Malaysian Journal of Economic Studies 49 (2): 157-177, 2012 ISSN 1511-4554

Role of Exchange Rate on China-Malaysia Long Run Trading: Complementary or Conflicting?

Tze-Haw Chan* & Chee-Wooi Hooy**
Universiti Sains Malaysia

Abstract: This paper examines the long run dynamics of exchange rate and bilateral export-import flows between China and Malaysia, from January 1990 to January 2008. The study is conducted based on the Autoregressive Distributed Lag bound testing procedure, the fully modified OLS, dynamic OLS and rolling estimations, as well as the generalised impulse response (IRF) and variance decomposition (VDC) analyses. Our findings reveal that the Marshall-Lerner condition holds in the long run but the export-import demands do not adhere to the J-curve pattern. In addition, expansionary effect is of greater evidence for Malaysia due to real exchange shocks but inconclusive for China. More important, the VDC results imply that China-Malaysia trade is along the sustainable path. In brief, the study supports the complementary role of China instead of conflicting (competing) features in the China-Malaysia bilateral trading.

Keywords: Exchange rates, J-curve, Marshall-Lerner Condition, ARDL Bound Test
JEL Classification: C51, F31, F42

1. Introduction

Malaysia was the first nation among the ASEAN nations to forge diplomatic relations with China in1974. Similarly, China recognises Malaysia as influential player within ASEAN and various ASEAN-driven collaboration platforms such as the ASEAN Regional Forum and the East Asian Summit. Today, China has become Malaysia's major trading partner, whereas Malaysia's production of liquefied natural gas remains as a highly demanded energy resource in China. Both economies are of different regulatory regimes, different degrees of development and trade openness, but within a comparable development in exchange rate regime. Malaysia - particularly throughout the capital control regime and, China - for most episodes during 1990s-2010s, stated that they were both committed to export-led growth policy based on maintenance of their undervalued currencies against the USD.

In 2007, China's total trade was reported at USD2170 billion (hundred times the total trade in 1978 - USD20.6 billion) and her current account surplus amounting to USD372 billion ranked top globally. Trade and growth expansion steadily continued in the wave of

* Tze-Haw Chan: Graduate School of Business, Universiti Sains Malaysia, 11800 USM, Penang, Malaysia. Email: *thchan@usm.my* (Corresponding author).

** Finance Section, School of Management, Universiti Sains Malaysia, 11800 USM, Penang, Malaysia. Email: *cwhooy@usm.my*

This research was fully supported by Research University Grant of Universiti Sains Malaysia [Grant no: 1001/PMGT/816150]. We would like to thank the Editor and the anonymous referees for their comments. The usual disclaimer applies.

the global crises but were subjected to various confrontations. Despite the advantages in labour costs and investment magnetism, it was slated that the Chinese foreign exchange regime had posed the economic giant as a formidable competitor, offering further threat to the crowding out of other developing Asian countries, including Malaysia (Zhang and Wan 2007). Such a policy practice is odd when East Asians are devoted to regional economic integration and committed to the ASEAN-China Free Trade Area. Malaysia has, in fact, suffered a continuous 7-year trade deficit against China (mainland) since 2002, which peaked at USD4.2 billion in 2007.

Two appealing and related questions thus arise. First, has the emergence of China shown complementary or conflicting (competing) features to Malaysia, or *vice versa*? Second, is the devaluation strategy expansionary or contractionary?

At the present stage, neither theoretical nor empirical work has established definitively whether currency devaluation (nominal or real) has caused output expansion or deterioration (Bahmani-Oskooee and Miteza 2003), or even if exchange rate plays a role in determining trade flows (Bahmani-Oskooee and Wang 2006; Ahmad and Yang 2007). The issue has become more vital following China's accession to WTO (November 2001) as well as the emergence of ASEAN+6 Free Trade Area due to the Chiang Mai Initiative (2000), the Bali Dialogue (2003) and the Singapore Declaration (2007). The need for an amendment to the regional trade policy and currency arrangements anchored by China is well understood but less investigated.

Motivated by these concerns, this study investigates the long run and dynamic nexus of China-Malaysia bilateral trade balances, exchange rates and national income. Thus far, to our best knowledge, no empirical study has yet investigated the China-Malaysia case using separated export and import demand models that encompass monthly series from January 1990 to January 2008 – a period of crises, trade expansion and major changes in currency regimes for both China and Malaysia. Relevant studies have previously worked on the Malaysian or Chinese case but not for China *vis-à-vis* Malaysia after the major currency adjustment in July 2005. For instance, Baharumshah (2001) studied the cases of Malaysia-US-Japan and Thailand-US-Japan using quarterly data from 1980-1996; Bahmani-Oskooee and Harvey (2006' 2010) studied Malaysia against 14 trading partners using quarterly data during 1983-2002 and 1973-2001 respectively; Ahmad and Yang (2004) then studied the China-G7 cases during 1974-1994; whereas Bahmani-Oskooee and Wang (2006) studied China against 13 trading partners without Malaysia during the period of 1983-2002.

Our analyses tackle the possible transmission channels via macro-variables (e.g. domestic output, foreign income) as in the standard international trade model. But unlike previous studies that assume constant parameters of the models over time, we take cognizance of changes in the economic environment in the past decades. Additional rolling analysis is conducted to capture the potential time-varying parameters so that the stability and predictive accuracy of our models can be evaluated. The Marshall-Lerner condition and income effect are investigated via the combination of elasticity and absorption approaches of balance of payments, using the three advanced methods for single-equation cointegration tests. These include the Autogressive Distributed Lag (ARDL hereafter) bound test (Pesaran, *et al.* 2001), the fully modified OLS (Phillips and Hansen 1990) and the dynamic OLS (Stock and Watson 1993).[1]

Of all, the ARDL procedure can be applied irrespective of whether the regressors are stationary, that is, I(0), or stationary at first difference, that is, I(1), or mutually cointegrated. It avoids the conventional pre-testing procedure of unit roots in Johansen-Juselius cointegration technique and has the advantage of being easily understood within the context of traditional error correction modelling approaches. Regardless of the possible exogeneity of explanatory variables, the long and short-run parameters can be obtained by applying OLS to an autoregressive distributed lag model with appropriate lag length, and with appropriate asymptotic inferences (Duarte and Holden 2001).

Alternatively, the J-curve phenomenon and the income response following shocks in real exchange rates are graphically illustrated via the generalised impulse response function (IRF) analysis from the unrestricted vector autoregression (VAR) framework. This framework is capable of analysing the dynamic impact of random disturbances on the system of variables. In our case, an impulse response function traces the effect of a one-time shock to one of the innovations of real exchange rates on current and future values of the export or import variables and national income. If the J-curve is present, countries are able to correct external imbalances via exchange rate devaluation after temporal adjustments of external competitiveness, or otherwise. Likewise, a positive response of national income should be present if devaluations are indeed expansionary, or otherwise. In addition, we also conducted generalised variance decomposition analysis (VDC) in an attempt to gauge to what extent shocks to certain macrovariables are explained by other variables considered in the system. Information from application of these tools should provide further evidence on the out-of-sample causal effects as well as contribute to enhancing our insights upon how variables react to system-wide shocks and how these responses propagate over time.[2]

The present study is organised in the following manner. Section 2 reviews the historical facts of exchange rates and trade in Malaysia and China. Section 3 presents the literature arguments while Section 4 outlines the theoretical representation of trade-exchange model that forms the basis of our empirical model. This is followed by the estimation procedures and data description in Section 5. Estimation results are discussed in Section 6. Finally, in Section 7, conclusions are drawn.

