statistics. Therefore, the model tends to over estimate Hong Kong retained imports for China originated products and introduces bias to its estimates of Hong Kong re-exports markup rates. This is clearly shown by comparing the last column of table 6, Hong Kong re-exports China originated goods back to China, with initial and adjusted estimates of Hong Kong's retained imports. There are three sectors in the model adjusted estimates are significantly higher than these initial estimates. They are textiles (increase from 4 to 5 billion), electronic equipment (increase from 27.2 to 42.2 billion), and other machinery and equipments (increase from 8 to 16.4 billion), while the corresponding Hong Kong re-exports from China back to China are 5, 17.8 and 7.3 billion respectively. Obviously, properly treat such round trip trade flows in the model will definitely improve the accuracy of the final estimates of the model.

4.3 Adjusted China's balance of trade at sector level

Table 3 reports model adjusted aggregate bilateral balance of trade between China, Hong Kong and their trading partners along with official trade balance reported by both sides. It shows that most of the adjusted bilateral balance of trade lies between China and its partner reported data. At aggregate level, the model adjusted trade surplus for China is 97.6 billion dollars, which is higher than China officially reported surplus of 81 billion[14], but significantly smaller than the 283.2 billion partners reported trade deficit with China. At bilateral level, for instance, the model adjusted trade balance between China and Canada is 6.7 billion dollars, which lies between the 0.8 billion China reported trade surplus with Canada and 13.4 billion Canada reported trade deficit with China. Similarly, the model adjusted trade balance between China and Philippine is 3.4 billion dollars, which also lies between the 273 million Philippine reported trade surplus with China and China reported 4.8 billion trade deficit with Philippine.

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these round tripping commodities are electronic equipment (17.8 billion), Other machineries (7.3 billion) and textiles (5.0 billion), there must be some incentive reasons to encourage exporters to do so.

[14] The balance of trade data reported here are calculated from current model data base, which is different from the officially reported data because our model database excludes utility trade (such as electricity) and HS Chapter 98 and 99. There are also 36.9 billion Hong Kong re-exports of China originated products back to China did not count as China's imports as described in the text. Therefore, China's trade surplus in the model is higher than 32 billion, the official 2004 number reported by China.

(Inset table 7 here)

The first panel of table 7 presents initial and model adjusted net exports of China with all its trading partners with and without Hong Kong by GTAP sectors. There are several interesting features of the model adjusted estimates of China's net exports to the world. First, there is no sign change among China officially reported net exports, the initial, and model adjusted estimates, in both including and excluding Hong Kong, for all but three GTAP sectors (processed rice, beverages and tobacco products, and petroleum products, first two of them has very small values). Further more, for the three sectors with sign changes, the sign of model adjusted net exports are the same with the officially reported net exports and consistent with people's intuition of China's comparative advantages (net importer of processed rice and petroleum products, net exporter of beverages and tobacco products). Finally, by adjusting Hong Kong's transshipment back to China's total export and imports, the adjusted net trade flows show China's current comparative advantages in the world market more clearly. For instance, the adjusted net exports are significantly larger than China officially reported in most labor intensive products such as textiles, wearing apparel, leather and sporting goods, other manufactures and certain technology-capital intensive goods such as electronic equipments. All these imply that Hong Kong's re-export activities facilitate China to fully realize its comparative advantages and the model did a reasonable job in adjusting China's net trade flows.

China's trade balance with the United States by GTAP sector is presented in the second panel of table 7 as an example to illustrate the features of model adjusted bilateral net trade flows. It also shows that most model adjusted sector net trade flows lie between China and the U.S. officially reported statistics except two sectors, which are textiles (about 90 million dollars higher than U.S. reported deficit with China) and meat products (only 6 million dollars higher than China reported deficit with U.S.). As we discussed earlier, textile sector also associated with large values of Hong Kong re-exports for China originated products back to China. Therefore, the inability to treat such trade flow properly may distort current model to overestimate China's trade surplus.

V. Concluding Remarks

This study constructed a mathematical programming model to estimate re-export markup and reconcile detailed bilateral trade statistics from China, Hong Kong and their trading partners. Five key steps to link the model with actual trade statistics are discussed. The model was applied to 2004 bilateral world trade data in GTAP sectoral classification to produce Hong Kong re-exports adjusted trade flows contributing to version 7 GTAP database. Preliminary result shows that the model is able to eliminate the statistical discrepancy efficiently. Hong Kong's re-export mark-up, each trading partner's transshipment via Hong Kong as percent of the country's total exports to and import from China, and adjusted bilateral balance of trade among China, Hong Kong and their partner countries by each covered commodity are all part of the model solution.

In conclusion, the model provides a flexible tool to reconcile trade statistics from China, Hong Kong and their trading partners simultaneously. Advantages of the model are its flexible in data requirement and its desirable theoretical and empirical properties. It can be applied to reconcile direct and indirect trade for other regions of the world where transshipment creates major discrepancies. It not only provides a tool for the preparation of global trade data in future versions of GTAP database, but also contributes to the methodological development to estimate and reconcile discrepancies in international trade statistics when transshipment and re-export activities heavily diminish the ability of a country identifying its correct partner countries.

However, there are several caveats that need mentioning. First, the model assumes all transshipments via Hong Kong are recorded by Hong Kong's re-export statistics, while China's export statistics only include China's direct exports to destination countries. In reality there is a large portion of China's exports to and imports from the world via Hong Kong may be only transferred through Hong Kong and do not reflect in Hong Kong re-export statistics.[15] In addition, as we mentioned earlier, China Customs also started to identify the final destinations of its goods shipped through Hong Kong in 1993, therefore, there may be some double counting between China reported trade via Hong Kong and Hong Kong re-export statistics. Tables 7 and 8 compare mirror trade statistics of China and Hong Kong with Hong Kong's "Port Cargo Loaded by Major Country/Territory and Port of discharge" statistics as well as Hong Kong's "Port Cargo Discharged by Major Country/Territory and Port of Loading" statistics. They show that as the difference between China reported exports via Hong Kong (but Hong Kong may be or may not be the final destination) and Hong Kong reported imports from China increase, the outward transshipment as percent of Hong Kong's total shipment to the world also increase (Table 8). Similarly, as China reported imports through Hong Kong (but Hong Kong may be or may not be the country of origin) and Hong Kong reported exports to China increase, the inward transshipment as percent of Hong Kong's total shipment received from the world also increase (Table 9). Unfortunately, we are unable to judge whether the transshipment value reported by China under or over valued China's outward or inward transshipment via Hong Kong to and from the world. In other words, for instance, only when we know whether the 35,891 million metric ton goods transshipped through Hong Kong to the world in 2004 over or under valued by the additional 54 billion dollars transshipment value reported by China, we are unable to adjust China and Hong Kong reported export statistics in either direction. The underline assumption of current model is suppose the transshipments double counted by both China's exports and Hong Kong's re-exports

[15] There are four types of shipment are classified by Hong Kong Census and Statistics Department: imports, exports (including domestic exports and re-exports), inward transshipment, and outward transshipment. Goods imported into or exported from Hong Kong are classified as direct shipment, while goods transshipped in Hong Kong under a through bill of lading are classified as transshipment. It refers to cargo that is consigned from a place outside Hong Kong to another place outside Hong Kong but is or is to be removed from one vessel and either returned to the same vessel or transferred to another vessel within Hong Kong waters. It is different with goods imported into Hong Kong for subsequent re-exports and usually do not go through Hong Kong custom valuations.

statistics just equal to Hong Kong's outward transshipment (i.e. anything do not go through Hong Kong Customs is suppose to recorded by China as direct exports to partner countries, or in 2004, the 35,891 million metric ton goods exactly worth 54 billion dollars). Obviously, this is a very strong assumption.

(Insert table 8 and 9 here)

Second, we keep re-export statistics reported by Hong Kong Census and Statistics Department as constant in the model during the adjustment process, because it is the most reliable source to provide both origins and destinations of transshipment through Hong Kong. In reality, such statistics also subject to errors as other reported trade statistics. As we described earlier, China customs started to report China's exports and imports via Hong Kong in 1993, and the quality of such statistics are improved in recent years, especially records on its imports through Hong Kong. Therefore, using such data as a mirror of Hong Kong's re-exports statistics may help us to eliminate possible double counting in westbound trade thus improving the quality of model adjusted estimates.

Thirdly, the model assume both China and Hong Kong correctly report their total exports to and imports from the world, therefore, these totals enter the model as controlled constants. However, in the real world, the sum of partner countries reported trade with China and Hong Kong in some sectors may well exceed what China and Hong Kong reported. Therefore, there is an inconsistency in the global level which can not be eliminated by current model alone. To solve this issue, a global commodity equilibrium adjustment model is needed. It treats each country as both supplies and demanders for each commodity and reconciles each countries' total exports and imports statistics using equation (17) as its constraint to solve a set of global consistent total exports and imports (no bilateral trade data needed) for each commodity and every country, which then can be used as input to our current model to solve the bilateral details.

Fourth, because data and time limitations, major parameters in the model, the reliability weights and fob/cif margins, have not been estimated by econometric methods we proposed yet. Reliability index and reference country method were applied as an approximation. Therefore, the numeric estimates reported in the paper should be interpreted with caution: they can only be viewed as preliminary and indicative rather than precise and final.

Finally, current model only reconciles one year bilateral trade data, to be consistent with the 2004 base year of version 7 GTAP database. However, a three year average may be more desirable. It not only smoothes any unusual annual variation of the bilateral trade data, reduce time difference of recording which might cause discrepancies, but also provides more non-zero entries in the trade flow matrix and corrects time delays in export and import records. This certainly will have a positive impact on the development of CGE-based trade policy analysis using future versions of GTAP database.

To solve above discussed remaining data and modeling issues, econometrically estimate all parameters in the model are in our next step research agenda.

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Appendix Table A1 Countries in the other reporting country block of the model

Country number	ISO3	Country name	Country number	ISO3	Country name
1	ABW	Aruba	32	JAM	Jamaica
2	AND	Andorra	33	KNA	St. Kitts and Nevis
3	ARM	Armenia	34	LBY	Libya
4	AZE	Azerbaijan	35	LCA	St. Lucia
5	BDI	Burundi	36	LSO	Lesotho
6	BFA	Burkina Faso	37	MDA	Moldova
7	BHR	Bahrain	38	MDV	Maldives
8	BIH	Bosnia and Herzegovina	39	MKD	Macedonia, FYR
9	BLR	Belarus	40	MNG	Mongolia
10	BLZ	Belize	41	MSR	Montserrat
11	BOL	Bolivia	42	MUS	Mauritius
12	BRB	Barbados	43	NAM	Namibia
13	BRN	Brunei	44	NCL	New Caledonia
14	CAF	Central African Republic	45	NER	Niger
15	CIV	Cote d'Ivoire	46	NIC	Nicaragua
16	CMR	Cameroon	47	NPL	Nepal
17	COK	Cook Islands	48	OMN	Oman
18	CPV	Cape Verde	49	PNG	Papua New Guinea
19	DMA	Dominica	50	PYF	French Polynesia
20	ERI	Eritrea	51	QAT	Qatar
21	ETH	Ethiopia(excludes Eritrea)	52	RWA	Rwanda
22	FJI	Fiji	53	SEN	Senegal
23	GAB	Gabon	54	SLE	Sierra Leone
24	GEO	Georgia	55	SLV	El Salvador
25	GIN	Guinea	56	STP	Sao Tome and Principe
26	GMB	Gambia, The	57	SWZ	Swaziland
27	GRD	Grenada	58	SYC	Seychelles
28	GRL	Greenland	59	TTO	Trinidad and Tobago
29	GUY	Guyana	60	VCT	St. Vincent and the Grenadines
30	HND	Honduras	61	WSM	Samoa
31	ISL	Iceland			

Table 1 Initial Estimates of Bilateral Trade Between China, Hong Kong and their Partner Countries, Eastbound Flows, 2004, in Millions of U.S. Dollars

