The Impact of Yuan/Ringgit on Bilateral Trade Balance of China and Malaysia

Hooy, Chee Wooi and Chan, Tze-Haw

School of Management, USM, Centre for Globalization and Sustainability Research, MMU

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Hooy Chee Wooi
Finance Section, School of Management
Universiti Sains Malaysia
cwhooy@usm.my

Chan Tze Haw
Centre for Globalization and Sustainability Research
Faculty of Business and Law
Multimedia University
thchan@mmu.edu.my

Abstract

The exposure to exchange rates remains an unresolved issue in international trade literature. The issue is particularly relevant to China and Malaysia, whom relaxed their USD pegging the same day in the mid of 2005. Our paper investigates the exchange rate exposure of China-Malaysian bilateral trade balance over the last 20 years using a standard trade balance equation which is a function of local income, foreign income, and the bilateral real exchange rates of yuan/ringgit. Our modeling is somewhat different with the literature where we take into account the structural breaks of the 1997 Asian currency crisis as well as the fixed-exchange rate regime adopted by the Malaysia. With high frequency monthly sample (Jan1990-Jan2008), we documented GARCH effect in the trade model. Taking that into consideration, our result shows that real exchange rates do play a role in the bilateral trade of China-Malaysia. The long run exchange rate elasticity is consistent with the Marshall-Lerner condition. However, the short run J-curve phenomenon is somewhat inconclusive.

Keywords: trade, exchange rates exposure, J-curve, structural breaks, GARCH.

JEL Classifications: F31

*Corresponding author**:**
Dr. Hooy Chee-Wooi
Finance Section, School of Management
Universiti Sains Malaysia
11800 USM, Penang, Malaysia
Tel: 604-653-2897; Fax: 604-657-7448
E-mail: cwhooy@usm.my

1. Introduction

Since the 1980s, China's economic reforms have been instrumental in promoting its trade sector. The continuous high growth of China has had a significant impact on the world economy, particularly in the East Asian region. A substantial amount of China's growth over the past decade has stemmed from the continued surge in her trade surplus due to undervaluation of renminbi over the years. In a broader perspective, China has hampers the prospect of her Asian neighbors from letting their currencies to rise very much against the USD to avoid losing competitive position against China. Malaysia, as one of the major trading partners of both China and the US, is unexceptionally facing the challenge. Along the lines of trade liberalization among the East Asian economies, Malaysia has actively participated in both global and regional trading activities. The liberalization process since 1970s brings to a slash in import tariff and non-tariff barriers and promoted a surge in her trade with industrial countries. The reduction in capital restriction and investment friendly policy has also attracted inflow of FDI from the industrial countries and spurred the growth and diversity of Malaysian economy especially during 1986-1996. However, the rising of China in the 1990s was commonly claimed to have divested away her trade and capital resources because both Malaysia and China shared quite a comparable factor endowment ratios, range of export products (mainly in manufacturing product), as well as similar direction of trade to the US and Japan.

The recent devaluation and USD de-pegging of both China renmimbi and Malaysian rinngit on July 2005 have open a new scenario to the trade sector in both countries. Since the opening of mainland Chinese economy in 1978, renmimbi was pegged to the USD, and a dual-track currency system was instituted, where renminbi is 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 decade until 2005, renminbi was tightly pegged at 8.2765 yuan to the USD. 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. To date, the yuan is traded at around 6.95 yuan (June 2008), appreciated about 16% since 2005. The Malaysian ringgit was trading as a free float currency at around RM2.50 per USD since early 1970s. During the 1997 Asian financial crisis, after the sharp depreciation of ringgit to around RM 4.00 within a year, Bank Negara Malaysia (BNM) decided to peg ringgit to the USD in September 1998 at RM3.80. On July 21, 2005, BNM responded to China's de-pegging announcement within an hour by announcing the end of the 7-year pegging. Similar to China, BNM allows the ringgit to operate in a managed floating system based on a basket of several major currencies. The ringgit has appreciated 1.3% to RM3.75 in a short period of time and now has reach RM3.2 (June 2008), about 15.6% appreciated from the pegged level at 2005, a value quite near to renminbi appreciation.