2. Historical Facts

Historically, the Malaysian ringgit has been trading as a free float currency at around RM2.50 per USD since the early 1970s. Managed floating was promoted in the 1980s and some over-valuations were found in the 1st half of the 1990s during the soft-peg against the

---

1 The fully modified OLS (FMOLS) estimator is asymptotically unbiased and has fully efficient mixture normal asymptotics allowing for standard Wald tests using asymptotic Chi-square statistical inference. Then, dynamic OLS (DOLS) involves augmenting the cointegrating regression with lags and leads of the first-differenced regressor so that the resulting cointegrating equation error term is orthogonal to the entire history of the stochastic regressor innovations.

2 See Masih and Masih (1999) for further details about the methodology of IRF and VDC.

Table 1. Exchange rates regime

Country	Horizon	Exchange rate system classification
China	June 1969 - December 1973	• Renmimbi is introduced
	January 1974 - February 1981	• *De facto* crawling band around USD (+/- 2%) / Multiple rates
	March 1981 - July 1992	• Managed floating/ Multiple rates
	August 1992 - December 1993	• *De facto* crawling band around USD (+/- 2%) / Multiple rates, premium peaks at 124% on June 1991
	January 1994 – June 2005	• *De facto* peg to USD, unification of markets
	July 2005 – current	• *De facto* band to USD and a basket of currencies (+/- 0.3%)
Malaysia	June 1967 – September 1975	• Peg to pound sterling. Malaysian ringgit is introduced
	September 1975 – July 1997	• *De facto* band around USD (+/- 2%). Officially the ringgit is pegged to a basket of currencies
	August 1997 – September 1998	• Freely floating
	September 1998 – June 2005	• Peg to USD. Capital control was implemented
	July 2005 – current	• Managed floating

Sources: IMF, modified and updated from Reinhart and Rogoff (2002)

USD (Table 1). During the 1997 Asian financial crisis, the Malaysian ringgit suffered a sharp depreciation of more than 40% within a year to about RM 4.00/USD. Bank Negara Malaysia (BNM, central bank of Malaysia) decided to impose capital controls and pegged the ringgit to the USD in September 1998 at RM3.80.

On the other hand, the renminbi was pegged to the USD and a dual-track currency system was instituted in 1978. The renminbi was only usable locally while foreign exchange certificates are forced on foreigners. China abolished the dual-track system and introduced single free floating currency effective 1 January 1994 and the renminbi turned freely convertible under current account transactions effective December 1996. In the following decade until 2005, the renminbi was tightly pegged at 8.2765 yuan to the USD (Table 1). On 21 July 2005, the People's Bank of China announced a 2.1 per cent revaluation to 8.11 yuan per USD and moved from USD pegging to managed-floating based on a basket of foreign currencies. On 21 July 2005, BNM responded to China's de-pegging announcement within an hour after the 7-year pegging. Akin to the Chinese policy, BNM allowed the ringgit to operate in a managed floating system based on a basket of several major currencies. Together, both the renmimbi and ringgit showed an analogous trend of subsequent appreciation against the weakened USD in the new millennium. By June 2008, the USD exchanged for 3.20 Malaysian ringgit, whereas the yuan traded at around 6.95 yuan (June 2008), appreciating about 16 per cent since 2005.

While China has continuously experienced trade expansion for the past three decades, Malaysia's external surplus has significantly increased since 1998 owing to the currency depreciation during the Asia crisis. In 2007, Malaysia's surplus achieved RM 26 billion and ranked 15th in the world. Presently, Malaysia's major trading partners are China, the US, Singapore, Japan and ASEAN members. Both China and Malaysia have committed themselves to regional trading and economic cooperation. In 2008, Malaysia contributed about 25 per cent of intra-ASEAN trading whereas China has become the third major trading partner of ASEAN after Japan and the European Union, contributing about 11 per cent of intra-ASEAN trading. Bilateral trading between China-Malaysia was minor in the 1980s (see Figure 1). The data improved slightly to USD4.7 billion in 1990 or about 8 per cent of Malaysia's trade. But in 2009, the Malaysia-China (plus Hong Kong) trade reached USD59 billion - about 18.9 per cent of Malaysian global trading, surpassing the Malaysia-US trade share (10.9%). However, there was a 7-year trade deficit before the major correction in 2009.

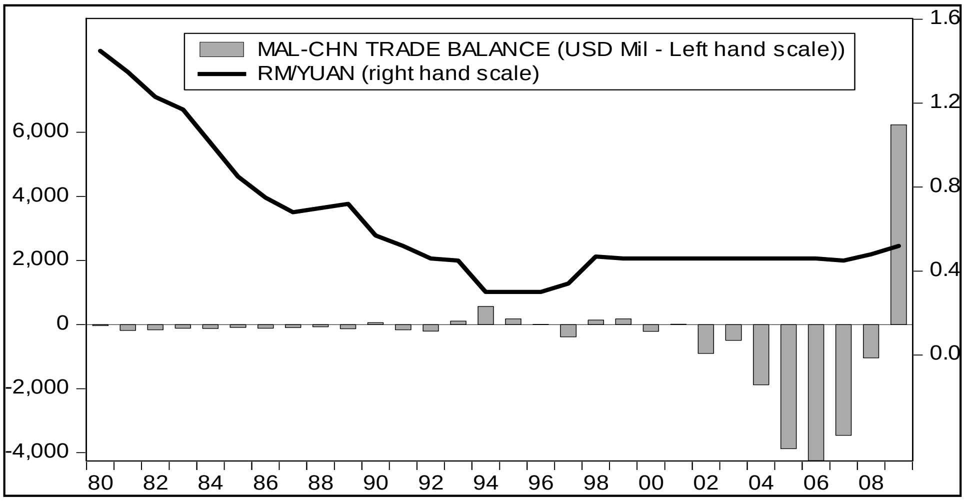

Figure 1. Malaysian-China Exchange Rate and Trade Balance, 1980-2009.
Source: DataStream.

3. Literature Review

Conventional inspection foresees a nominal devaluation translating into a real currency depreciation to boost net exports and hence result in growth. But there would be a perverse temporal negative response of the trade balance to a real depreciation in the short run, followed by the larger export and import elasticities that would improve the trade balance (Dornbusch and Krugman 1976; Krugman and Baldwin 1987; Helkie and Hooper 1987). The so-called J-curve phenomenon is mainly due to the overtaken price effect of volume effect at the early stage. This is later supported by Onafowora (2003) who found varying degree of J-curve effects among ASEAN-US and ASEAN-Japan via the analysis of generalised impulse response functions. On the contrary, Rose and Yellen (1989) rejected both the exchange rate-trade balance nexus and J-curve effect among US-G7, thus casting doubt on the effect of devaluation on the trade balance. Zhang (1998), based on Chinese variables in the 1990s, found that the causal effect only runs from trade balance to exchange rate but not in the reverse. Subsequent studies by Baharumshah (2001), Bahmani-Oskooee and Wang (2006), Ahmad and Yang (2007) also failed to discover firm evidence of the negative short-run J-curve effect for Asian economies, with limited support of positive long-run effect of foreign exchange on trade balance. Besides, empirical studies not only reported J-curve but also the S-curve. Backus *et al.* (1994), for instance, deployed the dynamic-general equilibrium models and found that the trade balance correlated negatively with current and future movements in terms of trade, but positively correlated with past movements. Over time, the cross correlation function of the trade balance and the terms of trade display an S-shape. Marwah and Klein (1996) then estimated trade balance equations for US and Canada. They found a tendency for trade balances to worsen first after depreciation and then to improve, but after several quarters, there appeared to be a tendency to worsen again, which too produced an S-pattern. Using disaggregated data, Bahmani-Oskooee and Ratha (2007) extended the literature by finding strong support for the S-curve between Japan and her trading partners.