Country Code	Country Name	China actual exports to partners	China direct exports to Partners	Hong Kong total exports to partner	Hong Kong domestic export to partner	China re-exports to partner via Hong kong	Hong Kong re-export markup	Partners total imports from Hong Kong	Partners total imports from China	Partner imports of Hong Kong domestic products	Partner direct import from China	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	China reported balance of trade with partners	Partner reported balance of trade with China	Partners balance of trade with Hong Kong after adjustment	Hong Kong reported balance of trade with partners	Partner reported balance of trade with Hong Kong	fob/cif ratio, China to partner	fob/cif ratio, Hong Kong to partner
	Variable in the model	TX0(CH,r)	DX0(CH,r)	TX0(HK,r)	DX0(HK,r)	RX0(s,CH)	RXM0(CH,r)	TM0(HK,r)	TM0(CH,r)	DM0(HK,r)	DM0(CH,r)	(RX0(CH,r)-RXM0(CH,r))/RX0(CH,r)	SDX(r)	RXM0(CH,r)/RX0(CH,r)	TX0(CH,r)-TX0(r,CH)	TX0(CH,r)-TM0(r,CH)	TX0(r,CH)-TM0(CH,r)	TX0(HK,r)-TX0(r,HK)	TX0(HK,r)-TM0(r,HK)	TX0(r,HK)-TM0(HK,r)	cif(CH,r)	cif(HK,r)
USA	United States	147,749	125,118	43,924	17,707	35,587	11,667	37,048	208,153	9,141	184,266	15.3	17.2	32.8	108,876	80,395	-174,095	8,671	29,469	-21,543	0.945	0.939
CAN	Canada	10,019	8,161	3,132	1,077	2,761	798	2,722	18,526	552	16,565	18.5	34.6	28.9	4,395	816	-13,436	600	1,929	-1,654	0.944	0.947
MEX	Mexico	5,634	4,973	938	226	808	116	1,152	14,003	406	13,310	11.7	54.7	14.3	4,952	2,831	-13,529	17	604	-668	0.952	0.954
AUS	Australia	10,462	8,838	3,190	1,062	2,493	780	3,167	13,064	933	11,360	15.5	11.6	31.3	3,637	-2,704	-6,755	-209	1,326	-1,132	0.951	0.953
NZL	New Zealand	1,313	1,077	413	133	355	107	398	2,180	104	1,934	17.9	29.5	30.3	107	-336	-1,080	-123	88	-25	0.949	0.955
JPN	Japan	81,243	73,222	13,799	4,302	11,977	3,557	11,276	93,589	1,322	85,190	9.9	4.2	29.7	-7,920	-21,035	-22,981	-6,790	-19,115	21,704	0.946	0.954
KOR	Korea Rep	29,313	27,810	5,653	2,117	2,832	1,269	6,929	29,585	3,268	28,027	5.1	-1.5	44.8	-26,748	-34,350	20,173	-8,724	-7,244	11,198	0.941	0.966
TWN	Taiwan China	15,193	13,489	6,298	2,221	2,486	706	6,289	16,625	2,072	14,860	11.2	1.6	28.4	-31,984	-51,289	17,373	-13,065	-13,597	23,439	0.950	0.967
SGP	Singapore	14,761	12,684	5,588	2,095	3,456	1,292	7,219	16,012	3,599	13,862	14.1	9.1	37.4	-2,611	-1,282	-889	-12,263	-8,655	9,981	0.961	0.966
MAC	Macao	1,768	1,605	1,242	351	256	83	1,293	1,531	368	1,362	9.2	-11.5	32.3	1,366	1,388	-1,140	207	950	-984	0.951	0.963
IDN	Indonesia	6,886	6,256	1,104	281	851	190	1,088	2,858	226	2,198	9.1	-115.5	22.4	2,521	-942	793	-156	-661	175	0.939	0.951
MYS	Malaysia	8,949	8,087	2,288	1,085	1,625	727	4,026	10,100	2,777	9,205	9.6	17.0	44.7	-2,734	-10,073	-1,704	-2,178	-4,377	3,444	0.954	0.965
PHL	Philippines	5,226	4,268	2,514	1,076	1,679	675	3,223	1,888	1,723	890	18.3	-58.7	40.2	1,243	-4,806	273	282	-1,816	-1	0.950	0.961
THA	Thailand	6,816	5,786	2,639	1,009	1,838	764	2,785	6,122	1,093	5,055	15.1	-10.6	41.6	-944	-5,757	-579	-472	-2,210	1,420	0.953	0.964
VNM	Vietnam	4,826	4,259	1,218	317	746	144	1,707	1,655	805	1,088	11.8	-79.8	19.3	3,294	1,777	-223	98	771	-1,319	1.000	1.000
KHM	Cambodia	756	452	451	110	393	71	778	357	422	40	40.2	-11.3	18.1	748	422	-351	-243	443	-423	0.952	0.956
BGD	Bangladesh	2,182	1,895	506	175	418	113	778	1,134	428	830	13.2	-48.9	27.1	2,122	1,826	-1,109	121	419	-685	0.946	0.944
IND	India	6,566	5,925	2,095	379	813	145	3,498	6,688	1,683	6,023	9.8	10.1	17.9	698	-1,807	-1,403	-1,577	-1,678	172	0.950	0.945
LKA	Sri Lanka	894	694	428	182	355	144	880	466	621	256	22.4	-3.9	40.4	867	668	-449	137	363	-811	0.945	0.949
PAK	Pakistan	2,292	2,230	126	35	84	19	190	1,486	95	1,422	2.7	-52.6	22.9	1,599	1,635	-1,181	-154	-477	401	0.947	0.957
AUT	Austria	1,124	781	583	195	513	155	604	2,609	199	2,250	30.6	44.1	30.1	-150	-731	-1,449	-131	71	-134	0.956	0.958
BEL	Belgium	6,544	5,860	1,610	529	1,047	329	1,943	8,287	798	7,572	10.4	15.5	31.5	3,515	2,327	-5,548	-744	-188	-20	0.943	0.943
DEU	Germany	28,520	23,753	8,071	2,752	6,905	1,924	8,039	40,679	2,491	35,710	16.7	21.4	27.9	1,077	-6,625	-15,831	569	2,940	-2,800	0.957	0.956
DNK	Denmark	2,335	1,946	807	331	578	171	852	2,677	354	2,269	16.7	6.1	29.5	961	379	-1,880	109	67	-40	0.949	0.954
ESP	Spain	6,617	5,477	1,880	582	1,637	438	1,724	10,609	358	9,410	17.2	27.2	26.7	5,108	3,718	-9,256	259	1,411	-1,214	0.944	0.950
FIN	Finland	3,080	2,495	907	265	818	212	815	2,466	146	1,858	19.0	-27.5	25.9	417	-614	-37	89	426	-276	0.956	0.959
FRA	France	11,982	9,922	3,409	1,099	2,981	821	3,163	20,367	743	18,210	17.2	31.2	27.6	5,129	2,252	-14,025	-632	1,016	-561	0.954	0.952
GBR	United Kingdom	19,218	14,952	8,450	3,587	6,849	2,360	8,485	26,206	3,372	21,719	22.2	15.7	34.5	14,267	10,151	-22,087	680	4,402	-3,558	0.949	0.950
GRC	Greece	1,549	1,380	262	76	228	51	281	1,765	84	1,587	10.9	6.0	22.2	1,469	1,293	-1,692	24	215	-219	0.942	0.945
IRL	Ireland	2,350	2,138	419	175	328	106	860	3,517	605	3,295	9.0	33.9	32.4	1,378	946	-2,747	-568	-608	189	0.957	0.955
ITA	Italy	10,939	9,224	3,001	1,056	2,654	849	2,739	14,700	695	12,898	15.7	15.6	32.0	4,202	2,735	-9,250	-1,104	-336	918	0.946	0.951
LUX	Luxembourg	945	918	73	13	35	7	121	76	58	48	2.9	-447.1	20.4	818	788	40	1	46	-96	0.985	0.955
NLD	Netherlands	20,779	18,519	4,253	1,690	3,555	1,199	4,649	17,826	1,981	15,473	10.9	-16.2	33.7	17,767	15,534	-15,077	948	2,702	-3,591	0.956	0.960
PRT	Portugal	685	588	150	43	135	34	149	570	37	469	14.1	-23.9	24.9	550	307	-453	-5	83	-73	0.937	0.947
SWE	Sweden	2,304	1,860	767	289	652	187	1,446	2,396	944	1,929	19.3	15.4	28.6	-423	-1,481	105	-28	260	-865	0.946	0.950
CHE	Switzerland	1,847	1,506	1,199	652	812	453	1,235	2,274	661	1,916	18.5	8.9	55.8	-1,085	-1,663	199	-1,484	-2,298	2,044	0.954	0.953
NOR	Norway	1,208	1,029	338	144	319	130	429	2,353	224	2,164	14.9	41.2	40.8	387	-371	-1,578	-112	159	-121	0.945	0.949
CYP	Cyprus	206	185	31	7	27	5	62	232	36	210	10.3	14.6	17.3	203	183	-229	1	24	-55	0.950	0.948
CZE	Czech Republic	1,515	1,351	274	96	252	81	347	3,512	162	3,341	10.8	51.7	32.0	1,197	909	-3,240	-14	125	-163	0.960	0.960
EST	Estonia	234	202	73	37	64	30	72	379	35	345	13.8	28.5	47.4	197	181	-343	31	67	-65	0.948	0.955
HUN	Hungary	3,216	2,652	775	176	747	163	1,277	2,871	660	2,288	17.6	0.6	21.8	2,744	2,174	-2,483	170	609	-1,117	0.966	0.969
LTU	Lithuania	290	274	26	6	22	5	29	295	8	278	5.6	-3.6	21.4	278	260	-283	-36	23	14	0.942	0.948
LVA	Latvia	195	179	28	10	26	9	27	92	9	75	8.1	-99.5	35.9	183	159	-80	8	28	-24	0.940	0.947
MLT	Malta	288	273	21	5	20	4	32	78	15	62	5.2	-196.7	19.8	228	21	-58	-29	-61	48	0.936	0.948
POL	Poland	2,023	1,844	290	92	264	76	261	4,065	53	3,876	8.9	43.7	28.7	1,452	1,353	-3,509	66	250	-220	0.946	0.954
SVK	Slovak Republic	188	160	44	15	43	14	74	784	43	755	14.8	71.6	32.4	107	31	-706	-2	32	-54	0.952	0.956
SVN	Slovenia	234	207	39	10	36	8	40	186	9	158	11.5	-26.8	22.4	194	165	-152	-2	25	-22	0.948	0.953
ALB	Albania	64	63	1	0	1	0	1	101	1	101	0.8	33.0	37.4	63	57	-101	0	1	-1	0.945	0.948
BGR	Bulgaria	369	338	45	8	38	6	60	465	22	433	8.3	17.3	15.6	328	270	-428	5	38	-53	0.949	0.964
HRV	Croatia	366	345	35	9	30	7	55	636	28	613	5.8	39.0	24.6	358	323	-628	7	33	-53	0.945	0.958
ROM	Romania	1,086	1,057	43	11	37	7	57	1,060	23	1,030	2.7	-6.2	19.3	884	730	-865	-26	22	-3	0.943	0.961

Country Code	Country Name	China actual exports to partners	China direct exports to Partners	Hong Kong total exports to partner	Hong Kong domestic export to partner	China re-exports to partner via Hong kong	Hong Kong re-export markup	Partners total imports from Hong Kong	Partners total imports from China	Partner imports of Hong Kong domestic products	Partner direct import from China	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	China reported balance of trade with partners	Partner reported balance of trade with China	Partners balance of trade with Hong Kong after adjustment	Hong Kong reported balance of trade with partners	Partner reported balance of trade with Hong Kong	fob/cif ratio, China to partner	fob/cif ratio, Hong Kong to partner
SER	Yugoslavia	170	163	13	4	12	4	13	543	4	535	4.3	65.3	35.0	169	150	-541	4	10	-10	0.946	0.954
UKR	Ukraine	1,490	1,444	62	10	57	8	59	266	4	218	3.1	-404.5	14.4	1,115	403	95	-2	42	-32	0.946	0.954
RUS	Russian Federation	9,355	9,102	427	120	361	96	333	4,734	10	4,470	2.7	-105.7	26.6	812	-3,009	3,635	20	-89	-16	0.942	0.954
KAZ	Kazakhstan	2,216	2,212	10	6	10	5	6	530	1	526	0.2	-340.7	53.6	837	-74	846	5	7	-2	0.943	0.948
KGZ	Kyrgyz Republic	492	492	1	0	0	0	0	80	0	80	0.1	-548.4	15.6	451	381	-41	0	-1	1	0.939	0.935
ARG	Argentina	982	852	174	28	151	15	180	1,401	28	1,265	13.2	23.5	10.1	-1,796	-2,407	1,246	-7	-50	-8	0.953	0.958
BRA	Brazil	4,334	3,675	833	114	778	92	1,121	4,050	372	3,363	15.2	-5.3	11.8	-1,423	-5,030	1,388	-280	-62	-345	0.945	0.959
CHL	Chile	1,947	1,689	313	36	303	31	362	1,846	72	1,575	13.3	-7.7	10.1	-1,361	-1,989	1,366	-5	122	-224	0.949	0.953
COL	Colombia	696	629	91	20	86	16	98	1,234	23	1,164	9.6	37.8	19.0	548	453	-1,092	11	71	-78	0.947	0.953
ECU	Ecuador	369	344	36	8	34	7	36	704	7	677	6.9	42.3	21.9	317	250	-653	3	24	-29	0.943	0.949
PER	Peru	461	418	61	14	55	9	72	768	22	723	9.3	34.4	17.1	-790	-1,109	468	-2	24	-40	0.946	0.947
PRY	Paraguay	337	235	132	19	124	17	143	486	27	380	30.3	22.5	14.1	287	175	-442	13	112	-133	0.963	0.965
VEN	Venezuela	652	596	76	15	73	13	98	185	34	125	8.7	-173.7	17.9	488	-147	-26	4	61	-78	0.945	0.947
URY	Uruguay	228	210	25	4	22	3	31	173	10	154	8.1	-29.5	13.7	105	99	-61	-4	-5	-12	0.954	0.959
CRI	Costa Rica	172	154	26	7	25	6	77	270	57	251	10.3	39.5	25.4	-33	-490	-107	-47	-246	62	0.944	0.948
GTM	Guatemala	475	393	116	28	110	23	156	198	62	111	17.3	-77.7	21.1	455	349	-179	27	113	-155	0.939	0.940
PAN	Panama	2,650	2,187	582	77	548	61	547	501	21	19	17.5	-221.8	11.1	2,639	2,171	-490	71	567	-538	0.954	0.962
DZA	Algeria	976	971	8	2	7	2	32	919	26	913	0.5	-9.2	25.8	713	711	-656	2	8	-32	0.944	0.955
EGY	Egypt Arab Rep	1,429	1,345	131	34	112	24	144	563	41	474	5.9	-134.2	21.1	1,318	1,150	-460	31	67	-131	0.944	0.947
IRN	Iran Islamic Rep	2,506	2,476	50	9	36	5	51	1,145	9	1,113	1.2	-122.5	13.8	2,291	-2,021	-956	-39	-79	30	0.947	0.960
ISR	Israel	1,878	1,540	873	202	495	138	1,889	1,469	1,178	1,113	18.0	13.2	27.9	932	509	-688	-1,189	-252	21	0.946	0.943
JOR	Jordan	761	623	201	51	185	39	206	681	47	535	18.1	-14.8	21.2	720	534	-641	50	196	-204	0.945	0.946
LBN	Lebanon	511	484	46	12	38	10	46	448	9	420	5.2	-20.1	26.1	503	470	-444	4	38	-34	0.936	0.945
MAR	Morocco	954	935	30	9	26	6	52	746	30	726	2.0	-30.8	22.8	829	720	-695	7	-84	42	0.941	0.951
NGA	Nigeria	1,787	1,719	120	35	99	28	203	751	113	680	3.8	-114.2	28.5	1,704	1,253	-675	35	100	-195	0.949	0.951
SAU	Saudi Arabia	2,988	2,776	295	55	266	43	275	1,771	22	1,547	7.1	-70.9	16.0	-4,625	-4,749	5,676	-96	-75	44	0.937	0.949
SYR	Syrian Arab Republic	721	690	42	7	37	5	37	310	0	278	4.2	-132.2	13.6	700	662	-289	7	41	-36	0.948	0.963
TUN	Tunisia	254	245	15	4	13	3	33	291	22	282	3.6	12.6	26.2	224	211	-266	3	7	-26	0.945	0.955
TUR	Turkey	3,163	2,804	513	73	422	47	586	4,476	129	4,103	11.4	23.5	11.2	2,786	2,205	-4,139	-26	358	-441	0.947	0.960
YEM	Yemen	455	452	6	2	3	0	6	234	3	231	0.6	-104.9	14.0	-716	-1,007	935	-4	-10	3	0.936	0.952
BEN	Benin	580	577	6	1	4	0	8	48	3	45	0.5	-1019.8	12.6	563	466	-30	0	6	-8	0.943	0.951
GHA	Ghana	524	510	24	7	18	4	47	188	30	173	2.6	-149.4	20.2	491	430	-155	6	-72	32	0.937	0.944
KEN	Kenya	396	347	67	14	60	8	69	188	13	137	12.4	-90.8	13.1	364	312	-178	12	16	-43	0.944	0.948
MOZ	Mozambique	78	75	5	1	4	1	5	18	1	15	3.9	-280.5	25.3	65	31	-11	1	-8	1	0.944	0.949
MWI	Malawi	20	19	2	0	2	0	4	25	3	24	6.9	20.3	19.0	20	19	-25	0	2	-4	0.947	0.950
MDG	Madagascar	224	152	103	23	91	16	88	174	3	98	32.0	-32.7	17.0	211	134	-165	17	94	-78	0.938	0.936
SDN	Sudan	731	730	7	2	2	0	11	263	6	261	0.2	-186.4	20.6	586	-981	-122	-3	-1	-2	0.942	0.960
TGO	Togo	422	399	29	4	29	4	40	56	14	31	5.6	-394.6	14.3	404	352	-38	3	26	-38	0.951	0.964
TZA	Tanzania	228	215	17	3	16	2	22	175	7	162	5.7	-31.1	14.7	142	133	-104	-2	-19	10	0.943	0.952
UGA	Uganda	74	71	4	1	4	1	17	103	14	99	4.2	30.7	18.0	53	44	-97	-12	-13	12	0.947	0.949
ZAF	South Africa	3,414	2,952	745	121	581	95	1,073	3,582	420	3,098	13.5	6.0	16.4	2,192	411	-2,526	-173	55	-503	0.948	0.954
ZMB	Zambia	52	51	2	1	2	0	9	46	7	44	2.5	-5.4	26.2	22	-120	-16	-1	-10	3	0.961	0.963
ZWE	Zimbabwe	80	78	3	1	2	1	11	65	9	63	2.1	-14.9	27.6	-34	-63	47	-2	-8	-2	0.953	0.951
OTH	Other reporting count	3,927	3,364	789	157	708	112	1,113	3,417	446	2,823	14.3	-10.9	15.9	2,204	-4,301	-1,781	59	527	-864	0.942	0.947
NRP	No reporting partner (	12,863	11,739	2,425	381	1,384	206	2,147	1,178	0	0	8.7	-382.5	14.9	-25,154	11,540	36,665	381	2,128	-1,867	0.943	0.951
PTN	Partner Total	564,172	491,441	144,986	51,618	110,863	34,417	147,933	661,451	49,847	585,209				119,618	-7,633	-282,386	-38,889	-8,145	24,562		
HKG	Hong Kong China	36,297	100,215	0	0	0	0	0	82,410	0	12,363	0.0	0.0	0.0	24,768	88,676	-834	0	0	0	0.951	
CHN	China	0	0	78,989	11,529	0	0	82,345	0	11,539	0	0.0	-28.2	0.0	0	0	0	-24,768	-834	88,676		0.952
WLD	World Total	600,470	591,656	223,975	63,148	110,863	34,417	230,279	743,862	61,386	597,572	12.1	3.9	31.0	144,385	81,043	-283,220	-63,656	-8,979	113,238		

