FEATURE ARTICLE

Hong Kong's trade patterns and trade elasticities

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As an entrepôt for the Mainland, Hong Kong has a complicated pattern of re-export trade unlike most other economies. Partly because of this, there has not been adequate study of the effect of movements in exchange rates on trade balances. This study attempts to fill the gap. It finds that a real depreciation of the Hong Kong dollar would likely lead to an improvement in the balance of trade in direct exports and imports, all other things constant. In other words, the Marshall-Lerner condition is satisfied for Hong Kong's trade.

Because a large part of Hong Kong's export earnings come from its entrepôt role, movements in the renminbi real effective exchange rate play an important part in influencing Hong Kong's balance of trade. In particular, the price elasticity of re-export margins is much greater than that of direct exports. These trade elasticities are useful in helping predict the effect of changes in the real exchange rate on Hong Kong's overall trade balance.

I. Introduction

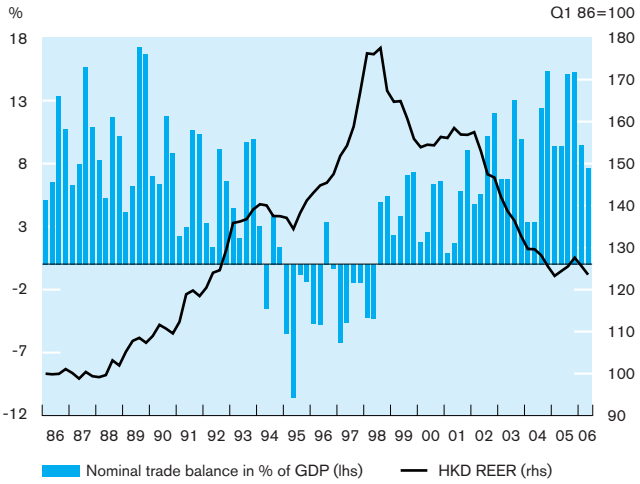
Hong Kong is an extremely open economy with total trade in goods and services representing over 3.8 times GDP in 2005. A salient feature of Hong Kong's external trade sector is its intermediation role. As an entrepôt for Mainland China, Hong Kong helped intermediate one-fifth of the Mainland's merchandise trade in 2005.

Economic theory suggests that the effect of a depreciation of the real exchange rate on an economy's trade balance can be ambiguous. This is because the real exchange rate depreciation often has two direct and, to a certain extent, offsetting effects on the trade balance – the volume and the value effect. The net effect depends on whether the volume or the value effect dominates. If the volume effect dominates, a real depreciation will generally lead to an improvement in the trade balance. This criterion, also known as the Marshall-Lerner condition, requires the sum of the price elasticities of demand for imports and exports, in absolute term, to exceed one.[1] The Marshall-Lerner condition and the stability of the trade elasticities are useful benchmarks for predicting the potential impact of a change in the real exchange rate on an economy's trade balance.

Casual observation suggests that movements in Hong Kong's real effective exchange rate (REER) are negatively correlated with its trade balance (Chart 1). Hong Kong's trade pattern, particularly the role of re-exports, may have complicated the estimation of Hong Kong's trade elasticities. Indeed, over 70% of Hong Kong's total trade in goods and services is related to re-exports, which not only respond to the

[1] The Marshall-Lerner condition was derived based on the assumptions that supply elasticities for exports and imports are perfectly elastic, so that changes in demand volumes have no effect on prices.

CHART 1
Hong Kong's trade balance



Sources: Census & Statistics Department and staff estimates.

exchange rate of the Hong Kong dollar, but also to those of other currencies involved and foreign income. Partly because of the complicated nature of re-exports, there has not been adequate study of whether the Marshall-Lerner condition holds for an entrepôt economy such as Hong Kong.

This paper intends to fill the void by providing a careful treatment of this complication when estimating Hong Kong's trade elasticities. The paper's objectives are twofold. First, we provide a careful analysis of the trade pattern of Hong Kong, with a special emphasis on its re-export trade with Mainland China. Secondly, we apply an established approach to estimating both the long-run trade elasticities and the short-run dynamics for both Hong Kong's direct trade and re-exports.

