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Abstract

Over the last decade, China and Malaysia have committed to export-led growth policy based on maintenance of their undervalued currencies. While both nations have recorded current account surplus and devoted for regional trade integration, it was lately claimed that the Chinese foreign exchange regime poses her as a formidable export competitor and offers further threat to the crowding out of other developing Asian, including Malaysia. Such scenario motivated us to examine the dynamic nexus of exchange rate impact on bilateral export and import flows between China and Malaysia. Our analysis contributed in using high frequency monthly data for the recent period from January 1990 to January 2008, based on the Autoregressive Distributed Lag (ARDL) bound testing procedure and generalised impulse response analysis. Our empirical findings reveal that the Marshall-Lerner condition holds in the long run but only the short run import demands adhere to the potential J-curve pattern. In brief, the study supports for 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 Codes: F31.

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1.0 Introduction

The recent revaluation and USD de-pegging of both Chinese yuan (renmimbi) and Malaysian ringgit on July 2005 have open a new scenario to the trade sector in both nations. 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 1980s-2000s, were alleged as committed to export-led growth policy based on maintenance of their undervalued currencies against the USD. Malaysia has earned substantial current account surplus in the past twelve years after decade-long of persistent external imbalances, as a result of competitive terms of trade due to currency turmoil in 1997. China, on the other hand, has repeatedly devalued Chinese yuan as a means of trade expansion and external competitiveness gains in the 1980s and the early 1990s. In 2007, China's total trade was reported at US$2170 billion (hundred times the total trade in 1978 - US$20.6 billion) and her current account surplus amounting US$372 billion ranked top globally. It was lately claimed that the yuan strategy poses her as a formidable export competitor and offers further threat to the crowding out of other developing Asian, including Malaysia (see Zhang and Wan, 2007; among others). Such practice of foreign exchange regime is odd as both nations have devoted for regional economic integration and committed to the ASEAN-China Free Trade Area as well as exchange rate arrangements at regional level.

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

Conventional inspection foresees a nominal devaluation will translate into a real currency depreciation to boost net exports and hence the resulting growth. But there would be a perverse temporal negative response of the trade balance to a real depreciation in 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 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 generalized 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 the reverse way. 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 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 the 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 produce 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 on is inconsistently understood, its support for output expansion is neither well-established. On one hand, devaluation generates an expansionary effect via aggregate demand; on the other hand, it has a negative impact on the aggregate supply through its effect on the cost of imported intermediate inputs[1]. In literature, arguments that currency devaluations are more contractionary and inflationary for developing countries than for industrial countries have been observed in Eichengreen and Hausmann (1999), Calvo and Reinhart (2001), among others, which partially explained the practice of 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 reversals of pegged exchange rates policy during crisis as governments ran out of reserves, witnessed the sharp declines in investor confidence, heavy capital outflows and concordant deteriorations of output and inflation performance. In mixed finding, 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), in similar observation, found that though the yuan appreciation is generally contractionary, but given the scale of capital flows, shocks to the capital account likely play a much bigger role than the yuan in Chinese growth.

Apparently, at present stage, neither the theoretical nor the empirical works have established definitively whether currency devaluation (nominal or real) has caused output expansion or deterioration, or even if exchange rates play a role in determining trade flows. The issue has become more vital following the 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 of regional trade policy and currency arrangements anchoring by China is well understood but less being investigated.

Motivated by the concerned issues, this study investigates the 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. We also encompass high frequency monthly data from January 1990 to January 2008 – a period of crisis, trade expansion and major changes in currency regime for both China and Malaysia. Relevant studies have previously worked on the Malaysian or Chinese case but not for

[1] The impact of devaluation on output is theoretically ambiguous and the relevant empirical evidence is largely inconclusive. A relevant survey can be cited via Bahmani-Oskooee and Miteza (2003).

China vis-a-vis Malaysia after the major currency adjustment in July 2005 (e.g., Baharumshah (2001) for Malaysia-US-Japan and Thailand-US-Japan, 1980Q1-1996Q4; Bahmani-Oskooee and Harvey (2006, 2010) for Malaysia-14 trading partners, 1983Q1-2002Q1, 1973Q1-2001Q3; Ahmad and Yang (2004) for China-G7, 1974-1994; Bahmani-Oskooee and Wang (2006) for China-13 Trading partners without Malaysia, 1983-2002). Our analyses also take concerns of the possible transmission channels via macro-variables (e.g. domestic output, foreign income) as in standard international trade model. The Marshall-Lerner condition and J-curve effect are investigated via the combination the elasticity and absorption approaches of balance of payment, within the Autogressive Distributed Lag (ARDL hereafter) bound testing procedure and unrestricted error correction framework.