The close tied of ringgit to renmimbi implied the Malaysian government regards vary seriously on the real exchange rate value of the Malaysian ringgit against any appreciation of renminbi as it could threaten the balance of payment of Malaysia economy. However, the effects of currency devaluation on trade balance still remain an unsolved issue as the impact of exchange rates mechanism is far from perfectly understood. Controversies were abounded, and theoretical as well as applied questions have been raised among academia and policy makers. The issue continues to be relevant to the understanding of the exchange rate dynamics and the formulation of trade policies, particularly for Malaysia and China. Both the two economies were committed to the export-led growth policy based on the maintenance of their undervalued currencies but again both also have recently succumbed to the revaluation pressure by releasing their pegging against USD.

The issue of exchange rate devaluation on international trade has long been a major topic of study in international economics. The elasticity approach to balance of payment was made well known as Marshall-Lerner condition (MLC henceforth)[1] that becomes the underlying assumptions of currency devaluation policy. The foreign exchange instability during the post-Bretton Wood era offers an excellent opportunity to investigate how exchange rate changes affect trade flows, and whether the currency devaluation is expansionary or contractionary. Most early studies focused on the US and developed nations (see Krugman and Baldwin, 1987; Rose and Yellen, 1989; Noland, 1989; Rose, 1991; among others) but the findings are at best mixed when aggregate trade data were used. Some of them tried to avoid the 'aggregation bias problem' by employing data between one country and each of her trading partners at the bilateral level, and found some supports for favorable impact of currency depreciation on trade balances. On the other hand, literature on developing Asian nations show better supports for the MLC as long run features and J-curve[2] as short run phenomenon (see *inter alia*, Himarios, 1989; Hsing and Savvides, 1996; Bahmani-Oskooee and Janardhanan, 1994).

Interesting findings are reported by recent Asian studies that consider the crisis experience. For instance, Bahmani-Oskooee and Miteza (2003) find that devaluations have been contractionary for Indonesia and Malaysia, but expansionary for the Philippines and Thailand. Onafowora (2003) employs a cointegration approach to find that bilateral trade, real exchange rates, domestic and foreign incomes are bounded by long run relationship and confirms the short run J-curve effect. Bahmani-Oskooee and Wang (2006) employ disaggregate quarterly data to discover that the Chinese income instead of Chinese yuan has played the major role in the Chinese trade balance determination. Chinese yuan depreciation only shows favorable impact on trade balance in 4 out of 13 major trading partners, including the US. The J-curve, however, is rarely supported.

Apparently, at present stage, neither the theoretical nor the empirical works have established definitively whether currency devaluation (nominal or real) has caused trade expansion or trade deterioration, or even if exchange rates play a role in

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[1] Under MLC, to get a positive effect from devaluation, a necessary condition is that the demand elasticity of both exports and imports must exceed one. 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 balance.

[2] The J-curve stands as a short-run departure from Marshall-Lerner condition. A usual rationale for it is that exchange rate depreciation initially means cheaper exports and more expensive imports, making the current account worse (a bigger deficit or smaller surplus). After a while the volume of exports will start to rise because of their lower price to foreign buyers, and domestic consumers will buy fewer of the costlier imports. Eventually the trade balance will improve.

determining trade flows. The issue has become more vital following the recent development of regional episodes. With the China's recent accession to WTO (November 2001) and the emergence of ASEAN10+3 Free Trade Area due to the Chiang Mai Initiative (May 2000)[3] and the Bali Dialogue (October 2003)[4], the need for an amendment of regional trade policy and currency arrangements anchoring by China is well understood, but less being investigated.