The next section (II) discusses the stylised facts about Hong Kong's external trade pattern, in terms of trading partners and product composition, with a particular focus on re-export trade with the Mainland. Section III applies an error correction model to test whether the Marshall-Lerner condition holds for Hong Kong's trade, and presents the empirical results. Section IV concludes.

II. Features of Hong Kong's External Trade

Trade flows by major trading partners and products

Table 1 summarises Hong Kong's external trade flows with its four largest trading partners in 2005 – the Mainland, the US, the Euro area and Japan. Table 2 provides detailed information on the major products of merchandise trade.[2] Several observations emerge:

First, as a service economy, Hong Kong's domestic exports of goods accounted for only 5% of total exports of goods and services, or equivalent to about 10% of GDP.[3] The Mainland and the US are the two largest markets, each accounting for about 30% of total domestic exports. Among those exports to the Mainland, more than half were raw materials or semi-finished manufacturing products for further processing with a contractual arrangement for subsequent re-importation of the processed goods into Hong Kong (the so-called outward processing trade). Of the total domestic exports, over 40% were articles of apparel and clothing accessories, followed by electrical machinery, apparatus and appliances, and electrical parts, accounting for 14% of total domestic exports.

Secondly, re-exports of goods were the largest category, accounting for 77% of total exports of goods and services, equivalent to 1.5 times GDP.[4] In particular, more than 60% of re-exports originated from the Mainland and most of the remaining 40% were imports from other economies for re-exports to the Mainland. Within those re-exports to the Mainland, almost 40% were for further processing

[2] Additional charts and more detailed statistics of trade in goods and services by main trading partner and product category are presented in Appendix A of Liu, Fan, and Shek (2006).

[3] Domestic exports are the natural produce of Hong Kong or the products of a manufacturing process in Hong Kong which has changed permanently the shape, nature, form or utility of the basic materials used in production process.

[4] Re-exports are products which have previously been imported into Hong Kong and which are re-exported without having undergone in Hong Kong a manufacturing process which has changed permanently the shape, nature, form or utility of the product.

and most of those processed goods were ultimately re-exported to other places through Hong Kong. Over half of the total re-exports were electrical and electronic products.

Thirdly, because Hong Kong is a small economy with limited natural resources and small agricultural and manufacturing sectors, most necessities are imported from other economies. Thus, retained imports of goods represented 41% of GDP in 2005.[5] Retained imports from the Mainland are relatively small, accounting for only 4% of total retained imports, while those from Japan and the euro area accounted for 16% and 11%, respectively.

Fourthly, reflecting Hong Kong's role as an entrepôt, most of its imports are for re-export to other economies. Imports of goods for re-export accounted for almost 70% of total imports of goods and services, or equivalent to 1.3 times GDP in 2005. As a large proportion of re-exports of goods originated from the Mainland, imports of goods for

TABLE 1

External trade pattern, 2005

Exports	In % of GDP	In % of total	In % of sub-total	Imports	In % of GDP	In % of total	In % of sub-total
Total exports	**197.9**	**100.0**	**100.0**	**Total imports**	**185.4**	**100.0**	**100.0**
Of which:				Of which:			
Mainland China	82.9	41.9	41.9	Mainland China	78.9	42.6	42.6
US	33.3	16.8	16.8	US	10.3	5.5	5.5
Euro area	19.3	9.8	9.8	Euro area	10.6	5.7	5.7
Japan	11.1	5.6	5.6	Japan	20.7	11.2	11.2
Exports of goods	**162.9**	**82.3**	**100.0**	**Imports of goods**	**167.2**	**90.2**	**100.0**
Of which:				Of which:			
Mainland China	73.3	37.0	45.0	Mainland China	73.9	39.9	44.2
US	26.1	13.2	16.0	US	7.6	4.1	4.5
Euro area	16.4	8.3	10.1	Euro area	9.7	5.2	5.8
Japan	8.6	4.3	5.3	Japan	19.1	10.3	11.4
Domestic exports	**9.9**	**5.0**	**100.0**	**Retained imports**	**40.9**	**22.1**	**100.0**
Of which:				Of which:			
Mainland China	3.2	1.6	32.8	Mainland China	1.8	0.9	4.3
US	2.7	1.4	27.8	US	3.2	1.7	7.9
Euro area	1.0	0.5	10.2	Euro area	4.6	2.5	11.2
Japan	0.3	0.2	3.2	Japan	6.6	3.6	16.2
Re-exports	**153.1**	**77.3**	**100.0**	**Imports for re-exports**	**126.3**	**68.1**	**100.0**
Of which:				Of which:			
Mainland China	70.1	35.4	45.8	Mainland China	72.2	38.9	57.1
US	23.4	11.8	15.3	US	4.3	2.3	3.4
Euro area	15.4	7.8	10.1	Euro area	5.1	2.7	4.0
Japan	8.3	4.2	5.4	Japan	12.5	6.7	9.9
Exports of services*	**35.0**	**17.7**	**100.0**	**Imports of services***	**18.2**	**9.8**	**100.0**
Of which:				Of which:			
Mainland China	9.6	4.8	27.4	Mainland China	5.0	2.7	27.4
US	7.2	3.6	20.6	US	2.7	1.4	14.7
Euro area	2.9	1.5	8.3	Euro area	1.0	0.5	5.4
Japan	2.5	1.3	7.2	Japan	1.6	0.9	8.7