The ARDL procedure can be applied irrespective of whether the regressors are stationary, i.e. I(0), or stationary at first difference, i.e. 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 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).

The present study is organized in the following manner. Section 2 shows 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. Estimation results are discussed in section 3. Finally, in the closing section 4, conclusions are drawn.

2.1 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-Robinson-Metzler (BRM, 1920; 1947; 1948) and was later make known by Marshall and Lerner (1923; 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 a nominal devaluation will 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 follow:

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

where $IM_{CH(MY)}$ represent 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 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:

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

where $RFX_{\frac{CH}{MY}} = \frac{P_{CH}}{FX_{\frac{CH}{MY}} P_{MY}}$

$P_{MY(EX)}$ 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. $RFX_{\frac{CH}{MY}} = \frac{P_{CH}}{FX_{\frac{CH}{MY}} P_{MY}}$, 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:

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

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

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

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

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

Thus, in our empirical model we express the balance of trade as a function of the real exchange rate and the levels of domestic and foreign incomes. Taking natural logarithm of both sides, the following model is obtained, with a stochastic term added to capture short-term departures from long run equilibrium:

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

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

where ln represents natural logarithm, and ε_t represents a white noise process. Given the definition of the real exchange rates, the absolute sum of c_{EX} and c_{IM} must exceed unity for the Marshall Lerner condition to holds, that is, if a real devaluation of the domestic currency improves the trade balance.

2.2 Estimation Procedures

This study employs the ARDL Bounds test advanced by Pesaran et al. (2001). 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:

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

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

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:

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

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

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 falls outside the lower bound. Nevertheless, if 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:

$$\begin{aligned}\alpha(L,r)\ln(EX_{CH,t}) = \beta(L,m)\ln(Y_{MY,t-m}) &+ \delta(L,n) RFX_{t-n} + d_1 Trend_t \\ &+ d_2 D97_t + d_3 DFIX_t + \mu_t\end{aligned} \quad (8b)$$

$$\begin{aligned}\alpha(L,s)\ln(M_{CH,t}) = \beta(L,p)\ln(Y_{CH,t-p}) &+ \delta(L,q) RFX_{t-q} + d_1 Trend_t \\ &+ d_2 D97_t + d_3 DFIX_t + \mu_t\end{aligned} \quad (9b)$$

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 Pesaran *et al*. (1996).

To trace the short run adjustments towards long run equilibrium, we can form an unrestricted error correction model to allow a more efficient estimate of the short-run coefficients as suggested by Stučka (2004). This is given by:

$$\Delta y_t = -\phi(1,\hat{p})EC_{t-1} + \sum_{i=1}^{k} \beta_{i0} \Delta x_{it} + \delta' \Delta w_t - \sum_{j=1}^{\hat{p}-1} \phi_j^* \Delta y_{t-j} - \sum_{i=1}^{k} \sum_{j=1}^{\hat{q}_i - 1} \beta_{ij}^* \Delta x_{i,t-j} + \mu_t \quad (10)$$

where $EC_t = y_t - \sum_{i=1}^{k} \hat{\theta}_i x_{it} - \hat{\psi}' w_t$

Alternatively, the J-curve phenomenon and the income response following shocks in real exchange rates can be graphically illustrated via the generalised impulse response function (IRF) analysis from the unrestricted vector autoregression (VAR) framework. VAR is capable for analyzing 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 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 present if devaluations are indeed expansionary, or otherwise.

2.3 Data Description

Our analyses are all based on high frequency 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 are compiled by having the nominal exchange rates (local currency/USD) 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 are sourced from the Direction of Trade Statistics compiled by International Monetary Fund while the CPI, IP and exchange rates series are sourced from DataStream.

3.1 Preliminary Facts

Historically, the Malaysian ringgit was trading as a free float currency at around RM2.50 per USD since early 1970s. Managed floating was promoted since 1980s and some overvaluations were found in the 1st half of 1990s during the soft-pegged against USD (Table 1). During the 1997 Asian financial crisis, Malaysian ringgit suffered sharp depreciation by more than 40% within a year to about RM 4.00/USD. Bank Negara Malaysia (BNM, central bank of Malaysia) decided to impose capital control and peg ringgit to the USD in September 1998 at RM3.80.

