The Volatility of The Malaysian Ringgit; Analyzing Its Impact on Economic Growth

Trishal Ashvin Kaur, Vikneswaran Manual, Meera Eeswaran

Abstract: ***In an ideal Malaysian economy, the exchange rate functions at a stable, competitive and appropriate level to allow the nation to capitalize on growth and development capacities. However, the instability of market conditions and economic fundamentals have led to a volatile ringgit. In 2015, the ringgit was deemed Asia's worst performer. With past researchers attributing exchange rates as crucial determinants of a country's economic health, the impact of such volatility must be carefully analyzed and understood. This study investigates the impact of exchange rate volatility on economic growth in Malaysia from 2000-2016 due to the lack of research within this setting coupled with evidence of discrepancies (in terms of direction and significance of impact) among past literature. The multiple regression employs the Ordinary Least Squares (OLS) method of estimation whereas the absolute percentage change model is applied to measure volatility. To develop a more robust model, the study incorporates the variables of exports, imports and foreign direct investment (FDI) as explanatory variables cum transmission channels. While the empirical analysis reports that the direct relationship between volatility and growth is insignificant, volatility significantly reduces Malaysian exports. In the long-run, this could substantially deteriorate the Malaysian economy due to its heavy reliance on trade. The researcher concludes by providing several recommendations to ensure the stability of the ringgit to assist the growth prospects of the Malaysia economy.***

Keywords: exchange rate, volatility, Malaysia, economic growth.

I. INTRODUCTION

Fiat currency is derived from the market forces of supply and demand and is not linked to physical reserves (Carducci, 2013). Hence, it lacks intrinsic value and is merely utilized as a medium of payment (Moffatt, 2017). This brings about vulnerability of exchange rates to new symptoms and factors associated with financial markets. Malaysia's change of regime to the managed float system in 2005 means that the Malaysian ringgit, although allows for government intervention when turned too volatile, is still tied to market conditions and economic fundamentals (Bank Negara Malaysia, 2005). The general instability of these factors, particularly those of the macroeconomic, contribute to the volatility of the ringgit. Alagidede and Ibrahim (2016) define such volatility as the persistent fluctuations of exchange rates. With past researchers attributing exchange rates as crucial determinants of a nation's economic health (Javed & Farooq, 2009; Sabina, Manyo & Ugochukwu, 2017; Musyoki, Pokhariyal & Pundo, 2012), such vulnerability must be carefully analysed and understood.

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Trishal Ashvin Kaur, School of Accounting, Finance and Quantitative Studies, Asia Pacific University, Malaysia.

Vikneswaran Manual, School of Accounting, Finance and Quantitative Studies, Asia Pacific University, Malaysia.

Meera Eeswaran, School of Accounting, Finance and Quantitative Studies, Asia Pacific University, Malaysia.

For instance, during the Asian Currency Crisis of 1997, currency declines rapidly spread throughout Southern Asia, resulting in deflated import revenues, stock market slumps and government upheaval (Wilson, 2017).

The Organization for Economic Co-operation and Development's (OECD) 2013 Interim Economic Assessment (cited in Yildirim & Ivrendi, 2016) predicted that emerging economies would experience an era of capital outflows and currency depreciation due to recent turmoil within global financial markets. In 2016, it reported that the world economy endured endless growth disappointments attributed to weak productivity, trade, investment and wages (OECD, 2016). This 'modern case of the Asian Financial Crisis' has already hit the Malaysian economy. On 3 December 2014, the ringgit dropped to 3.4455 against the US Dollar, its weakest since February 2010 (Balan, 2015). In August 2015, the ringgit fell to RM4.2615 to the US Dollar, the lowest in 17 years following commodity price declines as uncertainties surrounding China's economy injured global risk appetite (Yeo & Teng, 2015). As of 2016, The World Bank (2017) places the exchange rate of the ringgit at 4.148 to 1USD.

