Malaysia's Import Drop Due to Exchange Rate?

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ILSM, Sungkai

Bahagian Perangkaan Perkhidmatan

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How it Begins ….

Drop in imports due to weaker ringgit, battered stock market, says economist

Robin Augustin
April 18, 2019 8:58 AM
https://www.freemalaysiatoday.com/

PETALING JAYA: An economist has dismissed a deputy minister's suggestion that the drop in imports in February was due to the Chinese New Year celebrations, saying it was more likely a continuation of the trend in November and December last year.

Speaking to FMT, Hoo Ke Ping attributed this to the weaker ringgit and battered stock market.

Deputy International Trade and Industry Minister Ong Kian Ming recently said it was too early to draw conclusions on the recent trend of falling import numbers.

In February, imports fell by 9.4% to RM55.5 billion, the lowest since May 2016.

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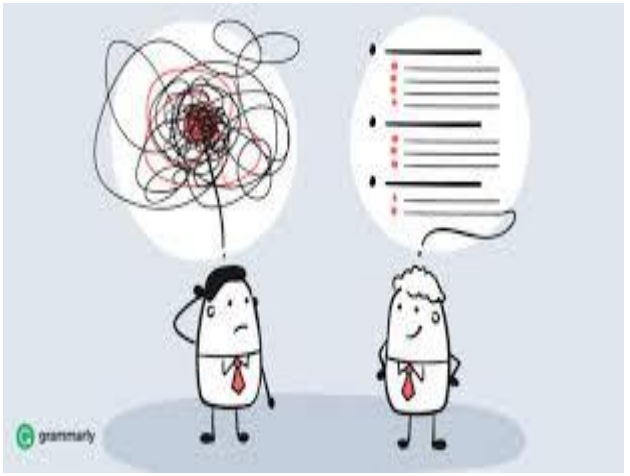
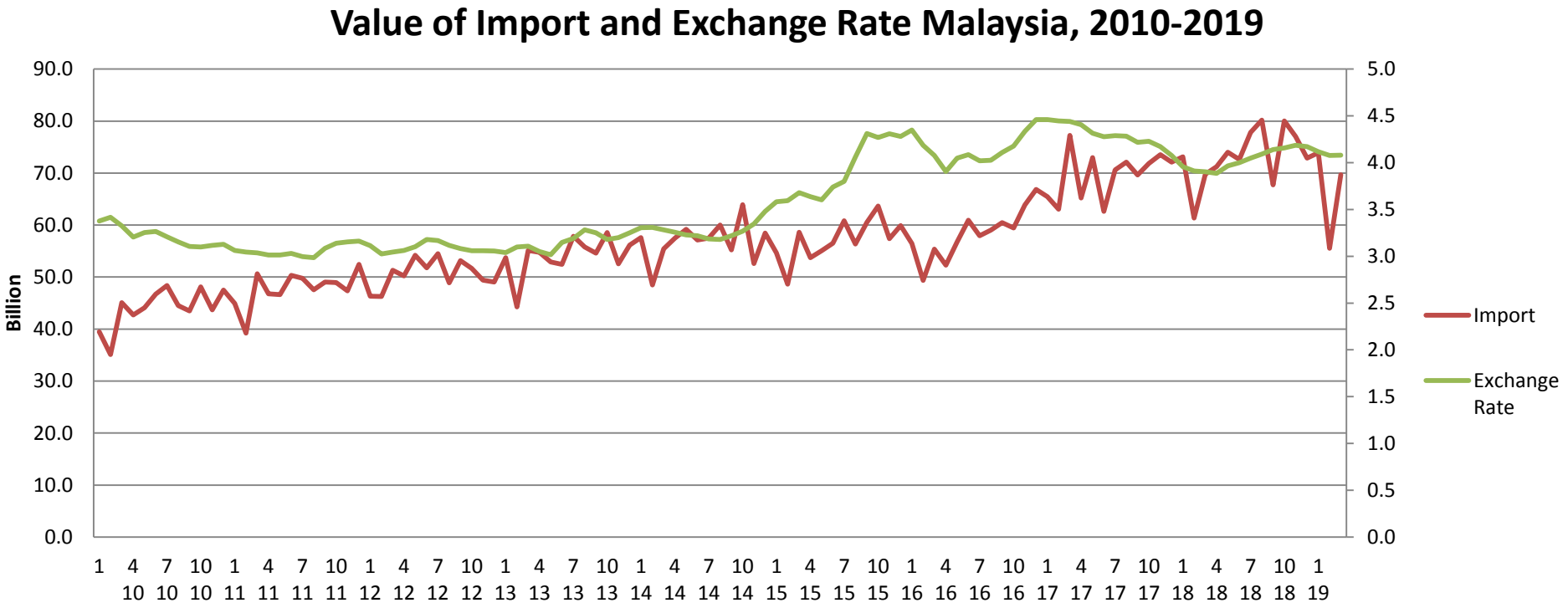
Outline

- Issues
- Objective of Study
- Methodology
- Analysis, Result and Diagnostic Test
- Conclusion of Findings



Issues

1. Economic theory: Depreciation in currency will make imports more expensive; ceteris paribus.
2. But current scenario: Malaysia imports in increasing trend, while exchange rate depreciate in general. Do these variables related?