While the impact of currency devaluation on trade gains is inconsistently understood, its support for output expansion is not well-established. On one hand, devaluation generates an expansionary effect via aggregate demand; on the other, it has a negative impact on the aggregate supply through its effect on the cost of imported intermediate inputs. In literature, arguments that currency devaluations are more contractionary and inflationary for developing countries than for industrial countries have been observed by Eichengreen and Hausmann (1999), Calvo and Reinhart (2001), among others, which partially explain the practice of a rigid exchange rate regime by many developing countries. Particularly, the simultaneous occurrence of currency depreciation and recession during the Mexico crisis (1995) and the Asian financial crisis (1997) appears to contradict the conventional view that devaluations are expansionary, as noted by Rajan and Shen (2002) and Ahmed *et al.* (2002). The reversal of pegged exchange rates policy during crisis as governments ran out of reserves, witnessed sharp declines in investor confidence, heavy capital outflows and concordant deteriorations of output and inflation performance. In mixed findings, Bahmani-Oskooee and Miteza (2003) revealed that devaluations have been contractionary for Indonesia and Malaysia, but expansionary for the Philippines and Thailand. Kim and Ying (2007) in addition, observe that devaluation can be contractionary in the post-crisis period for East Asia as well as for Mexico and Chile. Yet, Bahmani-Oskooee and Wang (2006) employed disaggregate quarterly data to discover that the Chinese income instead of the yuan has played the major role in the Chinese trade balance determination. Shi (2006) similarly found that though the yuan appreciation is generally contractionary, but given the scale of capital flows, shocks to the capital account are likely to have played a much bigger role than the yuan in Chinese growth.

4. Export Demand and Import Demand Models

The exchange rate devaluation-international trade relationship has long been a major topic of study in international economics. The conventional elasticity approach was firstly addressed by Bickerdike (1920), Robinson (1947) and Metzler (1948)(BRM henceforth) and was later make known by Marshall (1923) and Lerner (1944) as the Marshall-Lerner condition (MLC henceforth). According to MLC, the demand elasticity of both exports and imports must exceed one to improve trade balances from devaluation. There is an excess supply of currencies when the exchange rate is above the equilibrium level and excess demand when it is below. Only with this condition, will a nominal devaluation affect real exchange rates to enhance competitiveness and hence improves trade balances. Since then, the MLC has become the underlying assumptions of currency devaluation policy. We posit that the demand for import goods depends upon the relative price of imports and domestic income, expressed as

$$IM_{CH(MY)} = IM_{CH(MY)}\left(RP_{CH(MY)}, Y_{CH}\right) \tag{1}$$

where $IM_{CH(MY)}$ represents China demand for imports from Malaysia, $RP_{CH(MY)}$ is the relative imported price of Malaysia goods to domestic price in China, and Y_{CH} refers to China's real income. Letting $FX_{\frac{CH}{MY}}$ represents the nominal exchange rate, defined as the unit of yuan per ringgit, the relative price of imported goods can be expressed as

$$RP_{CH(MY)} = FX_{\frac{CH}{MY}}\left(\frac{P_{MY(EX)}}{P_{CH}}\right) = FX_{\frac{CH}{MY}}\left(\frac{P_{MY}}{P_{CH}}\right)\left(\frac{P_{MY(EX)}}{P_{MY}}\right) = \left(\frac{1}{RFX_{\frac{CH}{MY}}}\right)RP_{MY(CH)} \tag{2}$$

where $RFX_{\frac{CH}{MY}} = \dfrac{P_{CH}}{FX_{\frac{CH}{MY}} P_{MY}}$, $P_{MY(EX)}$ is the Malaysian currency price of its exports, P_{CH} and P_{MY} are the price indexes of all goods in China and Malaysia, respectively, $RFX_{\frac{CH}{MY}}$ is the real exchange rate, defined as the relative price of yuan to Malaysian goods, i.e. $RFX_{\frac{CH}{MY}} = \dfrac{P_{CH}}{FX_{\frac{CH}{MY}} P_{MY}}$, and $RP_{MY(CH)}$ is the relative price of Malaysian exports to Malaysian produced goods. With real exchange rates, $RFX_{\frac{CH}{MY}}$ thus defined, an increase (decrease) in its value indicates a real devaluation (appreciation) of the Chinese yuan. Substituting $RP_{CH(MY)}$ from equation 1, we obtain

$$IM_{CH(MY)} = IM_{CH(MY)}\left(\frac{RP_{MY(CH)}}{RFX_{\frac{CH}{MY}}}, Y_{CH}\right) \tag{3}$$

Similarly, the foreign country's demand for imports depends upon foreign income as domestic relative export prices:

$$IM_{MY(CH)} = IM_{MY(CH)}\left(RP_{CH(EX)} RFX_{\frac{CH}{MY}}, Y_{MY}\right) \tag{4}$$

Given that domestic exports are foreign imports and vice versa, that is,

$$EX_{CH(MY)} = IM_{MY(CH)} \text{ and } EX_{MY(CH)} = IM_{CH(MY)} \tag{5}$$

Thus, in our empirical model, we express the China exports to and imports from Malaysia as a function of the real exchange rate and the levels of domestic and foreign incomes.

Taking the natural logarithm of both sides, the following model is obtained, with a stochastic term added to capture short-term departures from long run equilibrium:

$$\ln(EX_t) = a_{EX} + b_{EX}\ln(Y_{MY,t}) + c_{EX}RFX_t + \varepsilon_{EX,t} \tag{6}$$

$$\ln(IM_t) = a_{IM} + b_{IM}\ln(Y_{CH,t}) + c_{IM}RFX_t + \varepsilon_{IM,t} \tag{7}$$

where ln represents natural logarithm, and ε_t represents a white noise process. Given the definition of the real exchange rates ($RFX_{YUAN/RM}$), c_{EX} is to be positive and c_{IM} to be negative. However, the absolute sum of c_{EX} and c_{IM} must exceed unity for the Marshall Lerner condition to hold, that is, if a real devaluation of the domestic currency improves the trade balance. In both Eq (6) and (7), both b_{EX} and b_{IM} are necessarily positive as indication of positive income effects.

5. Estimation and Data Description

5.1 Estimation Procedures

This study employs the ARDL Bounds test advanced by Pesaran *et al.* (2001). A similar procedure was adopted in recent studies of trade-exchange rates relationship (e.g. Ahmad and Yang 2004; Bahmani-Oskooee and Wang 2006; Bahmani-Oskooee and Harvey 2006). The approach of ARDL follows a 2-step procedure. The first is to identify the cointegration of the series involved applying a bound test on the following export and import demand functions:

$$\begin{aligned}\Delta\ln\left(EX_{CH,t}\right) = a_o &+ \sum_{i=1}^{12} b_i \Delta\ln\left(EX_{CH,t-i}\right) + \sum_{i=1}^{12} c_i \Delta\ln\left(Y_{MY,t-i}\right) + \sum_{i=1}^{12} d_i \Delta RFX_{t-i} \\ &+ \lambda_1 \ln\left(EX_{CH,t-1}\right) + \lambda_2 \ln\left(Y_{MY,t-1}\right) + \lambda_3 RFX_{t-1} + \kappa_1 Trend_t \\ &+ \kappa_2 D97_t + \kappa_3 DFIX_t + e_t\end{aligned} \tag{8}$$

$$\begin{aligned}\Delta\ln\left(IM_{CH,t}\right) = a_o &+ \sum_{i=1}^{12} b_i \Delta\ln\left(IM_{CH,t-i}\right) + \sum_{i=1}^{12} c_i \Delta\ln\left(Y_{CH,t-i}\right) + \sum_{i=1}^{12} d_i \Delta RFX_{t-i} \\ &+ \lambda_1 \ln\left(IM_{CH,t-1}\right) + \lambda_2 \ln\left(Y_{CH,t-1}\right) + \lambda_3 RFX_{t-1} + \kappa_1 Trend_t \\ &+ \kappa_2 D97_t + \kappa_3 DFIX_t + e_t\end{aligned} \tag{9}$$