Generally, developing economies are more prone to financial and currency crises and their impacts. The smaller size of their economies makes them more susceptible to internal and external shocks. They may also face challenges in developing policies to mitigate exchange rate risks and boost economic growth (Wandeda, 2014). Owing to its vast impacts on such economies, exchange rate volatility has been the focus of recent literature in international finance (Alagidede & Ibrahim, 2016). Numerous studies worldwide have been conducted on exchange rate fluctuations and its effects on imports (Oyovwi, 2012; Choudhry & Hassan, 2015), exports (Vieira & MacDonald, 2016; Aftab, Abbas & Kayani, 2012),employment growth (Demir, 2010; Belke & Setzer, 2003), inflation (Mohanty & Bhanumurthy, 2014; Adeniji, 2013) investment (Bahmani-Oskooee & Hajilee, 2013; Sharifi-Renani & Mirfatah, 2012) and more generally, economic activity (Adewuyi & Akpokodje, 2013) and growth (Alagidede & Ibrahim, 2016; Iyeli & Utting, 2017; Yildiz, Ide & Malik, 2016).

While the interaction between exchange rates and economic productivity has gained a great deal of attention from researchers and policymakers in the past decades, no consensus has been reached as the results produced demonstrate inconsistencies. Furthermore, despite the ample literature, studies that focus specifically on Malaysia are sparse. Instead, research within this area is heavily centered around the impact of exchange rate misalignment (Wong, 2013; Naseem & Hamizah, 2013;

Toulaboe, 2006) or explaining the determinants of exchange rate volatility (Yaseer, Noor, Shaliza, Bulot & Ibrahim, 2016; Quadry, Mohamad & Yusof, 2017; Chong & Tan, 2007). With Malaysia's exchange rate demonstrating severe vulnerability, it is of utmost importance to analyze its effects on the nation's economic health and growth. Moreover, the Malaysian Government has specifically identified the exchange rate as one of the challenges in attaining a competitive, robust, dynamic and resilient economy in line with Vision 2020 (Mohamad, 1999). Hence, this study will critically analyze fluctuations of the exchange rate and its impacts on economic growth within the Malaysian setting by depending on annual data from 2000 to 2016.

II. METHOD& MATERIALS

Based on a positivism philosophy, this study investigates and describes the relationship between exchange rate volatility and economic growth – proxied by real gross domestic product (GDP) growth rate – in Malaysia by utilizing past theories to develop and test the hypotheses.However, it is difficult to isolate the impact of exchange rate fluctuations on economic growth as a variety of other variables present significant effects as well. Therefore, this study has examined literature relating to various factors that may be recognized as traits affecting economic performance. Subsequently, the variables of exports, imports and foreign direct investment (FDI) are introduced as explanatory variables. Additionally, and more importantly, this study has used the said variables as transmission channels to intensify the relationship between volatility and growth. This is motivated from past theories and empirical evidence that contend that exchange rate volatility impacts trade and investment which, in turn, influences economic performance. By examining how ringgit fluctuations interacts with growth and each transmission channel, the research delivers an improved understanding on the relationship between volatility and economic performance.

Annual data collected is based on information made available by the World Bank spanning the years of 2000-2016 (17 years). The length of time is desirable because it focuses primarily on Malaysia's managed float system, is long enough to supply adequate information on the relationship between variables and considers accessibility of the most recent data. Quantitative information is gathered as the variables used are computed and conveyed numerically.Data analysis is conducted via the E-views software as it provides students with access to powerful forecasting, statistical and modelling tools via simple-to-use, object-oriented and innovative interface (ITQlick, 2018).Additional information surrounding the data is available in *Table 1.1*.

Table 1.1: Variable Data

Variables	Abbreviation	Explanation	Measurement
Real Exchange Rate Volatility	EXCHVOL	The risk linked with unexpected movements in the ringgit	Computed via the absolute percentage change model
Real GDP Growth Rate	GDPGR	Monetary value of all finished products and services within Malaysia's borders from 2000-2016	$\frac{RGDP_1 - RGDP_0}{RGDP_0} \times 100\%$
Total Exports	EXPORT	The sale of locally produced goods and services, abroad	(Export Value/GDP) x 100%
Total Imports	IMPORT	Foreign goods and services purchased by the residents of Malaysia	(Import Value/GDP) x 100%
Foreign Direct Investment	FDI	Net inflows of foreign investments into Malaysia	(FDI/GDP) x 100%

