IF YUAN SNEEZE, WILL MALAYSIAN RINGGIT BE AFFECTED?

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ABSTRAK

Objektif utama penyelidikan ini adalah untuk mengkaji hubungan mata wang Malaysia iaitu Ringgit Malaysia dengan mata wang utama yang lain: Euro, Pound Britain, Yuan China, dan Yen Jepun. Angka pembawah pasangan mata wang ini adalah Dollar Amerika. Data suku tahunan dari suku pertama 2015 hingga suku empat 2019 telah digunakan dalam penyelidikan ini. Setelah menjalankan unit root test, didapati Model Autoregressive Distributed Lag (ARDL) sesuai untuk digunakan. Hasil kajian menunjukkan bahawa lag satu MYR/USD, CNY/USD dan lag satu, JPY/USD, GBP/USD dan lag satu signifikan secara statistik dalam mempengaruhi MYR/USD. Analisis impulse response function menunjukkan MYR/USD mempunyai reaksi positif jika ada kejutan terhadap MYR/USD. MYR/USD juga akan bertindak balas positif jika ada kejutan terhadap EUR/USD, dan JPY/USD. Walau bagaimanapun, MYR/USD akan jatuh pada mulanya jika terdapat kejutan dalam GBP/USD tetapi akan kembali ke arah positif dalam jangka masa sederhana. Untuk CNY/USD, jika ada kejutan terhadap pasangan mata wang ini, MYR/USD akan bertindak balas secara negatif hingga jangka panjang. Dalam analisis variance decomposition, JPY/USD adalah peramal yang baik untuk MYR/USD. Walau bagaimanapun, EUR/USD, CNY/USD, dan GBP/USD adalah penunjuk yang lemah kepada MYR/USD. Dalam kajian ini, penyelidik hanya fokus kepada pasangan mata wang utama sebagai pemboleh ubah tidak bersandar. Bagi tujuan kajian di masa hadapan, pemboleh ubah lain yang dapat dijelajahi adalah harga minyak, harga emas, dan kadar faedah sebagai pemboleh ubah tidak bersandar.

Kata kunci: Mata Wang, Ringgit Malaysia, Autoregressive Distributed Lag Model, Impulse Response Function dan Variance Decomposition

ABSTRACT

The primary objective of this research is to study the relationship of Malaysia currency i.e. Malaysian Ringgit with other major currencies: the Euro, British Pound, Chinese Yuan, and Japanese Yen. The denominator of these currencies pair is the U.S. Dollar. Quarterly data from quarter one 2015 to quarter four 2019 were used. After conducting unit root test, it was found Autoregressive Distributed Lag (ARDL) Model was suitable to be applied. Results showed that lag one of MYR/USD, CNY/USD and its lag one, JPY/USD, GBP/USD and its lag one were statistically significant in influencing MYR/USD. Impulse response function analysis showed MYR/USD has positive reaction if there is a shock to MYR/USD. MYR/USD will also react positively if there is a shock to EUR/USD, and JPY/USD. However, MYR/USD will fall initially if there is shock in GBP/USD but will later rebound to positive territory in medium term. For

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CNY/USD, if there is a shock to this currency pair, MYR/USD will react negatively for a long period. In variance decomposition analysis, JPY/USD is a good predictor to MYR/USD. However, EUR/USD, CNY/USD, and GBP/USD are poor indictors to MYR/USD. In this study, we purposely focus on major currencies pair as independent variables. For future study, other variables can be explored are oil price, gold price, and interest rate as independent variables.

Keywords: Currency, Malaysian Ringgit, Autoregressive Distributed Lag Model, Impulse Response Function and Variance Decomposition

1. INTRODUCTION

In 2019, Malaysia economy was ranked the fifth largest in Southeast Asia after Indonesia, Thailand, the Philippines and Singapore (World Bank, 2019) with a value of USD364.7 billion. Malaysia is an open economy. In 1970, Malaysia total trade contributed 86.9 per cent to Malaysia Gross Domestic Product, and it jumped to 123.1 per cent in 2019 (World Bank, 2020). Thus, international trade is very important to Malaysia. One of the important considerations in doing international business is the stability of currency exchange rate. Currency exchange rate is defined as the price of one country when exchanged into another country's currency which was referred as the relative prices of national currencies. An appreciation in exchange rate will result in export become expensive, and vice versa. A higher exchange rate can also worsen a country's balance of trade. In other angle, consumers monitor exchange rate because it can affect consumption price which later will influence purchasing power. Companies can lose millions of dollars due to volatility of exchange rate. Central Bank observes exchange rate because it is one of factor determining Overnight Policy Rate which will give pressure to interest rate in Malaysia.

