The Future of Malaysia Trade in One Belt One Road

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***Abstract*— The One Belt and One Road Initiative (OBOR) will open up more trade opportunities for Malaysia due to the two trade routes, namely, the land-based "Silk Road Economic Belt" and the seagoing "21st Century Maritime Silk Road". This paper empirically examines the short-term and long-term relationship between Malaysia's trade balance, real exchange rates (RER), industry production index (IPI), Malaysia's consumer price index (MCPI) and China's consumer price index (CCPI) for the period January 2000 to September 2017. The Malaysia's trade balance is regarded as an explained variable while the MYR-RMB, IPI, MCPI and CCPI will be regarded as explanatory variables. The Autoregressive Distributed Lag (ARDL) cointegration test is employed to estimate the long-run relationship between China and Malaysia. Then the Error-Correction model and the error correction term would explain the speed of adjustment in restoring equilibrium in the dynamic model referred to in this paper. The finding shows that the exports in Malaysia would benefit from the real appreciation of MYR and China's inflation. The OBOR will open up more opportunities for Malaysia to generate trade mainly because it involves the belt and the maritime but diplomatic relationship and export constructive policy also important to improve Malaysia trade balance with China.**

***Keywords*—*trade balance, real exchange rate, autoregressive distributed lag, One Belt and One Road Initiative.*

1. Introduction

In year 2016, Malaysia's trade remained resilient and unaffected by the uncertainties and challenges in the global environment. Total trade in 2016 increased by 1.5% to reach MYR1.485 trillion, compared to MYR1.463 trillion in 2015which was mainly due to higher trade volume with China [1]. Malaysia's total exports in the first nine-months of 2017 achieved MYR690.25 billion, estimated to achieve a 16.6% export growth in 2017 compared to 2016 according to a 2017 report published by the Malaysia Trade Statistics issued under the purview of the Minister of International Trade and Industry Malaysia. Comparably, Malaysia's trade in the first nine-months of 2017 increased by 21.7% to MYR1.311 trillion in the same period of 2016. The increase in volume of exports in year 2016 mainly due to higher exports of manufactured goods such as electrical and electronic (E&E) products, petroleum products, transport equipment, optical and scientific equipment, rubber products, iron and steel products as well as textiles, apparels and footwear. Export of mining goods is the second highest in volume followed by agriculture goods segment.

China is Malaysia's largest trading partner for the 8th successive year since 2009 and Malaysia is China's largest trading partner in Southeast Asia, with their bilateral annual trading volume surpassing US$100 billion and is projected to reach US$160 billion by 2017. China is Malaysia's largest importer with 20.4% shares of the total imports in 2016. Majority of the imports recorded comprised petroleum products, E&E products, chemicals and chemical products as well as machinery, equipment and its spare parts. Undoubtedly, the One Belt and One Road Initiative (OBOR) would open up more trade opportunities for Malaysia mainly because of China's effort in energizing the global economy via her two trade routes, namely, the land-based "Silk Road Economic Belt" and the seagoing "21st Century Maritime Silk Road". China's maritime route will cover Malaysia via ASEAN strategically, Malaysia, is situated right in the center of the route between China and Europe, which will give Malaysia optimal opportunity to generate trade exponentially in order to narrow down a huge trade deficit between Malaysia and China since 2012. China has adopted the Made in China (MIC) policy which aims to upgrade China into a manufacturing

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powerhouse in 2025 and it is urged Malaysian exporters to leverage on the MIC initiative to export more products to China especially in manufacturing sectors. With the participation of Malaysia in the OBOR, Malaysia will see more international trade being conducted in this region and it is expected to benefit from it since Malaysia is already 23rd largest exporter in the world out of 168 countries in the World Trade Organization (WTO).

