Chapter 48
The Effects of Crude Oil Price Volatility, Stock Price, Exchange Rate and Interest Rate on Malaysia's Economic Growth

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Abstract This study examines the effects and relationships between Malaysia's economic growth and selected variables which are oil price volatility, stock price, real exchange rate and real interest rate. Using time-series data methodology, the study employs unit root test using Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP), Auto-Regressive Distribution Lag (ARDL) model supplemented by Bounds F-Testing, Johansen-Julius Co-integration test and Granger causality test. The long-run equation derived from ARDL shows that there are positive relationships for stock price and real exchange rate whilst there are negative relationships between oil price volatility and real interest rate. Furthermore, Granger causality test shows that only stock price and real interest rates have an impact on Malaysia's gross domestic product (GDP) in the short run. Finally, sound policy recommendations are suggested, in particular, to address oil price volatility in a forward-looking manner as well as monetary-friendly measures to further support Malaysia's economic growth.

Keywords Economic growth · Malaysia · Oil price volatility

JEL Codes O44 · O47

48.1 Introduction

Oil and gas industry have been volatile since the 1970s. The sector experienced thick and thin for the past three (3) to four (4) decades which correspond to positive and negative impacts on the economic and financial activities. Starting with the "Energy Crisis" in 1973 where an oil embargo was imposed by the Organization of Arab Petroleum Exporting Countries (OAPEC) leading to short in supply and hence hike

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in oil prices, it was then followed by an oil glut in the 1980s whereby oil demand plummeted and hence forced the prices down. Another oil shock took place in the 1990s due to adverse economic conditions, perhaps after experiencing a 10-year cyclical oil shock persistently. During this era, the infamous “Asian Financial Crisis” hit the Asian region making the Asian countries suffering from slump and economic depression. There was a loss of demand and confidence in financial and economic development for the region.

As for Malaysia and as outlined by Kaplan (2001), Malaysia’s effort to recovery was highly dependent on the imposition of capital control framework in September 1998 which was not eminent at that time. The trending was to borrow from the International Monetary Fund (IMF) but Malaysia had embarked on a different path by fixing the exchange rate, cutting the interest rate and adopting a policy to stimulate growth. It was found that this initiative had been proven worked for Malaysia as compared to taking funding from the IMF as faster recovery was formed. There were minimal declines in wages and employment coupled with more rapid retrieval in its stock market activity.

According to the World Bank (2017), Malaysia is a highly open, upper-middle-income country with over 31 million population. The country experiences escalation in economic growth throughout Q1 2017 at 5.6% as compared to the same quarter in 2016 at 4.5%. It was notable that the sources for this growth were on private investment on capital spending along with implementation of several large-scale projects. At the same time, inflation also peaked driven by high fuel prices as the oil and gas sector improves rapidly on cost efficiency and limiting its supply quantity. As a result, the reaction is to push up crude oil prices globally due to agreement between Organisation of Petroleum Exporting Countries (OPEC) and non-OPEC members to slightly curb on the supply side, Bank Negara Malaysia (2016). On the financial side, the indicators demonstrate that banking sectors are well-capitalised combined with strong liquidity performance in Q1 2017. The system remains resilient as the currency, i.e. the ringgit, reversing its downward trend towards appreciation against the US dollar, World Bank (2017).

As the ringgit volatility subsides, it promotes healthy rounds of exports and imports which simultaneously helping the nation’s most highly dependable industry to grow and bounce back from the oil turmoil in recent years.

48.2 Literature Review

48.2.1 Oil Price Volatility and Economic Growth

Based on the economic theory, the behaviour of oil price volatility has the possibility to change over a short period of time, according to Narayan and Narayan (2007). Mohn and Misund (2009) investigated the relationship between investment and oil price volatility and they found that oil price volatility has the stimulating effect whereby oil shocks are temporary and transitory in nature. Over a longer period, Gadea et al. (2016), based on the study on the US' long term oil performance, found that the relationship between oil price and economic growth is not even significant. It could be due to important changes that occurred in the demand and supply that had actually led to a few structural breaks.