This study investigates the dynamic nexus of bilateral trade balance-exchange rates, with respect to Malaysia and China. Both economies are of different regulatory regimes, different degrees of development and trade openness, but within a comparable exchange rate regime. Our analyses take concerns of the possible transmission channels via macro-variables (e.g. domestic output, foreign income) as in standard international trade model. The J-curve effect is investigated as well, within the unrestricted Vector Autoregressive (VAR) framework.

The present study is organized in the following manner. In section 2, a theoretical trade model is presented which forms the basis of our empirical model for testing the exchange rate impact. This is followed by our empirical estimation procedures and data description reported in Section 3. Estimation results are presented and discussed in section 4. Finally, conclusions are drawn in the closing section.

2. The Trade Balance Model for China-Malaysia

We posit that the demand for China import depends upon the relative price of income of Malaysia and China, expressed as follow:

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

where $IM_{CH(MY)}$ represent China demand for imports from Malaysia, Y_{CH} refers to China real income, and RP_{CH-MY} is the relative price of goods between China and Malaysia. Letting E = the nominal exchange rate, defined as the domestic price of foreign currency, the relative price of imported goods can be expressed as:

$$RP_{CH-MY} = FX_{\frac{CH}{MY}}\left(\frac{P_{MY}}{P_{CH}}\right) = RFX_{\frac{CH}{MY}} \quad (2)$$

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[3] During the Asian Development Bank meeting on 6th May 2000, Chiang Mai (Thailand), ASEAN-10, China, Japan, and South Korea (collectively known as ASEAN10+3) agreed to create a network of regional currency swap arrangements, associated with surveillance and monitoring mechanisms. The initiatives began to take concrete when multiple countries signed swap arrangements in 2001, some with ceilings as high as $3 billion. These eye-catching initiatives parallel plans by China and Southeast Asian countries to form a Free Trade Area, ongoing sub-regional economic development projects and the efforts to regularize meetings among finance and trade officials, have constituted towards regional integration.

[4] During the 9th ASEAN Summit on 7-8 October 2003, Bali (Indonesia), leaders from ASEAN, China, India, Japan and South Korea have expressed their strong support for the Bali Concord II as a solid platform to achieve an ASEAN Community based on political-security, economic and socio-cultural cooperation. Despite the countermand of trans-national crimes/ terrorism and communicable diseases, these countries have propounded the economic integration of ASEAN (at regional and sub-regional level) and the establishment of Asian Bond as an alternative for regional financing.

where $\frac{P_{CH}}{P_{MY}}$ is the ratio of China and Malaysia price indexes of all goods, $FX_{\frac{CH}{MY}}$ is the nominal exchange rates of China yuan over Malaysian ringgit and $RFX_{\frac{CH}{MY}}$ corresponding real exchange rates, defined as the relative price of domestic to foreign goods.

With real exchange rates thus defined, a decrease in its value indicates a real devaluation of the domestic currency. Substituting (2) into (1), we obtain:

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

On the contrary, China export to Malaysia depends upon Malaysian income, as well as the relative price of goods between China and Malaysia:

$$EX_{CH(MY)} = EX_{CH(MY)}\left(Y_{MY}, RP_{CH-MY}\right) \quad (4)$$

Again, based on (2) we can rewrite the function as:

$$EX_{CH(MY)} = EX_{CH(MY)}\left(Y_{MY}, RFX_{\frac{CH}{MY}}\right) \quad (5)$$

We thus derive China's trade balance with Malaysia, $TB_{CH(MY)}$, as the following function:

$$TB_{CH(MY)} = \frac{EX_{CH(MY)}}{IM_{CH(MY)}} = \left(Y_{CH}, Y_{MY}, RFX_{\frac{CH}{MY}}\right) \quad (6)$$