The exchange rate volatility and GDP variables will be computed using real values to account for the impact of inflation differentials in order to ensure the heightened accuracy of measurements. Real GDP also provides an enhanced perspective when tracking economic output over a certain time period in comparison to nominal GDP (Ifunanya, 2016). Excluding the two variables mentioned, all other variables will be computed using nominal values. Based on the growth models of Solow (1956) and Ifunanya (2016), the research model of this study is expressed as:

$$GDPGR = f\,(EXCHVOL, EXPORT, IMPORT, FDI\ \varepsilon) \quad (1)$$

Here, economic growth is a linear function of exchange rate volatility, exports, imports and FDI.The ε is the error term that will be utilized to capture the influence of other variables that affect economic growth but are not included in this study's model. To facilitate estimation, equation (1) is expressed as:

$$LNGDPGR = \beta_0 + \beta_1 LNEXCHVOL + \beta_2 LNEXPORT + \beta_3 LNIMPORT + \beta_4 LNFDI + \varepsilon \quad (2)$$

The multiple regression will employ the Ordinary Least Squares (OLS) method of estimation as it can be easily extended to models encompassing two or more explanatory variables, is simple, convenient, andproduces momentous results (Kunda, 2011). To provide a good model to fit the simple OLS regression, this study will measure volatility using the absolute percentage change method by Thursby and Thursby (1985) and Bailey, Tavlas and Ulan (1986) (cited in Ifunanya, 2016).

Absolute percentage change: Vt = [(Et – Et-1)/Et-1] x 100%

Where:

Vt = exchange rate volatility

Et = current year spot exchange rate

Et-1 = previous year spot exchange rate

Researchers have contended that macroeconomic data is characterized by a stochastic trend, and if untreated, the statistical behaviour of the estimates in the study could be affected by such a trend (Aliyu, 2011). The treatment requires differencing the data to ascertain the level of integration and will be conducted via the Augmented Dickey Fuller test (ADF) (Iyeli & Utting, 2017). However, undertaking differencing to develop stationarity causes the non-stationary variables to lose their long-run properties (Kunda, 2011). Hence, cointegration is conducted to establish the long-term relationships that may have been eradicated. An equilibrium relationship between the variables is suggested to exist if the economic series are found to be integrated at the same order (Iyeli & Utting, 2017). Cointegration amongst the selected variables will be tested via the Johansen cointegration as it has been proven to be the primary choice among past researchers including Sharifi-Renani & Mirfatah, (2012), Aliyu (2009), and Ifunanya,(2016). Per Kunda (2011), if cointegration between variables are recorded, the researcher may employ the Vector Error Correction Model (VECM) to examine the short-run dynamics of the series. Where the ECM produces a negative value, it implies that any short-run deviations will converge towards long-run equilibrium.

III. RESULTS

Aliyu (2011) argues that macroeconomic data often display stochastic trends (violation of stationarity) and if left untreated, such trends could impact the statistical behavior of a study's estimators. In this study, the test and treatment of non-stationary behavior (unit root) will by employed via the Augmented Dickey-Fuller (ADF) test. From the findings, the null hypothesis of the presence of unit root cannot be rejected as all the series are depicted to be non-stationary at level, with exceptions to GDPGR and IMPORT that are stationary at 5%. Differencing the variables at level one shows that all of them are stationary (symbolized as I(1)) at 1% level of significance except EXPORT which is I(1) at 5% significance level. For the purpose of consistency, all the series are regarded as I(1), rejecting the null hypothesis of unit root presence at first difference.

Table 1.2: Summary of Unit Root Test

Variables	ADF statistics	Level of difference	Probability value	1% critical value	5% critical value	10% critical value	OI
GDPGR	-4.841865	1	0.0023	-4.004425	-3.098896	-2.690439	I(1)
EXCHVOL	-4.276596	1	0.0062	-4.004425	-3.098896	-2.690439	I(1)
EXPORT	-3.827352	1	0.0128	-3.959148	-3.081002	-2.681330	I(1)
IMPORT	-4.039971	1	0.0086	-3.959148	-3.081002	-2.681330	I(1)
FDI	-4.610072	1	0.0034	-4.004425	-3.098896	-2.690439	I(1)

Source: Researcher's EViews 10 Computation

Given that the series is stationary and integrated in the same order, the Johansen cointegration test is employed to examine the presence of long-run relationships between the variables. It is noteworthy that the raw data have been transformed using logarithms (denoted 'LN') for this test to stabilize the variances of the study and improve cointegration forecasts (Lutkepohl & Xu, 2012).