Table 1: Exchange Rates Regime

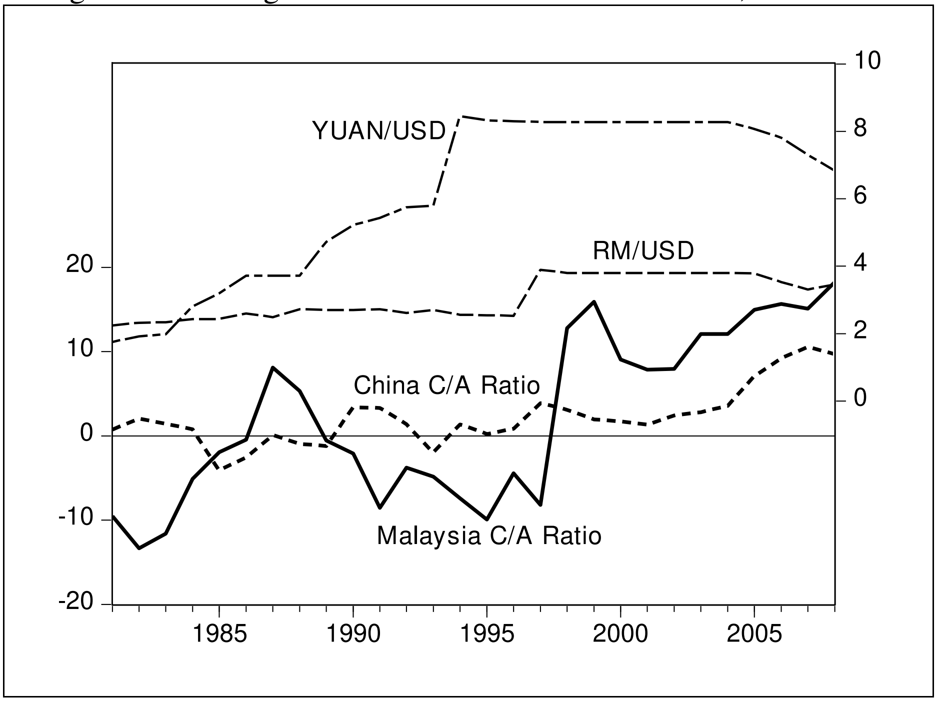
Country	Horizon	Exchange Rate System Classification
Malaysia	June 1967 – September 1975 September 1975 – July 1997 August 1997 – September 1998 September 1998 – June 2005 July 2005 – current	• Peg to Pound Sterling. Malaysian Ringgit is introduced • De facto band around US Dollar (+/- 2%). Officially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

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

On the other hand, renminbi was pegged to the USD and a dual-track currency system was instituted since 1978. 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 January 1, 1994 and the renminbi turn freely convertible under current account transaction effective December 1996. In the following decade until 2005, renminbi was tightly pegged at 8.2765 yuan to the USD (Table1). On July 21, 2005 People's Bank of China announced the 2.1% revaluation to 8.11 yuan per USD and move from USD pegging to managed-floating based on a basket of foreign currencies. On July 21, 2005, BNM responded to China's de-pegging announcement within an hour after the 7-year pegging. Akin to the Chinese policy, BNM allows the ringgit to operate in a managed floating system based on a basket of several major currencies. Together, both renmimbi and ringgit show analogous trend of subsequent appreciation against the weakened USD in the new millennium. By June 2008, the USD exchanges for 3.20 Malaysian ringgits, whereas the yuan is traded at around 6.95 yuan (June 2008), appreciated about 16% since 2005 (see Figure 1).

While China has continuously experienced trade expansion for the past three decades, Malaysia's external surplus has significantly increased since 1998, in line with the currency depreciation owing to Asia crisis (see Figure 1). In 2007, Malaysia's surplus has achieved RM 26 billion and ranked 15th in the world. In terms of current account ratio, Malaysia is higher than China attributable to greater trade openness (about 200% of GDP). Presently, Malaysia's major trading partners are the US, China, Singapore, Japan and other ASEAN members. Both China and Malaysia have committed to regional trading and economic cooperation. In 2008, Malaysia has contributed about 25% of intra-ASEAN trading whereas China has become the third major trading partner of ASEAN after Japan and the European Union, contributing about 11% of intra-ASEAN trading.

Figure 1: Exchange Rates and Current Account Ratios, 1981-2008



Note: Current account ratios are referred to left hand scale whereas exchange rates are referred to right hand scale.
Source: Asia Development Bank Key Indicators

3.2 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 problem, 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 mix of I(0) and 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 inappropriate and the ARDL Bound test is preferred.

Table 2: Summary of Descriptive Statistics and Unit Root Tests

	$\ln(EX_{CH})$	$\ln(IM_{CH})$	$\ln(Y_{MY})$	$\ln(Y_{CH})$	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 the 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.

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 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 we hold 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.