Main point from the above graph:

Exchange rate RM/USD in Jan. 2010 and Mac 2019 were 3.4 and 4.1 respectively, meaning depreciate but imports still in increasing trend.

Study Objective and Methodology

Objective of Study

To study relationship between Malaysia Imports, and US-Malaysia (RM/USD) exchange rate.

Methodology

1. Statistical Techniques

Autoregressive Distributed Lag (ARDL) Model

2. Data

(1) Imports of Malaysia; (2) RM/USD exchange rate;
(3) Monthly data: Jan 2010 to Mac 2019

ARDL General Model

$$Y_t = \alpha_{0t} + \sum_{i=1}^{p} \delta_t Y_{t-i} + \sum_{i=0}^{q} \beta_t X_{t-i} + €_{it}$$

where

Y = dependent variable

X = regressor

α = constant

δ and β = coefficients

€ = error terms

p = optimal lag for dependent variable

q = optimal lag for regressor

Analysis, Results and Diagnostic Tests

Correlation Analysis

Pearson Correlation Analysis

	Imports	Exchange Rate
Imports	1.00	0.74
Exchange Rate	-	1.00

Source: Author's computation.

Result:
Strong positive correlation between Imports and Exchange rate.

Stationary Test

Augmented Dickey-Fuller Test Statistic

Variable	Stationarity	t-Statistic	Prob.
Imports	Level	-4.3	0.00
Exchange rate	1st. Dif.	-6.99	0.00

Source: Author's computation. Significant intercept at 5%.

Results:

- Imports is stationary at level with significant trend and intercept.
- Exchange rate is stationary at 1st. Dif.

The variables I(0) and I(1), hence proceed with ARDL Bound Test.

Bound Test

- Bound test to identify whether Imports and Exchange Rate (both as endogenous variables) have long run relationship or not with independent variables.

- Since Imports integrated at level [I(0)], and Exchange Rate at 1st. difference [I(1)], Bound Test and ARDL are performed to identify long and short run relationship.

Imports as Endogenous Variable: ARDL Bound Test

ARDL Bound Test for Imports

	Critical Value Bounds*		
	F-statistic	I(0) Bound	I(1) Bound
	12.27	4.04	4.78

*Significance at 10 per cent. Null Hypothesis: No long-run relationships exist.
F statistics > I(1), reject null hypothesis.

Result:
F stats = 12. 27 I(1) = 4.78
F stats > I(1); reject null hypothesis, meaning imports has long run relationship with exchange rate.

Exchange Rate as Endogenous Variable: ARDL Bound Test

ARDL Bound Test for Exchange Rate

	Critical Value Bounds*		
	F-statistic	I(0) Bound	I(1) Bound
	0.33	4.04	4.78

*Significance at 10 per cent. Null Hypothesis: No long-run relationships exist.
F statistics < I(0), cannot reject null hypothesis.

F stats= 0.33; I(0)=4.04

F stats < I(0) meaning cannot reject null hypothesis;

Exchange rate and Imports have no long-run relationship.

Imports as Endogenous Variable: Optimal Lag

Recap: Imports as endogenous has long run relationship with exchange rate. What is the optimal lag?

Optimal Lag: Akaike Information Criterion (AIC)

Lag	AIC
1	6.12
2	5.84
3	5.77*
4	5.79

Source: Author's computation. Optimal lag is 3.

Optimal lag is 3.

Imports as Endogenous Variable

ARDL & ECM – Dependent Variable: Imports

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Independent Variables				
C	0.37	0.41	0.90	0.37
D(M(-1))	-1.03	0.17	-6.22	0.00
D(M(-2))	-0.55	0.18	-3.11	0.00
D(R(-1))	17.54	5.99	2.93	0.00
D(R(-3))	-11.87	5.79	-2.05	0.04
ECM(-1)	5.91E+14	4.89E+14	1.21	0.23

Source: Author's computation. Significant at 5%; R-squared: 0.492; Prob (F-statistic): 0.00.
Note. M is Imports and R is Exchange rate.

Result:
D(M(-1)), D(M(-2)), D(R(-1)) and D(R(-3)) are significant. However, ECM (-1) is not significant.