In another study on the relationship of energy sources namely electricity and oil, against economic growth, Sarwar et al. (2017) concluded that oil price shocks upsurge the economic risk. As a result, and in accordance with the fundamental of risk management whereby higher risk yields higher returns, they found that economic growth in low and middle-income countries somehow increase when oil price shocks happened. The scenario is however varied in other countries depending on their income and region.

Hamilton (2003) studied the non-linear relationship between oil prices and gross domestic product (GDP) growth. He used functional forms in his model as many economic analyses on oil shocks tend to begin with a production function and then relate it towards inputs such as capital, labour, and energy. This approach is appealing as it easily demonstrates linearity between log of GDP to the log of real oil prices. Therefore, the relationship between dependent variable and independent variable(s) could be clearly established and represented graphically by a straight line. He argued that the existing models interpret recession aftermath an oil shock as supply-driven rather than demand-driven, meaning that an oil prices increase would result in an increase in production cost.

48.2.2 Stock Price and Economic Growth

Stock market liquidity supports the hypothesis that it would positively predict growth. Indirectly, it indicates that banking and financial system play an important role to spur innovations by providing good prospective investment products, according to Levine (1998). Schumpeter and Backhaus (2003) further added that entrepreneurship would outgrowth economic development by vanishing savings and replacing it with funds. This marks a significant move towards generating funds by firms via financial market and stock market.

In a study by Silva et al. (2018) on stock market performance and economic growth of Sri Lanka using a linear model over a period of sixteen (16) years, they concluded that there is a positive relationship between the share prices that represented the stock market and economic growth. The same result is shared with Bangladesh on research performed by Mamun et al. (2018) using Granger causality test on the short-run dynamics and vector error correction model (VECM) on the long-run dynamics. Interestingly, the found a positive relationship between stock market development and economic growth for both short-run and long-run views though the long-run equilibrium is rather slow to be achieved.

Kuang (2008) conducted a holistic overview of Malaysian financial market situation to ascertain the underlying factors and risks that contribute to such an impact.

Blessed by stability economically and geopolitically, Malaysia managed to attract positive net inflow of foreign direct investment (FDI) at about 3.8% of GDP between 2004 and 2007 signifying ample capacity of Malaysian companies to expand and diversify their business operations. To support this development, the Central Bank of Malaysia, i.e. Bank Negara Malaysia, adopted several monitoring measures to enhance its surveillance and capital account transactions. Through sophisticated reporting and system, Malaysia portrays strong capital market performance alongside promotion of good governance and risk management. Therefore, Malaysia's monetary policy is then determined based on balanced risk assessment between inflation and growth. Sound intervention at both regulatory and supervisory levels would be initiated to address any fluctuation whether it is an appreciation or depreciation of Malaysian currency, to mitigate speculative exposure.

48.2.3 Real Exchange Rate and Economic Growth

There is a consensus agreement that high real exchange rate would encourage economic growth as outlined by Gala (2007), Rodrik (2008) and Rapetti et al. (2012). Taking example of China when the Yuan was undervalued in the 1970s, the country experienced rapid GDP growth owing to the fact that currency-undervaluation has driven its economic growth. Nonetheless, the key success to economic development in East and South Asia regions has been the competitive currency. They managed to smoothen their currency from over appreciating so that artificial high real wages could be prevented. This scenario is inferior such that consumption would increase but at the expense of high debt rather than generating resources to finance consumption. Bresser-Pereira (2002) termed this situation as 'saving displacement' which has the potential to worsen balance of payments simply attributable to overvaluation in exchange rate.