Noted that in the above models, a time trend (*Trend*), and two structural breaks dummies, i.e. *D97* and *DFIX* are added to capture the impact of the 1997 Asian financial crisis and the regime of fixed exchange rates of Malaysia. The bound test involved the test of null hypothesis of non-existence of long run relationship, which is defined as

$$H_0: \lambda_1 = \lambda_2 = \lambda_3 = 0 \quad \text{against} \quad H_A: \lambda_1 \neq 0, \lambda_2 \neq 0, \lambda_3 \neq 0 \tag{8a}$$

$$H_0: \kappa_1 = \kappa_2 = \kappa_3 = 0 \quad \text{against} \quad H_A: \kappa_1 \neq 0, \kappa_2 \neq 0, \kappa_3 \neq 0 \tag{9a}$$

The critical value bounds of the F-statistics for different numbers of regressors are tabulated in Pesaran *et al.* (1996). Cointegration is confirmed irrespective of whether the variables are *I*(1) or *I*(0) if the computed F-statistic falls outside the upper bound; and rejected if it falls outside the lower bound. Nevertheless, if the F-statistic falls within the critical value band, no conclusion can be drawn without knowledge of the time series properties of the variables. Once cointegration is confirmed, the second step is to estimate the ARDL models:

$$\alpha(L,r)\ln\left(EX_{CH,t}\right)=\beta(L,m)\ln\left(Y_{MY,t-m}\right)+\delta(L,n)RFX_{t-n}+d_1Trend_t + d_2D97_t+d_3DFIX_t+\mu_t \quad (8b)$$

$$\alpha(L,s)\ln\left(IM_{CH,t}\right)=\beta(L,p)\ln\left(Y_{CH,t-p}\right)+\delta(L,q)RFX_{t-q}+d_1Trend_t + d_2D97_t+d_3DFIX_t+\mu_t \quad (9b)$$

where L is the back-shift operator such that $Ly_t = y_{t-1}$. The lag orders r, m, n for export demand model, and s, p, q for import demand model are selected based on AIC lag selection criterion. The long run coefficients for the response of dependent variable to a unit change in the independent variable can then be calculated based on the approach of Pesaran *et al*. (1996).

5.1 Data Description

Our analyses are based on monthly data. The sample period spanned from January 1990 to January 2008, a period of trade expansion and major changes in currency regime for both China and Malaysia. Real exchange rates ($RFX_{MY/CHN}$) are compiled by having the nominal exchange rates adjusted for relative price changes proxy by consumer price index (CPI) series; whereas trade balance ratios are computed based on the export-import series. Then, domestic and foreign incomes are represented by the domestic industrial production index (IP) as GDP is not available for high frequency monthly observation. All trade series were sourced from the Direction of Trade Statistics compiled by IMF while the CPI, IP and exchange rates series were sourced from DataStream.

6. Empirical Results and Discussion

Descriptive statistics for all the series are reported in Table 2. All the time series basically are not univariate normal. To avoid spurious regression problems, the stationarity of all the series are examined using the Augmented Dickey Fuller (ADF) unit root test for both intercept and intercept plus trend models. The ADF results suggest that the data are a mix of I(0) and

Table 2. Summary of descriptive statistics and unit root tests

	In (EX_{CH})	In (IM_{CH})	In (Y_{MY})	In (Y_{CH})	RFX
Mean	5.2574	5.8142	4.3959	4.7307	0.6447
Std. Dev.	1.1677	1.2378	0.3820	0.0512	0.2231
Maximum	7.4795	7.9654	4.9712	4.8629	0.9899
Minimum	3.0751	3.3438	3.5752	4.3682	0.0696
Jarque-Bera	10.0452***	13.6371***	13.5503***	1129.8340***	44.7863***
Unit Root 1	0.1548	0.2319	-4.3057***	-3.9077***	-2.5356
Unit Root 2	-1.8850	-2.4701	-4.3921***	-3.8125**	-2.0368

Note: Figures in parenthesis are probability values. Std. Dev. denotes standard deviation. Asterisks ** and *** denote significance at the 5% and 1% levels, respectively. Normality refers to Jarque-Bera normality test, where rejection of hull hypothesis implies non-normal distribution. Test for stationarity test refers to Augmented Unit Root (ADF) test, where Unit Root 1 is the model with intercept only and Unit Root 2 is the model with intercept and time trend. Rejection of null hypothesis reflects stationarity.

I(1) series where the export and import trade series and real yuan/ringgit exchange rate series are not stationary. The conventional Johensen-Juselius cointegration test may thereby be inappropriate and the ARDL Bound test is preferred.

In Table 3, the Bound test results up to lag 12 for the export and import models are reported in Panel A and Panel B, respectively. The critical value bounds of the F-statistics for different numbers of regressors (k) are tabulated in Pesaran *et al*. (1996). Two sets of critical values are provided, with an upper bound calculated on the basis that the variables are I*(0)* and, a lower bound on the basis that they are I*(1)*. The critical values for this bounds test are generated from an extensive set of stochastic simulations under differing assumptions regarding the appropriate inclusion of deterministic variables in the error correction model. Under the Bound test framework, the results confirm the existence of a cointegrating relationship in both the export and import demand model for the lag length 1-2. The cointegration tie becomes less evident and indecisive when lag lengths are extended. However, too many lags tend to make the model less parsimonious and reduce the degrees of freedom, and therefore we go by the lag 1-2 results. In addition, time trend play an important role in mitigating the cointegrating relationship, especially for the import demand model. Besides, we also cannot discount the exposure to the structural breaks dummy variables of the 1997 crisis and fixed exchange rate regime. In brief, the results imply that long run relationship exists among the variables in which the real exchange rates, domestic production and foreign incomes can be treated as the long run forcing variables for the explanation of the respective export and import demand model.

Looking at Table 4, the coefficients on domestic and foreign income show consistent signs with those predicted by economic theory where demand is the main determining factor of exports and imports. In our analysis, domestic ($\text{In}(Y_{CH})$) and foreign ($\text{In}(Y_{MY})$) incomes are consistently positive and significant. $\text{In}(Y_{MY})$ is reported at 1.8967, 3.3221 and 3.1416 in the export models whereas $\text{In}(Y_{CH})$ is reported at 9.0327, 14.8974 and 11.5279 in the import models. Hence, as far as domestic and foreign incomes are concerned, the China-Malaysia trading is demand-driven. Nevertheless, the income effect of Chinese import demand is greater than that of export demand. With China being the top trading partner and focused on export promotion as its engine of growth, Malaysia is benefiting from such high-income elasticity. This is somewhat in line with Eichengreen *et al.* (2004) who found that Chinese export growth is likely to have positive consequences for exporters (East Asians) of more sophisticated capital goods, who benefit from the high Chinese income elasticity of import demand for such products. In addition, the Malaysian fixed exchange rate regime during 1998-2005 plays significant role in both models, in that it expanded Malaysia-China bilateral trade. This is in line with conventional view that exchange rate stability is good for trade and investments. When the Malaysian ringgit was fixed against the USD at 3.80, it also stablised against the Chinese yuan. The undervalued but fixed ringgit has gained competitiveness in manufactured exports, primary commodities with the prices quoted in USD, as well as in domestic tourism and the local education industry.[3] The

[3] However, rising cost of imported intermediate inputs and high domestic inflation will erode away any such competitive advantage in the long run and large speculative inflows placed largely on the money market have to be sterilised due to undervalued but fixed ringgit. In consequence, the ringgit was de-pegged by 2005.