The Malaysia External Trade Development Corporation (MATRADE) reported that the statistics data has evidenced Malaysia's amount of export to China was up to MYR98.56 billion, while her imports was up to MYR142.35 billion which contributed to MYR240.91 billion of total trade with China in 2016. From the statistics data provided by MATRADE, it is obvious the trade deficit between Malaysia and China has greatly gone up to MYR43.79 billion. The huge trade gap between Malaysia and China is becoming a critical concern for both countries under the OBOR. Therefore, it is imperative in this paper that we adopt the Autoregressive Distributed Lag (ARDL) cointegration technique whereby the cointegration test is used and monthly data-sets from January 2000 to September 2017 are applied to analyse the trade balance between Malaysia and China.

Numerous studies have been carried out to measure the effects of exchange rate changes on trade balance in Malaysia. [2] examined the long-run relationship between the real exchange rate and trade balance in Malaysia from 1955 to 2006 using various analysis such as unit root tests, cointegration techniques, Engle-Granger test, Vector Error Correction Model (VECM), and impulse response analysis. Their empirical results provided significant evidence for the long-run relationship that exists between exchange rate and trade balance. Other variables such as domestic income and foreign income exist in long-run relationship between trade balances. [3] studied the Malaysia's trade balances against 14 trading partners during Q1 1973 to Q3 2001, concluded inconclusive support of income effects and real exchange rate impacts on Malaysia trade balances.

[4] estimated the exchange rate volatility (MYR-RMB) by the threshold generalized autoregressive conditional heteroscedasticity (TGARCH(1,1)) model and investigated the impact of exchange rate volatility on disaggregated bilateral exports of Malaysian manufactured goods to China using monthly data for the period 2010 to 2013. The study found that there was no strong evidence of exchange rate volatility on real exports. The long-run relationship exists among real export, real exchange rate and real foreign demand.

[5] examined the long-run dynamics of exchange rate and bilateral export-import flows between China and Malaysia. Their results disclosed that the Marshall-Lerner condition supports in the long-run but the export-import demands did not cohered to the J-curve pattern. [6] focused on the influence of China's export growth on Malaysia's monthly trade with her 12 major trading partners over the period of 1990-2010 with monthly trade series. Their findings concluded that the China's export growth has a strong effect on Malaysia's monthly trading. It may be due to the increase in global production networks in the export sector.

There is limited number of studies done regarding the effect of exchange rate depreciation on Malaysia trade balance. Such analysis is quite important especially for Malaysia as China is Malaysia's largest trading partner and Malaysia is China's largest trading partner in Southeast Asia, with their bilateral annual trading volume surpassing US$100 billion and is projected to reach US$160 billion by 2017. In theoretical, exchange rate movements play important role on trade balance. The exchange rate depreciation will not improve trade balance if trade deficit is larger and export's elasticities are smaller. The depreciation will lead to increase domestic currency prices of imported goods as well as domestic price level. Depreciation will increase cost of external debts and service in foreign currencies. Therefore, in many countries, governments are resistant to depreciate their currency to improve their trade balance.

The main objective of this paper is to study the effects of real exchange rate on Malaysia's trade balance. More specifically, this paper focuses primarily on whether there is a long-term relationship among the variables: trade balance, real exchange rate, the industry production index, the consumer price index in Malaysia and the consumer price index in China. This paper consists of four sections; the next section will discuss the conceptual framework used in the study followed by results and discussions, and finally conclusion.

2. Conceptual framework

2.2 Data Description

This study uses the monthly data for Malaysia from January 2000 till September 2017 for export, import, industry production index (IPI), consumer price index in Malaysia (MCPI), consumer price index in China (CCPI) and real exchange rate (RER) to determine the long-run relationship among trade balance and independent variables by using time series analysis. A total of 213 observations for each variable are obtained. The domestic and foreign incomes are represented by the domestic IPI as Gross Domestic Product (GDP) is not available for high frequency monthly observation. The formula below is employed to compute the real exchange rate (RER) between Ringgit Malaysia (MYR) and Renminbi currency (RMB):