The above model expresses the balance of trade as a function of the real exchange rate and the levels of both China and Malaysia incomes. Taking natural logarithm of both sides, exempted the country notations, and adding a stochastic term to capture short-term departures from long run equilibrium, the empirical model for China-Malaysia trade is obtained:

$$\ln(TB_t) = \beta_0 + \beta_1 \ln(Y_{CH,t}) + \beta_2 \ln(Y_{MY,t}) + \beta_3 RFX_t + \varepsilon_t \quad (7)$$

where ln represents natural logarithm, $\ln(TB_t)$ is calculated from $\ln(EX) - \ln(IM)$, ε_t represents a white noise process, β_0 is the intercept and β_1, β_2, β_3 are the parameter to be estimated. Note that expressing the trade balance as the ratio of exports to imports allows all variables to be expressed in log form and obviates the need for an appropriate price index to performing our basic statistical tests. Given the definition of the real exchange rates, the sign of β_3 is negative if the Marshall Lerner condition holds, that is, if a real devaluation of the domestic currency improves the trade balance.

3. The Empirical Testing Procedure

The relationship between trade balance with income and exchange rates is considered using time series regression analytical framework. Our approach is a 2-step procedure.

The first is to identify and filter any trend and structural breaks in all the series involved in order to avoid possible spurious regression problem. The trend problem is particularly concern for the industrial production series. The structural breaks occurred due to the recent Asian currency crisis, as well as the fixed exchange rate regime adopted by the Malaysian government during the period Sep 1, 1998 to July 21, 2005. The filtering process is done through running a simple regression on all the involved variables, as shown followings:

$$Z_t = a_0 + b_1 Trend_t + b_2 D_{1997,t} + b_3 D_{RMFX,t} + e_t \quad (8)$$

where Z_t includes TB_t, the trade balance ratio, RFX_t, the real exchange rates, and $Y_{CH,t}$ and $Y_{MY,t}$, incomes of China and Malaysia, respectively. The binary variable $D_{1997,t}$ takes unity value of one for the period July 1997 to August 1998 and zero otherwise. For $D_{RMFX,t}$, the binary variables takes value of one for the period Malaysia ringgit was fixed to RM3.80/USD, i.e. from September 1998 to July 2005, and zero otherwise. If these series are indeed contaminated with the trends and structural breaks, the residuals of the regression will be collected to replace the original series and regressed in model (7) as follows:

$$\ln(TB_t^*) = \beta_0 + \beta_1 \ln(Y_{CH,t}^*) + \beta_2 \ln(Y_{MY,t}^*) + \beta_3 RFX_t^* + \varepsilon_t \quad (9)$$

The asterisk marks define the de-trended series that is also free from structural breaks. In addition, we also conducted a stationarity test developed by Kwiatkowski-Phillips-Schmidt-Shin (1992) to verify the unit root problem. Since all the right hand side variables are demeaned, we can expect β_0 not significantly different from zero.

For diagnostic checking purposes, to ensure that the specification of the mean equation of model (9) is free from autocorrelation problem we refer to Durbin-Watson test on AR(1), F-test on the joint significance of all of the slope coefficients in the regression, and the Ljung-Box Q-statistics on the residual for higher AR terms. As we are using high frequency monthly observations for all series, our least square regression might have exposure to autoregressive conditional heteroskedasticity (ARCH) effects. We test the effects by a Lagrange multiplier (LM) test proposed by Engle (1982). The ARCH effect is also examined through the Ljung-Box Q-statistics on the squared residuals. Finally Jarque-Bera normality test is also examined to affirm that our regression is consistent with the standard regression assumptions.