Table 3. ARDL Bound Tests for cointegration (1990-2008)

Export demand	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7	Lag 8	Lag 9	Lag 10	Lag 11	Lag 12
With intercept only	5.50***	4.04	3.20	2.30	2.14	2.28	2.20	2.27	1.90	1.82	2.21	1.80
With intercept and D97	6.05***	4.27	3.19	2.22	2.04	2.11	1.89	1.87	1.36	1.29	1.69	0.94
With intercept and DFix	6.77***	5.07	3.94	2.78	2.33	2.41	2.63	3.09	2.61	2.71	2.81	2.08
With intercept, D97 and DFix	8.57***	6.14***	4.21	3.00	2.39	2.39	2.55	2.95	2.38	2.42	2.52	1.66
With intercept and trend	13.14***	6.70***	4.21	3.12	3.09	2.46	2.22	2.11	2.41	1.67	1.74	1.58
With intercept, trend and D97	13.12***	6.70***	4.19	3.06	3.10	2.48	2.09	1.88	2.02	1.29	1.53	0.99
With intercept, trend and DFix	16.85***	9.29***	6.22***	4.63	4.42	3.59	3.47	3.53	4.16	2.95	2.44	2.35
With intercept, trend, D97 and DFix	18.22***	10.10***	6.37***	4.74	4.40	3.56	3.37	3.37	3.84	2.65	2.30	1.94
Import demand	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7	Lag 8	Lag 9	Lag 10	Lag 11	Lag 12
With intercept only	1.11	0.63	0.35	0.22	0.20	0.15	0.09	0.12	0.10	0.21	0.85	0.13
With intercept and D97	1.50	1.06	0.70	0.52	0.52	0.51	0.30	0.37	0.37	0.45	0.97	0.42
With intercept and DFix	1.46	1.02	0.85	0.82	0.64	0.85	0.77	0.95	0.87	1.21	4.34	2.04
With intercept, D97 and DFix	1.69	1.25	0.98	0.90	0.76	0.94	0.80	0.98	0.92	1.24	4.28	2.01
With intercept and trend	13.13***	6.82***	4.80	3.52	3.53	2.88	3.37	3.16	3.17	4.06	4.54	3.00
With intercept, trend and D97	14.72***	8.01***	5.64	4.18	4.10	3.36	3.56	3.29	3.29	4.16	4.75	3.12
With intercept, trend and DFix	12.82***	6.51***	4.53	3.35	3.24	2.77	3.21	3.13	3.12	4.16	7.04***	4.21
With intercept, trend, D97 and DFix	14.55***	7.76***	5.32	3.86	3.73	3.09	3.30	3.15	3.15	4.15	6.95***	4.08

Notes: For model with intercept only with k=2, 95%, the bound is F(3.793, 4.855); for model with intercept and trend, the bound is F(4.903, 5.872). The asterisk *** denotes value that exceeds the upper bound.

Table 4. Estimates for long run elasticity

	Export Demand Model, In(EX_{CH})		
	ARDL [2,2,2]	FMOLS [4]	DOLS [14, 14]
In(Y_{MY})	1.8967*	3.3221***	3.1416***
	(1.1241)	(0.1396)	(0.1711)
RFX	-0.8074*	-0.8455***	-1.1303***
	(0.4514)	(0.2663)	(0.2059)
DFix	-0.3403***	-0.4367***	-0.3139**
	(0.0983)	(0.1145)	(0.1220)
D97	-0.1423	-0.3363**	-0.4865
	(0.2007)	(0.1691)	(0.3488)
Trend	0.0105*	-	-
	(0.0057)		
Intercept	-3.5657	-8.4533***	-7.6530***
	(4.0717)	(0.6136)	(0.6555)
Adj R^2	0.72	0.53	0.65
	Import Demand Model, In(IM_{CM})		
	ARDL [2,2,2]	FMOLS [1]	DOLS [1, 1]
In(Y_{CH})	9.0327***	14.8974***	11.5279**
	(3.4113)	(6.0590)	(4.5372)
RFX	0.8498*	-2.0434	-0..7074
	(0.4601)	(1.4637)	(0.9019)
DFix	0.6033**	1.4823***	1.2627***
	(0.2648)	(0.5550)	(0.3415)
D97	0.0678	0.7657	0.1161
	(0.2390)	(0.9616)	(0.7022)
Tread	0.0169***	-	-
	(0.0016)		
Intercept	-39.2570**	-63.4485**	-48.6072**
	(16.1978)	(28.5481)	(21.3771)
Adj R^2	0.59	0.45	0.55

Note: Asterisks *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Standard errors are reported in parentheses ( ). Optimal lags for each estimation method are selected by the Akaike information criterion. ARDL[2,2,2] denotes lag 2 selected for dependent variables and two other endogenous variables, FMOLS[4] denotes optimal lag of 1 selected, whereas DOLS[14, 14] means lead=14 and lag=14.

1997 crisis dummies somehow show similar but insignificant signs. Thus far, the findings have suggested that Malaysia cleaves to better gains in the bilateral trading under the stable exchange rate regime.

Then, the MLC hypothesis can be testified based on the long-run elasticity estimation of real exchange rate for both export and import demand models (Table 4). For the export demand model, a negative relationship between the bilateral Chinese exports (to Malaysia) and the real exchange rates ($RFX_{YUAN/RM}$) is overwhelmingly reported by ARDL [2, 2, 2], FMOLS [4] and DOLS [14, 14]. The respective long run elasticity is -0.8074, -0.8455 and -1.1303. The negative relationship indicates that the decrease in $RFX_{YUAN/RM}$ (appreciation of yuan against ringgit) resulted in an increase of Chinese exports to Malaysia. The results contradict the conventional view that export gains are due to real devaluation of yuan. It does not support the argument that Chinese undervalued exchange rate regime offers threat to the crowding out of other developing Asian economies, at least for Malaysia. The finding is in fact consistent with García-Herrero and Koivu (2009) who found that Malaysia holds the exception case among Asia counterpart that exports would benefit from renminbi real appreciation. This is due to that fact that besides electronics, Malaysia also exports substantial quantities of oil and other raw materials to China.

Unlike export models, the real exchange elasticities are inconsistent in the import models. ARDL [2, 2, 2] predicts that the $RFX_{YUAN/RM}$ positively related to IM_{CH} but FMOLS[1] and DOLS [1, 1] reported negative relationship. If a negative relationship holds, an appreciation of yuan ($RFX_{YUAN/RM}$ reduces) results in lesser import demand from Malaysia due to relative expensive import prices. Otherwise if positive relationship holds, currency devaluation ($RFX_{YUAN/RM}$ increases) will cause imports to be more expensive and lead to deterioration in the Chinese terms of trade. As volume effects fail to be large enough to offset the price effect, it implies the loss of real national income and more units of exports have to be given to obtain a unit of import. Additionally, devaluation could be inflationary as it raises the cost of imported intermediate inputs and this affects the supply side of the economy. Nevertheless, despite the inconsistency of real exchange in demand models, the absolute sums of the export and import elasticises have all exceeded unity. We cannot reject that MLC holds for the China-Malaysia trading link. This is consistent with the theoretical prediction that real depreciation (yuan) improves Chinese trade balance in the long run.

However, one needs to be careful when interpreting the implication of MLC results. If we refer to theoretical derivation, real exchange rate movements can be decomposed into two components: first, the nominal exchange rate (yuan/RM) movements, and second, the relative price ($Price_{China}$ / $Price_{Malaysia}$) movements. To the extent that yuan/RM movements are also largely identical relative to China's foreign exchanges against other countries, the first component would therefore capture changes in competitiveness relative to exporters from Malaysia-China as well as from other trading partners. It is most likely that $RFX_{YUAN/RM}$ does not only reflect changes in price competitiveness relative to Malaysia-China, it does pick up some of the effects of China against other trading partners. This has two implications: first, the crowding out coefficient (export model) is likely to be under-estimated; and second, as long as China products are closer substitutes for other countries' products, the elasticity of substitution (import model) with respect to other trading partners' products is likely to be over-estimated (García-Herrero and Koivu, 2009). In other words, the estimation of MLC based on export and import model is still insufficient to fully justify the gain-loss state of Malaysia-China trade.

Next, we proceed to the rolling analysis in Figure 2 to capture the potential time-varying parameters in our models. Among all, we highlight the potential structural shifts that may affect the coefficients being estimated:

(a) 1992 – official market rate was lower than the internal settlement rate and the swap rate, suggesting a constant pressure for yuan to depreciate.