$$RER = \frac{RM}{RMB} \, x \, \frac{CCPI}{MCPI} \qquad (1)$$

where RER is the real exchange rate, MYR is the currency of Malaysia, RMB is the currency of China, CCPI is the consumer price index of China and MCPI is the consumer price index of Malaysia. The RM against RMB exchange rate and IPI are obtained from the website of Bank Negara Malaysia. Monthly export, monthly import and MCPI are obtained from the Department of Statistics of Malaysia, while CCPI is obtained from the website of National Bureau of Statistics of China. The trade balances (TB) are computed based on the difference between Malaysia's imports and its exports. The model could be represented as follow:

$$\log TB_t = \beta_0 + \beta_1 \log RER_t + \beta_2 \log IPI_t + \beta_3 \log MCPI_t + \beta_4 \log CCPI_t + \varepsilon_t \qquad (2)$$

where log represents natural logarithm, β_0 is the intercept to be estimated with the other coefficients $(\beta_i, i = 1,2,3,4)$, and ε_t represents a white noise process.

2.3 Autoregressive Distributed Lag (ARDL) Approach

This study employs the Autoregressive Distributed Lag (ARDL) approach proposed [7]. A similar approach was applied in recent studies of trade-exchange rates relationship [3], [8-10]. The ARDL approach has the advantage that it does not require all variables to be integrated at order 1 as the Johansen framework. The short-run and long run-coefficients of the model are estimated simultaneously. ARDL is more robust compare to others existing methods and performs better for small sample of data. In order to estimate model in Eq.(2) by the Ordinary Least Squares (OLS), the ARDL bound approach is applied and represented as ARDL(p_1,p_2,p_3,p_4,p_5) model:

$$\log TB_t = \alpha_1 + \sum_{j=1}^{p_1} \gamma_1 \log TB_{t-j} + \sum_{j=0}^{p_2} \gamma_2 \log RER_{t-j} + \sum_{j=0}^{p_3} \gamma_3 \log IPI_{t-j} + \sum_{j=0}^{p_4} \gamma_4 \log MCPI_{t-j} + \sum_{j=0}^{p_5} \gamma_5 \log CCPI_{t-j} + \varepsilon_t \qquad (3)$$

where log represents natural logarithm, TB is the trade balance, RER is the real exchange rates between RM and RMB, IPI is the industry production index, MCPI is the consumer price index of Malaysia, CCPI is the consumer price index of China, α_1 is the deterministic variables, including intercept terms, dummy variables, trends and other exogenous variables, p_i is the optimum lag length of each variable which is determined by using Schwarz Bayesian Criterion (SBC) [11], and ε_t is a stochastic error term assumed to be normally distributed. The γ_i is the co-efficient of the long-term relationships of the model. Based on the definition of TB, we expect an estimate of γ_2 to be positive. This is because, as Eq. (1) shows, the RER is defined in such a way that an increase represents a real depreciation of the ringgit which expected to decrease Malaysian imports and increase her exports. An estimate of γ_3 is expected to be positive since an increase in Malaysian income could lead to an increase in her exports. By the same token an estimate of γ_4 is expected to be negative since an increase in Malaysia imports could lead to an increase in Malaysia's inflation rate. However, an estimate of γ_5 is expected to be positive since an increase in trading partner's inflation could lead to an increase in Malaysia exports to that trading partner.