Note: * Data on breakdown of service trade by trading partner for 2005 are not yet available. Ratios are based on those in 2004.
Sources: Census & Statistics Department and staff estimates.

[5] Retained imports refer to those imported goods which are retained for use in Hong Kong. The value of retained imports is derived by subtracting the estimated import value of re-exports from the value of imports. The former is obtained by removing an estimated re-export margin from the value of re-exports. The Census and Statistics Department regularly conducts a survey of re-export trade, based on which the rates of re-export margin for different categories of goods are estimated for deriving the retained import statistics.

TABLE 2

Product composition of merchandise trade, 2005

	In % of sub-total
Domestic exports of goods	**100.0**
Articles of apparel and clothing accessories (84)	41.3
Electrical machinery, apparatus and appliances, and electrical parts (77)	13.8
Miscellaneous manufactured articles (89)	11.1
Office machines and automatic data processing machines (75)	10.1
Total of the above	***76.3***
Imports of goods	**100.0**
Electrical machinery, apparatus and appliances, and electrical parts (77)	22.8
Telecommunications and sound recording and reproducing apparatus and equipment (76)	12.7
Office machines and automatic data processing machines (75)	10.7
Articles of apparel and clothing accessories (84)	6.2
Total of the above	***52.4***
Re-exports of goods	**100.0**
Electrical machinery, apparatus and appliances, and electrical parts (77)	20.9
Telecommunications and sound recording and reproducing apparatus and equipment (76)	15.4
Office machines and automatic data processing machines (75)	13.0
Miscellaneous manufactured articles (89)	8.6
Total of the above	***57.8***

Note: Numbers in brackets are the Standard International Trade Classification (SITC) codes.
Sources: Census & Statistics Department and staff estimates.

re-export from the Mainland to other economies accounted for almost 60% of the total goods imported. Moreover, the product composition of imported goods for re-exports was very similar to that of re-exports.

Fifthly, exports of services, which have been growing fast, accounted for 18% of total exports of goods and services or 35% of GDP. Similar to exports of goods, the Mainland and the US were the two largest trading partners, accounting for 27% and 21% of total exports of services, respectively. Out of the major export service categories, exports of merchanting and other trade-related services was the largest group, accounting for 34% of the total, [6] followed by transportation, travel, and financial services, which accounted for 31%, 17%, and 9%, respectively. The Mainland and the US were the two most important destinations for merchanting and other trade-related services, with each accounting for nearly 30% of the total exports of services. For travel services, the Mainland was the largest contributor, accounting for more than half the total. The most important counterparts for financial services were the US and the UK, together contributing half the total.

Finally, imports of services, equivalent to 18% of GDP, made up 10% of total imports of goods and services. Imports of services from the Mainland accounted for 27% of the total and those from the US 15%. Travel was the largest major service group, accounting for 41% of the total, followed by transportation (29% of total) and merchanting and other trade-related services (7% of total). For travel services, the Mainland was the most important source, accounting for 30% of the total.