Table 2 Initial Estimates of Bilateral Trade Between China, Hong Kong and their Partner Countries, Westbound Flows, 2004, in Millions of U.S. Dollars

Country Code	Country Name	Partner actual exports to China	Partner direct exports to China	Partner total exports to Hong Kong	Partner exports remain in Hong Kong	Partner re-exports to China via Hong kong	Hong Kong re-export markup	Hong Kong total imports from partners	China total imports from partners	Hong Kong retained imports from partner	China direct import from partner	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	Partners balance of trade with Hong Kong after adjustment	fob/cif ratio, partner to China	fob/cif ratio, partner to Hong Kong
	Variable in the model	TX0(s,CH)	DX0(s,CH)	TX0(s,Hk)	DX0(s,Hk)	RX0(s,CH)	RXM0(s,CH)	TM0(s,HK)	TM0(s,CH)	DM0(s,HK)	DM0(s,CH)	(RX0(r,CH)-RXM0(r,CH))/RX0(r,CH)	SDX(s)	RXM0(CH,r)/RX0(CH,r)	TX0(CH,r)-TX0(r,CH)	TX0(HK,r)-TX0(r,HK)	cif(s,CH)	cif(s,HK)
USA	United States	38,873	34,058	15,505	9,036	5,795	781	14,456	44,723	7,727	39,716	12.3	1.7	13.5	-108,876	-8,671	0.963	0.965
CAN	Canada	5,625	5,090	1,068	476	585	30	1,203	7,346	589	6,790	9.4	16.3	5.1	-4,395	-600	0.948	0.958
MEX	Mexico	681	474	484	209	309	97	334	2,142	53	1,929	29.9	48.5	31.3	-4,952	-17	0.971	0.972
AUS	Australia	6,825	6,309	2,035	1,271	581	42	1,864	11,543	1,067	11,001	7.5	25.7	7.3	-3,637	209	0.911	0.940
NZL	New Zealand	1,205	1,100	372	256	131	21	325	1,413	203	1,303	8.6	2.5	15.7	-107	123	0.943	0.936
JPN	Japan	89,163	70,608	32,979	11,092	20,625	1,600	32,914	94,257	10,476	75,231	20.5	-1.7	7.8	7,920	6,790	0.969	0.972
KOR	Korea Rep	56,061	49,757	18,127	10,840	6,730	225	12,897	62,160	5,387	55,655	11.1	-3.8	3.3	26,748	8,724	0.964	0.968
TWN	Taiwan China	47,176	33,997	29,728	15,285	14,773	1,237	19,895	64,778	5,069	51,242	27.4	4.8	8.4	31,984	13,065	0.968	0.968
SGP	Singapore	17,373	15,122	17,200	14,358	2,471	150	14,243	13,966	11,311	11,644	12.7	-29.0	6.1	2,611	12,263	0.969	0.966
MAC	Macao	402	392	309	145	12	2	293	217	124	206	2.5	-75.3	13.3	-1,366	-207	0.960	0.968
IDN	Indonesia	4,365	3,652	1,263	437	826	79	1,765	7,198	899	6,451	16.0	31.4	9.6	-2,521	156	0.935	0.938
MYS	Malaysia	11,683	8,395	7,471	3,263	4,169	818	6,666	18,160	2,385	14,808	27.5	16.4	19.6	2,734	2,178	0.958	0.977
PHL	Philippines	3,983	2,161	3,221	794	1,879	38	4,331	9,075	1,876	7,232	44.6	41.1	2.0	-1,243	-282	0.986	0.987
THA	Thailand	7,760	5,543	4,205	1,481	2,447	138	4,849	11,543	2,022	9,234	28.2	20.4	5.7	944	472	0.952	0.959
VNM	Vietnam	1,532	1,432	388	219	111	11	448	2,482	278	2,382	6.2	32.1	10.2	-3,294	-98	1.000	1.000
KHM	Cambodia	8	7	355	353	1	0	8	30	6	29	14.0	-917.5	5.5	-748	243	0.956	0.944
BGD	Bangladesh	60	24	93	54	45	8	88	69	47	31	59.1	-4.6	17.9	-2,122	-121	0.957	0.962
IND	India	5,868	5,285	3,670	1,955	621	16	3,773	7,731	2,010	7,119	9.7	-0.7	2.5	-698	1,577	0.903	0.978
LKA	Sri Lanka	27	17	69	45	12	1	65	27	41	16	37.1	-25.7	7.5	-867	-137	0.924	0.956
PAK	Pakistan	693	306	590	189	428	26	603	596	185	193	55.0	-13.0	6.0	-1,599	154	0.959	0.961
AUT	Austria	1,275	1,160	470	325	134	15	512	1,511	361	1,392	8.9	8.9	11.5	150	131	0.971	0.942
BEL	Belgium	3,029	2,739	1,924	1,273	387	86	1,797	3,534	1,128	3,231	9.1	-3.3	22.1	-3,515	744	0.960	0.976
DEU	Germany	27,443	24,847	5,238	2,183	2,923	245	5,131	30,378	1,980	27,699	9.3	3.8	8.4	-1,077	-569	0.971	0.970
DNK	Denmark	1,374	797	812	223	677	75	739	1,568	125	925	40.9	1.2	11.0	-961	-109	0.964	0.960
ESP	Spain	1,509	1,353	510	323	180	18	469	1,759	273	1,593	10.1	4.1	9.8	-5,108	-259	0.958	0.956
FIN	Finland	2,662	2,430	539	176	253	14	482	3,109	108	2,859	8.4	4.5	5.5	-417	-89	0.972	0.970
FRA	France	6,853	6,342	2,603	1,731	592	65	2,393	7,670	1,493	7,143	7.3	-0.2	11.0	-5,129	632	0.974	0.972
GBR	United Kingdom	4,951	4,119	4,927	2,907	970	114	4,048	4,801	1,990	3,942	16.4	-28.5	11.8	-14,267	-680	0.969	0.976
GRC	Greece	79	73	62	51	11	4	47	87	35	80	7.8	-16.0	39.2	-1,469	-24	0.931	0.955
IRL	Ireland	972	770	1,050	743	484	279	1,027	1,192	717	987	20.2	2.8	57.7	-1,378	568	0.984	0.986
ITA	Italy	6,737	5,450	3,657	2,160	1,537	207	3,337	6,490	1,792	5,138	18.8	-11.3	13.5	-4,202	1,104	0.969	0.968
LUX	Luxembourg	127	115	25	12	13	1	26	129	13	117	9.2	-3.2	8.1	-818	-1	0.956	0.966
NLD	Netherlands	3,012	2,749	1,059	742	301	29	1,550	2,985	1,223	2,712	8.5	5.6	9.7	-17,767	-948	0.964	0.965
PRT	Portugal	134	117	76	49	21	3	67	281	39	263	12.8	34.8	12.9	-550	5	0.950	0.970
SWE	Sweden	2,728	2,501	581	317	286	53	507	3,341	235	3,107	8.2	10.1	18.4	423	28	0.969	0.970
CHE	Switzerland	2,932	2,473	3,279	2,136	516	47	3,496	3,169	2,327	2,698	15.3	-5.9	9.1	1,085	1,484	0.978	0.977
NOR	Norway	821	775	307	256	70	22	179	1,399	125	1,352	5.6	23.7	32.1	-387	112	0.944	0.951
CYP	Cyprus	4	3	7	6	1	1	7	2	6	2	18.1	-23.4	49.4	-203	-1	0.976	0.993
CZE	Czech Republic	318	271	184	110	56	8	148	442	71	395	14.4	7.5	14.5	-1,197	14	0.970	0.970
EST	Estonia	37	36	8	6	2	0	5	21	4	19	3.5	-79.4	11.2	-197	-31	0.964	0.967
HUN	Hungary	472	387	160	6	94	7	166	477	9	391	17.7	-11.5	7.6	-2,744	-170	0.977	0.981
LTU	Lithuania	12	12	42	42	0	0	3	14	2	13	1.5	-254.5	29.5	-278	36	0.959	0.996
LVA	Latvia	11	11	3	3	0	0	0	20	0	20	0.9	24.0	4.9	-183	-8	0.959	0.965
MLT	Malta	59	20	80	33	53	12	82	252	34	212	65.5	55.6	23.6	-228	29	0.990	0.991
POL	Poland	571	556	41	26	17	2	40	490	24	475	2.5	-20.3	10.0	-1,452	-66	0.960	0.958
SVK	Slovak Republic	81	78	21	17	3	0	12	129	8	125	3.6	24.5	9.8	-107	2	0.963	0.966
SVN	Slovenia	40	34	17	11	6	1	13	42	7	37	13.1	-6.8	11.9	-194	2	0.971	0.971
ALB	Albania	1	1	0	0	0	0	0	6	0	6	4.8	88.1	4.0	-63	0	0.999	0.998
BGR	Bulgaria	40	37	7	3	4	1	8	68	4	65	7.4	31.5	14.9	-328	-5	0.929	0.980
HRV	Croatia	8	7	3	2	0	0	2	22	2	22	4.1	56.6	21.4	-358	-7	0.987	0.978