The model outlined by Eq.(3) can be expanded by incorporating the short-term dynamic adjustment mechanism giving an error correction model. The unrestricted error-correction model (ECM) is derived from Eq.(3) in terms of the lagged levels, and the first difference, **I**(1), of each variables can be obtained as follows:

$$\nabla \log TB_t = \alpha_1 + \sum_{j=1}^{p_1} \omega_1 \nabla \log TB_{t-j} + \sum_{j=0}^{p_2} \omega_2 \nabla \log RER_{t-j} + \sum_{j=0}^{p_3} \omega_3 \nabla \log IPI_{t-j} + \sum_{j=0}^{p_4} \omega_4 \nabla \log MCPI_{t-j} + \sum_{j=0}^{p_5} \omega_5 \nabla \log CCPI_{t-j} + \varphi EC_{t-1} + u_t \qquad (4)$$

where ∇ is the first-difference operator, log represents natural logarithm, EC_{t-1} is the error-correction term and u_t is a stochastic error term assumed to be normally distributed. The parameters of ω shows the short-term relationships and φ shows the speed of adjustment coefficient. The error-correction term shows how much of the disequilibrium is being corrected, that is, a positive coefficient indicates a divergence, while a negative coefficient indicates convergence [12]. If the error-correction term is 0, it shows that there is no adjustment, and to claim that there is a long-term relationship does not make sense any more. In order to select the appropriate model of the long-term underlying equation, the optimum lag length is determined by using SBC.

According to [12], the ARDL cointegration bound test requires the following steps:

Step 1: Determine the existence of any long-term relationship among the variables of interest in Eq.(3) using the F-test. We test the null hypothesis that $H_0 : \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$ and the alternative hypothesis, $H_a : \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq 0$, by calculate a non-standard F-statistic and compare with the critical value tabulated [7]. The null hypothesis of no co-integration is rejected if the calculated F-statistic is bigger than the upper bound; otherwise, the null hypothesis cannot be rejected.

Step 2: If there exists a long-term relationship among the variables of interest, estimate the coefficients of the long-term relationship and determine their values, followed by the estimation of the short-run elasticity of the variables with the error-correction term from the unrestricted ECM.

The ARDL approach is flexible as can be applied whether the repressors are **I**(1) and/or **I**(0) [7]. Therefore, unit root tests are not compulsory if the conclusion can be made from the ARDL bound test for co-integration [9]. However, in order to avoid **I**(2) presence among the variables, Augmented Dickey-Fuller (ADF) unit root test [13] is applied to justify the integration order of respective variables in this study.

3. Results and discussions

Table 1 illustrates the results of the ADF tests for unit root on both level and the first difference of the variables. The null hypothesis in ADF is that the variables is non-stationary is tested and all variables are fail to reject the null hypothesis under the 5% significance level except logTB and logCCPI. However, after the first difference, **I**(1), logRER, logIPI and logMCPI become stationary under the 5% significance level. The unit root's results suggest that logTB and logCCPI are stationary in levels form, **I**(0) and logRER, logIPI and logMCPI are integrated of order one in levels, **I**(1) to model the long-term relationship between the series using ARDL.

Table 1. Unit Root Test

Variable	*T*-Statistic	*P*-values
logTB	-4.9113	0.0001
logRER	0.3529	0.9805
logIPI	-0.4937	0.8886
logMCPI	0.3959	0.9824
logCCPI	-3.0240	0.0344
∇ logRER	-9.7851	0.0000
∇ logIPI	-4.4143	0.0004
∇ logMCPI	-10.5991	0.0000

∇ represents the first difference of all variables

The next task is to carry out the F-test for joint significance of all lagged level variables using Bound test and the F-statistics give the values of 5.2013 which is greater than the upper bound critical value. It can be concluded that there is a long-term economic relationship among TB, RER, IPI, MCPI, and CCPI. We then employ SBC criterion and select the optimum number of lags based on the lowest Bayesian information criterion (BIC) values. The model ARDL (2,0,0,0,0) is selected, indicates that the BIC selected 2 lags for logTB, 0 lags for ∇ logRER, 0 lags for ∇ logIPI, 0 lags for ∇ logMCPI, and 0 lags for logCCPI.