Merchandise flows between Hong Kong, the Mainland, and the rest of the world

Chart 2 illustrates the flow of goods between Hong Kong, the Mainland, and the rest of the world. All figures in the chart are expressed as a percentage of

[6] Merchanting is defined as services associated with the trading of goods which are purchased from and then sold to parties outside Hong Kong without the goods ever entering and leaving Hong Kong. Merchanting and other trade-related services are the major components of offshore trade.

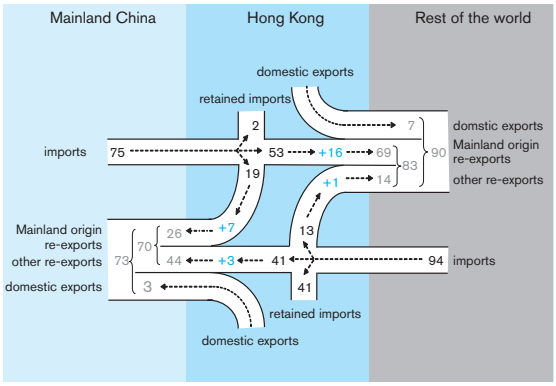
2005 GDP. Of the total imports of goods from Mainland China, 70% (53 out of 75) were for re-export to the rest of world and 25% (19 out of 75) were for re-export back to the Mainland. Among re-exports back to the Mainland, over half were electrical and electronic products.[7] About half of re-exports to the rest of the world were electrical and electronic products. Clothing and textiles accounted for less than 10%.

Of the total imports of goods from places other than the Mainland, 44% (41 out of 94) were imports for re-exports to the Mainland and 14% (13 out of 94) were for re-export to the rest of the world. A large part of the goods re-exported to the Mainland were raw materials and semi-manufactures for further processing on the Mainland. About 44% (41 out of 94) of the goods were retained in Hong Kong. Taking all imports of goods together, over 75% were for re-exports and only 25% for domestic use.

Of the total re-exports to places other than the Mainland, 83% (69 out of 83) originated from the Mainland. For re-exports to the Mainland, about 63% (44 out of 70) originated from the rest of the world. Taking these re-exports together, around 90% of them either originated from the Mainland or were re-exported to the Mainland from the rest of the world. These Mainland-related re-exports depend on both the demand conditions on the Mainland and its trading partners and the renminbi exchange rates. The margins earned by Hong Kong from re-exports were estimated to amount to 26% of GDP in 2005, of which over 80% were from re-exports of Mainland origin.

CHART 2

Traffic of goods between Hong Kong, Mainland China, and the rest of the world, 2005



Note: Import figures are in black, export margins in grey and re-export margins in blue. All figures are the value of goods expressed as a percentage of 2005 GDP. Figures may not add up to the total due to rounding.

Sources: Census & Statistics Department and staff estimates.

III. Empirical Estimation

Having outlined the major sources and destinations of Hong Kong's trade, we now turn to the determinants. We will estimate the rate of variations the real exchange rate of both the Hong Kong dollar and the renminbi for the evolution of the various categories of exports and imports.

The Model: In getting a quick gauge of the long-run elasticities, we conduct the empirical analysis using aggregate trade data. Applying an established approach to estimating price and income elasticities (Hooper, Johnson, and Marquez, 2000, and Chinn, 2005), we specify both an import and an export equation based on the trade theory of imperfect substitution. By assuming log-linear function forms, these two equations can be written as:

$$IM_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 RER_t^{IM} + \mu_{t,IM} \quad (1)$$

$$EX_t = \beta_0 + \beta_1 FY_t + \beta_2 RER_t^{EX} + \mu_{t,EX} \quad (2)$$

[7] One possible reason for these round tripping trade flows is to make use of the logistics facilities in Hong Kong. For example, shipments of raw materials and semi-manufactured goods from factories in some northern Mainland cities to Hong Kong by sea and then transported to factories located in southern cities by truck for further processing, may be cheaper than the direct shipment of the goods from the north to the south.

where IM_t in equation (1) is Hong Kong's real imports, Y_t its real GDP, and RER_t^{IM} the import-weighted real effective exchange rate; EX_t in equation (2) is Hong Kong's real exports, FY_t its foreign real GDP, and RER_t^{EX} the export-weighted real effective exchange rate. It is expected that both α_t and β_1 are greater than zero. Because both RER_t^{IM} and RER_t^{EX} are measured relative to the Hong Kong dollar, we thus expect $\alpha_1 > 0$ and $\beta_1 < 0$. In addition, this specification implies that the real effective exchange rate (*RER*) can be considered as a composite indicator that combines both the exchange rate pass-through effect and the price effect. This approach allows direct interpretation of the response of imports to changes in the real effective exchange rate (Chinn, 2005).