The movement of Malaysian Ringgit will give impact to many parties such as producers of goods and services, consumers and central bank. There are many factors that can influence exchange rate; one of it is world major currencies. Acknowledging the importance of the exchange rate, this paper would like to investigate relationship between Malaysia currency i.e. Malaysian Ringgit with other major currencies. We will study relationship between Malaysian Ringgit against, Euro, British Pound, Chinese Yuan, Japanese Yen, and the U.S. Dollar as denominator. We also want to explore if there is a shock to the major currencies, what will happen to Malaysian Ringgit. Further, we also would like to investigate the future composition of Malaysian Ringgit against the studied variables.

2. LITERATURE REVIEW

The United States is the world's largest economy and thus, the movement in U.S. Dollar may have huge effect on the other world currency. However, recent development shows the Chinese currency is doing well and is becoming dominant in influencing Asian currencies (Subramanian and Kessler, 2013 and Fratzscher and Mehl, 2014). There were quite a significant number of studies have been done on exchange rate.

In a study on the relationship between nine Asian currencies and the US dollar against the renminbi, Hwee Kwan Chow (2014) employed Vector Autoregression models and generalized impulse response analysis. The results showed that the US dollar has a significant influence on Asian currencies before the global financial crisis, and the role of the renminbi in Asian exchange rate determination has increased after the global financial crisis, giving a greater or similar impact as the US dollar. Beh Woan-Lin, Har Wai-Mun, Chong Shyue-Chuan, and Lee Sim-Kuen (2018) examine the short-term and long-term relationship between Malaysia's trade balance and China by employing ARDL cointegration and Error Correction Model. The findings show that the exports in Malaysia would benefit from the Renminbi real appreciation and the increase in China's inflation.

In another study, Lin Yao, Wee Yeap Lau and Tien Ming Yip (2019) analyse the impact of changes in the Chinese Yuan-Dollar exchange rate (CNYUSD) on Malaysia's macroeconomic variables in pre- and post-exchange rate reform in China. The impulse response function and variance decomposition analysis are applied.

3. METHODOLOGY

The aim of this study is to examine the relationship between Malaysian Ringgit (MYR) with four major currencies i.e. the Euro (EUR), British Pound (GBP), Chinese Yuan (CNY), and Japanese Yen (JPY). All currencies were denominated in the USD i.e. EUR/USD, GBP/USD, CNY/USD, JPY/USD, and MYR/USD. We used quarterly data i.e. from quarter one 2015 to quarter four 2019 which were sourced from Bank Negara Malaysia and Federal Reserve Bank of St. Louis.

This analysis started by investigating the level of stationary of the studied variables using Augmented Dickey-Fuller (ADF) unit root test. Then, optimal lag was chosen using Akaike information criterion (AIC). The general model for the ARDL is as follows:

$$Y_t = b_{10} + b_{12}X_t + \gamma_{11}Y_{t-1} + \gamma_{12}X_{t-1} + \varepsilon_{yt}$$

where Y = MYR/USD, X = independent variables, b and γ = constant term, t = time trend, and ε = error term.

In this study, impulse response functions (IRF) and variance decomposition (VD) were also used to examine future reaction when there is a shock to the VAR system (model), and what are the future composition of the studied variables VD was used at data level. Diagnostics tests were also conducted to check whether the fitted ARDL model is acceptable.

4. RESULT

To get the general idea on the associationship between all the studied variables, Pearson correlation analiysis was conducted. It was found that MYR/USD had strong positive correlation with EUR/USD (r = +0.89), while MYR/USD had relatively strong negative associationship with GBP/USD (r = -0.57). Correlation between MYR/USD against JPY/USD and CNY/USD was +0.66 and +0.20, respectively. Unit root test showed that all the studied variables had different stationary level i.e. at level, and first difference. Since the studied variable were stationary at level and first difference, ARDL was applied. Bound Test was conducted to study long run cointegration with optimal lag two as shown by AIC.

ARDL Bound Test

ARDL Bound Test showed that there was long run relationship between dependent variable (MYR/USD) with the four studied variables (F statistics 4.91; Table 1). Regression coefficients then were generated. However, the coefficient of Error correction model (ECM) was not significant (p-value > 5 per cent; Table 2). Thus, this research proceeded with short term relationship.

Table 1: ARDL Bound Test

Significance	I0 Bound	I1 Bound	F-statistic
			4.91
10%	2.45	3.52	
5%	2.86	4.01	
2.5%	3.25	4.49	
1%	3.74	5.06	

F-statistic > 5% I1 Bound significant level

Table 2: Long Run Model, Dependent Variable – MYR/USD

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Independent Variables:				
ECM lag one	-1.06	0.58	-1.80	0.08
ECM lag two	-0.10	0.54	-0.18	0.85

Source: Author's computation.