The estimated long-run ARDL cointegration model (2,0,0,0,0) is reported in Table 2. The coefficients of ∇ logRER and logCCPI are statistically significant at the 5% level. However the coefficients of ∇ logIPI, ∇ logMCPI and the constant term are not significant at the 5% level, so this three variables can be omitted from the ARDL model and it can be simplified as ARDL (2,0,0). The negative relationship between the real exchange rate and the trade balance indicates that the decrease in MYR-RMB exchange rate (appreciation of MYR) resulted in an increase of trade balance in Malaysia. It can be found that 1.0% of the decrease in MYR-RMB will lead to a 3.5% increase of trade balance in Malaysia. The result implies that absolute sum of the export and import demand elasticities is less than 1 as per Marshall–Lerner condition. It is contrast to common believe that appreciation will discourage export and encourage import, thus worsen trade balance. This result is also consistent with findings from [14] where validity of Marshall-Lerner condition not only failed for Malaysia bilateral trades with China but also European Union, Japan, Singapore and United States.

In Malaysia-China trade context, impact from political initiative through government-to-government (G2G) overpowers effectiveness of exchange rate in determining trade balance. Diplomatic ties between these two countries are at peak with exchanges of official visits between leaders within the period of this study. Both countries mark 2014 as "Malaysia-China Friendship Year" following 40 years of diplomatic relations. Bank of China (M) Berhad is established in 2015 as a Renminbi clearing bank to further promote trade and investment. Various business chambers and institutions also play important roles to sell Malaysian products (export) to China following Malaysia's aggressive participation in Belt and Road Initiative. Examples are Malaysia-China Chamber of Commerce, Associated Chinese Chambers of Commerce and Industry of Malaysia and MCA Belt and Road Center. Historically, Abdul Razak, then Prime Minister of Malaysia was the first from ASEAN to forge diplomatic ties with China. Perhaps due to three reasons - Chinese culture that emphasis on "guanxi" (relationship) in doing business, China "repay kind deed" (*gan-en*) of Abdul Razak's friendship with China during the later hardship time and strategic role of Malaysia in countering United States' domination of South China Sea through tripartite of Singapore-Japan-Philippines, exports of Malaysia are relatively more encouraged to enhance bilateral ties. Hence, this result contributed greatly in highlighting importance of political factors in promoting better trade balance.

The relationship between consumer price index of China and trade balance in Malaysia is positive with a 1.0% of increase in the consumer price index of China will cause a 2.4% of increase in the trade balance. This support the fact that an increase in China's inflation will lead to an increase in Malaysia exports to China.

The bottom part of Table 2 contains diagnostic test results of the ARDL (2,0,0,0,0) model. The adjusted R^2 value of 40.0% suggests that RER, IPI, MCPI and CCPI jointly explain a significant part of the variation in TB. Based on the results of the Breusch-Godfrey serial correlation F-test and the Breusch-Pagan-Godfrey heteroscedasticity F-test, to which we fail to reject the null-hypotheses of no serial correlation and homoscedasticity of the residuals. The Ramsey's RESET test (for testing functional misspecification) in Table 2 shows that the model does not pose any problem on the functional misspecification.

Table 2. Estimated Long-run Coefficients using the ARDL (2,0,0,0,0) Selected based on Schwarz Bayesian Criterion

Variables	Coefficient	Standard Error	*T*-Statistic	*P*-values
logTB(-1)	0.3545	0.0659	5.3759	0.0000
LogTB(-2)	0.3016	0.0658	4.5798	0.0000
∇ logRER	-3.4545	1.4569	-2.3711	0.0187
∇ logIPI	0.6762	0.4658	1.4516	0.1482
∇ logMCPI	-3.5821	5.6511	-0.6339	0.5269
logCCPI	2.4314	1.2169	1.9980	0.0470
Constant	-3.5603	2.3565	-1.5109	0.1324
Diagnostic Tests				
Adjusted R^2		0.4000		
Breush-Godfrey serial correlation *F*-test		0.0510 (0.9502)		
Breusch-Pagan-Godfrey heteroscedasticity *F*-test		0.5378 (0.7791)		
Ramsey RESET Test		0.1785 (0.6731)		