Recognising the simultaneity between income, real effective exchange rate, and trade, we test for co-integration and identify co-integration vectors using the methods proposed by Johansen (1988) and Johansen and Juselius (1990). In addition, because movements in international trade may respond differently in the short and long run to those in key determinants of trade, we use the error correction method to capture the short-run dynamics. Thus, a vector error correction model (VECM) for the import equation can be written as:

$$\Delta IM_{it} = \gamma_{10} + \varphi_1(IM_{t-1} - \alpha_0 - \alpha_1 Y_{t-1} - \alpha_2 RER_{t-1}^{IM}) + \gamma_{11}\Delta IM_{t-1} + \gamma_{12}\Delta RER_{t-1}^{IM} + \gamma_{13}\Delta Y_{t-1} + \xi_{1t} \quad (3)$$

$$\Delta RER_t^{IM} = \gamma_{20} + \varphi_2(IM_{t-1} - \alpha_0 - \alpha_1 Y_{t-1} - \alpha_2 RER_{t-1}^{IM}) + \gamma_{21}\Delta IM_{t-1} + \gamma_{22}\Delta RER_{t-1}^{IM} + \gamma_{23}\Delta Y_{t-1} + \xi_{2t} \quad (4)$$

$$\Delta Y_t = \gamma_{30} + \varphi_3(IM_{t-1} - \alpha_0 - \alpha_1 Y_{t-1} - \alpha_2 RER_{t-1}^{IM}) + \gamma_{31}\Delta IM_{t-1} + \gamma_{32}\Delta RER_{t-1}^{IM} + \gamma_{33}\Delta Y_{t-1} + \xi_{3t} \quad (5)$$

Similarly, a VECM for the export system can be written as:

$$\Delta EX_t = \gamma_{40} + \varphi_4(EX_{t-1} - \beta_0 - \beta_1 FY_{t-1} - \beta_2 RER_{t-1}^{EX}) + \gamma_{41}\Delta EX_{t-1} + \gamma_{42}\Delta RER_{t-1}^{EX} + \gamma_{43}\Delta FY_{t-1} + \xi_{4t} \quad (6)$$

$$\Delta RER_t^{EX} = \gamma_{50} + \varphi_5(EX_{t-1} - \beta_0 - \beta_1 FY_{t-1} - \beta_2 RER_{t-1}^{EX}) + \gamma_{51}\Delta EX_{t-1} + \gamma_{52}\Delta RER_{t-1}^{EX} + \gamma_{53}\Delta FY_{t-1} + \xi_{5t} \quad (7)$$

$$\Delta FY_t = \gamma_{60} + \varphi_6(EX_{t-1} - \beta_0 - \beta_1 FY_{t-1} - \beta_2 RER_{t-1}^{EX}) + \gamma_{61}\Delta EX_{t-1} + \gamma_{62}\Delta RER_{t-1}^{EX} + \gamma_{63}\Delta FY_{t-1} + \xi_{6t} \quad (8)$$

where Δ stands for the difference of a variable between time t and t-1. φ_i's are coefficients of error correction terms, which measure for the difference between actual imports (exports) and their long-run values as predicted by the co-integration relationship among the import (export) system. It is expected that φ_1 and φ_4 are negative and statistically significant in trade equations as trade flows react to long-run disequilibria by closing the gap in the co-integration relationship. Although it can be directly tested, the error correction coefficients in the non-trade equations also indicate whether the relationships exist for the exchange rate and income.