The MLC hypothesis can be testified based on the long-run elasticity estimation for both export and import demand models, as reported in Table 4. For the export demand model, a negative relationship between the bilateral China→Malaysia exports and the real exchange rates ($RFX_{CH/MY}$) is reported, with a long run elasticity of -0.8074. Though the result does not imply an export gain due to real devaluation, it neither supports the argument that Chinese undervalued exchange rate regime offers threat to the crowding out of other developing Asian economies at least for Malaysia.

Next, the import demand model predicts that the $RFX_{CH/MY}$ positively related to IM_{CH} with a long run elasticity of 0.8498, contradicting the conventional view that depreciation of currency results in lesser import demand due to relative expensive import prices. In other words, currency devaluation ($RFX_{CH/MY}\uparrow$) will cause imports more expensive and hence 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 imports. Additionally, devaluation could be inflationary as it raises the cost of imported intermediate inputs and this affects supply side of the economy.

On the other hand, the coefficients on domestic and foreign income show consistent signs to those predicted by economic theory where demand is the main determining factor of exports and imports. In our analysis, domestic ($\ln(Y_{CH})$=9.0327) and foreign incomes ($\ln(Y_{MY})$=1.8967) are positively related to both the import and export demand models. Hence, as far as domestic and foreign incomes are concerned, their influence on the China-Malaysia trading is demand driven. Nevertheless, the income effect of import demand is greater than that of export demand. In addition, the fixed exchange rate regime plays significant role in both models with expected signs.

Table 3: ARDL Bound Tests for Cointegration, 1990-2008

Panel A 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
Panel B 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

Note: 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 exceeded upper bound.

Table 4: Estimates for long run elasticity

Panel A: Export Demand, $\ln(EX_{CH})$			
	Coefficient	Standard Error	P-value
$\ln(Y_{MY})$	1.8967*	1.1241	0.0930
RFX	-0.8074*	0.4514	0.0750
Intercept	-3.5657	4.0717	0.3820
Trend	0.0105*	0.0057	0.0670
D97	-0.1423	0.2007	0.4790
DFix	-0.3403***	0.0983	0.0010

Panel B: Import Demand, $\ln(IM_{CH})$			
	Coefficient	Standard Error	P- value
$\ln(Y_{CH})$	9.0327***	3.4113	0.0090
RFX	0.8498*	0.4601	0.0660
Intercept	-39.2570**	16.1978	0.0160
Trend	0.0169***	0.0016	0.0000
D97	0.0678	0.2390	0.7770
DFix	0.6033**	0.2648	0.0240

Note: Asterisks *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. The UECM estimates are not reported but are available upon request.

If the absolute sum of the export and import elasticises that exceeds unity (1.6572) is considered, we cannot reject that MLC holds for the China-Malaysia trading linkage in the long run. This is consistent with the theory that real depreciation improves the trade expansion in the long run, with Malaysia cleaves to better gains. On the whole, the exchange rate regime and trading diversification within our analysis period have shown complementary than conflicting features to Malaysia, at least in the long run.

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 purpose, we proceed 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 (renminbi to ringgit) is shown in Figure 2 and Figure 3. 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 Chinese export series. The export series depicted a M-shape adjustment to real exchange shocks as 1% depreciation of renminbi brings to about 2% drop in China exports to Malaysia immediately, recovery after the second month, but further drop after the third month, pick up a little in the fifth month, but the impact die out slowly after ten months. As for the Chinese import series, the J-curve adjustment is more apparent but incomplete. A 1% real depreciation of renminbi leads to drop in China imports from Malaysia by a maximum of about 2.5% with a similar magnitude as the export initial adjustment, but the increase in China imports from Malaysia follows an increasing path thereafter and the impact also die out slowly after ten months. In other words, the volume effect fail 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 2: Response of China Exports (to Malaysia) to Real Exchange Rate Shocks