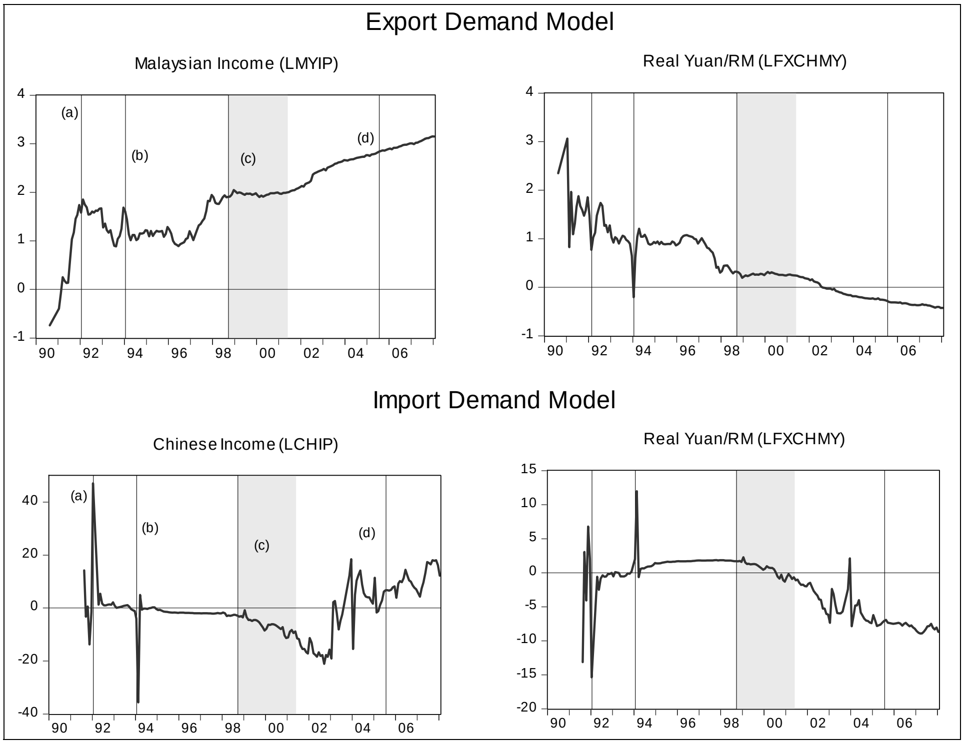

Figure 2. Rolling Estimates for Cointegration Regressions, 1990-2008

Note: The rolling analysis computes parameter estimates over a rolling window of a fixed size through the sample of 1990: Jan - 2008: Jan based on the FMOLS cointegration regression.

(b) 1994 – China unified the official and swap market rates by moving the official rate to the then prevailing swap market rate, 8.7yuan/USD.
(c) 1998-2001 – capital control by the Malaysian government.
(d) 1998-2005 – Malaysian ringgit was pegged against the USD at RM3.8.

Apparently, coefficients of variables in the export demand model are more stable than coefficients in the import demand model. In the export model, Chinese income (In(Y_{MY})) remains positive and shows an upward trend during 1991-2008 with some positive impacts of (a) and (b). As for real exchange rate ($RFX_{YUAN/RM}$), some negative impacts of (a) and (b) were captured. Still, it remains stable with a downward trend. On the other hand, the rolling coefficients of Malaysian income (In(Y_{MY})) vary over the sample. A sharp increase in (a) and decrease in (b) is followed by negative trending before the positive adjustments during 2003-2008. Likewise, $RFX_{YUAN/RM}$ coefficients are also unstable and show downward trending since (c). The results are considered consistent with the point estimates of long run coefficients reported earlier in Table 4.

Another major concern in this study involves the verification of the J-curve phenomenon in the short- and moderate-term. When there is currency devaluation, we generally expect that the trade balance deteriorates at first, because the price change occurs quickly while trade quantities (volume) change more slowly. After a moderate time period, the volume effects become large enough to offset the price effect that the trade balance improves to present the so-called J-curve. For such purposes, we proceeded to the generalised impulse response function (IRF) analysis that provides sufficient information to draw a conclusion on the existence of J-curve. An IRF traces the effect of a one-time shock to one of the innovations (exports or imports) on current and future values of the real exchanges rates from an unrestricted vector autoregression.

The respective generalised IRF of Chinese exports and imports series to unit shocks of real exchange rates (yuan/RM) is shown in Figures 3a and 3b. Although the IRF reflect stationary response of both export and import series to generated unit shocks of real exchange rates, there is no clear pattern of J-curve for the Chinese export series. The export series depicted a M-shape adjustment to real exchange shocks as a 1 per cent depreciation of Chinese yuan brings about a 2 per cent drop in Chinese exports to Malaysia immediately, recovering after the second month, but further dropping after the third month, picking up a little in the fifth month, with the impact dying out slowly after ten months. As for the Chinese import series, the J-curve adjustment is more apparent but incomplete. A one per cent real depreciation of yuan leads to a drop in Chinese imports from Malaysia by a maximum of about 2.5 per cent with a similar magnitude as the export initial adjustment, but the increase in Chinese imports from Malaysia follows an increasing path thereafter and the

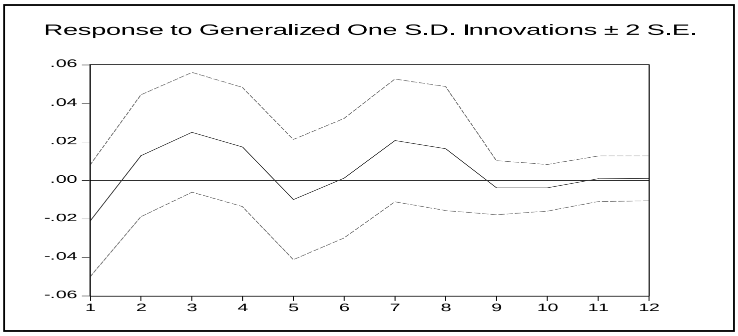

Figure 3a. Response of China Exports (to Malaysia) to Real Exchange Rate Shocks.

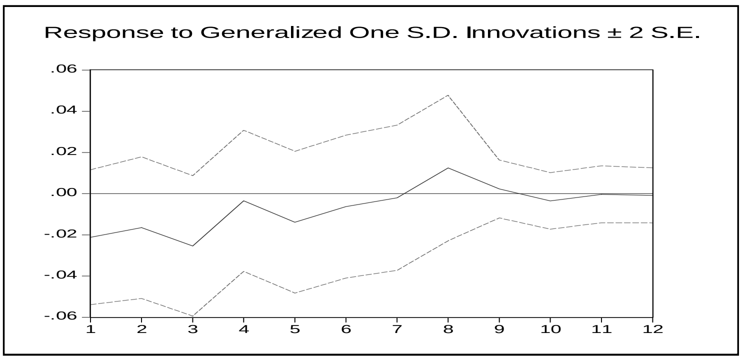

Figure 3b. Response of China Imports (from Malaysia) to Real Exchange Rate Shocks.

impact also dies out slowly after ten months. In other words, the volume effect fails to offset the price effect, implying that the unit value of imports has increased resulting in an increase in total value of imports against a constant or an insignificant change in the value of exports, over time.

Figure 4 reports the generalised IRF of both the Chinese and Malaysian industrial production to unit shocks of real exchange rates. Clearly, Malaysia shows greater response to the foreign exchange shocks, perhaps due to the greater openness of the Malaysian economy. An initial 1 per cent depreciation of renminbi brings about a 3 per cent drop in Malaysian producttion immediately but some 5 per cent consistent gains after a quarter. As for China, the deterioration of production due to currency depreciation is observed in the second to third months, with some improvements in production in the following months. However, after a year, production responds negatively in gradual form. In brief, China's exports gains due to real yuan devaluation are uncertain but import losses are more evident, and the impacts of depreciation gradually die out within a year. Expansionary effect due to real exchange shocks has been observed for Malaysia but again, inconclusive for China. Putting together, the shock adjustments are temporal and our study supports the Chinese complementary role instead of conflicting (competing) features in the China-Malaysia bilateral trading.