The Data: The two VECM systems are estimated using quarterly data from 1994 Q1 to 2006 Q1.[8] All variables are in logarithm. Because about 90% of re-exports either originate from the Mainland to the rest of the world or re-exported to the Mainland from the rest of the world, they depend mainly on demand

[8] Before 1994, Mainland China had a dual exchange rate system for the renminbi (RMB). The official rate was set by the Government at 5.8 RMB/USD and the "swap" rate was set by the market according to the supply and demand conditions. The foreign exchange swap market was first established in the early 1980s in which those who held retained foreign exchanges could sell to those who needed them. It appeared that most of the trade-related transactions were determined using the swap rate. Partly because of this, these two exchange rates were merged on 1 January 1994. The official rate was *de facto* devalued from 5.8 RMB/USD to 8.7 RMB/USD. Since the movement of the RMB/HKD exchange rate has a significant influence on the HKD REER given that the renminbi has the largest currency weight, we use data starting from 1994 to avoid any distortions due to the unification of the official and the swap rates. In addition, there appears to be a structural change in Hong Kong's trade pattern from re-exports to offshore trade in the middle of the 1990s. To avoid these complications, a sample starting from 1994 may be preferable.

conditions on the Mainland and those of its trading partners, and the real exchange rates of the renminbi against the trading partners' currencies. In estimating the price and income elasticities of Hong Kong's re-exports, its re-export flows and re-export margins (re-exports minus imports for re-exports) in logarithms are regressed on the logarithms of the REER of the renminbi and the Mainland's foreign demand.[9] For this purpose, a measure of the REER of the renminbi is computed based on the methodology presented in Peng and Fan (2005), for which the currency weights are determined by the trade pattern of the Mainland, adjusting for its trade via Hong Kong with the rest of the world. The Mainland's foreign demand is defined as the trade-weighted real GDP of its major trading partners.[10]

Selection of lags: Before estimating the two VECM systems, we need to select lag length. The Johansen (1988) procedure was used to estimate the co-integrating vectors using lag lengths up to nine quarters. The optimal lag length is chosen based on the minimum of the Akaike and Schwarz information criteria, in addition to the judgement on whether the signs of the coefficients are consistent with economic theory. As such, the lag lengths for the co-integrating vectors tend to vary across trade aggregates. The estimation results are presented in Table 3. For retained imports and services and domestic exports and services, the optimal lag selected is 5. For re-exports and re-export margins, the lag chosen is 9. In addition, two test statistics (the trace and the maximum eigenvalue) for testing the alternative of co-integration against the null of no co-integration are also calculated as shown in Table 3. These tests indicate that for retained imports and imports of services, domestic exports and exports of services, and re-report volume, there is only one co-integration vector. However, for re-export margins, we cannot reject the null hypothesis of two co-integration vectors. Thus, some judgement has to be exercised to determine which price and income elasticities from the two co-integration vectors are more plausible, according to both economic theory and intuition.[11]

TABLE 3

Co-integration test for Aggregate data

Variable	λ_{max}	λ_{trace}	H_0	H_1	lags
Retained imports &	23.82*	30.43*	r = 0	r = 1	5
import of services	6.42	6.62	r ≤ 1	r = 2	
Domestic exports &	22.53*	32.21*	r = 0	r = 1	5
exports of services	9.58	9.68	r ≤ 1	r = 2	
Re-export volume	32.09*	43.16*	r = 0	r = 1	9
	9.32	11.07	r ≤ 1	r = 2	
Re-export margins	83.84*	55.17*	r = 0	r = 1	9
	28.67*	28.48*	r ≤ 1	r = 2	
	0.19	0.19	r ≤ 2	r = 3	

Note: *Denote significance at the 95% level. r = 0 represents no cointegrating vector. Lags defines the length of lag in the Vector Autogression.

[9] Because most of the re-exports from the rest of world passing through Hong Kong to the Mainland are for processing on the Mainland, this implies that ultimate demand is still foreign. Thus in the re-export equation, only foreign demand is considered. That said, it may be worthwhile to estimate re-exports of the opposite directions separately.

[10] The reason foreign income is used in estimating the trade elasticities of re-exports is that a large portion of the re-exports originated from the rest of the world to the Mainland is for further processing. Thus, the ultimate demand remains foreign.

[11] Detailed statistics are presented in Appendix C of Liu, Fan, and Shek (2006).