To trace the possibility of J curve, we run a vector autoregressive model (VAR) to examine the sequential impact of exchange rates on trade balance, assuming the effects of the income variable, i.e. Y_{CH} and Y_{MY}, to be exogenous. The VAR specification is given by the system of regressions as following:

$$TB_t = \sum_{i=1}^{12} \delta_1 TB_{t-i} + \delta_2 Y_{CH,t-i} + \delta_3 Y_{MY,t-i} + \sum_{j=1}^{12} \delta_{4,i} RFX_{t-i} + v_{1t} \quad (10a)$$

$$RFX_t = \sum_{i=1}^{12} \delta_1 TB_{t-i} + \delta_2 Y_{CH,t-i} + \delta_3 Y_{MY,t-i} + \sum_{j=1}^{12} \delta_{4,i} RFX_{t-i} + v_{2t} \quad (10b)$$

The responses of the trade balance from the real exchange rate shocks are examined using the generalized impulses procedure as described by Pesaran and Shin (1998), which does not depend on the ordering of the variables at the right hand side of the

VAR equations. The generalized impulse responses from the real exchange rate shocks to the trade balance, as stated in (10a), is basically the orthogonal set of innovations derived by applying a variable specific Cholesky factor of the residual covariance matrix computed with the trade balance at the top of the Cholesky ordering.

Our analyses are all based on high frequency monthly data. The sample period spanned from January 1990 to January 2008. Real exchange rates are compiled by having the nominal exchange rates (local currency/USD) adjusted for relative price changes which is proxy by consumer price index (CPI) series; whereas trade balance ratios are computed based on the USD denominated export and import series. The income for China and Malaysia are represented by their industrial production (IP) indices 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 are sourced from DataStream.

4. Empirical Results and Discussion

Descriptive statistics for all the series are reported in panel A of Table 1. 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 only the real exchange rate series of yuan/ringgit is not stationary. In panel B of Table 1, the correlation matrix is displayed. Generally, there is no multicolinearity problem, except that the industrial production of Malaysia is moderately correlated with the real exchange rates. This is not serious as the value is still below 0.75.

The results of applying model (8) on all the time series are reported in Table 2. All involved series are stationary but they are still highly exposed to the trend and structural breaks dummy variables. The Asian currency crisis has a significant positive impact on the bilateral China-Malaysia trade balance, where China-Malaysia trade balance was shown to improve about 5% as compared to before crisis. During the fixed ringgit regime, however, the trade balance deteriorated more than 25% as compared to before crisis. The linear time trend is positive and significant for all except the trade balance series, which is negatively significant, suggesting a reduction in the bilateral China-Malaysia trade balance over time. As a result of significant loadings of the time tread and dummy variables, we decided to replace the original series with these residual series collected from model (8). To be cautious, we also report the ADF unit-root results on these new series at the last column in Table 2. As these residuals basically represent the component of the original time series after removing the mean, time trend, the 1997 structural break, and the fixed exchange rate regime over 1998-2005, the tested ADF model excludes the drift term and time trend. The unit root tests support these series are all stationary, including the real exchange rates. This implies that the non-stationary behavior of real exchange rates reported in unit root tests in Table 1 is due to structural breaks.

Table 1 Descriptive Statistics and Correlation

Panel A: Summary of Descriptive Statistics				
Statistics	ln(EX/IM)	ln(IP_{China})	ln($IP_{Malaysia}$)	RFX
Mean	-0.5568	4.7307	4.3959	0.6447
Maximum	0.1492	4.8629	4.9712	0.9899
Minimum	-1.2280	4.3682	3.5752	0.0696
Std. Dev.	0.2650	0.0512	0.3820	0.2231
Skewness	0.3805	-1.5857	-0.3532	-1.1025
Kurtosis	3.0065	13.7192	2.0002	3.3023
Normality	5.2369*	1129.8340***	13.5503***	44.7863***
	(0.0729)	(0.0000)	(0.0011)	(0.0000)
Unit Root 1	-4.3057***	-3.9077***	-4.3057***	-2.5356
Unit Root 2	-4.3921***	-3.8125**	-4.3921***	-2.0368
Panel B: Correlation Statistics				
Variable	ln(EX/IM)	ln(IP_{China})	ln($IP_{Malaysia}$)	RFX
ln(EX/IM)	1			
ln(IP_{China})	0.1071	1		
ln($IP_{Malaysia}$)	-0.2590	0.2089	1	
RFX	0.0007	0.2131	0.7445	1

Note: Figures in the parenthesis are probability values. Std. Dev. denotes standard deviation. Asterisks *, ** and *** denote significance at the 10%, 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.