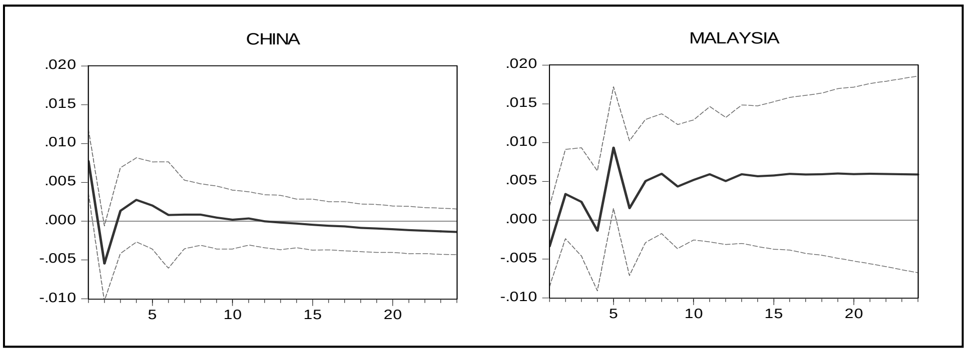

Figure 4. Response of National Income to Real Exchange Rate Shocks
Note: Estimations are based on impulse response to generalized one S.D. innovations ± 2 S.E.

Generalised VDC from one-standard deviation shocks to each variable in export and import models over 1 to 36 months are shown in Tables 5a-5b. For the export model, the Chinese export (In(EX_{CH})) appears to be more endogenously determined. After a 8-month horizon, 82 per cent of its variance is explained by its own shocks. But after a 36-month horizon, the own innovations dropped to 65.3 per cent, with about 28 per cent and 6.7 per cent of the variance being explained by the Malaysian industrial production (In(Y_{MY})) and real exchange rate respectively. By comparison, the real exchange of yuan/RM seems to be more exogenous as most of its shock is explained by its own innovations. For example, at the end of 24 months, 91.12 per cent of *RFX* variance is still explained by its own shocks. However, in the import model, it is the real exchange rate that was relatively endogenous as compared to the Chinese import (In(IM_{CH})) and Chinese Income (In(Y_{CH})).

Table 5a. Variance decomposition analysis for Export Demand Model

Variance decomposition of	Horizon	% of forecasted variance explained by innovations in		
		In(EX_{CH})	In(Y_{MY})	*RFX*
In(EX_{CH})	1	100.00	0.00	0.00
	4	85.48	6.58	7.95
	8	82.22	8.38	9.40
	16	76.55	14.15	9.31
	24	71.78	19.99	8.23
	36	65.30	27.98	6.72
In(Y_{MY})	1	6.34	93.66	0.00
	4	6.60	92.22	1.18
	8	5.30	88.57	6.14
	16	6.59	83.86	9.54
	24	9.24	79.68	11.08
	36	13.17	75.36	11.47
RFX	1	0.85	0.24	98.92
	4	0.23	2.05	97.72
	8	0.43	3.28	96.30
	16	1.05	5.42	93.53
	24	1.63	7.25	91.12
	36	2.18	9.48	88.34

Note: the VAR optimal lag = 5 is chosen based on the Akaike information criterion.

At the present stage, the VDC finding does not seem to provide clear insights. We decided to proceed further with the combined analysis that all variables from export and import models are included in one VAR framework. The VDC results are shown in Table 5c. Several findings are worth noting. For instance, in the case of Chinese exports (to Malaysia), its forested variances are mostly explained by the Chinese imports (from Malaysia) and Malaysian industrial production (In(Y_{MY})) as much as 13 per cent and 21.6 percent respectively, after a 36-month horizon.

Then, in the similar horizon, the variances of Chinese imports are mainly explained by innovations in Chinese exports (37.37%) and Malaysian production (26.83%). Likewise, about 12.3 per cent and 25.39 per cent of Malaysian production's variances are explained by Chinese exports and imports respectively. Such findings indicate some lead-lag relationship and trivariate causal effects among the Chinese export-import and Malaysian industrial production. By econometric prediction, the close association of export-import implies that Chine-Malaysia trade is along the sustainable path and, the Malaysian production is closely linked to trade sustainability.

On the other hand, the relatively leading role of Chinese income (industrial production) seems to be more pronounced with the real exchange of yuan/RM (*RFX*). For example, after a 24-month horizon, approximately 80.2 per cent of the variance of In(Y_{CH}) is explained by its own shocks and only 3.3 per cent is explained by*RFX*. But for, 22 per cent of the forecasted error variance is explained by In(Y_{CH}).

Table 5b. Variance decomposition analysis for Import Demand Model

Variance decomposition of	Horizon	% of forecasted variance explained by innovations in		
		In(IM_{CH})	In(Y_{CY})	*RFX*
In(IM_{CH})	1	100.00	0.00	0.00
	4	98.73	0.99	0.28
	8	98.63	1.04	0.32
	16	99.04	0.69	0.27
	24	99.26	0.52	0.23
	36	99.43	0.38	0.19
In(Y_{CY})	1	4.33	95.67	0.00
	4	4.14	92.33	3.53
	8	3.88	92.98	3.14
	16	3.54	92.78	3.69
	24	3.48	91.73	4.78
	36	3.51	90.53	5.96
RFX	1	0.74	7.51	91.75
	4	0.93	14.16	84.91
	8	1.32	16.47	82.21
	16	2.14	22.25	75.61
	24	3.13	25.97	70.90
	36	4.87	28.36	66.78

*Not*e: the VAR optimal lag = 5 is chosen based on the Akaike information criterion.

Table 5c. Variance decomposition analysis for Combined Model

Variance decomposition of	Horizon	% of forecasted variance explained by innovations in				
		In(EX_{CH})	In(IM_{CH})	In(Y_{CH})	In(Y_{MY})	*RFX*
In(EX_{CH})	1	100.00	0.00	0.00	0.00	0.00
	4	93.17	0.78	2.05	0.85	3.16
	8	87.93	3.12	3.58	2.81	2.56
	16	78.15	7.79	3.90	8.25	1.91
	24	70.31	10.51	3.38	14.15	1.65
	36	61.20	13.01	2.78	21.64	1.37
In(IM_{CH})	1	43.43	56.57	0.00	0.00	0.00
	4	44.16	54.12	0.24	1.33	0.14
	8	45.07	50.22	0.29	4.16	0.26
	16	43.30	44.45	0.25	11.48	0.52
	24	39.78	40.67	0.23	18.71	0.62
	36	35.06	37.37	0.21	26.83	0.53

Table 5c. Variance decomposition analysis for Combined Model (Continued)

In(Y_{CH})	1	5.22	2.27	92.51	0.00	0.00
	4	7.15	2.13	86.79	0.39	3.55
	8	9.71	1.86	84.16	0.85	3.42
	16	12.33	1.73	81.30	1.39	3.25
	24	13.25	1.70	80.19	1.53	3.33
	36	13.53	1.69	79.65	1.54	3.59
In(Y_{MY})	1	9.07	3.32	0.02	87.60	0.00
	4	13.08	9.16	0.48	76.14	1.13
	8	12.51	14.47	0.57	71.03	1.41
	16	11.80	19.88	0.58	65.59	2.15
	24	11.88	22.85	0.66	61.63	2.97
	36	12.30	25.39	0.88	57.37	4.07
RFX	1	1.27	0.05	7.79	0.27	90.62
	4	0.36	1.05	15.71	1.38	81.50
	8	0.24	2.64	18.86	2.75	75.50
	16	0.76	4.63	21.17	5.61	67.82
	24	1.49	5.11	22.06	8.20	63.15
	36	2.20	4.95	22.59	11.31	58.96

Note: The VAR optimal lag = 3 is chosen based on the Akaike information criterion.