Rather supporting the above findings, Habib et al. (2017) confirmed a negative relationship between real exchange rate and economic growth only on developing countries and those countries with currency-pegged regime, while the result for advanced countries and currency-floating regime is not significant and weak. They also found that depreciation appears to have larger impact on economic growth than appreciation does. Similarly, Ribeiro et al. (2017) showed that the impact of exchange rate devaluation against economic growth is negatively signed and the effects of real exchange rate on economic growth are rather indirect, supported by income distribution and technological advancement.

On the contrary, devaluing a currency often invites recession according to Ito et al. (1999) with exception to rapidly developing countries. The contributing factor that relates to the success of the exchange rate and economic growth in international trade especially high exports which are then being translated into current account surplus. By referring to growth in Asia, they found that economic development within this region was due to upgrading from traditional industry such as mining and agriculture to manufacturing and hence these countries become modernised and advanced in technological inventiveness. They attract foreign direct investments and therefore could produce high quality yet cheap exports which then resulting in immense economic growth.

In Malaysia, a specific study on the impact of exchange rate misalignment on economic growth was conducted by Tsen Wong (2013). It was argued that an increase in the exchange rate misalignment would decrease economic growth, or in short, it reflects that uncontrolled appreciation would lead to slower growth, vice versa. In this study, it was also found that oil price and interest rate are important determinants to real exchange rate misalignment, in addition to currency reserve itself. As a nation with a managed floating exchange rate regime, it was evident that exchange rate policies undertaken by the Central Bank of Malaysia had been able to protect the exchange rate market from over-exposure to exchange rate risks.

48.2.4 Real Interest Rate and Economic Growth

By norm, investors in financial market are forward-looking, meaning that they consider expectations of future economic performance. Dotsey (1998) found that the use of the spread between long-term and short-term interest rates is still relevant to predict economic growth even though its accuracy has become more challenged recently due to several occurrences whereby spread has failed to anticipate the onset of likely recession. An example would be during 1990–91 where the economic downturn has seriously affected mostly the Western countries, yet spread has not functioned to forecast this occasion. Following this, Sims and Zha (2006) examined monetary policy shocks with attention towards interest rate-smoothing policy. Using the VAR model, they found that monetary policy shocks had little consequences on business cycle and growth as well as interest rate only accounts marginally as the contributing factor of the shock.

A study by Ramlan and Suhaimi (2017) on the relationship between the interest rate and economic growth in Malaysia during 2004–2013 was positive, meaning that an increase in interest rate would bring about an increase in economic growth. Conflicting with the act of Central Bank whereby they normally use high interest rate to moderate back the economy especially when inflation is expected to set-in, this study highlighted an interesting paradox, but this was understandable as Malaysia was undergoing a hard decade during this time both politically and economically. As a result, Malaysians did not reflect decrease in consumption despite interest rate was charged high therefore economic activities run as normal. Another interesting finding by Ang (2007) suggests that during macroeconomic shocks, real interest rate leads to a negative impact on Malaysia's financial deepening. This simultaneously shows that policy changes in real interest rates would not contribute to long-run growth of the country. Instead, they found that economic growth is the factor that leads to financial sector reformation in Malaysia in line with the demand-following hypothesis.

48.3 Materials and Methods

48.3.1 Model Specification

Since this study aims to resolve the question of what are the impacts of oil price volatility, stock price, real exchange rate and real interest rate on Malaysia's economic growth, it is imperative that a model specified for the empirical work shall be correct so that it supports the underlying intuition. The parameters chosen were derived from existing literature after thorough consideration of existing economic theory as well as the main factors that affect Malaysia's GDP itself. By implementing this thought, a strong connection between the model and the economic theory is established so that the selected variables are self-explanatory.