Table 2 De-trending and Removal of Structural Breaks Based on Model (8)

Y	Intercept	Trend	D97	Dfix	Adj R^2	Unit Root
ln(EX/IM)	-0.4425***	-0.0001	0.0560	-0.2687***	0.2635	-5.7568***
	(0.0312)	(0.0003)	(0.0643)	(0.0367)		
ln(IP_{China})	4.7167***	0.0003***	-0.0550***	-0.0322***	0.1456	-4.3962***
	(0.0065)	(0.0001)	(0.0134)	(0.0076)		
ln($IP_{Malaysia}$)	3.7449***	0.0059***	0.0785***	0.0260**	0.9645	-3.7422***
	(0.0099)	(0.0001)	(0.0204)	(0.0116)		
RFX	0.3847***	0.0025***	0.0842*	-0.0374	0.4421	-2.0753***
	(0.0229)	(0.0002)	(0.0471)	(0.0269)		

Note: Figures in the parenthesis are standard errors. Asterisks ** and *** denote significance at the 5% and 1% levels, respectively. RFX denotes the real exchange rates calculated using the formula $\ln([CPI_{Mal}*FX_{Yuan/Ringgit}]/CPI_{China})$. Adj R^2 denotes adjusted R^2. Unit Root refers to ADF test on the residuals of model (9) with intercept only, and Unit Root 2 on the residuals of model (8) with no intercept and no time trend. Rejection of null hypothesis reflects stationarity.

The coefficients estimated for model (9) are reported in panel A of Table 3. We report three model estimates. The first model, OLS, is the simple least square. This model is subject to various diagnostic problems. The R^2 is low, the residual and residual square series are serially correlated, the error process content ARCH effects and the error distribution is not normal. As a result, we proceed to the second model, which is basically model (9) accounting for a standard GARCH(1,1) specification. This model basically takes care of the ARCH effects; however, it is still subject to serial correlation in the residual, non-normality error and worse, insignificant F-test. Thus we proceed augment the model to include autoregressive (AR) terms to model the correlation in the error process. This third model, which is termed as AR-GARCH, is free from all the above mentioned diagnostic problems. The AR-GARCH model is also better in the sense that it provides better goodness-of-fit, and lower AIC and SBC values. Thus, our discussion following will focus only on the AR-GARCH model.

Table 3 Regression Results for Long Run Elasticity

Panel A: Coefficient Estimates						
	OLS		GARCH		AR-GARCH	
C	0.0000	(0.0149)	-0.0189	(0.0153)	0.0039	(0.0268)
CHIP	0.4114	(0.3207)	-0.0674	(0.3358)	-0.7463	(0.3224)**
MYIP	-0.6111	(0.2900)**	-0.4637	(0.2810)*	-0.3830	(0.2807)
REX	0.4492	(0.1253)***	0.3076	(0.1258)**	0.3891	(0.1978)**
AR(1)	-		-		0.4180	(0.0575)***
AR(2)	-		-		0.1339	(0.0658)**
W	-		0.0039	(0.0017)**	0.0002	(0.0001)**
ARCH	-		0.1890	(0.0751)**	-0.0349	(0.0175)**
GARCH	-		0.7333	(0.0878)***	1.0176	(0.0189)***
Panel B Diagnostics Statistics						
Adj R^2	0.0544		0.0157		0.2280	
SSR	10.2721		10.5419		8.1623	
LogL	23.0659		40.2198		72.0340	
AIC	-0.1757		-0.3062		-0.5864	
SBC	-0.1134		-0.1971		-0.4453	
DW	1.1998		1.1166		2.0792	
F-statistic	5.1418	(0.0019)***	1.5741	(0.1561)	8.8984	(0.0000)***
Q(4)	70.1880	(0.0000)***	49.7290	(0.0000)***	2.4164	(0.2990)
Q(12)	87.1430	(0.0000)***	65.0400	(0.0000)***	15.2150	(0.1240)
$Q^2(4)$	42.8460	(0.0000)***	2.5612	(0.6340)	2.0655	(0.3560)
$Q^2(12)$	47.5730	(0.0000)***	4.8927	(0.9610)	6.8106	(0.7430)
ARCH	18.7485	(0.0000)***	1.9716	(0.1603)	2.0803	(0.1492)
Normality	7.0944	(0.0288)**	6.2902	(0.0431)**	0.4277	(0.8075)