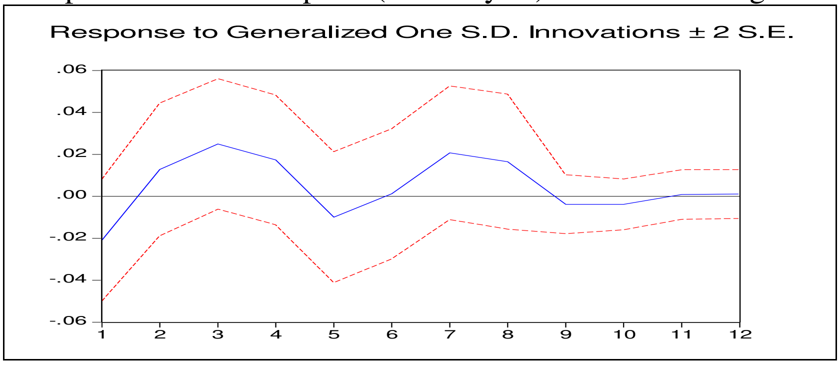
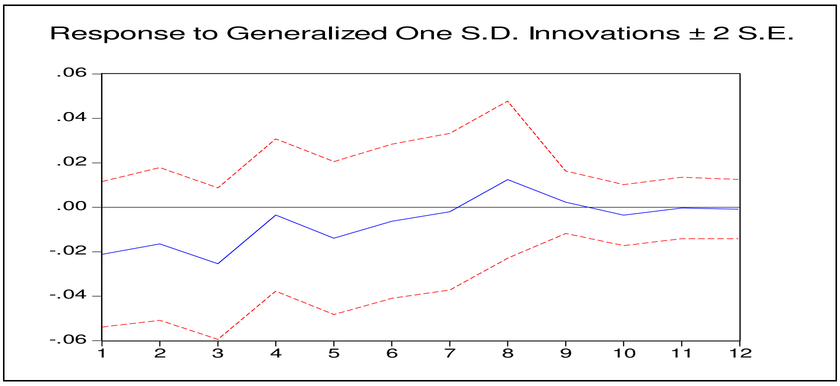


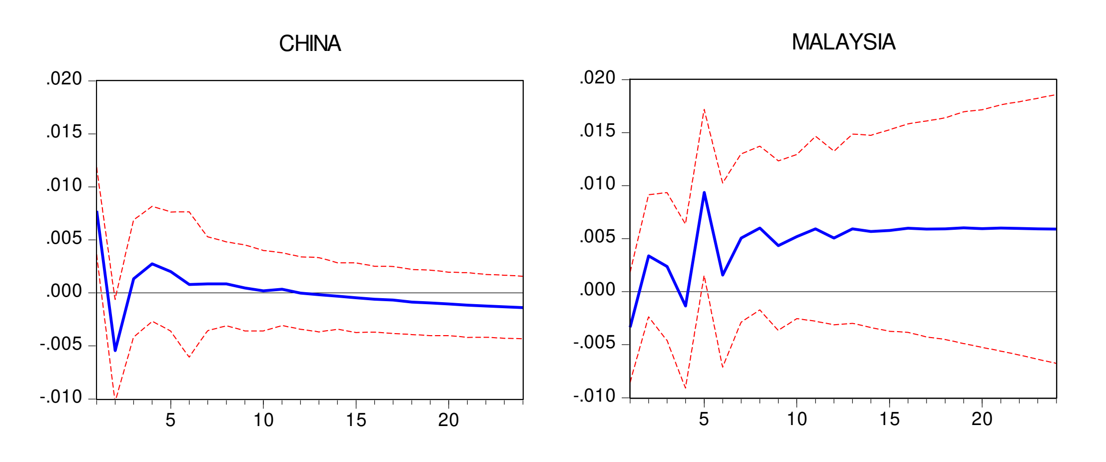
Figure 3: Response of China Imports (from Malaysia) to Real Exchange Rate Shocks



In other words, the trade adjustments following real exchange shocks are temporal and the result supports for 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.

Figure 4 then report 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 Malaysian economy. An initial 1% depreciation of renminbi brings to about 3% drop in Malaysian production immediately but some 5% consistent gains after a quarter. As for China, the deterioration of production due to currency depreciation is observed in the 2nd – 3rd month, with some improvement of production in the following months. However, after a year, production responses negatively in gradual form. In brief, the renmimbi devaluation strategy indicates expansionary effect for Malaysia but inconclusive for China.

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.

5. Conclusion

The ARDL bound test confirms that the real exchange rates, domestic production and foreign incomes are significant in explaining the China-Malaysia bilateral export and import demands. Nevertheless, the real exchange reported inconsistent long run coefficients that devaluation may resulted in deteriorated terms of trade against Malaysia. On the other hand, domestic and foreign incomes are significant and correctly signed, suggesting that the China-Malaysia exports and imports are determined by demand side effects.

Based on the generalized IRF analysis, there is no clear indication of J-curve phenomenon. China's exports gains due to real devaluation against Malaysian ringgit 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 for the Chinese complementary role instead of conflicting (competing) features in the China-Malaysia bilateral trading. All in all, there are no clear supports that the emergence of China and her currency strategy offers further threat to the crowding out Malaysia as formidable export competitor. Indeed, Malaysia may experience better economic gains in market structure and product diversification as well as economies of scale, on account of the gradual trade liberalization of China since 1990s.

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