Country Code	Country Name	Partner actual exports to China	Partner direct exports to China	Partner total exports to Hong Kong	Partner exports remain in Hong Kong	Partner re-exports to China via Hong kong	Hong Kong re-export markup	Hong Kong total imports from partners	China total imports from partners	Hong Kong retained imports from partner	China direct import from partner	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	Partners balance of trade with Hong Kong after adjustment	fob/cif ratio, partner to China	fob/cif ratio, partner to Hong Kong
ROM	Romania	202	195	53	37	21	13	21	327	5	320	3.3	19.2	64.9	-884	26	0.941	0.974
SER	Yugoslavia	2	1	3	1	1	0	3	13	0	12	38.8	53.6	22.2	-169	-4	0.964	0.977
UKR	Ukraine	375	361	27	12	16	1	19	1,041	4	1,027	3.6	59.4	8.2	-1,115	2	0.949	0.955
RUS	Russian Federation	8,543	8,369	317	99	195	10	516	12,111	285	11,927	2.0	24.9	5.2	-812	-20	0.940	0.938
KAZ	Kazakhstan	1,379	1,376	4	1	4	0	3	2,286	0	2,283	0.2	36.0	8.4	-837	-5	0.951	0.943
KGZ	Kyrgyz Republic	41	39	2	0	1	0	2	111	0	110	3.2	59.8	7.6	-451	0	0.947	0.996
ARG	Argentina	2,779	2,647	172	35	149	13	224	3,260	81	3,123	4.7	10.8	8.7	1,796	7	0.949	0.962
BRA	Brazil	5,757	5,438	776	395	352	19	895	8,705	497	8,370	5.4	24.9	5.5	1,423	280	0.927	0.960
CHL	Chile	3,308	3,213	138	41	108	8	191	3,678	88	3,577	2.9	5.8	6.9	1,361	5	0.948	0.943
COL	Colombia	148	142	20	9	7	0	20	177	8	170	4.2	9.4	2.9	-548	-11	0.963	0.958
ECU	Ecuador	52	50	7	5	2	0	11	93	9	91	3.3	42.4	10.4	-317	-3	0.992	0.950
PER	Peru	1,251	1,236	32	15	18	2	37	1,527	20	1,511	1.2	10.8	9.5	790	2	0.920	0.952
PRY	Paraguay	50	45	11	5	6	0	19	60	14	54	10.0	19.8	2.0	-287	-13	0.953	0.940
VEN	Venezuela	164	159	21	11	6	1	15	742	5	736	3.1	72.2	8.5	-488	-4	0.950	0.962
URY	Uruguay	123	112	20	8	11	0	30	111	18	99	8.6	-6.0	1.9	-105	4	0.962	0.967
CRI	Costa Rica	205	163	139	54	118	75	273	644	186	601	20.1	57.4	63.6	33	47	0.988	0.986
GTM	Guatemala	20	19	1	0	1	0	3	43	2	43	2.5	53.4	7.1	-455	-27	0.998	0.977
PAN	Panama	12	11	8	7	1	0	16	16	14	14	8.4	31.2	5.6	-2,639	-71	0.958	0.936
DZA	Algeria	262	262	0	0	0	0	0	259	0	259	0.0	-2.0	8.2	-713	-2	0.992	0.997
EGY	Egypt Arab Rep	112	102	13	3	10	0	64	196	54	185	8.2	46.9	3.0	-1,318	-31	0.934	0.944
IRN	Iran Islamic Rep	216	189	82	48	31	3	128	4,497	93	4,469	11.7	93.0	9.2	-2,291	39	0.934	0.971
ISR	Israel	946	780	1,911	1,391	216	21	1,125	1,031	563	792	16.9	-58.7	9.8	-932	1,189	0.958	0.959
JOR	Jordan	41	40	2	1	1	0	6	89	5	88	2.0	52.2	4.3	-720	-50	0.977	0.983
LBN	Lebanon	8	4	12	8	4	0	8	13	4	9	44.6	5.4	5.5	-503	-4	0.972	0.993
MAR	Morocco	126	50	94	2	82	6	114	215	21	139	58.3	26.7	7.7	-829	-7	0.972	0.993
NGA	Nigeria	83	76	8	0	8	1	20	467	12	460	7.5	80.0	7.3	-1,704	-35	0.943	0.966
SAU	Saudi Arabia	7,613	7,447	319	151	195	18	371	7,525	193	7,348	2.2	-7.2	9.3	4,625	96	0.937	0.940
SYR	Syrian Arab Republic	21	21	1	0	1	0	1	28	0	28	2.3	23.8	8.3	-700	-7	0.997	0.970
TUN	Tunisia	30	26	7	1	6	1	8	34	1	29	15.3	2.6	16.2	-224	-3	0.931	0.959
TUR	Turkey	377	337	144	100	47	6	155	599	109	557	10.3	24.5	13.1	-2,786	26	0.921	0.941
YEM	Yemen	1,171	1,169	9	6	2	0	16	1,459	12	1,457	0.2	14.9	7.0	716	4	0.940	0.977
BEN	Benin	17	17	1	0	0	0	0	111	0	111	0.1	83.9	1.0	-563	0	0.997	0.992
GHA	Ghana	33	33	79	1	0	0	96	80	0	80	0.9	-28.4	11.3	-491	-6	0.932	0.823
KEN	Kenya	32	11	26	2	24	1	52	35	26	11	64.9	26.2	4.8	-364	-12	0.945	0.953
MOZ	Mozambique	13	7	6	0	7	1	12	45	6	38	37.2	63.3	13.0	-65	-1	0.919	0.930
MWI	Malawi	0	0	0	0	0	0	0	0	0	0	30.4	-86.4	13.6	-20	0	0.980	0.986
MDG	Madagascar	13	9	10	6	4	0	9	18	4	14	31.4	0.0	3.3	-211	-17	0.882	0.858
SDN	Sudan	146	141	9	5	5	0	8	1,711	3	1,705	3.2	90.4	2.8	-586	3	0.943	0.982
TGO	Togo	18	18	2	1	1	0	4	47	3	46	3.2	58.1	9.2	-404	-3	0.999	0.988
TZA	Tanzania	86	71	32	4	16	1	35	82	5	65	16.2	-23.0	4.7	-142	2	0.912	0.928
UGA	Uganda	20	5	29	13	17	2	17	27	0	10	71.1	-22.3	9.4	-53	12	0.958	0.953
ZAF	South Africa	1,222	1,057	571	294	183	10	691	2,541	399	2,367	13.2	35.6	5.4	-2,192	173	0.920	0.955
ZMB	Zambia	31	29	12	1	1	0	12	171	1	170	4.2	71.4	4.9	-22	1	0.969	0.965
ZWE	Zimbabwe	114	112	9	3	3	0	10	141	5	139	2.1	13.2	4.1	34	2	0.955	0.972
OTH	Other reporting countries	1,723	1,636	249	98	102	10	262	7,665	104	7,572	4.9	72.6	9.8	-2,204	-59	0.933	0.940
NRP	No reporting partner countr	38,018	37,843	280	0	201	16	298	199	0	0	0.5	-8111.9	7.9	25,154	-381	0.979	0.942
PTN	Partner Total	444,555	379,065	172,495	90,507	74,329	6,869	153,132	499,074	68,750	431,445				-119,618	38,889		
HKG	Hong Kong China	11,529	78,989		0	0	0	0	11,539		82,345	0.0	-9.2	0.0	-24,768	0	0.952	
CHN	China	0		100,215	36,297	0	0	82,410	0	12,363	0	0.0	-8.2	0.0	0	24,768		0.951
WLD	World Total	456,084	458,054	272,710	126,804	74,329	6,869	235,542	510,613	81,113	513,791	12.3	-2.5	9.2	-144,385	63,656		

Table 3 Adjusted Estimates of Bilateral Trade Between China, Hong Kong and their Partner Countries, Eastbound Flows, 2004, in Millions of U.S. Dollars

Country Code	Country Name	China actual exports to partners	China direct exports to Partners	Hong Kong total exports to partner	Hong Kong domestic export to partner	China re-exports to partner via Hong kong	Hong Kong re-export markup	Partners total imports from Hong Kong	Partners total imports from China	Partner imports of Hong Kong domestic products	Partner direct import from China	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	China reported balance of trade with partners	Partner reported balance of trade with China	Partners balance of trade with Hong Kong after adjustment	Hong Kong reported balance of trade with partners	Partner reported balance of trade with Hong Kong	fob/cif ratio, China to partner	fob/cif ratio, Hong Kong to partner
	Variable in the model	TX(CH,r)	DX(CH,r)	TX(HK,r)	DX(HK,r)	RX(s,CH)	RXM(CH,r)	TM(HK,r)	TM(CH,r)	DM(HK,r)	DM(CH,r)	(RX(CH,r)-RXM(CH,r))/RX(CH,r)	SDX(r)	RXM(CH,r)/RX(CH,r)	TX(CH,r)-TX(r,CH)	TX0(CH,r)-TM0(r,CH)	TX0(r,CH)-TM0(CH,r)	TX(HK,r)-TX(r,HK)	TX0(HK,r)-TM0(r,HK)	TX0(r,HK)-TM0(HK,r)	cif(CH,r)	cif(HK,r)
USA	United States	167,059	148,529	31,128	9,284	35,587	16,095	33,104	176,838	9,893	157,322	11.1	0.0	45.2	126,105	80,395	-174,095	1,640	29,469	-21,543	0.945	0.939
CAN	Canada	12,837	11,192	2,410	598	2,761	1,029	2,539	13,587	631	11,857	12.8	0.0	37.3	6,661	816	-13,436	68	1,929	-1,654	0.944	0.947
MEX	Mexico	7,389	6,773	951	288	808	163	996	7,749	302	7,104	8.3	0.0	20.2	6,170	2,831	-13,529	189	604	-668	0.952	0.954
AUS	Australia	11,095	9,604	2,819	892	2,493	926	2,957	11,667	939	10,110	13.4	0.0	37.2	2,562	-2,704	-6,755	-98	1,326	-1,132	0.951	0.953
NZL	New Zealand	1,680	1,460	351	95	355	125	367	1,770	100	1,542	13.1	0.0	35.1	479	-336	-1,080	-105	88	-25	0.949	0.955
JPN	Japan	84,747	77,470	10,001	1,300	11,977	4,362	10,463	89,683	1,368	82,088	8.6	0.0	36.4	-4,948	-21,035	-22,981	-7,897	-19,115	21,704	0.946	0.954
KOR	Korea Rep	27,351	25,846	5,092	1,618	2,832	1,271	5,274	29,161	1,679	27,603	5.5	0.0	44.9	-30,132	-34,350	20,173	-3,658	-7,244	11,198	0.941	0.966
TWN	Taiwan China	14,908	13,300	5,606	1,936	2,486	812	5,805	15,717	2,008	14,057	10.8	0.0	32.7	-39,290	-51,289	17,373	-5,131	-13,597	23,439	0.950	0.967
SGP	Singapore	14,035	12,041	5,996	2,942	3,456	1,384	6,214	14,589	3,049	12,531	14.2	0.0	40.0	416	-1,282	-889	-8,584	-8,655	9,981	0.961	0.966
MAC	Macao	1,599	1,411	1,205	286	256	57	1,254	1,683	299	1,487	11.8	0.0	22.2	1,470	1,388	-1,140	209	950	-984	0.951	0.963
IDN	Indonesia	3,169	2,651	973	275	851	309	1,024	3,388	291	2,845	16.3	0.0	36.3	-2,105	-942	793	-259	-661	175	0.939	0.951
MYS	Malaysia	8,667	7,813	3,002	1,943	1,625	736	3,120	9,071	2,018	8,186	9.9	0.0	45.3	-5,587	-10,073	-1,704	-471	-4,377	3,444	0.954	0.965
PHL	Philippines	2,187	1,498	2,799	1,654	1,679	962	2,913	2,313	1,722	1,599	31.5	0.0	57.3	-3,365	-4,806	273	369	-1,816	-1	0.950	0.961
THA	Thailand	5,787	4,775	2,521	948	1,838	784	2,619	6,038	987	4,990	17.5	0.0	42.6	-3,116	-5,757	-579	-725	-2,210	1,420	0.953	0.964
VNM	Vietnam	1,794	1,279	1,516	672	746	202	1,516	1,794	672	1,279	28.7	0.0	27.0	-22	1,777	-223	428	771	-1,319	1.000	1.000
KHM	Cambodia	587	356	604	339	393	149	631	614	355	373	39.3	0.0	37.9	575	422	-351	335	443	-423	0.952	0.956
BGD	Bangladesh	1,225	889	709	323	418	63	750	1,296	343	941	27.4	0.0	15.0	1,103	1,826	-1,109	272	419	-685	0.946	0.944
IND	India	6,280	5,623	2,403	800	813	130	2,543	6,634	848	5,954	10.5	0.0	16.0	-239	-1,807	-1,403	-1,067	-1,678	172	0.950	0.945
LKA	Sri Lanka	506	255	799	494	355	90	841	536	521	273	49.5	0.0	25.4	481	668	-449	448	363	-811	0.945	0.949
PAK	Pakistan	1,595	1,534	164	77	84	21	172	1,689	81	1,626	3.8	0.0	24.7	1,068	1,635	-1,181	-100	-477	401	0.947	0.957
AUT	Austria	1,565	1,247	525	172	513	183	548	1,642	181	1,312	20.3	0.0	35.6	205	-731	-1,449	-142	71	-134	0.956	0.958
BEL	Belgium	6,862	6,327	1,475	580	1,047	491	1,573	7,266	624	6,709	7.8	0.0	46.9	3,676	2,327	-5,548	-531	-188	-20	0.943	0.943
DEU	Germany	32,370	28,163	7,056	2,322	6,905	2,521	7,363	33,889	2,435	29,515	13.0	0.0	36.5	4,208	-6,625	-15,831	360	2,940	-2,800	0.957	0.956
DNK	Denmark	2,195	1,844	733	325	578	212	767	2,319	341	1,953	16.0	0.0	36.6	798	379	-1,880	195	67	-40	0.949	0.954
ESP	Spain	8,096	7,067	1,591	386	1,637	557	1,673	8,569	408	7,489	12.7	0.0	34.0	6,510	3,718	-9,256	123	1,411	-1,214	0.944	0.950
FIN	Finland	2,228	1,626	786	143	818	194	819	2,343	150	1,717	27.0	0.0	23.8	-645	-614	-37	-15	426	-276	0.956	0.959
FRA	France	15,170	13,315	2,854	745	2,981	1,040	2,991	15,936	784	13,997	12.2	0.0	34.9	8,047	2,252	-14,025	-734	1,016	-561	0.954	0.952
GBR	United Kingdom	21,090	17,322	7,848	3,508	6,849	2,896	8,250	22,265	3,701	18,316	17.9	0.0	42.3	16,491	10,151	-22,087	1,483	4,402	-3,558	0.949	0.950
GRC	Greece	1,538	1,398	234	80	228	81	247	1,633	85	1,486	9.1	0.0	35.6	1,462	1,293	-1,692	43	215	-219	0.942	0.945
IRL	Ireland	2,692	2,484	579	356	328	111	605	2,813	372	2,596	7.7	0.0	33.9	1,656	946	-2,747	-357	-608	189	0.957	0.955
ITA	Italy	12,150	10,748	2,276	664	2,654	1,184	2,385	12,847	697	11,379	11.5	0.0	44.6	6,019	2,735	-9,250	-1,072	-336	918	0.946	0.951
LUX	Luxembourg	44	34	265	219	35	24	269	47	220	36	24.3	0.0	68.4	-72	788	40	208	46	-96	0.985	0.955
NLD	Netherlands	17,070	14,874	4,271	1,865	3,555	1,270	4,437	17,830	1,934	15,547	12.9	0.0	35.7	14,289	15,534	-15,077	890	2,702	-3,591	0.956	0.960
PRT	Portugal	549	455	138	34	135	36	146	588	36	489	17.2	0.0	26.5	381	307	-453	-8	83	-73	0.937	0.947
SWE	Sweden	2,126	1,726	1,004	577	652	235	1,057	2,254	610	1,836	18.8	0.0	36.0	-849	-1,481	105	344	260	-865	0.946	0.950
CHE	Switzerland	1,812	1,518	957	478	812	504	1,005	1,899	504	1,592	16.2	0.0	62.0	-1,118	-1,663	199	-1,584	-2,298	2,044	0.954	0.953
NOR	Norway	1,427	1,271	313	143	319	155	330	1,514	152	1,350	10.9	0.0	48.7	414	-371	-1,578	34	159	-121	0.945	0.949
CYP	Cyprus	191	173	38	18	27	9	40	202	19	184	9.2	0.0	32.1	156	183	-229	-46	24	-55	0.950	0.948
CZE	Czech Republic	2,126	1,984	269	115	252	104	280	2,216	120	2,069	6.7	0.0	41.2	1,766	909	-3,240	31	125	-163	0.960	0.960
EST	Estonia	268	238	65	32	64	33	68	282	33	250	11.1	0.0	51.7	246	181	-343	28	67	-65	0.948	0.955
HUN	Hungary	2,735	2,205	904	352	747	199	932	2,827	364	2,281	19.4	0.0	26.7	2,268	2,174	-2,483	334	609	-1,117	0.966	0.969
LTU	Lithuania	267	251	24	6	22	5	25	283	7	266	6.1	0.0	21.8	257	260	-283	-35	23	14	0.942	0.948
LVA	Latvia	96	83	22	8	26	12	23	102	8	89	13.4	0.0	47.9	85	159	-80	7	28	-24	0.940	0.947
MLT	Malta	72	59	24	10	20	6	26	77	11	63	18.3	0.0	29.2	-17	21	-58	-23	-61	48	0.936	0.948
POL	Poland	2,685	2,505	247	54	264	76	259	2,837	56	2,648	6.7	0.0	28.7	2,206	1,353	-3,509	31	250	-220	0.946	0.954
SVK	Slovak Republic	331	308	48	23	43	19	50	348	24	324	7.0	0.0	43.9	228	31	-706	-231	32	-54	0.952	0.956
SVN	Slovenia	180	155	34	7	36	10	36	190	8	164	13.8	0.0	28.2	144	165	-152	1	25	-22	0.948	0.953
ALB	Albania	62	62	5,985	5,984	1	0	6,255	66	6,254	65	0.8	0.0	41.8	61	57	-101	5,984	1	-1	0.945	0.948
BGR	Bulgaria	367	338	47	14	38	7	49	386	15	356	8.0	0.0	19.0	317	270	-428	11	38	-53	0.949	0.964
HRV	Croatia	400	380	37	14	30	9	39	423	15	402	4.9	0.0	30.9	390	323	-628	12	33	-53	0.945	0.958
ROM	Romania	805	778	43	14	37	9	45	854	15	825	3.4	0.0	24.3	555	730	-865	-24	22	-3	0.943	0.961
SER	Yugoslavia	282	276	11	4	12	5	11	298	4	292	2.2	0.0	45.3	272	150	-541	3	10	-10	0.946	0.954