Note: Figures in the parenthesis are probability values. Asterisks *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Adj R^2, SSR, LogL, AIC, SBC and DW denote adjusted R^2, sum of square residual, log likelihood value, Akaike information criterion and Schwarz information criterion, and Durbin-Watson test, respectively. Q(4) and $Q^2(4)$ refers to Ljung-Box Q-statistics for checking autocorrelations in the residuals and squared residuals, respectively, for lags up to one quarter (4 months) and Q(12) and $Q^2(12)$ for lags up to one year (12 months). Normality and ARCH refer to Jarque-Bera normality test, and ARCH Lagrange multiplier test by Engle (1982), respectively. Test for stationarity refers to unit root test by Kwiatkowski-Phillips-Schmidt-Shin (1992), where Stationarity 1 is the model with intercept only and Stationarity 1 is the model with intercept and time trend. Rejection of null hypothesis reflects unit root.

For the AR-GARCH model, all the coefficients estimated are statistically significant at 95% confident level or higher. Only two parameters are insignificant, the intercept and the coefficient for Malaysian income, $Y_{MY,t}$. As expected, with the demeaned right hand side variables, there is no statistical evidence to infer that β_0 is significantly different from zero. The coefficient for Malaysian income β_2 does not have the correct direction but since it is insignificant, this is not really a matter.

For the rest, the direction are mostly consistent with theory, so as the magnitude. The result suggests that for every 1% higher in China income, the trade balance will deteriorate for about 0.7%. This implies that when the income of China's people increases, they might have demand more imports from Malaysia and thus worsen the bilateral trade balance with Malaysia.

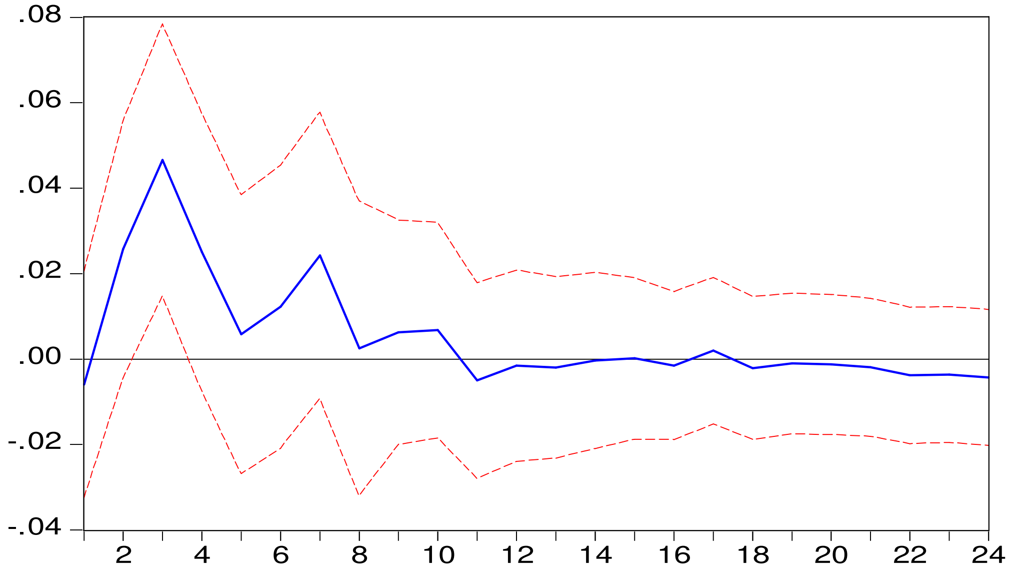
For the real exchange rates, the estimate shows that for 1% devaluation in yuan/ringgit real exchange rates, bilateral China-Malaysia trade balance will improve for about 0.4%. Basically a devaluation of yuan/ringgit means cheaper exports to Malaysia and more expensive imports from Malaysia, making China's current account improved, i.e., either a bigger surplus deficit or a smaller deficit. However, the result implies that the process of trade adjustment is inelastic to their real exchange rates. This could be the result of incomplete pass-through of the currency effects on prices, the resistant in consumers to fully adjust to the new prices, or both. With a positive impact documented here for devaluation on trade, we thus can conclude that MLC is met, although the currency effect is inelastic.