Results: Table 4 presents the estimated long-run price and income elasticity and error correction coefficients. The price elasticity, in absolute term, of Hong Kong's demand for imports is found to be 0.65 and that for foreign demand for Hong Kong's exports 0.52. The sum of these point estimates is 1.17, implying that the Marshall-Lerner condition for Hong Kong's direct trade is satisfied. This also suggests that 1% depreciation in Hong Kong's real effective exchange rate will lead to an increase in Hong Kong's retained imports of goods and services by 0.65% and a decrease in Hong Kong's direct exports of goods and services by 0.52%, provided other things remain constant. For income elasticity, we find that Hong Kong's elasticity for imports of goods and services is larger than foreign income elasticity for its exports of goods and services. For re-export volume, the estimated price elasticity is -2.02 and the estimated income elasticity 4.27.[12] Similar results are also obtained for re-export margins. As both price and income elasticities are much greater than one, it suggests that Hong Kong's re-exports are quite sensitive to changes in the exchange rate and in foreign demand.

The error correction coefficients for equations (3) and (6) of the VECM system are negative and significant statistically, suggesting both imports and exports respond to disequilibria in the long-run relationship, but with exports adjusting to disequilibria faster than imports. Similarly, for equations (4) and (5) of the import VECM system, the error coefficients are both statistically significant, suggesting that movements in Hong Kong's real effective exchange rate and income also affect its imports of goods and services from overseas. However, for equations (7) and (8) in the export VECM system, the error correction coefficients are no longer statistically significant. This implies that foreign income and prices may be weakly exogenous to Hong Kong's exports, consistent with the view that Hong Kong is a small open economy whose exports are mostly determined by both foreign income and prices.[13]

TABLE 4

Johansen MLE estimates for Aggregate trade data

			Error Correction Coefficients		
	RER Elasticity	Income Elasticity	Export or Import	RER	Income
Imports					
Retained imports and import of services	0.65** (2.2)	1.57*** (5.9)	-0.065*** (-3.4)	0.09** (2.30)	0.08* (1.7)
	Lags: 5, Intercept and trend included				
Exports					
Domestic exports and export of services	-0.52*** (-5.9)	0.78*** (11.6)	-0.93*** (-2.9)	0.18 (1.7)	-0.01 (-0.2)
	Lags: 5, Intercept and trend included				
Re-export volume	-2.04*** (4.2)	4.27*** (11.2)	-0.25*** (1.99)	-0.05 (0.63)	-0.01 (-0.27)
	Lags: 9, Intercept included				
Re-export margin	-1.98*** (-4.4)	4.17*** (11.9)	-0.25* (-2.0)	-0.05 (-0.6)	-0.01 (-0.3)
	Lags: 9, Intercept and trend included				

t- statistics are in parentheses.
***, **, * denotes significance at the 1%, 5%, 10% level.

[12] An appreciation of the renminbi would hurt re-exports originating from the Mainland to the rest of the world, but would help Hong Kong's re-exports to the Mainland. The estimated coefficient of the RMB REER suggests that the negative effect on re-exports originating from the Mainland outweighs the positive effect on re-exports to the Mainland. This is not surprising because the size of re-exports from the Mainland has been much larger than that of re-exports in the opposite direction. A large part of the re-exports to the Mainland is also related to outward processing activities, most of them are ultimately re-exported to the rest of the world through Hong Kong.

[13] Not reported here, using a weak exogeneity test developed by Bruggemann (2002), we can not reject there exists weak exogeneity for export equations.

Stability of the estimated elasticities: Although Hong Kong's trade does satisfy the Marshall-Lerner condition, a check needs to be made on whether these estimated price elasticities are stable over the sample period between 1994 and 2005. We next use a one-step-ahead Chow test to examine the stability of price elasticities. This procedure is implemented by first estimating the price elasticity for the sub-period of 1994 Q1 to 2000 Q4 and obtaining the sum of squared errors (SSE). The sub-sample is then extended by one quarter forward to obtain a new price elasticity estimate and a re-computed SSE. This procedure is carried forward quarter-by-quarter until all observations are exhausted. The test results for the error correction equation indicate that the price elasticities are mostly stable for the sample period investigated (Table 5). However, for domestic exports and exports of services, the price elasticities are unstable over the sample period between 2001 Q1 and 2003 Q2. With hindsight, this may not be surprising as it was a volatile period marked by large external shocks, such as the US recession in 2000-01, the terrorist attack on the US on 11 September 2001, and the SARS outbreak in Mainland China, Hong Kong and parts of East Asia in early 2003.