Country Code	Country Name	China actual exports to partners	China direct exports to Partners	Hong Kong total exports to partner	Hong Kong domestic export to partner	China re-exports to partner via Hong kong	Hong Kong re-export markup	Partners total imports from Hong Kong	Partners total imports from China	Partner imports of Hong Kong domestic products	Partner direct import from China	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	China reported balance of trade with partners	Partner reported balance of trade with China	Partners balance of trade with Hong Kong after adjustment	Hong Kong reported balance of trade with partners	Partner reported balance of trade with Hong Kong	fob/cif ratio, China to partner	fob/cif ratio, Hong Kong to partner
UKR	Ukraine	518	475	55	6	57	12	57	549	7	505	8.3	0.0	20.6	26	403	95	-2	42	-32	0.946	0.954
RUS	Russian Federation	5,245	4,997	296	12	361	101	309	5,594	12	5,334	4.7	0.0	28.0	-4,475	-3,009	3,635	-1,159	-89	-16	0.942	0.954
KAZ	Kazakhstan	897	891	7	1	10	4	7	952	1	946	0.6	0.0	39.2	-739	-74	846	1	7	-2	0.943	0.948
KGZ	Kyrgyz Republic	204	204	0	0	0	0	1	218	0	218	0.2	0.0	15.7	146	381	-41	0	-1	1	0.939	0.935
ARG	Argentina	1,119	992	166	28	151	18	173	1,173	29	1,041	11.4	0.0	12.2	-1,813	-2,407	1,246	-36	-50	-8	0.953	0.958
BRA	Brazil	3,850	3,215	959	282	778	117	1,004	4,067	298	3,405	16.5	0.0	15.0	-3,069	-5,030	1,388	-149	-62	-345	0.945	0.959
CHL	Chile	1,774	1,527	317	54	303	43	333	1,870	57	1,611	13.9	0.0	14.3	-1,611	-1,989	1,366	-12	122	-224	0.949	0.953
COL	Colombia	879	820	83	20	86	25	87	927	21	865	6.7	0.0	28.5	734	453	-1,092	11	71	-78	0.947	0.953
ECU	Ecuador	484	462	32	8	34	11	34	513	9	489	4.6	0.0	31.0	412	250	-653	1	24	-29	0.943	0.949
PER	Peru	561	525	58	18	55	17	61	593	20	555	6.4	0.0	31.3	-788	-1,109	468	-695	24	-40	0.946	0.947
PRY	Paraguay	382	289	117	13	124	27	121	397	14	300	24.5	0.0	21.4	-1,368	175	-442	4	112	-133	0.963	0.965
VEN	Venezuela	207	160	76	25	73	23	80	221	26	171	22.7	0.0	31.9	-183	-147	-26	22	61	-78	0.945	0.947
URY	Uruguay	172	155	26	7	22	5	27	180	7	163	9.7	0.0	22.5	78	99	-61	-5	-5	-12	0.954	0.959
CRI	Costa Rica	196	182	38	23	25	11	40	207	24	193	7.1	0.0	42.2	-128	-490	-107	-78	-246	62	0.944	0.948
GTM	Guatemala	396	312	134	44	110	22	143	422	47	333	21.2	0.0	19.5	373	349	-179	43	113	-155	0.939	0.940
PAN	Panama	1,857	1,645	285	38	548	326	297	1,937	41	1,717	11.4	0.0	59.4	1,844	2,171	-490	33	567	-538	0.954	0.962
DZA	Algeria	883	878	18	11	7	2	18	934	12	928	0.6	0.0	23.9	12	711	-656	11	8	-32	0.944	0.955
EGY	Egypt Arab Rep	970	893	125	36	112	31	133	1,024	38	943	7.9	0.0	27.6	833	1,150	-460	11	67	-131	0.944	0.947
IRN	Iran Islamic Rep	1,324	1,296	46	9	36	7	48	1,394	9	1,365	2.1	0.0	20.1	-2,337	-2,021	-956	-65	-79	30	0.947	0.960
ISR	Israel	1,374	1,165	1,183	655	495	277	1,253	1,456	694	1,239	15.2	0.0	55.9	462	509	-688	27	-252	21	0.946	0.943
JOR	Jordan	628	489	197	47	185	39	209	665	50	518	22.0	0.0	21.1	605	534	-641	45	196	-204	0.945	0.946
LBN	Lebanon	400	376	40	8	38	13	42	426	9	401	6.0	0.0	33.3	391	470	-444	-2,553	38	-34	0.936	0.945
MAR	Morocco	727	710	40	21	26	8	42	773	22	755	2.4	0.0	29.6	595	720	-695	4	-84	42	0.941	0.951
NGA	Nigeria	859	806	145	75	99	44	152	908	79	853	6.1	0.0	44.5	652	1,253	-675	68	100	-195	0.949	0.951
SAU	Saudi Arabia	1,900	1,690	260	22	266	46	273	2,025	23	1,804	11.1	0.0	17.1	-5,295	-4,749	5,676	-119	-75	44	0.937	0.949
SYR	Syrian Arab Republic	393	362	36	1	37	5	37	416	1	384	7.8	0.0	13.1	-3,523	662	-289	0	41	-36	0.948	0.963
TUN	Tunisia	243	234	19	9	13	4	20	257	9	248	3.6	0.0	28.1	213	211	-266	7	7	-26	0.945	0.955
TUR	Turkey	3,604	3,243	526	106	422	46	548	3,809	111	3,433	10.0	0.0	10.8	3,138	2,205	-4,139	7	358	-441	0.947	0.960
YEM	Yemen	296	294	2,246	2,243	3	1	2,423	316	2,420	314	0.7	0.0	33.1	-1,015	-1,007	935	1,892	-10	3	0.936	0.952
BEN	Benin	402	400	5	2	4	2	6	426	2	424	0.5	0.0	45.9	361	466	-30	1	6	-8	0.943	0.951
GHA	Ghana	251	241	27	14	18	8	29	269	15	259	4.0	0.0	42.8	-4,280	430	-155	13	-72	32	0.937	0.944
KEN	Kenya	302	258	68	20	60	13	72	320	22	273	14.7	0.0	21.7	276	312	-178	12	16	-43	0.944	0.948
MOZ	Mozambique	69	67	4	1	4	1	5	82	1	79	4.0	0.0	31.9	-3,228	31	-11	0	-8	1	0.944	0.949
MWI	Malawi	21	20	365	363	2	0	394	22	392	21	6.6	0.0	18.8	21	19	-25	363	2	-4	0.947	0.950
MDG	Madagascar	209	153	65	2	91	33	70	223	2	164	26.6	0.0	35.6	169	134	-165	-2	94	-78	0.938	0.936
SDN	Sudan	286	284	9	4	2	1	10	304	4	302	0.4	0.0	35.8	-88	-981	-122	-225	-1	-2	0.942	0.960
TGO	Togo	190	178	26	13	29	17	27	199	13	187	6.3	0.0	56.6	160	352	-38	-5,382	26	-38	0.951	0.964
TZA	Tanzania	183	178	14	7	16	10	15	194	8	188	3.1	0.0	62.0	119	133	-104	-6,150	-19	10	0.943	0.952
UGA	Uganda	81	77	4,710	4,706	4	1	5,154	85	5,150	82	4.1	0.0	13.3	53	44	-97	3,826	-13	12	0.947	0.949
ZAF	South Africa	3,287	2,870	829	268	581	143	868	3,469	282	3,033	12.7	0.0	24.7	1,623	411	-2,526	-34	55	-503	0.948	0.954
ZMB	Zambia	427	426	167	165	2	0	192	449	190	447	0.3	0.0	18.3	-422	-120	-16	164	-10	3	0.961	0.963
ZWE	Zimbabwe	398	397	1,977	1,974	2	1	2,038	403	2,035	401	0.5	0.0	23.0	268	-63	47	-232	-8	-2	0.953	0.951
OTH	Other reporting countries	3,075	2,495	990	347	708	96	1,045	3,274	367	2,663	18.8	0.0	13.5	286	-4,301	-1,781	297	527	-864	0.942	0.947
NRP	No reporting partner coun	12,053	11,739	1,574	381	1,384	1,053	1,661	12,803	405	12,471	3	0.0	76.1	-25,965	11,540	36,665	-26	2,128	-1,867	0.943	0.951
PTN	Partner Total	567,923	504,582	140,113	58,106	110,863	44,523	147,262	599,606	61,271	533,389				82,214	-7,633	-282,386	-28,874	-8,145	24,562		
HKG	Hong Kong China	26,905	90,246	0	0	0	0	0	94,564	0	28,224	0.0	0.0	0.0	15,375	88,676	-834	0	0	0	0.951	
CHN	China	0	0	80,690	11,529	0	0	93,685	0	25,178	0	0.0	0.0	0.0	0	0	0	-15,375	-834	88,676		0.952
WLD	World Total	594,828	594,828	220,803	69,635	110,863	44,523	240,947	694,171	86,450	561,613	10.6	0.0	40.2	97,589	81,043	-283,220	-44,250	-8,979	113,238		

Table 4 Adjusted Estimates of Bilateral Trade Between China, Hong Kong and their Partner Countries, Westbound Flows, 2004, in Millions of U.S. Dollars