Table 1.3: Summary of Johansen Cointegration Test

Hypothesized No. of CE(s)	Trace Statistics	Critical Value at 5%	Max-Eigen Statistics	Critical Value at 5%
None	94.60239	69.81889	40.30156	33.87687
At most 1	54.30083	47.85613	27.82715	27.58434
At most 2	26.47368	29.79707	22.26332	21.13162
At most 3	4.210363	15.49471	4.067973	14.26460
At most 4	0.142390	3.841466	0.142390	3.841466

Source: Researcher's EViews 10 Computation

From the results, the trace statistics propose that there are at least two cointegrating equations whereas the Max-Eigen statistics suggest that there are at least three cointegrating equations at 5% level. The null hypothesis is thus rejected, implying that the series are related and can be combined in a linear fashion. Hence, even if there are shocks in the short-run which may impact the movement of the individual variables, they would ultimately converge in the long-run. The principal concern of this study is to evaluate how real GDP reacts to exchange rate volatility in the long term. In establishing this, Table 1.4 presents the normalized cointegrating coefficients (β) of the study's variables in line with the Johansen test.

Table 1.4: Normalized Cointegrating Eigenvector

1 Cointegrating Equation(s):		Log likelihood	18.56140	
LNGDPGR	LNEXCHVOL	LNEXPORT	LNIMPORT	LNFDI
1.000000	-0.322584	4.113149	-8.273090	0.862621
	(0.07273)	(2.01783)	(2.74181)	(0.08136)

Source: Researcher's EViews 10 Computation (standard error in parentheses)

With log of real GDPGR as the regressand and the log of EXCHVOL, EXPORT, IMPORT and FDI as regressors, the researcher derives the cointegrating equation as follows:

$$LNGDPGR = 3.841466 + (-0.322584)*LNEXCHVOL + 4.113149*LREXPORT + (-8.273090)*LNIMPORT + 0.862621*LNFDI \quad (3)$$

Equation (3) infers that exchange rate volatility and imports adversely impact the Malaysian economy whereas exports and FDI contribute positively. Furthermore, Malaysia's GDP heightens more by export increases compared to FDI increases, consistent with the country's substantial reliance on exports. Considering that the variables in the current study are non-stationary at level but are I(1) and cointegrated in the preceding sections, the researcher may proceed to run the VECM.

Table 1.5: Vector Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.016872	0.095617	-0.176451	0.8638
D(LNEXCHVOL)	0.058781	0.114358	0.514010	0.6196
D(LNEXPORT(-1))	-5.272545	4.418095	-1.193398	0.2632
D(LNIMPORT(-1))	4.456912	4.587956	0.971437	0.3567
D(LNFDI)	-0.295247	0.100827	-2.928265	0.0168
ECM(-1)	-1.400712	0.304951	-4.593237	0.0013

Source: Researcher's EViews 10 Computation

A critical parameter in this estimation is the coefficient of the error correction (ECM) term which computes the speed of adjustment of real GDP in reverting to equilibrium after changes in the independent variables. The result of a negative ECM figure with a probability value of 0.0013 shows that the adjustment is correctly signed and statistically significant. This implies that the Malaysian real GDP has an automatic adjustment mechanism whereby the economy responds to equilibrium deviations in a balancing manner. The coefficient of -1.4 indicates that the Malaysian economy undergoes a sizeable speed of adjustment to converge towards its long-run equilibrium state after fluctuations in the levels of exchange rate volatility, exports, imports and FDI.