TABLE 5

Chow Forecast test

	Dates of instability
Retained imports and import of services	stable
Domestic exports and export of services	unstable for (2001Q1 - 2003Q2)
Re-export volume	stable
Re-export margin	stable

Bilateral Trade Elasticities: The remainder of this section presents the estimated price and income elasticities of bilateral trade between Hong Kong and its four largest trading partners, the Mainland, the US, the EU and Japan. Since the statistics on bilateral trade in services are only available for the period 1999-2004, the estimations are based on the merchandise trade data only. The empirical results in Table 6 suggest that the Marshall-Lerner condition is satisfied for Hong Kong's bilateral trade with the Mainland, the US and Japan, but it is inconclusive for trade with the EU as the price elasticity for imports has an incorrect sign. For merchandise trade between Hong Kong and the Mainland, the price elasticities for both imports and exports and the income elasticity for imports are much larger than one; but the income elasticity of the Mainland for Hong Kong's exports is lower than one. This suggests that the real bilateral exchange rate has significant influence on real trade flows and the same goes for Hong Kong's GDP growth on imports. Exports to the Mainland are relatively less responsive to the Mainland's GDP growth. The latter could be explained by the fact that about 40% of exports to the Mainland are for outward processing and not required for the Mainland's own domestic demand. Therefore, it is unlikely to be responsive to its growth. Exports involving outward processing are also sensitive to production costs on the Mainland, which are affected by the real bilateral exchange rate between the Hong Kong dollar and the renminbi. Similar to the results for aggregate trade data, the income elasticity is, in general, larger than the price elasticity, except for exports to the Mainland.

TABLE 6

Johansen MLE estimates for bilateral trade data

	RER Elasticity	Income Elasticity		RER Elasticity	Income Elasticity
HK Imports of goods			*HK Exports of goods*		
From Mainland China	3.26*** (6.0)	4.33*** (10.9)	To Mainland China	-2.29*** (3.3)	0.89*** (5.0)
From US	1.40*** (22.6)	1.80*** (30.1)	To US	-0.04 (0.6)	0.89*** (8.3)
From EU	-0.82*** ^ (4.9)	0.6* (1.3)	To EU	-0.75*** (12.9)	2.25*** (30.6)
From Japan	0.74*** (3.9)	1.69*** (18.0)	To Japan	-2.82** (2.3)	9.98*** (6.2)

t- statistics are in parentheses.
***, **, * denotes significance at the 1%, 5%, 10% level.
^ The sign of the coefficient is opposite to that expected.

IV. Concluding Remarks

As an entrepôt for the Mainland, Hong Kong helps channel raw materials and semi-manufactures from the rest of the world to the Mainland for further processing and then re-exports the processed goods to the rest of the world.

Our empirical analysis suggests that the Marshall-Lerner condition does hold for Hong Kong's direct trade, implying that a real depreciation of the Hong Kong dollar would likely lead to an improvement in the balance of trade in direct exports and imports, provided other things are constant. Given that a large part of Hong Kong's export earnings come from its role as an entrepôt for the Mainland, movements in the renminbi real effective exchange rate plays an important role in influencing Hong Kong's overall trade balance. In particular, the price elasticity of re-export margins is much greater than that of direct exports. In addition, we find that these estimated price elasticities are mostly stable over the sample period, suggesting they are quite useful in helping predict the effect of changes in the real exchange rate on Hong Kong's trade balances.

Price and income elasticities of bilateral merchandise trades between Hong Kong and its four largest trading partners, the Mainland, the US, the EU and Japan, are also estimated. The Marshall-Lerner condition is satisfied for Hong Kong's bilateral trade with the Mainland, the US and Japan, but it is inconclusive regarding trade with the EU. In particular, movements in the real bilateral exchange rate between the Hong Kong dollar and the renminbi are found to have significantly affected trade flows between Hong Kong and the Mainland. This probably reflects the fact that a large proportion of goods traded with the Mainland are related to outward processing activities, which are quite sensitive to the Mainland's production costs. In addition, we find that the US income elasticity for Hong Kong's imports is much larger than Hong Kong's income elasticity for US imports. The finding appears to be consistent with those using aggregated US data in relation to the rest of world.

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