Therefore, there are five variables specified in the model and they are shown as below:

$$\mathrm{GDP} = f(\mathrm{OPV}, \mathrm{SP}, \mathrm{RER}, \mathrm{RIR}) \tag{48.1}$$

where GDP is Gross Domestic Product as a proxy to economic growth, OPV is Oil Price Volatility represented by the average in change in oil prices between two consecutive periods, SP is the Stock Price, RER is Real Exchange Rate and RIR is Real Interest Rate. Explicitly, the equation could be expressed as:

$$\mathrm{LGDP}_t = \alpha_0 + \alpha_1\mathrm{OPV}_t + \alpha_2\mathrm{SP}_t + \alpha_3\mathrm{RER}_t + \alpha_4\mathrm{RIR}_t + \varepsilon_t \tag{48.2}$$

where the model is in loglinear form. This model is chosen to address possibility of having a negative value for OPV based on the definition provided by Energy Information Administration (EIA) of the US in their May 2012 report. In addition, a loglinear model is a flexible and independent model which is normally used on raw data for data-smoothing purpose (Holland and Thayer 2000) and for considerate small sample analysis (Moreira et al. 2008). As such, α_i ($i = 0, 1, 2, 3, 4$) are the parameters to be estimated and ε_t is the disturbance term. In this model, the interpretation of α_i is such that it is in unit form, that is if the variables OPV, SP, RER and RIR change by 1 unit, LGDP is expected to change by α_i and to get it in percentage form, α_i would need to be times by hundred. In this model, the signs of the coefficients are sensitive to the level of GDP.

48.3.2 Testing Methodology

To pursue the empirical test, firstly, Ordinary Least Squared (OLS) of the model is estimated to understand the expected sign of each variable selected. Next, time-series property of each variable is verified using Augmented Dickey–Fuller (ADF) test to check their stationarity on the following form (Dickey and Fuller 1979).

In addition, Phillips–Perron (PP) Unit Root test (Phillips and Perron 1988) is also carried out to supplement ADF test. The advantage of using PP unit root test is such that it allows testing in a more general model and therefore both types of weak and strong variables are outfitted accordingly.

Second, Auto-Regressive Distributed Lag (ARDL) model (Pesaran and Shin 1998) and Bounds F-testing are conducted to extract both long-run and short-run relationships between independent and dependent variables for the former and to identify co-integration relationship for the latter. The expected outcome would yield consistent long-run coefficients despite stationarity of the regressors at I(0) or I(1), therefore valid interpretations may be developed from the result. Endogeneity is also minimised as there is no residual correlation (Nkoro and Uko 2016).

With a similar objective as ARDL test, co-integration test is carried out to avoid spurious regression. Once these tests have been fulfilled, the next step is to employ Granger causality test to analyse causality relationship between all variables. It is useful to determine causality property amongst the variables at least in one direction supported by Granger (1988). Upon existence of co-integration, there would be possible causal and effect relationship amongst the variables. Conditional to this outcome, Granger Causality test shall be proposed to ascertain the causality direction of the co-integrated variables.

48.3.3 Data Sources

Time series data from 1993 until 2017 were obtained quarterly from Q4:1993 until Q4:2017. The data for GDP was derived from International Monetary Fund (IMF) which represents the economic growth and it is in the form of real GDP. Real GDP indicates that the GDP data has been adjusted for inflation accordingly. Oil prices data was taken on the basis of Crude Brent Oil prices from Quandl database and it is measured in USD. From this data, oil price volatility (OPV) was calculated as follows based on EIA definition mentioned earlier.

$$\text{Average OP}_{t-2} = \frac{\text{Oil Price}_{t-2} - \text{Oil Price}_{t-3}}{\text{Oil Price}_{t-3}} \text{ Let this equation be A} \tag{48.3}$$

$$\text{Average OP}_{t-1} = \frac{\text{Oil Price}_{t-1} - \text{Oil Price}_{t-2}}{\text{Oil Price}_{t-2}} \text{ Let this equation be B} \tag{48.4}$$

$$\text{Average OP}_{t} = \frac{\text{Oil Price}_{t} - \text{Oil Price}_{t-1}}{\text{Oil Price}_{t-1}} \text{ Let this equation be C} \tag{48.5}$$