Test of Hypotheses

Hypothesis 1

H0: There is no significant relationship between exchange rate volatility and economic growth in Malaysia
H1: There is a significant relationship between exchange rate volatility and economic growth in Malaysia

Hypothesis 2

H0: There is no significant relationship between exchange rate volatility and exports in Malaysia
H1: There is a significant relationship between exchange rate volatility and exports in Malaysia

Hypothesis 3

H0: There is no significant relationship between exchange rate volatility and imports in Malaysia
H1: There is a significant relationship between exchange rate volatility and imports in Malaysia

Hypothesis 4

H0: There is no significant relationship between exchange rate volatility and FDI in Malaysia
H1: There is a significant relationship between exchange rate volatility and FDI in Malaysia

Decision Rule:

Reject H_{01} and accept H_{a1} if t-Statistic calculated is greater than t-Statistic tabulated
Reject H_{a1} and accept H_{01} if t-Statistic calculated is smaller than t-Statistic tabulated
Based on 17 observations and 0.05 level of significance, t-Statistic tabulated = 2.131
Independent variable: Exchange rate volatility

Table 1.6: Regression Results

Dependent Variables	Coefficient	Probability	t-Statistic	Hypothesis Decision
GDPGR	-0.1423	0.2601	-1.17	Accept H_0
EXPORT	-0.007	0.0289	-2.415	Reject H_0; Accept H_1
IMPORT	-0.0029	0.1804	-1.405	Accept H_0
FDI	-0.0005	0.4475	-0.7831	Accept H_0

Source: Researcher's EViews 10 Computation

Based on *Table 1.6*, exchange rate volatility is seen to influence all the dependent variables adversely. However, the impact on GDP, imports and FDI are insignificant as their probability values are higher than 0.05 and their t-Statistic calculated are lower than 2.131.Only the influence on exports is deemed significant as it reports a probability value within the 5% significance level. This is further strengthened by the fact that the t-Statistic calculated (-2.415) is higher than the tabulated value of 2.131.

IV. DISCUSSION

The negative but insignificant impact of exchange rate volatility on economic growth in Malaysia mirrors the findings of Wandeda (2014) and Kogid, Mulok, Lim & Mansur (2010). The insignificance could be a result of theconsistent effort of Malaysian authorities in introducing structural reforms to boost productivity amid gloomy global outlooks. For example, the Economic Stimulus Package established in 2009 and the Economic Transformation Programme founded in 2010 improved market productivity by creating jobs under the National Key Economic Areas. From these initiatives, the electronics and electrical products sector enjoyed growth of 15.6% while the service and finance sectors grew 6.8% and 6.1% respectively to combat the effects of the crisis (BNM, 2010). BNM has also consistently introduced effective fiscal and monetary policies amid unstable economic environments. During the Global Financial Crisis, it slashed interest rates three times to a low 2.00%. It also lowered the statutory reserve requirements (SRR) to 1.00%. These measures stabilized the local economy with private consumption gradually improving bymid-2009 after falling by 2.90% at the start of the year (Lim & Goh, 2010). In 2016, the Bank again reduced its SRR to 3.50% from 4.00%, lowering borrowing costs whilst supplying other banks with greater flexibility in managing their liquidity positions. The government also ensures that the country has ample foreign exchange reserves and deploys them to assist the economy adjust to lower commodity prices and outflows of capital. These initiatives provide the nation with sufficient liquidity to absorb exchange rate shocks(BNM, 2016).

Next, the current studies' results on the relationship between volatility and imports is in line with Oyovwi (2012) and Koray and Lastrapes (1989). This signals that domestic consumption of the nation is skewed towards imported goods where even rises in prices do not substantially affect their demand for international products (Oyovwi, 2012). For one, Malaysia relies heavily on food imports. Despite the depreciating currency in 2014, imports decreased by a mere 2.90% compared to the exports decline of 5.00% in the same period. Lacking in self-sufficiency, Malaysia continues to heavily import rice, garlic, onions, chilies and tomatoes (FMT, 2016; Kankyakumari, 2017). Furthermore, massive importation is encouraged by inferior quality and design of local products in comparison to foreign brands. For instance, Honda was the second highest selling brand in 2016 (surpassing Proton in third place) despite the depreciating ringgit (Lee, 2017). Moreover, there is high import content in the exports of Malaysian manufactured goods. For example, while electrical machinery and equipment represent the top exports of Malaysia, the same components are also the country's top imports (Workman, 2018a).

The insignificant relationship between volatility and FDI points to FDI inflows to Malaysia being significantly affected by other variables instead. These include trade openness, market size and inflation rate(Xin, Thye, Chun, Yoke and Chun, 2012). Within the services sector, Sandhu and Fredericks (2005) report that workforce factors are highly relevant to FDI inflows. These include the labor cost, availability of skilled workforce and education levels.