The results of the estimated ARDL short-run ECM are present in Table 3. The error-correction term, EC_{t-1}, is significant at the 5% level and exhibits the expected negative sign. It shows that around 32.6% of corrected disequilibrium in the previous month corrected for the current month, although the speed of adjustment is moderate maybe due to Malaysia encountering a global shock. In short run, empirical evidence shows that lagged one month of MYR-RMB real exchange rate has a negative and statistically significant impact on trade balance in current period. It can be shown that 1% of the decrease in MYR-RMB in short-term will lead to a 10.0% increase of trade balance in Malaysia. The short-run consumer price index of China is 7.0703, which means a 1.0% increase in consumer price index of China will cause a 7.0% increase in trade balance. The stability of the ARDL parameters is examined applying Cumulative Sum of Recursive Residuals (CUSUM) test [15]. The Figure 1 shows the plot of the CUSUM statistics stay within the critical bounds indicating the stability of trade balance equation.

4. Conclusion and Recommendations

In this study, we examined the long-term relationship between Malaysia's trade balance and her real exchange rate. Using ARDL bound approach to cointegration and error-correction modeling together with monthly data from January of 2000 to September of 2017 would confirm that the real exchange rates and the inflation in China are significant in explaining the Malaysia-China exports and import demands. We will establish that long-run results and short-run results would demonstrate the real appreciation of MYR has improved Malaysia's trade balance. Interesting, this result implies that appreciation of MYR can also improve trade balance, perhaps through political factor like government-to-government deals. The finding also shows that the exports in Malaysia would benefit from China's inflation. Thus, policy makers in Malaysia should take note to minimize domestic inflation. Further plan to increase Good and Services Tax (GST) and minimum wages may impact adversely on Malaysia's trade balance. The OBOR will open up more opportunities for Malaysia to generate trade mainly because it involves the belt and the maritime but diplomatic relationship and export constructive policy also important to improve Malaysia trade balance with China.

Table 3. Short-Run Coefficient Estimates using the ARDL (2,0,0,0,0)

Variables	Coefficient	Standard Error	*T*-Statistic	*P*-values
∇ logTB(-1)	-0.3032	0.0628	-4.8240	0.0000
∇^2 logRER	-5.1858	1.3388	-3.8735	0.0001
∇^2 logIPI	0.5813	0.2657	2.1872	0.0299
∇^2 logMCPI	-7.9024	4.6170	-1.7116	0.0885
∇ logCCPI	5.8556	4.0667	1.4399	0.1514
∇ logRER	-10.0455	4.7654	-2.1080	0.0363
∇ logIPI	1.9662	1.4299	1.3751	0.1706
∇ logMCPI	-10.4166	16.5968	-0.6276	0.5310
logCCPI	7.0703	3.2576	2.1704	0.0311
Constant	-10.3533	6.5432	-1.5823	0.1151
EC(-1)	-0.3257	0.0607	-5.3682	0.0000

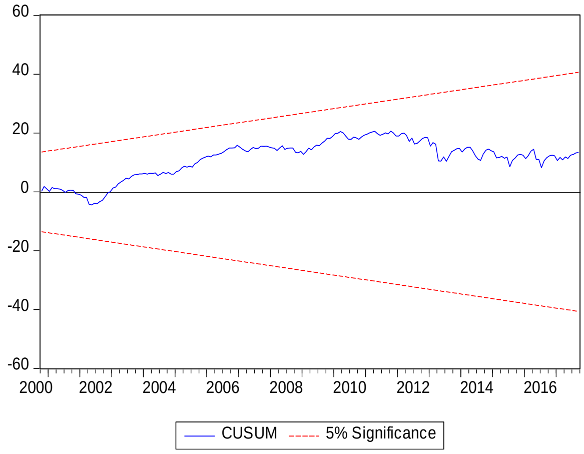

Figure 1. Plot of the Cumulative Sum of Recursive Residuals

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