Import as Endogenous Variable

Long run relationship exists:

- Imports as endogenous variable is cointegrated with exchange rate.
- Hence, error correction model is developed.
- However, the coefficient for error correction model is not significant (P-value = 22.9%). Thus, only short-run model is interpreted.

Import as Endogenous Variable: Interpretation

Short run relationship:

1. 1 unit increase in imports lag one, will result in imports decrease 1.03 unit (Prob. < 0.01).
2. 1 unit increase in imports lag two will result in 0.55 unit falls in imports (Prob. < 0.01).
3. 1 unit appreciation in exchange lag one will result in imports increase 17.54 unit in imports (Prob. < 0.01).
4. 1 unit appreciation in exchange rate lag three will result in 11.87 unit fall in imports (Prob. < 0.05).

Import as Endogenous Variable: Diagnostic Test

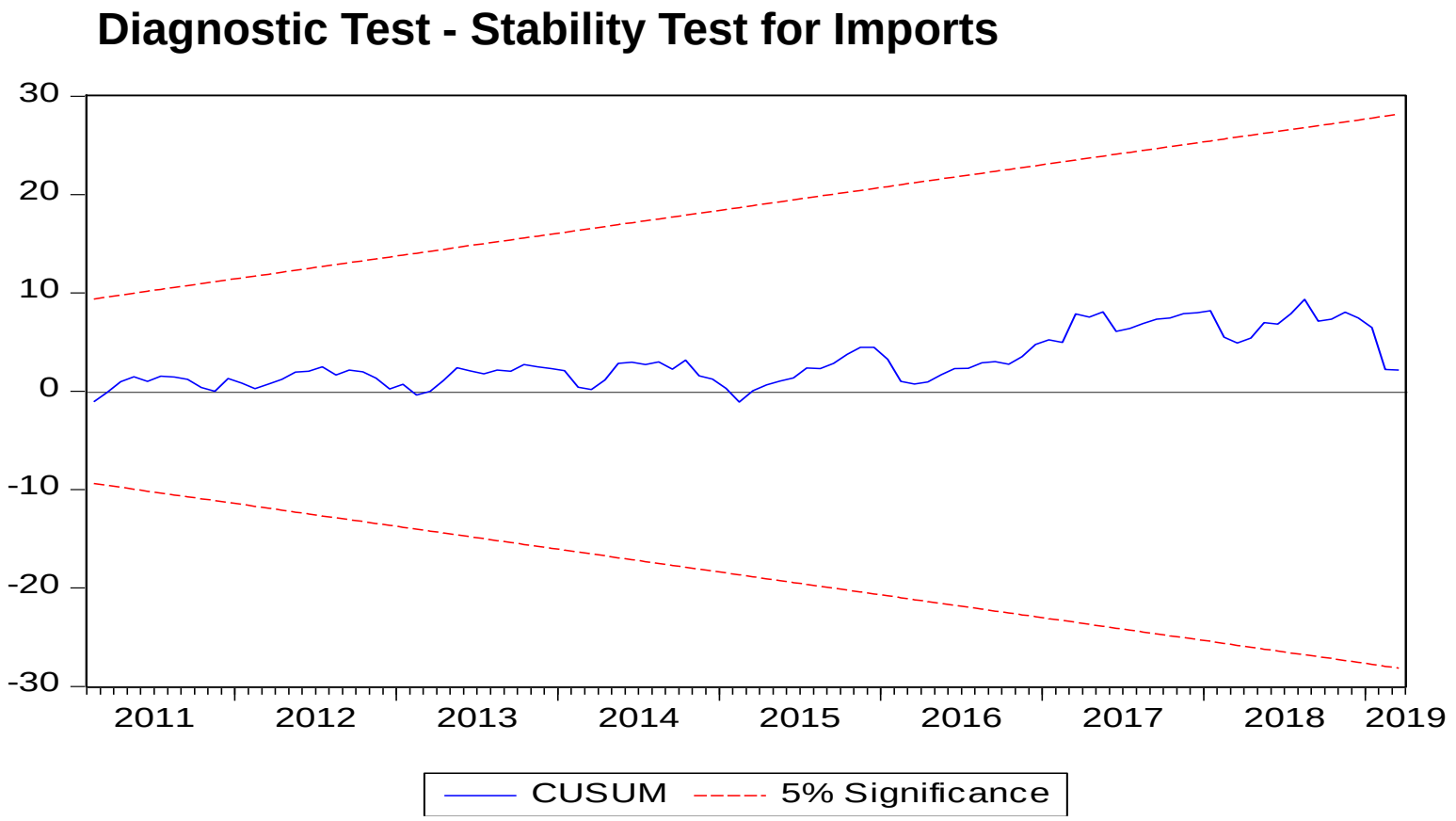
Diagnostic Test - Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.620542	Prob. F(3,95)	0.6034
Obs*R-squared	2.037261	Prob. Chi-Square(3)	0.5647

Source: Author's computation. Significant at 5%; R-squared: 0.492; Prob (F-statistic): 0.00.