Then,

$$\text{OPV}_t = \frac{\text{A} + \text{B} + \text{C}}{3} \tag{48.6}$$

Stock price data was based on FTSE Bursa Malaysia from Kuala Lumpur Stock Exchange (KLSE) via Yahoo Finance. It is measured in Ringgit Malaysia (RM). For real exchange rate, the data was sourced from The Federal Reserve Bank of St. Louis and it is in index form with base 2010. Since the data is basing an index at a specified time, it is believed that this would eliminate the difficulty of carrying out regression on an indexed number (Bailey et al. 1963). Finally, real interest rate data was derived from IMF with slight modifications required since the data available for Malaysia are only on nominal interest rates. By also extracting the data on consumer price index (CPI) from IMF, real interest rate was derived as per the equation below.

$$\text{Real Interest Rate} = \text{Nominal Interest Rate} - \text{Inflation} \tag{48.7}$$

whereby inflation is calculated using CPI information as per the following equation.

$$\text{Inflation} = \frac{\text{CPI}_t - \text{CPI}_{t-1}}{\text{CPI}_{t-1}} \times 100 \tag{48.8}$$

48.4 Results and Discussion

48.4.1 Descriptive Statistics

Descriptive statistics is normally used to describe brief features of data employed for the study. The result is shown as per Table 48.1.

48.4.2 OLS Estimation of the Model

The OLS estimation of the model is as follows with t-stats are displayed in () parentheses and *p*-values are displayed in [] parentheses:

Table 48.1 Descriptive statistics

Variables	Mean	Maximum	Minimum	Standard deviation
LGDP	4.329	4.952	3.579	0.353
OPV	0.025	0.314	−0.236	0.095
SP	1157.6	1882.7	373.5	414.3
RER	100.2	130.7	84.57	10.37
RIR	6.635	12.82	0.42	2.458

$$\mathrm{LGDP}_t = 5.38 - 0.279\mathrm{OPV}_t + 0.0004\mathrm{SP}_t - 0.013\mathrm{RER}_t - 0.028\mathrm{RIR}_t \quad (48.9)$$

$$\begin{array}{cccc} (-1.88) & (8.69) & (-7.40) & (-2.67) \\ [0.07] & [0.00] & [0.00] & [0.009] \end{array}$$

As shown in Eq. (48.9) above, all coefficients appear to be statistically significant.

48.4.3 Unit Root Test

Macroeconomic time series variables may exhibit trending behaviour and subsequently non-stationarity as the mean keeps on rising and not integrated. The problem with non-stationary data is that the OLS regression may lead to incorrect conclusions. Unit root test is carried out so that the time series data is differenced after d times to achieve stationarity and integrated at the order d (Asteriou and Hall 2015).

The findings of unit root test using ADF test and PP test are shown in Table 48.2 at level and first difference. Lag length of each series is automatically determined by the system tool using Akaike's Information Criterion (AIC). The null hypothesis is non-stationary. If the test statistic is greater than the critical values of the level of significance, the conclusion is that the variable has a unit root or a non-stationary series.

The null hypothesis of no unit root is rejected at first difference, hence the series are all stationary and integrated at the same order I(1).

Table 48.2 Unit root test

Variables	ADF	PP
At level		
LGDP	−0.309	1.322
OPV	−2.275**	−3.912*
SP	0.992	0.141
RER	−0.879	−1.221
RIR	−1.516	−1.453
At first difference		
ΔLGDP	−1.907***	−10.40*
ΔOPV	−4.729*	−20.76*
ΔSP	−5.342*	−10.18*
ΔRER	−8.373*	−8.342*
ΔRIR	−12.922*	−13.22*

Notes *denotes significant at 1% level using t-stats approach
**denotes significant at 5% level using t-stats approach
***denotes significant at 10% level using t-stats approach

48.4.4 Autoregressive Distributed Lag (ARDL) Model

In applying the ARDL approach, it is commendable to note that ARDL model has several advantages in comparison with other cointegration methods (Belloumi 2014). First, it does not need all variables to be integrated at the same order. As such, it could be applied to a mixture of stationary and non-stationary variables to get the estimated values of different parameters. Second, ARDL approach is more efficient to be used in a small and finite data sample and third, the long-run estimates are unbiased.