7. Conclusion

The ARDL bound test, the FMOLS and DOLS estimations, and the generalised IRF and VDC analyses confirm that the real exchange rates, domestic production and foreign incomes are significant in explaining the China-Malaysia bilateral export and import demands. Our results hold several implications in the area of sustainable regional trading, on both methodological and more substantive levels. First, the income effect on both export and import models suggest that Malaysia cleaves the major gaining. Second, the real exchange effect on export model indicates that China's export expansion was not mainly due to yuan depreciation. However, when both export and import models are considered, the MLC holds to imply that yuan devaluation improves the Chinese trade balance against Malaysia in the long run.

Third, the J-curve is unclear while trade adjustments following real exchange shocks are temporal and the results support the Chinese complementary role in bilateral trading. This is partially consistent with Zhang (1998; 1999) – at least for the China-Malaysia case, that the effect of currency depreciation is found to be not sizable and China's reforms have not produced an economic system under which economic agents have become responsive to market signals to allow changes in exchange rates to influence the trade balance. Fourth, expansionary effect is of greater evidence for Malaysia due to real exchange shocks but inconclusive for China.

Fifth, when both export and import models are combined, the VDC analysis confirms that the China-Malaysia trade is along the sustainable path. Some lead-lag effects are also found among Chinese export-import and Malaysian industrial production. On the whole, the exchange rate regime and trading diversification within our analysis period have shown a Chinese complementary role rather than conflicting features in regional trading, at least in the long run. There is no clear support that the emergence of China and her currency strategy offers further threat to the crowding out of Malaysia as a formidable export competitor. Indeed, Malaysia may experience better economic gains in the market structure and product diversification as well as economies of scale, on account of the liberalisation process of China since the 1990s. It is, perhaps, the best timing for both nations to take full advantage of the ASEAN-China Free Trade Area as a platform for closer economic collaboration and hence greater trade and growth expansion.

References

Ahmad, J. and J. Yang. 2004. Estimation of the J-Curve in China. East–West Center Working Papers No. 67.

Ahmed, S., C. J. Gust, S. B. Kamin and J. Huntley. 2002. Are Depreciations as Contractionary as Devaluations? A Comparison of Selected Emerging and Industrial Economies. International Finance Discussion Paper, No. 737, Board of Governors of the Federal Reserve System, Washington, D.C.

Backus, D. K., P.J. Kehoe and F.E Kydland. 1994. Dynamics of the trade balance and the terms of trade: the J-Curve? *American Economic Review* **84**: 84-103.

Baharumshah, A. Z. 2001 The effect of exchange rate on bilateral trade balance: new evidence from Malaysia and Thailand. *Asian Economic Journal* **15(3)**: 291-312.

Bahmani-Oskooee, M. and I. Miteza. 2003. Are devaluations expansionary or contractionary? A survey article. *Economic Issues* **8 (2)**: 1-28.

Bahmani-Oskooee, M. and H. Harvey. 2006 How sensitive Are Malaysia's bilateral trade flows to depreciation? *Applied Economics* **38** :1279-1286.

Bahmani-Oskooee, M. and H. Harvey. 2010. The J-curve: Malaysia versus her major Trading Partners. *Applied Economics* **42**: 1067-1076.

Bahmani-Oskooee, M and Y. Wang. 2006. The J Curve: China versus her trading partners. *Bulletin of Economic Research* **58 (4)**: 323-343.

Bahmani-Oskooee, M and A. Ratha. 2007. Bilateral S-curve between Japan and her trading partners. *Japan and the word Economy* **19**: 483–489.

Bickerdike, C. F. 1920. The instability of foreign exchanges. *The Economic Journal* **30:** 118-122.

Calvo, Guillermo A. and C.M. Reinhart. 2001. When Capital Inflows Come to a Sudden Stop: Consequences and Policy Options. Working Paper

Dornbusch, R. and P. Krugman. 1976. Flexible exchange rates in the short tun. *Brookings Papers on Economic Activity* **3**: 537-584.

Duarte, A and K. Holden. 2001. The Business Cycle in the G7 Economies. Centre for International Banking, Economics and Finance, Working Paper, Liverpool John Moores University.

Eichengreen, B. and R. Hausmann. 1999. Exchange Rates and Financial Fragility. NBER Working Papers 7418, National Bureau of Economic Research.

Eichengreen, B., Y. Rhee and H. Tong. 2004. The Impact of China on the Exports of Other Asian Countries. Working Paper 10768, National Bureau of Economic Research, Cambridge, MA.

García-Herrero, A. and Koivu, T. 2009. China's Exchange Rate Policy and Asian Trade. Economie Internationale, No. 116, 4th Quarter, 2008, Bank for International Settlements Working Paper.

Helkie, W.L. and P. Hooper. 1987. The U.S. External Deficit in the 1980s. International Finance Discussion Paper No. 304, Board of Governors, Federal Reserve System, Washington, D.C.

Kim, Y. and Y.Ying. 2007. An empirical assessment of currency devaluation in East Asian countries. *Journal of International Money and Finance* **26**: 265-283.

Krugman, P. and R. E. Baldwin. 1987. The persistence of the U.S. trade deficit. *Brookings Papers on Economic Activity* **1**: 1-43.

Lerner, A. 1944. *The Economics of Control*. New York: Macmillan.

Marshall, A. 1923. Money, Credit and Commerce. London: Macmillan and Co.

Marwah, K. and L.R. Klein. 1996. Estimation of J -curves: United States and Canada. *Canadian Journal of Economics* **29**: 523-539.

Masih, A.M.M. and R. Masih. 1999. Are Asian stock market fluctuations due mainly to intra-regional contagion effects? Evidence based on Asian emerging stock markets. *Pacific-Basin Finance Journal* **7**: 251–282.

Metzler, L. 1948. *A Survey of Contemporary Economics*, Vol. I. Homewood, IL:Richard D. Irwin, Inc.

Onafowora, O. 2003. Exchange rate and trade balance in East Asia: is there a J-curve? *Economics Bulletin* **5(18)**: 1-13.

Pesaran, M.H., Y. Shin, and R.J. Smith. 1996. Testing for the Existence of a Long-Run Relationship. DAE Working Paper No. 9622, Department of Applied Economics, University of Cambridge.

Pesaran, M.H., Y. Shin and R.J. Smith. 2001. Bound testing approaches to the analysis of level relationship. *Journal of Applied Econometrics* **16**: 289-326.

Phillips, P. C. B. and B. E. Hansen. 1990. Statistical inference in instrumental variables regressions with 1(1) processes. *Review of Economic Studies* **57**: 99-125.

Rajan, R.S. and C-H Shen. 2002. Are Crisis-Induced Devaluations Contractionary? Pacific Basin Working Paper Series 02-06, Federal Reserve Bank of San Francisco.

Reinhart, C. M. and Rogoff, K. 2002. The Modern History of Exchange Rate Arrangements: A Reinterpretation. NBER Working Paper No. 8963, National Bureau of Economic Research, Cambridge, MA.

Robinson, J. 1947. *Essays in the Theory of Employment*. Oxford: Basil Blackwell.

Rose, A.K. and J.L. Yellen. 1989. Is there a J-curve? *Journal of Monetary Economics*, **24** (July): 53–68.

Shi, J. (2006) Are Currency Appreciations Expansionary in China? NBER Working Paper No. W12551.

Stock, J.H. and M. Watson. 1993. A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica* **61**: 783–820.

Zhang, Y. and G.-H. Wan. 2007. What accounts for China's trade balance dynamics? *Journal of Policy Modeling* 29: 821–83.

Zhang, Z. 1998. Does devaluation of the renminbi improve china's balance of trade? *Economia Internazionale* **51(3):** 437–45.

Zhang, Z. 1999. China's exchange rate reform and its impact on the balance of trade and domestic inflation. *Asia Pacific Journal of Economics and Business* **3(2)**: 4–22.