Country Code	Country Name	Partner actual exports to China	Partner direct exports to China	Partner total exports to Hong Kong	Partner domestic export to Hong Kong	Partner re-exports to China via Hong kong	Hong Kong re-export markup	Hong Kong total imports from partners	China total imports from partners	Hong Kong retained imports from partner	China direct import from partner	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	Partners balance of trade with Hong Kong after adjustment	fob/cif ratio, partner to China	fob/cif ratio, partner to Hong Kong
	Variable in the model	TX(s,CH)	DX(s,CH)	TX(s,Hk)	DX(s,Hk)	RX(s,CH)	RXM(s,CH)	TM(s,HK)	TM(s,CH)	DM(s,HK)	DM(s,CH)	(RX(r,CH)-RXM(r,CH))/RX(r,CH)	SDX(s)	RXM(CH,r)/RX(CH,r)	TX(CH,r)-TX(r,CH)	TX(HK,r)-TX(r,HK)	cif(s,CH)	cif(s,HK)
USA	United States	40,955	36,219	14,086	7,643	5,795	862	14,606	42,547	7,902	37,623	11.4	0.0	14.9	-126,105	-1,640	0.963	0.965
CAN	Canada	6,176	5,662	1,092	530	585	51	1,141	6,549	556	6,015	8.2	0.0	8.7	-6,661	-68	0.948	0.958
MEX	Mexico	1,219	1,027	330	100	309	113	339	1,265	103	1,068	15.4	0.0	36.6	-6,170	-189	0.971	0.972
AUS	Australia	8,533	8,026	1,759	990	581	52	1,866	9,416	1,064	8,888	5.9	0.0	9.0	-2,562	98	0.911	0.940
NZL	New Zealand	1,202	1,099	313	201	131	22	333	1,284	214	1,175	8.4	0.0	17.2	-479	105	0.943	0.936
JPN	Japan	89,695	71,257	30,591	9,197	20,625	1,718	31,448	92,539	9,507	73,632	20.2	0.0	8.3	4,948	7,897	0.969	0.972
KOR	Korea Rep	57,483	51,205	12,473	5,276	6,730	253	12,908	59,635	5,491	53,158	10.7	0.0	3.8	30,132	3,658	0.964	0.968
TWN	Taiwan China	54,198	42,072	20,199	7,067	14,773	2,299	20,795	56,029	7,292	43,555	22.0	0.0	15.6	39,290	5,131	0.968	0.968
SGP	Singapore	13,618	11,367	14,216	11,526	2,471	149	14,675	14,122	11,896	11,800	16.2	0.0	6.0	-416	8,584	0.969	0.966
MAC	Macao	129	123	242	77	12	6	249	134	80	128	4.8	0.0	47.1	-1,470	-209	0.960	0.968
IDN	Indonesia	5,274	4,593	1,333	534	826	113	1,434	5,648	596	4,935	12.7	0.0	13.7	2,105	259	0.935	0.938
MYS	Malaysia	14,254	11,020	6,330	2,413	4,169	873	6,504	14,835	2,517	11,540	22.2	0.0	20.9	5,587	471	0.958	0.977
PHL	Philippines	5,552	3,951	3,280	1,285	1,879	261	3,322	5,620	1,305	4,002	28.1	0.0	13.9	3,365	-369	0.986	0.987
THA	Thailand	8,903	6,888	4,146	1,673	2,447	346	4,332	9,356	1,760	7,255	22.3	0.0	14.1	3,116	725	0.952	0.959
VNM	Vietnam	1,816	1,738	395	244	111	34	395	1,816	244	1,738	4.0	0.0	30.4	22	-428	1.000	1.000
KHM	Cambodia	12	11	6	4	1	0	6	13	5	12	7.8	0.0	18.2	-575	-335	0.956	0.944
BGD	Bangladesh	122	87	91	51	45	8	95	125	53	88	28.7	0.0	18.6	-1,103	-272	0.957	0.962
IND	India	6,519	5,976	3,541	1,867	621	59	3,622	7,278	1,901	6,716	8.1	0.0	9.5	239	1,067	0.903	0.978
LKA	Sri Lanka	25	16	68	46	12	2	71	28	48	18	37.6	0.0	13.6	-481	-448	0.924	0.956
PAK	Pakistan	527	162	562	176	428	48	585	551	184	170	68.3	0.0	11.2	-1,068	100	0.959	0.961
AUT	Austria	1,360	1,254	451	314	134	24	482	1,399	339	1,289	7.7	0.0	18.1	-205	142	0.971	0.942
BEL	Belgium	3,186	2,900	1,742	1,111	387	89	1,788	3,320	1,139	3,022	8.5	0.0	23.0	-3,676	531	0.960	0.976
DEU	Germany	28,162	25,610	4,982	1,962	2,923	290	5,135	29,010	2,019	26,377	8.9	0.0	9.9	-4,208	-360	0.971	0.970
DNK	Denmark	1,397	881	657	131	677	139	684	1,446	135	908	35.9	0.0	20.5	-798	-195	0.964	0.960
ESP	Spain	1,586	1,435	453	263	180	22	473	1,653	275	1,495	9.4	0.0	12.2	-6,510	-123	0.958	0.956
FIN	Finland	2,873	2,645	460	158	253	18	473	2,955	163	2,720	7.6	0.0	7.1	645	15	0.972	0.970
FRA	France	7,123	6,624	2,409	1,478	592	78	2,479	7,309	1,518	6,795	6.9	0.0	13.2	-8,047	734	0.974	0.972
GBR	United Kingdom	4,599	3,782	4,057	2,024	970	130	4,154	4,746	2,084	3,905	17.3	0.0	13.4	-16,491	-1,483	0.969	0.976
GRC	Greece	76	69	48	37	11	5	50	81	39	75	8.0	0.0	40.7	-1,462	-43	0.931	0.955
IRL	Ireland	1,036	840	1,005	713	484	285	1,019	1,053	723	854	18.5	0.0	58.9	-1,656	357	0.984	0.986
ITA	Italy	6,131	4,879	3,277	1,736	1,537	243	3,384	6,326	1,793	5,032	20.1	0.0	15.8	-6,019	1,072	0.969	0.968
LUX	Luxembourg	117	105	24	11	13	1	25	123	12	111	10.0	0.0	8.1	72	-208	0.956	0.966
NLD	Netherlands	2,781	2,532	1,267	975	301	42	1,312	2,887	1,009	2,628	8.8	0.0	14.0	-14,289	-890	0.964	0.965
PRT	Portugal	168	151	67	42	21	4	69	175	43	158	9.8	0.0	17.0	-381	8	0.950	0.970
SWE	Sweden	2,975	2,746	504	233	286	50	519	3,074	239	2,838	7.6	0.0	17.4	849	-344	0.969	0.970
CHE	Switzerland	2,930	2,504	3,185	2,062	516	80	3,258	2,997	2,110	2,560	14.2	0.0	15.5	1,118	1,584	0.978	0.977
NOR	Norway	1,014	968	160	108	70	23	172	1,074	118	1,027	4.5	0.0	32.6	-414	-34	0.944	0.951
CYP	Cyprus	34	34	65	64	1	1	65	34	64	34	1.9	0.0	49.2	-156	46	0.976	0.993
CZE	Czech Republic	361	315	158	84	56	8	163	372	87	324	12.6	0.0	15.1	-1,766	-31	0.970	0.970
EST	Estonia	21	20	5	4	2	0	5	22	4	21	5.8	0.0	15.7	-246	-28	0.964	0.967
HUN	Hungary	468	384	140	17	94	8	143	478	18	393	17.6	0.0	8.7	-2,268	-334	0.977	0.981
LTU	Lithuania	10	9	41	41	0	0	42	10	41	10	1.8	0.0	30.2	-257	35	0.959	0.996
LVA	Latvia	10	10	1	1	0	0	1	11	1	11	0.9	0.0	5.3	-85	-7	0.959	0.965
MLT	Malta	90	48	79	33	53	10	80	91	34	48	45.8	0.0	19.3	17	23	0.990	0.991
POL	Poland	479	465	38	23	17	3	40	498	25	484	2.8	0.0	15.2	-2,206	-31	0.960	0.958
SVK	Slovak Republic	103	100	257	254	3	1	258	107	254	104	2.5	0.0	21.1	-228	231	0.963	0.966
SVN	Slovenia	36	31	11	6	6	1	12	37	6	32	13.2	0.0	19.2	-144	-1	0.971	0.971
ALB	Albania	1	1	0	0	0	0	0	1	0	1	2.2	0.0	4.0	-61	-5,984	0.999	0.998
BGR	Bulgaria	50	47	7	3	4	1	7	54	3	51	5.5	0.0	21.4	-317	-11	0.929	0.980
HRV	Croatia	9	9	2	2	0	0	2	9	2	9	3.8	0.0	14.4	-390	-12	0.987	0.978
ROM	Romania	250	244	53	38	21	14	54	266	39	259	2.4	0.0	68.5	-555	24	0.941	0.974
SER	Yugoslavia	10	9	3	0	1	0	3	11	0	10	7.5	0.0	22.2	-272	-3	0.964	0.977

Country Code	Country Name	Partner actual exports to China	Partner direct exports to China	Partner total exports to Hong Kong	Partner domestic export to Hong Kong	Partner re-exports to China via Hong kong	Hong Kong re-export markup	Hong Kong total imports from partners	China total imports from partners	Hong Kong retained imports from partner	China direct import from partner	Re-exports as percent of partner total exports to China	Statistical discrepancies	Hong Kong re-export markup rate	Partners balance of trade with China after adjustment	Partners balance of trade with Hong Kong after adjustment	fob/cif ratio, partner to China	fob/cif ratio, partner to Hong Kong
UKR	Ukraine	492	479	22	8	16	2	23	524	9	511	2.6	0.0	14.7	-26	2	0.949	0.955
RUS	Russian Federation	9,720	9,549	1,384	1,171	195	12	1,414	10,356	1,187	10,173	1.7	0.0	6.0	4,475	1,159	0.940	0.938
KAZ	Kazakhstan	1,636	1,633	3	0	4	0	3	1,726	0	1,723	0.2	0.0	8.4	739	-1	0.951	0.943
KGZ	Kyrgyz Republic	59	57	2	0	1	0	2	62	0	61	2.2	0.0	7.6	-146	0	0.947	0.996
ARG	Argentina	2,932	2,804	199	64	149	16	207	3,083	67	2,950	4.3	0.0	10.9	1,813	36	0.949	0.962
BRA	Brazil	6,920	6,597	818	431	352	15	851	7,562	448	7,225	4.6	0.0	4.2	3,069	149	0.927	0.960
CHL	Chile	3,385	3,285	168	67	108	2	179	3,574	71	3,468	3.0	0.0	2.3	1,611	12	0.948	0.943
COL	Colombia	145	139	19	9	7	1	20	150	9	144	4.0	0.0	10.5	-734	-11	0.963	0.958
ECU	Ecuador	72	70	9	7	2	0	10	72	8	71	2.3	0.0	12.6	-412	-1	0.992	0.950
PER	Peru	1,348	1,336	727	713	18	5	728	1,467	714	1,454	0.9	0.0	27.3	788	695	0.920	0.952
PRY	Paraguay	1,750	1,746	14	9	6	1	14	1,753	10	1,748	0.3	0.0	13.0	1,368	-4	0.953	0.940
VEN	Venezuela	390	385	12	3	6	1	12	416	3	411	1.2	0.0	15.1	183	-22	0.950	0.962
URY	Uruguay	93	84	22	12	11	2	23	97	13	88	9.6	0.0	16.2	-78	5	0.962	0.967
CRI	Costa Rica	324	295	162	101	118	89	164	328	103	298	8.7	0.0	75.1	128	78	0.988	0.986
GTM	Guatemala	23	23	2	1	1	0	2	23	1	23	2.1	0.0	8.5	-373	-43	0.998	0.977
PAN	Panama	13	12	7	5	1	0	7	14	6	13	7.5	0.0	8.7	-1,844	-33	0.958	0.936
DZA	Algeria	871	871	0	0	0	0	0	873	0	873	0.0	0.0	8.2	-12	-11	0.992	0.997
EGY	Egypt Arab Rep	136	132	29	24	10	6	31	149	26	144	3.1	0.0	55.3	-833	-11	0.934	0.944
IRN	Iran Islamic Rep	3,661	3,636	106	73	31	5	109	3,899	75	3,873	0.6	0.0	16.3	2,337	65	0.934	0.971
ISR	Israel	912	748	1,144	628	216	23	1,217	962	660	768	17.3	0.0	10.5	-462	-27	0.958	0.959
JOR	Jordan	23	22	3	2	1	0	3	23	2	22	3.3	0.0	13.1	-605	-45	0.977	0.983
LBN	Lebanon	9	6	2,564	2,561	4	1	2,564	10	2,561	6	32.3	0.0	18.4	-391	2,553	0.972	0.993
MAR	Morocco	132	54	96	17	82	3	97	136	17	57	57.8	0.0	3.9	-595	-4	0.972	0.993
NGA	Nigeria	206	200	14	7	8	1	15	220	7	213	2.9	0.0	11.5	-652	-68	0.943	0.966
SAU	Saudi Arabia	7,195	7,026	311	141	195	16	331	7,677	150	7,497	2.3	0.0	8.0	5,295	119	0.937	0.940
SYR	Syrian Arab Republic	3,916	3,916	1	0	1	0	1	3,916	0	3,916	0.0	0.0	8.3	3,523	0	0.997	0.970
TUN	Tunisia	30	26	7	2	6	1	7	32	2	28	14.8	0.0	18.5	-213	-7	0.931	0.959
TUR	Turkey	467	431	139	98	47	10	147	508	105	471	7.4	0.0	22.1	-3,138	-7	0.921	0.941
YEM	Yemen	1,311	1,310	353	351	2	2	353	1,393	351	1,392	0.0	0.0	83.5	1,015	-1,892	0.940	0.977
BEN	Benin	41	41	1	1	0	0	1	41	1	41	0.0	0.0	29.8	-361	-1	0.997	0.992
GHA	Ghana	4,532	4,532	79	1	0	0	96	4,852	1	4,852	0.0	0.0	12.6	4,280	-13	0.932	0.823
KEN	Kenya	26	5	31	8	24	2	33	27	9	6	76.3	0.0	10.3	-276	-12	0.945	0.953
MOZ	Mozambique	3,297	3,291	7	1	7	1	7	3,338	1	3,332	0.1	0.0	13.6	3,228	0	0.919	0.930
MWI	Malawi	0	0	0	0	0	0	0	0	0	0	28.3	0.0	14.1	-21	-363	0.980	0.986
MDG	Madagascar	40	37	8	4	4	1	9	41	4	38	9.0	0.0	12.7	-169	2	0.882	0.858
SDN	Sudan	373	369	233	229	5	0	234	397	229	392	1.2	0.0	6.0	88	225	0.943	0.982
TGO	Togo	30	29	5,395	5,394	1	0	5,395	30	5,394	29	2.0	0.0	9.2	-160	5,382	0.999	0.988
TZA	Tanzania	64	51	6,184	6,157	16	2	6,374	70	6,345	56	20.2	0.0	11.2	-119	6,150	0.912	0.928
UGA	Uganda	28	14	895	880	17	3	896	29	880	14	48.3	0.0	17.1	-53	-3,826	0.958	0.953
ZAF	South Africa	1,664	1,501	577	302	183	13	606	1,838	317	1,668	9.5	0.0	7.1	-1,623	34	0.920	0.955
ZMB	Zambia	849	848	11	1	1	0	12	851	1	850	0.1	0.0	13.8	422	-164	0.969	0.965
ZWE	Zimbabwe	130	128	2,212	2,207	3	0	2,317	136	2,311	134	1.8	0.0	4.1	-268	232	0.955	0.972
OTH	Other reporting countries	2,789	2,702	201	49	102	10	210	2,993	52	2,900	3.0	0.0	9.8	-286	-297	0.933	0.940
NRP	No reporting partner countries	38,018	37,843	683	407	201	16	729	38,846	435	38,661	0.5	0.0	7.9	25,965	26	0.979	0.942
PTN	Partner Total	485,710	422,414	165,519	86,980	74,329	9,101	170,532	504,914	89,637	439,694				-82,214	28,874		
HKG	Hong Kong China	11,529	80,690		0	0	0	0	93,685	0	25,178	0.0	0.0	0.0	-15,375	0	0.952	
CHN	China	0		90,246	26,905	0	0	94,564	0	28,224	0	0.0	0.0	0.0	0	15,375		0.951
WLD	World Total	497,239	503,103	255,765	113,885	74,329	9,101	265,096	598,599	117,861	464,872	11.0	0.0	12.2	-97,589	44,250		