ARDL Model

In short run:

- MYR/USD lag one was significant (p-value < 1 per cent; coefficient +0.69);
- CNY/USD was significant (p-value < 1 per cent; coefficient +0.33);
- CNY/USD lag one was significant (p-value < 5 per cent; coefficient -0.30);
- JPY/USD was significant (p-value < 1 per cent; coefficient +0.01);
- GBP/USD was significant (p-value < 1 per cent; coefficient -0.58); and
- GBP/USD lag one was significant (p-value < 10 per cent; coefficient +0.28).

Table 3: ARDL Result, Dependent Variable – MYR/USD

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Independent Variables:				
MYR(-1)	0.69	0.06	10.58	0.00
EUR	0.39	0.32	1.22	0.23
CNY	0.32	0.11	2.73	0.01
CNY(-1)	-0.30	0.12	-2.53	0.01
JPY	0.01	0.00	3.69	0.00
GBP	-0.57	0.15	-3.61	0.00
GBP(-1)	0.28	0.15	1.81	0.08
C	0.46	0.34	1.36	0.18

Source: Author's computation.
Note. R-squared: 97.1 per cent; Prob (F-statistic): 0.00.
MYR=MYR/USD, EUR=EUR/USD, CNY=CNY/USD, JPY=JPY/USD, GBP=GBP/USD

Based on Fratzscher and Mehl (2014), Hausman test donate statistical significance at 1%, 5% and 10% respectively. In another study, Lin Yao, Wee Yeap Lau and Tien Ming Yip (2019) analyse ADF-SB test using statistical significance at 1%, 5% and 10% respectively.

Impulse Response Function (IRF)

In this study, a ten-year period was selected. Result is shown in Chart 1.

Response of MYR/USD to MYR/USD. A one standard deviation shock to MYR/USD has noticeable impact on the variable itself. MYR/USD will gradually increase in short term until period two. However, it starts to fall until to the long run, but will not enter negative region.

Response of MYR/USD to EUR/USD. A one standard deviation shock to EUR/USD has positive impact on MYR/USD. MYR/USD has an upward trend and reaches its peak in period three and maintains its momentum in the long run, and does not enter negative territory.

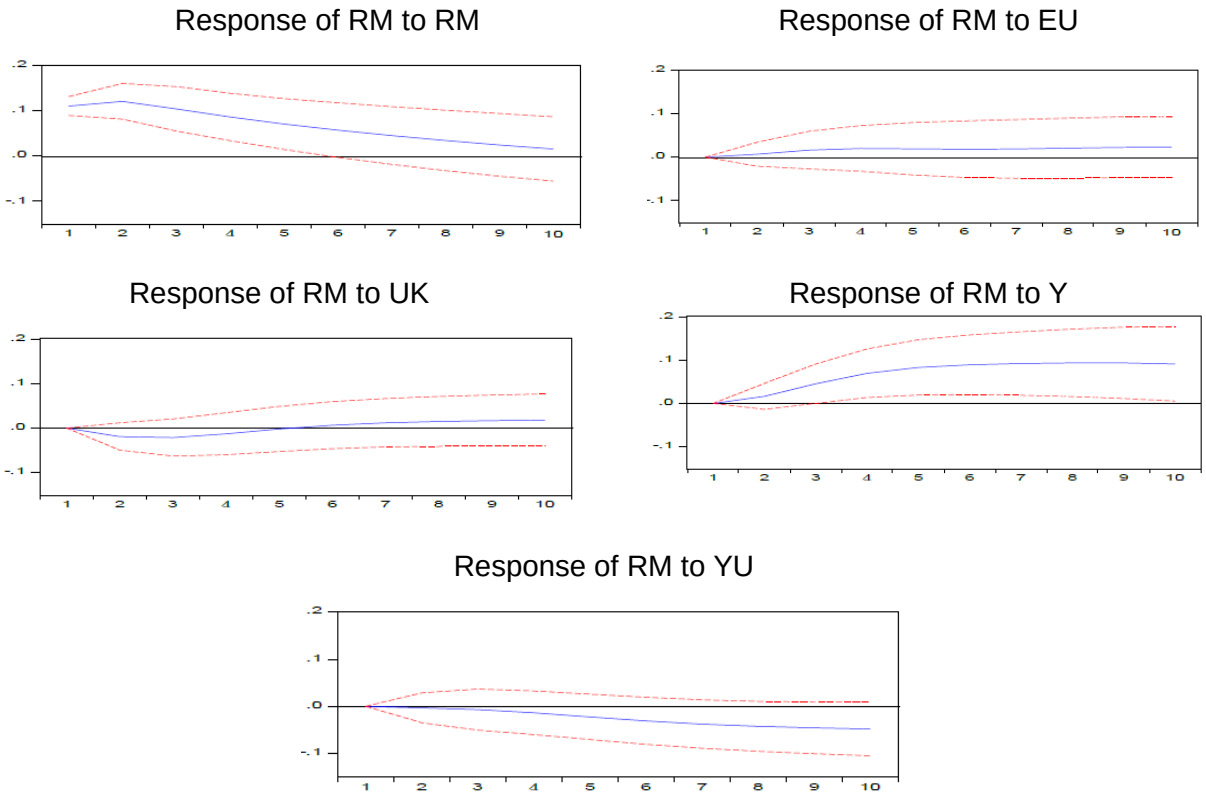
Response of MYR/USD to GBP/USD. A one standard deviation shock to GBP/USD will result in MYR/USD react negatively in downward trend. However, in the period five, it starts to enter positive territory and maintain upward trend in the long run.