Besides, the trade balance process is also significantly depending on previous performances, with higher persistency from last month trade figure. The component of the variance process, i.e. the constant variance, ARCH and GARCH terms are all statistically significant. This implies that there is baseline volatility in the trade flows between China and Malaysia, and the magnitude of the trade balance fluctuation tends to persist from the previous volatility.

The trace whether the currency effects follows a J-curve phenomenon, we plot the generalized impulse responses of China-Malaysia trade balance to unit shocks in real yuan/ringgit rates using an unrestricted VAR model as explained in section 3.2, assuming the income series are exogenous. As we are analyzing monthly observations, the short run dynamics of trade adjustment to shocks in the real exchange rates is traced as far as 24 months to allow us to compare our result here with the literature that predominantly based on quarterly data. By theory, if J-curve is present, a country is able to correct external imbalances via exchange rate devaluation after temporal adjustments of external competitiveness, or otherwise.

As shown in Figure 1, there is no clear indication of J-curve effect. The Chinese-Malaysian trade balance series depicted immediate positive adjustment to real exchange shocks from an initially negative position. A 1% real depreciation of renminbi brings to a maximum of 4.5% improvement in trade balance. The correction of trade reduces after the 3rd month and the impact of real depreciation die out gradually after 14 months. In other words, the volume effect occurs faster than price effect but after a moderate time period, the price effects become large enough to offset the volume effect that the trade balance improvements due to real depreciation die off.

Figure 1 Response of Trade Balance to Real Exchange Rate Shocks



Note: The responses of China-Malaysia trade balance is traced up to 24 months. The impulse is generalized one standard error of yuan/ringgit real exchange rates derived from the 12-lag VAR modeling as shown in (10a) and (10b).

5. Conclusion

This paper deals with currency exposure of bilateral trade balance between China and Malaysia. We are motivated by the fact that both China and Malaysia, emerging and open economies, whom went through similar currency regime over the last decade, has relaxed their pegging to USD exactly the same day in 2005. Our sample covered the last 20 years of monthly frequency data. We follow a standard trade balance model relating bilateral trade to local and foreign incomes and their bilateral real exchange rates. One of our contributions in empirical modeling is that our modeling takes into account the structural impact of the 1997 Asian currency crisis on both China and Malaysia, as well as the period of pegging regime adopted by Malaysia during 1998-2005.

Our result shows that real exchange rates play a significant role in the bilateral trade of China-Malaysia. The Marshall-Lerner condition is partially met and the currency effect is inelastic. However, the J-curve phenomenon is somewhat unobserved through the generalized impulse response analysis. The real depreciation of Chinese Yuan poses an immediate correction of the Chinese-Malaysia trade imbalances but the effect does not last long. Additionally, the coefficients on domestic and foreign income show consistent signs to those predicted by economic theory where the China-Malaysia bilateral trading is demand driven but the income effect is greater for Malaysia. All in all, Malaysia holds better gains in the bilateral trading with China.

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