Table 5 Initial and Adjusted Estimates of Hong Kong Re-exports Markup Rates by GTAP Sectors, 2004, all partner average, in percent

			Eastbound Trade						West Bound Trade					
			Initial Estimates			*Adjusted Estimates*			*Initial Estimates*			*Adjusted Estimates*		
	GTAP	Sector name	Hong Kong re-exports as percent of China's total exports	Hong Kong re-exports markup rate	Standard deviation of markup rate	re-exports as percent of China's total exports	Hong Kong re-exports markup rate	Standard deviation of markup rate	Hong Kong re-exports as percent of China's total imports	Hong Kong re-exports markup rate	Standard deviation of markup rate	re-exports as percent of China's total imports	Hong Kong re-exports markup rate	Standard deviation of markup rate
1	pdr	Paddy rice,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	wht	Wheat,	0.0	16.4	0.0	0.0	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	gro	Cereal grains nec,	0.0	58.5	18.1	0.0	58.5	18.1	0.1	20.2	18.4	0.1	19.7	18.6
4	v_f	Vegetables fruit nuts,	0.2	26.3	17.0	0.3	25.7	17.3	26.1	4.7	0.9	14.2	5.8	6.4
5	osd	Oil seeds,	0.2	25.8	12.4	0.2	27.1	14.6	0.1	4.5	3.4	0.1	4.5	3.4
6	c_b	Sugar cane and sugar beet,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	pfb	Plant-based fibers,	0.8	14.1	0.0	0.5	14.1	0.2	0.5	26.2	10.7	0.4	26.2	10.6
8	ocr	Crops nec,	2.6	44.9	17.7	2.5	45.0	17.8	7.3	9.9	11.4	7.5	11.3	15.7
9	ctl	Bovine cattle sheep and goats horses,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
10	oap	Animal products nec,	0.7	34.6	19.8	0.6	44.3	25.8	35.4	6.5	3.6	36.4	17.9	15.7
11	rmk	Raw milk,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	wol	Wool silk-worm cocoons,	9.2	6.6	0.7	10.0	6.6	0.7	0.1	0.0	0.0	0.1	7.4	9.7
13	frs	Forestry,	3.5	34.1	12.4	2.3	47.7	17.3	2.9	4.4	5.2	2.3	4.0	6.7
14	fsh	Fishing,	1.8	37.4	27.3	1.6	37.8	26.6	4.5	10.5	3.2	7.3	9.2	5.4
15	col	Coal,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.8	33.1	0.0	60.8	33.1
16	oil	Oil,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	gas	Gas,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	omn	Minerals nec,	0.4	38.1	40.1	0.4	40.2	40.1	1.6	26.1	28.9	1.0	22.2	23.7
19	cmt	Bovine cattle sheep and goat horse meat prods,	0.5	1.8	0.0	0.5	1.8	0.0	34.3	4.7	2.3	29.9	22.2	19.2
20	omt	Meat products nec,	0.3	19.3	9.8	0.3	15.1	13.1	41.2	4.4	3.8	42.1	8.5	16.5
21	vol	Vegetable oils and fats,	1.0	35.1	10.5	0.9	42.3	13.4	1.8	1.8	1.4	1.6	5.2	13.8
22	mil	Dairy products,	4.0	25.6	6.8	3.4	25.6	6.8	6.5	25.7	11.3	6.6	26.1	12.0
23	pcr	Processed rice,	0.1	11.1	4.9	0.1	11.2	4.9	0.6	11.7	0.2	0.3	11.7	0.2
24	sgr	Sugar,	1.7	14.3	19.7	2.2	19.1	23.6	7.0	12.3	1.6	3.0	12.3	1.6
25	ofd	Food products nec,	1.3	21.0	14.1	1.2	30.8	17.1	7.3	5.8	5.0	7.3	5.2	9.1
26	b_t	Beverages and tobacco products,	13.5	33.7	20.8	5.6	51.1	32.0	24.7	28.7	18.7	30.6	34.6	14.8
27	tex	Textiles,	10.8	30.6	12.6	11.5	25.4	20.3	24.2	9.3	5.6	26.8	11.5	8.9
28	wap	Wearing apparel,	14.1	38.9	10.2	15.3	34.4	12.1	40.9	10.3	6.8	18.4	14.9	14.8
29	lea	Leather products,	26.8	15.5	4.3	9.3	70.5	15.0	38.7	11.0	8.0	20.6	12.7	11.1
30	lum	Wood products,	4.3	28.5	9.2	2.9	47.9	16.3	11.4	5.9	4.3	10.3	5.6	8.4
31	ppp	Paper products publishing,	24.6	49.6	7.7	18.5	57.4	9.3	7.5	6.3	4.2	6.4	4.5	6.5
32	p_c	Petroleum, coal products,	0.1	19.0	12.9	0.1	19.7	12.4	2.4	6.5	5.1	2.2	6.5	7.7
33	crp	Chemical rubber plastic products,	5.9	31.6	9.0	6.2	26.6	12.4	14.4	6.1	4.1	13.4	4.3	4.7
34	nmm	Mineral products nec,	2.6	31.3	14.6	2.1	43.5	16.3	8.9	1.0	1.6	8.5	1.9	10.5
35	i_s	Ferrous metals,	0.1	42.9	20.3	0.2	45.5	21.0	9.6	2.6	4.8	9.4	2.0	5.6
36	nfm	Metals nec,	2.4	20.3	13.2	2.7	15.3	25.6	10.8	3.6	5.3	8.4	21.2	39.0
37	fmp	Metal products,	8.2	31.4	9.2	7.9	33.6	12.6	7.8	5.6	3.4	7.5	3.5	4.2
38	mvh	Motor vehicles and parts,	0.2	53.0	19.0	0.4	48.5	21.7	7.2	5.4	2.9	7.3	8.5	4.7
39	otn	Transport equipment nec,	1.6	19.2	12.5	1.6	39.3	23.8	1.8	2.5	3.6	1.8	12.7	14.3
40	ele	Electronic equipment,	15.7	23.9	14.3	15.7	22.4	15.6	25.2	11.0	10.0	23.0	15.3	10.5
41	ome	Machinery and equipment nec,	14.7	37.0	10.1	11.9	45.3	9.8	10.2	10.0	4.9	9.1	12.7	5.2
42	omf	Manufactures nec,	29.9	40.3	8.2	15.2	65.9	11.8	21.2	2.9	5.1	27.5	2.5	8.0
		All sectors	12.9	31.0	6.6	11.2	40.2	9.1	14.5	9.2	6.3	12.8	12.2	6.9

Table 6 Initial and Adjusted Estimates of Hong Kong's Re-export Earnings and Retained Imports, 2004, in million U.S. Dollars

			Re-export Earnings						Retained Imports				Hong Kong re-exports Chinese goods back to
			Re-export for China		Re-export to China		Others		Excluding China		Including China		
	GTAP	Sector name	Initial	Adjusted	Initial	Adjusted	Initial	Adjusted	Initial	Adjusted	Initial	Adjusted	
1	pdr	Paddy rice,	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	
2	wht	Wheat,	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.9	1.8	0.9	
3	gro	Cereal grains nec,	0.1	0.1	0.0	0.0	0.0	0.0	11.7	68.3	13.7	69.0	
4	v_f	Vegetables fruit nuts,	2.5	2.4	10.3	12.9	2.4	2.4	654.2	538.9	839.0	710.7	0.8
5	osd	Oil seeds,	0.4	0.4	0.3	0.3	0.1	0.0	10.5	710.1	13.1	712.4	0.4
6	c_b	Sugar cane and sugar beet,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7	pfb	Plant-based fibers,	0.0	0.0	3.8	3.8	0.0	0.0	71.9	1,046.6	71.9	1,046.6	1.0
8	ocr	Crops nec,	33.4	33.4	4.3	4.9	9.8	8.9	165.9	154.1	246.7	242.7	1.6
9	ctl	Bovine cattle sheep and goats horses,	0.0	0.0	0.0	0.0	0.0	0.0	59.0	61.6	73.6	71.3	
10	oap	Animal products nec,	4.4	5.7	55.2	153.4	2.9	2.8	446.3	288.9	770.6	609.1	9.0
11	rmk	Raw milk,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
12	wol	Wool silk-worm cocoons,	0.1	0.1	0.0	0.1	0.0	0.0	0.5	0.8	0.5	0.8	0.8
13	frs	Forestry,	1.3	1.9	2.4	2.2	0.2	0.2	4.6	885.2	9.9	889.2	1.0
14	fsh	Fishing,	13.7	13.8	1.3	1.1	22.2	22.1	481.4	669.5	559.5	759.9	3.9
15	col	Coal,	0.0	0.0	0.0	0.0	0.0	0.0	309.0	527.2	368.0	585.9	
16	oil	Oil,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	4.3	
17	gas	Gas,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	254.8	154.0	
18	omn	Minerals nec,	6.6	7.0	80.7	68.6	194.3	212.8	314.1	340.8	382.4	406.1	5.3
19	cmt	Bovine cattle sheep and goat horse meat prods,	0.0	0.0	8.9	42.1	4.9	5.2	241.1	205.0	268.8	233.0	0.4
20	omt	Meat products nec,	0.8	0.6	6.1	11.9	4.0	3.7	550.4	482.9	882.7	819.5	0.5
21	vol	Vegetable oils and fats,	2.0	2.4	1.2	3.4	0.7	1.0	206.8	207.5	243.3	244.9	0.8
22	mil	Dairy products,	0.8	0.8	13.1	13.3	6.1	5.5	224.2	176.3	264.7	218.2	0.2
23	pcr	Processed rice,	0.0	0.0	0.1	0.1	0.6	0.8	143.5	138.4	149.9	144.9	0.0
24	sgr	Sugar,	0.1	0.1	1.2	1.2	0.4	0.4	27.2	31.7	38.4	41.7	0.2
25	ofd	Food products nec,	42.4	62.2	19.4	17.5	43.6	34.1	1,674.2	1,623.6	2,150.5	2,142.2	7.9
26	b_t	Beverages and tobacco products,	37.2	56.4	59.1	71.3	134.2	125.4	462.3	366.2	911.6	846.4	32.7
27	tex	Textiles,	2,163.3	1,797.8	445.9	554.8	250.3	127.2	1,926.1	2,108.7	3,958.6	4,950.1	4,974.6
28	wap	Wearing apparel,	4,578.2	4,048.8	49.1	71.1	131.8	125.3	543.3	586.6	5,041.8	2,882.8	328.1
29	lea	Leather products,	1,507.5	6,851.0	228.6	264.7	232.2	96.6	1,342.1	1,274.0	1,342.1	1,274.0	849.4
30	lum	Wood products,	297.2	499.6	22.5	21.2	2.7	4.1	264.4	266.6	699.0	603.2	55.7
31	ppp	Paper products publishing,	925.1	1,071.0	43.6	31.4	18.6	30.4	951.3	992.8	1,396.4	1,309.9	259.8
32	p_c	Petroleum, coal products,	2.2	2.3	15.0	15.1	30.0	26.5	4,130.0	6,601.4	4,421.7	6,917.0	26.5
33	crp	Chemical rubber plastic products,	1,190.8	1,000.2	634.2	453.5	326.3	221.5	5,731.9	5,923.3	6,384.0	6,863.4	1,451.0
34	nmm	Mineral products nec,	128.8	179.2	3.1	6.0	12.9	9.8	755.6	1,057.4	1,081.9	1,451.9	128.9
35	i_s	Ferrous metals,	14.9	15.8	59.8	45.7	22.2	18.0	1,026.9	2,657.8	1,352.0	3,050.7	208.6
36	nfm	Metals nec,	46.9	35.4	67.1	390.5	11.0	6.0	1,751.0	4,096.2	2,008.0	4,444.4	793.5
37	fmp	Metal products,	807.0	862.0	25.9	16.0	23.8	18.4	505.0	884.7	776.9	1,109.5	219.9
38	mvh	Motor vehicles and parts,	27.2	24.9	65.1	102.8	32.6	26.3	1,243.3	1,906.3	1,381.2	2,095.9	8.7
39	otn	Transport equipment nec,	37.7	77.4	3.7	18.6	133.2	100.9	978.4	1,380.2	1,214.1	1,657.4	14.6
40	ele	Electronic equipment,	8,176.9	7,663.6	3,638.6	5,057.9	2,695.7	5,152.7	27,207.7	26,624.8	27,207.7	42,222.1	17,760.0
41	ome	Machinery and equipment nec,	7,960.8	9,731.8	1,282.9	1,628.7	1,042.5	306.3	8,007.1	15,054.4	8,007.1	16,382.4	7,296.3
42	omf	Manufactures nec,	6,406.8	10,474.6	17.1	14.8	557.5	510.2	6,324.2	9,692.3	6,324.2	9,692.3	380.0
		All sectors	34,417.2	44,522.6	6,869.3	9,100.7	5,949.6	7,205.5	68,749.5	89,636.8	81,112.8	117,861.0	34,822.1