Response of MYR/USD to JPY/USD. A one standard deviation shock to JPY/USD will result in MYR/USD react positively in upward trend. MYR/USD reaches the highest point in period four and maintain in positive territory.

Response of MYR/USD to CNY/USD. A one standard deviation shock to CNY/USD has visible negative impact on MYR/USD. MYR/USD starts to fall in period two, and continue to be in negative territory with wider gap.

Chart 1: Impulse Response Function

Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Author's computation
Note. RM=MYR/USD, EU=EUR/USD, UK=GBP/USD Y=JPY/USD YU=CNY/USD

Variance Decomposition

In variance decomposition study, a ten-year period was selected. Result is shown in Table 4.

Variance decomposition of MYR/USD:

- In short-run (period one), 100 per cent of forecast error variance in MYR/USD is explained by MYR/USD itself. The contribution of MYR/USD is strongly endogenous. In long-run (year ten), the influence of MYR/USD on itself decrease significantly to 43.9 per cent.
- In short-run, EUR/USD contributes zero per cent of forecast error variance, and in the long run its contribution increase marginally to 6.8 per cent. It is not a good predictor to MYR/USD.

- In short-run, CNY/USD contributes zero per cent of forecast error variance, and in the long run its contribution up marginally to 4.4 per cent. It is also not a good predictor to MYR/USD.
- In short-run, JPY/USD contributes zero per cent of forecast error variance; however, in the long run its contribution will increase significantly to 35.0 per cent. It is a good predictor to MYR/USD. JPY/USD shows strongly exogenous influence. This implies real JPY/USD will influence MYR/USD in the future.
- In short-run, GBP/USD contributes zero per cent of forecast error variance, and in the long run its contribution will increase marginally to 9.7 per cent. It is not a good predictor to MYR/USD.

Table 4: Variance Decomposition (VD) of MYR

Period	S.E.	MYR	EUR	CNY	JPY	GBP
1	0.10	100.00	0.00	0.00	0.00	0.00
5	0.23	71.36	4.94	1.34	16.24	6.09
10	0.33	43.95	6.81	4.43	35.05	9.74

Source: Author's computation
Note. MYR=MYR/USD, EUR=EUR/USD, CNY=CNY/USD, JPY=JPY/USD, GBP=GBP/USD

Diagnostic Test

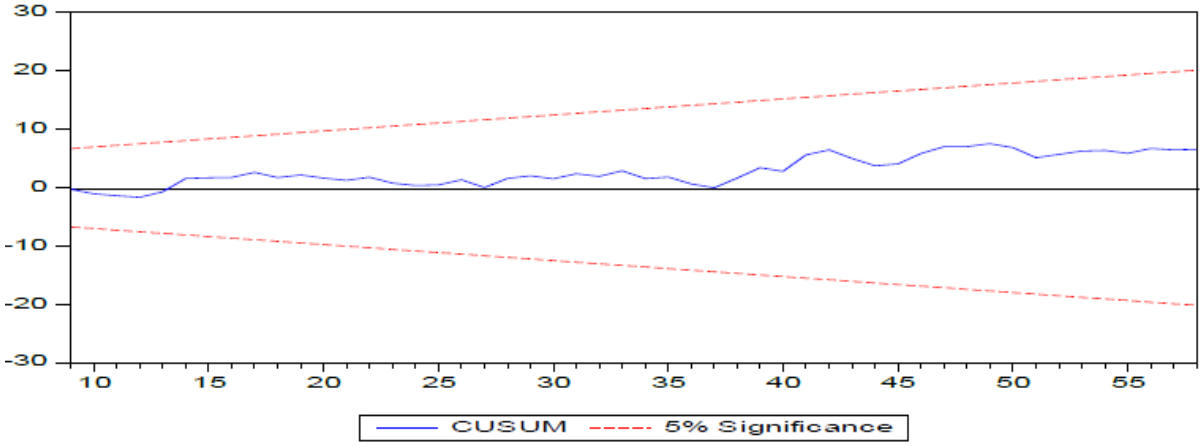
The above ARDL model which MYR/USD is dependent variable has significant Rsquared (97.1 per cent) and F-statistic (p-value < 1 per cent). Breusch-Godfrey Serial Correlation LM Test showed there was no serial correlation (p-value > 5%; Table 5), and the model passed CUSUM Stability Test (Chart 2).