Finally, volatility exerts a negative and significant impact on Malaysian exports where a 1.00% increase in volatility, lowers exports by 0.7%. This result is in line with Chit, Rizov and Willenbockel (2010), Arize, Osang and Slottje (2008) and Serenis and Tsounis (2014). One reason for this is the risk averse nature of market participants(Chowdhury, 1993). The author argues that volatility causes exporters to decrease their activities, change prices or shift sources of supply and demand to reduce exposure to exchange rate risks. In turn, this alters output distribution across the many sectors of exporting nations.

A second explanation stems from the inefficiency of exporters in utilizing hedging mechanisms (Habibullah, 2018). A research conducted by Kamil, Balu and Ismail (2018) studied how 261 Malaysian exporters (companies) of palm products manage their exposure to exchange rate volatility. Only 65% of respondents manage exchange rate risks using available derivatives in the market (e.g. forward and options contracts). The remaining 35% of the respondents failed to engage in hedging due to the lack of knowledge in risk management and deficiency of internal resources. Several companies also reported that the available hedging instruments were too speculative and expensive.

V. CONCLUSION

To summarize, volatility only demonstrated a significant impact on Malaysian exports whereas the other variables of GDP, imports and FDI are insignificantly influenced by the independent variable. Despite this, it must be noted that exports are the most significant, positive contributor to real GDP growth in Malaysia as highlighted in the Johansen cointegration test. Here, a 10% rise in exports would elevate growth by a substantial 41.13% due to the country's export-orientation. As exports reduce by 7% for every 10% increase in volatility, failing to curb volatility could eventually lead to detrimental impacts on growth via this transmission channel. Hence, proper measures must be undertaken to ensure the country flourishes and thrives in the long-term through stable exchange rate fluctuations.

Going forward, the authorities should allow the reserves to be gradually rebuilt and continue relying on greater exchange rate flexibility in response to external shocks. Interventions should only be undertaken to smoothen excessive levels of volatility where capital outflows threaten domestic activity. This is to ensure greater liquidity of the Malaysian financial and foreign exchange markets amid global economic slowdowns.Malaysian exporters must be given adequate exposures to risk management and hedging tools and techniques to enable enhanced mitigation of exchange rate risks. This will serve as encouragement for them to trade more actively within international markets. Additionally, Workman (2018b) and Workman (2018c) report that over 60% of manufactured exports come from the electrical and electronics industry and over 50% of trade in focused on four markets (China, US, Japan, Singapore). This has made Malaysia reliant of the economies of these industries to prosper. If any one of them were to decline (e.g. downturns of US and Japan in 2001), the Malaysian economy will be badly hit. Therefore, both the composition and destination of this country's exports must be diversified by exploring new products and markets to lower exposure to volatility.

As import is negatively linked to economic growth, measures must be taken to improve Malaysia's self-sufficiency given that the country is surrounded by land and natural resources. To improve the food and beverage industry, added incentives or new technologies should be catered to this sector. Additionally, the quality of local offerings must heighten to be able to compete with foreign products. A bottom-up approach should be encouraged within organizational hierarchies to ensure all levels of staff are able to contribute to product and service enhancement. Authorities should also assist the companies in forming alliances with international counterparts to improve innovation and quality to counter market hegemony by foreign brands. The cointegration results reveal that FDI contributes positively to economic growth in Malaysia. To promote more foreign investment, the nation should offer incentives to foreign multinational companies. For one, the bases on which to attain tax reliefs via pioneer status or investment tax allowance should be broadened or corporate taxes could be lowered during the first few years of investment. Furthermore, the availability and quality of the Malaysian labour force should be heightened. This can be achieved by encouraging female labour force participation and improving the standard of education in the country (e.g. promoting the uptake of foreign languages in schools).

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AUTHORS PROFILE

Trishal Ashvin Kaur is working in School of Accounting, Finance and Quantitative Studies, Asia Pacific University, Malaysia.

Vikneswaran Manual is working in School of Accounting, Finance and Quantitative Studies, Asia Pacific University, Malaysia.

Meera Eeswaran is working in School of Accounting, Finance and Quantitative Studies, Asia Pacific University, Malaysia.