Table 7 Initial and Adjusted Estimates of China's Net Trade Flows, 2004, in million U.S. Dollars

			Trade Balance with All Partners Excluding Hong Kong			Trade Balance with All Partners			Trade Balance with the United States			
	GTAP	Sector name	China official reported	Initial estimates	Adjusted estimates	China official reported	Initial estimates	Adjusted estimates	China official reported	U.S. official reported	Initial estimates	Adjusted estimates
1	pdr	Paddy rice,	47.5	47.0	47.5	47.5	47.0	47.5	0.0	0.6	-0.6	0.0
2	wht	Wheat,	-1,528.4	-952.7	-1,046.0	-1,528.4	-952.7	-1,046.0	-648.2	495.0	-495.0	-570.0
3	gro	Cereal grains nec,	69.0	188.5	137.0	70.8	190.2	137.5	0.1	0.2	-0.7	0.1
4	v_f	Vegetables fruit nuts,	1,101.5	1,478.0	812.5	1,215.0	1,576.0	927.8	20.0	-95.0	0.6	43.5
5	osd	Oil seeds,	-6,620.1	-4,653.1	-5,636.2	-6,617.0	-4,651.3	-5,634.4	-3,334.8	2,306.9	-2,314.9	-2,845.8
6	c_b	Sugar cane and sugar beet,	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	0.0	0.0	0.0	0.0
7	pfb	Plant-based fibers,	-2,723.3	-1,825.1	-2,123.9	-2,723.3	-1,828.9	-2,127.6	-1,766.1	1,421.0	-1,425.7	-1,623.8
8	ocr	Crops nec,	911.2	936.9	1,003.0	1,059.2	1,044.0	1,079.0	45.9	-120.3	45.4	91.4
9	ctl	Bovine cattle sheep and goats horses,	-184.3	-158.1	-137.3	-154.3	-128.1	-130.3	0.0	0.1	-0.1	-0.1
10	oap	Animal products nec,	-974.8	-951.6	-632.7	-666.3	-705.8	-389.6	-380.0	243.1	-412.7	-316.4
11	rmk	Raw milk,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	wol	Wool silk-worm cocoons,	-975.9	-978.8	-932.1	-975.5	-978.8	-932.1	-6.3	0.5	-4.0	-5.0
13	frs	Forestry,	-2,443.5	-1,422.7	-1,773.8	-2,437.4	-1,421.1	-1,772.9	-69.4	94.0	-132.9	-69.0
14	fsh	Fishing,	766.6	729.2	872.0	924.2	870.2	932.9	4.6	-21.4	0.9	16.6
15	col	Coal,	2,927.2	3,261.8	3,157.0	2,975.6	3,310.2	3,205.8	8.6	17.9	-24.5	10.1
16	oil	Oil,	-24,368.3	-10,768.2	-16,595.8	-24,368.3	-10,768.2	-16,595.8	114.5	-181.2	114.0	148.5
17	gas	Gas,	-0.1	-89.7	-89.6	186.8	97.2	56.6	0.0	0.0	0.0	0.0
18	omn	Minerals nec,	-17,885.5	-8,976.9	-16,009.8	-17,816.4	-8,993.8	-16,041.8	-112.6	-142.8	39.4	-13.2
19	cmt	Bovine cattle sheep and goat horse meat prods,	-443.4	-433.4	-399.4	-416.6	-415.6	-382.1	-97.3	28.0	-59.1	-60.5
20	omt	Meat products nec,	920.8	889.4	718.4	1,253.0	1,209.4	1,030.6	-76.8	50.6	-76.4	-81.8
21	vol	Vegetable oils and fats,	-3,775.7	-3,149.2	-3,459.9	-3,730.3	-3,108.3	-3,425.4	-12.3	3.9	-11.2	-9.4
22	mil	Dairy products,	-426.6	-448.5	-431.0	-383.7	-420.8	-407.7	-45.9	46.4	-44.8	-46.4
23	pcr	Processed rice,	-73.5	77.5	-47.7	-67.6	83.1	-42.4	11.8	-20.8	11.8	14.5
24	sgr	Sugar,	-156.6	-94.9	-247.7	-147.1	-86.6	-239.7	0.4	-0.9	0.4	0.6
25	ofd	Food products nec,	6,806.5	7,121.3	6,885.5	7,566.8	7,717.0	7,332.5	984.5	-1,658.2	1,097.0	1,305.4
26	b_t	Beverages and tobacco products,	45.3	-45.9	454.2	624.8	393.0	792.1	-4.7	-30.4	-13.6	0.0
27	tex	Textiles,	24,306.1	25,801.5	28,250.0	32,592.1	29,708.7	29,630.0	4,750.7	-7,201.0	5,129.6	7,291.2
28	wap	Wearing apparel,	40,724.9	47,409.6	45,823.2	48,000.8	46,895.3	46,659.8	5,996.6	-11,539.5	8,072.8	10,536.4
29	lea	Leather products,	17,331.0	24,055.5	20,538.0	19,880.9	23,821.5	20,304.0	7,897.9	-16,648.8	11,460.7	12,650.2
30	lum	Wood products,	11,938.4	12,813.7	13,368.4	13,440.6	13,640.1	13,641.6	6,507.7	-13,910.6	6,882.1	7,802.0
31	ppp	Paper products publishing,	-7,008.6	-4,436.7	-5,564.2	-6,251.5	-4,487.8	-5,630.9	-1,036.1	-1,166.3	-39.8	27.0
32	p_c	Petroleum, coal products,	-3,273.1	-74.7	-3,042.2	-2,939.1	263.4	-2,776.2	499.7	-767.5	613.2	605.9
33	crp	Chemical rubber plastic products,	-34,527.9	-23,248.8	-28,298.8	-31,909.3	-22,770.2	-28,827.0	901.3	-6,814.2	3,605.5	3,565.8
34	nmm	Mineral products nec,	5,690.0	6,293.7	6,694.5	6,659.9	7,079.7	7,024.2	1,539.0	-3,396.9	1,693.8	2,299.6
35	i_s	Ferrous metals,	-11,768.3	-8,378.8	-11,247.6	-11,375.3	-7,901.9	-11,105.5	669.9	-556.9	457.4	612.9
36	nfm	Metals nec,	-10,843.1	-8,554.2	-9,844.3	-8,928.3	-6,466.3	-9,679.7	-684.2	836.6	-901.5	-717.2
37	fmp	Metal products,	12,487.2	14,785.0	14,474.2	13,931.4	14,721.6	14,619.6	5,161.5	-7,748.3	5,942.6	6,465.3
38	mvh	Motor vehicles and parts,	-4,830.7	-4,287.3	-8,693.6	-3,653.6	-3,193.1	-8,579.8	3,044.4	-1,409.3	2,999.3	1,615.1
39	otn	Transport equipment nec,	2,205.4	1,999.0	602.3	2,765.6	2,420.2	863.6	-1,277.8	270.6	-619.9	-880.6
40	ele	Electronic equipment,	23,265.5	48,278.5	46,292.0	60,424.4	59,757.5	57,272.2	35,413.7	-57,796.1	41,324.3	46,205.7
41	ome	Machinery and equipment nec,	-43,101.9	-19,590.3	-22,831.0	-29,140.9	-18,057.8	-23,276.3	7,214.0	-24,172.9	12,931.3	16,303.1
42	omf	Manufactures nec,	18,756.9	26,971.5	31,169.0	23,654.4	26,877.6	31,075.2	9,160.5	-24,511.0	13,031.4	15,733.2
		All sectors	-7,632.6	119,617.5	82,213.6	81,043.4	144,385.3	97,588.9	80,395.0	-174,094.7	108,876.0	126,104.8

Table 8 Trade and Port Cargo Loaded Statistics Reported By China and Hong Kong on China's exports, 1995 to 2004

	China Reported Exports (fob)			Hong Kong Reported Imports			Adjustment		Port cargo loaded and port discharge, 1000 Metric Ton			
year	Hong Kong as final destination	Hong Kong as consigned destination	Export via Hong Kong (Transshipment)	Hong Kong total Imports from China (cif)	Hong Kong-China FOB/CIF ratio	Hong Kong total Imports from China (fob)	Statistical discrepancy (Million U.S. Dollars)	Statistical discrepancy (Percent)	Exports[1]	Outward transshipment[2]	Total Cargo loaded	Outward Transshipment as % of total
1995	35,988	74,493	38,505	69,736	0.9919	69,171	5,321	7.1	4,924	4,190	9,114	46.0
1996	32,904	64,209	31,305	73,758	0.9919	73,160	-8,952	-13.9	5,638	4,486	10,124	44.3
1997	43,798	77,852	34,054	78,581	0.9919	77,944	-92	-0.1	5,944	4,882	10,826	45.1
1998	38,785	76,547	37,762	74,966	0.9919	74,359	2,188	2.9	4,841	3,883	8,724	44.5
1999	36,917	72,674	35,757	78,312	0.9929	77,756	-5,082	-7.0	2,606	3,704	6,310	58.7
2000	44,530	82,409	37,879	91,771	0.9938	91,202	-8,793	**-10.7**	14,830	15,655	30,485	**51.4**
2001	46,489	83,423	36,934	87,445	0.9901	86,579	-3,155	**-3.8**	13,013	18,776	31,789	**59.1**
2002	58,465	99,295	40,829	91,944	0.9912	91,135	8,160	**8.2**	12,318	21,673	33,991	**63.8**
2003	76,289	123,600	47,312	100,889	0.9921	100,092	23,508	**19.0**	19,697	34,127	53,824	**63.4**
2004	100,878	154,885	54,007	117,909	0.9927	117,048	37,837	**24.4**	20,662	35,891	56,553	**63.5**

Data source: All China reported trade data are from China Customs Authority; all Hong Kong reported trade data are from Hong Kong Census and Statistics Department.
Port Cargo data are from Hong Kong Census and Statistics Department. The cargo statistics from 1995 to 1999 refer to HK's seaborne cargo statistics, while those for 2000-2004 refer to Hong Kong's seaborne and river port cargo statistics. The river cargo statistics have been compiled in recent years given the growing importance of the river trade between Hong Kong and the mainland of China, particularly the Pearl River Delta (PRD) region. Port cargo movements between HK and places other than the mainland of China and Macao are all classified as seaborne cargo movement.

Note: 1. Goods exported/re-exported from Hong Kong are classified as direct shipment, whereas goods shipped in Hong Kong under a through bill of lading are classified as transshipment. Gods in transit through Hong Kong are not included in the statistics.
2. It refers to cargo that is consigned under a through bill of lading from a place outside Hong Kong to another place outside Hong Kong but is or is to be removed from one vessel and either returned to the same vessel or transferred to another vessel with Hong Kong waters.

Table 9 Trade and Port Cargo Loaded Statistics Reported By China and Hong Kong on China's imports, 1995 to 2004

	Hong Kong Reported Exports (fob)			China Reported Imports(cif)			Adjustment				Port Cargo Discharged and Port Loading 1000 Metric Ton			
year	Reexport to China for third countries	Domestic Export to China	Total Exports to China	Imports originated from Hong	Total imports via Hong Kong	Imports originated from third countries	Hong Kong-China FOB/CIF ratio	Total imports via Hong Kong (fob)	Statistical discrepancy (Million U.S. Dollars)	Statistical discrepancy (Percent)	Imports[1]	Inward Transshipment[2]	Total cargo discharged	Inward Transshipment as percent of total
1995	49,644	8,216	57,859	8,599	60,165	51,566	0.9919	59,678	1,819	3.0	5330	5252	10582	49.6
1996	54,015	7,967	61,982	7,839	55,046	47,207	0.9919	54,600	-7,383	-13.5	5177	4304	9481	45.4
1997	57,334	8,249	65,583	6,990	53,808	46,818	0.9919	53,372	-12,211	-22.9	4666	4409	9075	48.6
1998	52,597	7,239	59,836	6,667	52,762	46,096	0.9919	52,335	-7,501	-14.3	4465	4154	8619	48.2
1999	51,455	6,498	57,953	6,893	62,391	55,497	0.9929	61,948	3,994	6.4	3715	5158	8873	58.1
2000	62,742	6,951	69,693	9,431	76,384	66,952	0.9938	75,910	6,217	8.2	19334	10805	30139	35.9
2001	63,672	6,353	70,025	9,420	82,496	73,076	0.9901	81,680	11,655	**14.3**	22422	10958	33380	**32.8**
2002	73,326	5,305	78,631	10,741	104,979	94,237	0.9912	104,055	25,424	**24.4**	24983	13519	38502	**35.1**
2003	90,637	4,720	95,357	11,119	132,064	120,945	0.9921	131,021	35,664	**27.2**	69502	35447	104948	**33.8**
2004	109,225	4,866	114,091	11,800	166,529	154,729	0.9927	165,314	51,222	**31.0**	67207	41418	108626	**38.1**

Data source: All China reported trade data are from China Customs Authority; all Hong Kong reported trade data are from Hong Kong Census and Statistics Department.
Port Cargo data are from Hong Kong Census and Statistics Department. The cargo statistics from 1995 to 1999 refer to HK's seaborne cargo statistics, while those for 2000-2004 refer to Hong Kong's seaborne and river port cargo statistics. The river cargo statistics have been compiled in recent years given the growing importance of the river trade between Hong Kong and the mainland of China, particularly the Pearl River Delta (PRD) region. Port cargo movements between HK and places other than the mainland of China and Macao are all classified as seaborne cargo movement.

Note: 1. Goods imported into Hong Kong are classified as direct shipment, whereas goods shipped in Hong Kong under a through bill of lading are classified as transshipment. Gods in transit through Hong Kong are not included in the statistics.
2. It refers to cargo that is consigned under a through bill of lading from a place outside Hong Kong to another place outside Hong Kong but is or is to be removed from one vessel and either returned to the same vessel or transferred to another vessel with Hong Kong waters.