Table 5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.340810	Prob. F(2,48)	0.7129
Obs*R-squared	0.770088	Prob. Chi-Square(2)	0.6804

F-statistic > 5% I1 Bound significant level.

Chart 2: CUSUM Stability Test: MYR/USD as Dependent Variable



5. DISCUSSION AND CONCLUSION

If Yuan sneeze, will Malaysian Ringgit (MYR/USD) be affected? At least in two analyses, Chinese Yuan has significant influence on MYR/USD. Result of ARDL showed that CNY/USD and its lag one is significant affecting Malaysian Ringgit. Other results showed that, lag one of Malaysian Ringgit, Japanese Yen, British Pound and its lag one were also statistically significant in affecting Malaysian Ringgit. In other study done by Beh Woan-Lin et al., they found that one per cent of the decrease in MYR-RMB will lead to a 3.5 per cent increase of trade balance in Malaysia. Meanwhile, one per cent increase in the consumer price index of China will cause a 2.4 per cent of increase in the trade balance.

In impulse response function analysis also, CNY/USD has significant effect on MYR/USD. For CNY/USD, if there is a shock to this currency, MYR/USD will react negatively from period two until long period. Other result showed that MYR/USD has positive reaction if there is a shock to Malaysian Ringgit itself. MYR/USD will also react positively if there is a shock to EUR/USD, and JPY/USD. On the other hand, MYR/USD will fall initially if there is shock in GBP/USD but will start to enter positive territory in period five. Only in variance decomposition analysis, Japanese Yen is a good predictor to MYR/USD. EUR/USD, CNY/USD, and GBP/USD are not good predictors to MYR/USD. Study by Lin Yao et al. found that both Chinese Yuan and Malaysian Ringgit appreciation have no impact on Malaysia's macroeconomic variables in pre-exchange rate reform period. However, in the post-exchange rate reform period, the impulse response function shows that Chinese Yuan appreciation shock has an expansionary effect on Malaysia's real output and price level. The positive impact is found to be temporary and last for the 1-year horizon. Moreover, the variance decomposition yields consistent results with impulse response function.

In this study, major currencies were used as independent variables. For future study, other variables that can be considered are price of petroleum, gold price, and interest rate as independent variables.

REFERENCES

Chow, H. K. (2014). Is the Renminbi Asia's Dominant Reference Currency? A Reconsideration. *China Economic Policy Review*, *3*(01), 1450002.

Fratzscher, M., & Mehl, A. (2014). China's dominance hypothesis and the emergence of a tri‐polar global currency system. *The Economic Journal*, *124*(581), 13431370.

Subramanian, A., & Kessler, M. (2013). The renminbi bloc is here: Asia down, rest of the world to go? *Journal of Globalization and Development*, *4*(1), 49-94.

Woan-Lin, B., Wai-Mun, H., Shyue-Chuan, C., & Sim-Kuen, L. (2018). A study on the rade balance between Malaysia and China: An ARDL cointegration analysis. In *AIP Conference Proceedings*, *2016*(1), p. 020033. AIP Publishing LLC.

World Bank (2020) https://www.macrotrends.net/countries/mys/malaysia/trade-gdpratio, retrieved 16 Sept. 2020.

World Bank. (2019). https://data.worldbank.org/indicator/NY.GDP.MKTP.CD, retrieved 8 Sept. 2020.

Yao, L., Lau, W. Y., & Yip, T. M. (2019). Dynamic Relationship between Yuan-Dollar Exchange Rate and Malaysian Macroeconomic Variables in Pre- and Post-Exchange Rate Reform Periods in China. *Contemporary Chinese Political Economy and Strategic Relations: An International Journal*, *5*(3), Dec. 2019, 1173-1210.