Result:
F-statistics for Breusch-Godfrey Serial Correlation LM Test is more than 5 per cent meaning the model has no serial correlation.

Import as Endogenous Variable: Diagnostic Test



Result:
The model is stable.

Exchange Rate as Endogenous Variable

Only short run relationship exist.
Estimate ARDL short run model for Exchange Rate.

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Independent Variables				
C	0.003758	0.01	0.59	0.56
D(R(-1))	0.380768	0.09	4.22	0.00
D(M(-1))	-0.000797	0.00	-0.69	0.49

Source:Author's computation. Significant at 1%; R-squared: 0.144;
Prob (F-statistic): 0.00.
Note. R = Exchange rate; M = Imports

Result:
D(R(-1)) is significant. However, D(M(-1)) is not significant.

Exchange Rate as Endogenous Variable

Short-run Model

- It is found that exchange rate lag one is significant (p-value < 1 per cent) to explain exchange rate.

- 1 unit increase in exchange rate lag one will result in 0.38 unit increase in exchange rate.

Exchange Rate as Endogenous Variable: Diagnostic Test

Table 9: Diagnostic Test - Breusch-Godfrey Serial Correlation LM Test

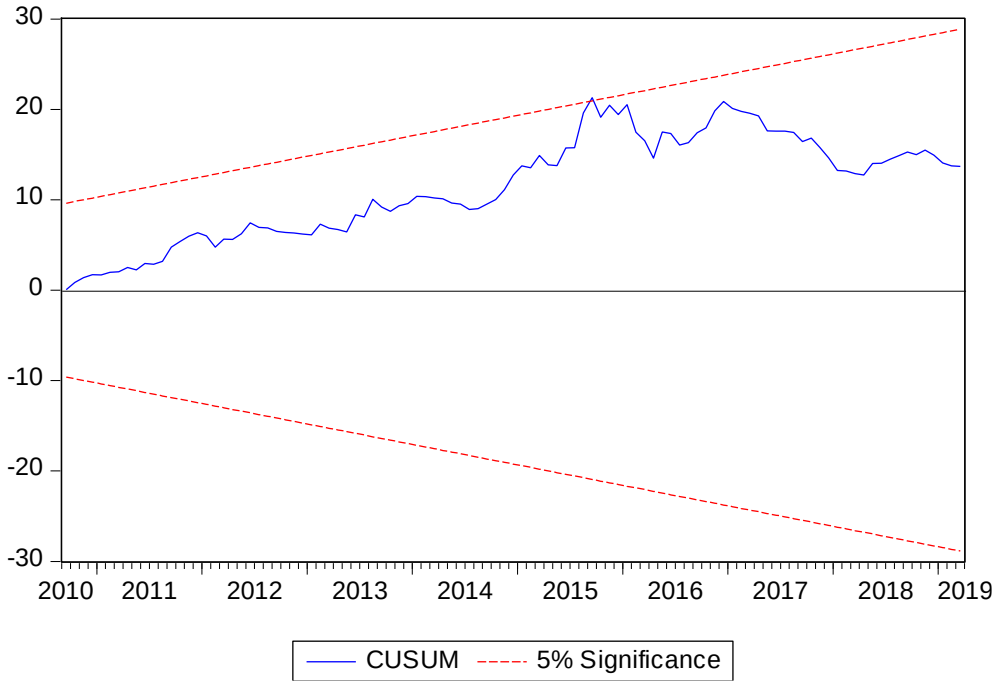
F-statistic	1.326565	Prob. F(2,101)	0.2700
Obs*R-squared	2.764393	Prob. Chi-Square(2)	0.2510

Source: Author's computation.

Result:
Breusch-Godfrey Serial Correlation LM Test is performed to study serial correlation. F-statistic result is more than 5 per cent. This indicates the model has no serial correlation.

Exchange Rate as Endogenous Variable: Diagnostic Test

Chart 2: Diagnostic Test - Stability Test for Exchange Rate



CUSUM test also shows the model is stable.

Conclusions of Findings

1. Imports as Endogenous Variable

- Imports has long run relationship with exchange rate but the ECM is not significant.
- In brief, imports lag one and two have negative relationship with imports;
- Meanwhile, exchange rate lag one has positive relationship with imports. However, exchange rate lag three has negative relationship with imports.

2. Exchange rate as Endogenous Rate

- Exchange rate lag one is significant to explain exchange rate as endogenous variable.

References

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3. Preya Chetty. (2019). “Autoregressive Distributed Lag Model (ARDL) and It’s Advantage. https://www.projectguru.in/publications. Retrieved Sept. 21, 2019.