From the testing, the model outcome is given by ARDL (4,2,4,0,2) where the numbers in parentheses represent lags for each variable. It is a co-integration technique to ascertain the long-run relationship between all variables. The long-run coefficients of the variables are given as per below. Automated AIC is again used to select the optimum number of lags in this model.

Based on the ARDL result presented in Table 48.3, there is evidence of a unique long-run equilibrium relationship between Malaysia's economic growth and stock price as well as real interest rate. As for oil price volatility and real exchange rate, there is no any long-run relationship found. This situation would mean that causality examination would only be valid on stock prices and real interest rate, and there must exist Granger causality at least in one direction, whilst Granger causality would not bind for oil price volatility and real exchange rate (Ozturk and Acaravci 2011). More specifically in the long run, one unit increase in stock price would merely reduce Malaysia's real GDP by 0.02% and a one-unit increase in real interest rate would decrease Malaysia's real GDP by 2.02%. Despite that the nation relies heavily on its petroleum product, it shows that in the long term, Malaysia needs to overcome its dependency on these natural resources perhaps by diversifying the portfolio towards other types of energy as well as other income sources. This finding supports that Malaysia's growth in the long-run would not be vital upon crude oil price volatility and in fact, its economic growth strategy is therefore forward-looking and effective. It may also be argued that diversion from petroleum resources to other resources may improve overall productivity of Malaysia.

As for the more speculative variables which are stock price and real interest rate, it is not surprising that a long-run relationship exists since as a rapidly developing nation, other countries may find Malaysia as an attractive investment hub with huge

Table 48.3 ARDL test

Variables	Long run coefficient	t-stats [prob]
Dependent variable is LGDP		
ΔOPV_{t-2}	−0.174	−1.554 [0.1244]
ΔSP_{t-4}	0.0002	−2.825 [0.0060]*
RER_t	0.0019	1.335 [0.1860]
ΔRIR_{t-2}	−0.0202	−2.082 [0.0407]**

Notes *denotes significant at 1% level using prob. approach
**denotes significant at 5% level using prob. approach

profits potential to be explored, supported by positive looking stock market and interest rate management. In tandem with economic theory, lower real interest rate would indicate lower cost of borrowing. It, therefore, encourages investment spending that would boost Malaysia's economy further.

48.4.5 Bounds F-Testing

The Bounds F-testing using ARDL model is based on a technique outlined by Pesaran et al. (2001). The null hypothesis of no level relationship despite the variables are I(0) or I(1) would be evaluated using the critical value given. Rather than expected, the result suggests that there is compelling evidence of co-integration relationship between Malaysia's economic growth and the selected variables in this study which are oil price volatility, stock price, real exchange rate and real interest rate. The result is as follows in Table 48.4. Thus, it could be concluded that there is a relationship between Malaysia's economic growth and oil price volatility, stock price, real exchange rate and real interest rate.

48.4.6 Johansen-Julius Co-integration Test

Johansen-Julius co-integration method is carried out in this study for the purpose to confirm ARDL estimation earlier. Provided that all variables are stationary at I(1) as evidenced by ADF and PP unit root test method, this co-integration test is applied to learn if two or more time series variables have a long run or equilibrium relationship (Pillay 2013). By using 5% significant level, the test results indicate that the null hypothesis of no co-integrating variables is rejected at rank equals one which implies that there is indeed co-integration occurs in the model. The result is as per Table 48.5.

48.4.7 Granger Causality Test

To proceed with dynamic short-run causality relationships among all variables after having analysed the long-run relationship, the study employs Granger causality test.

Table 48.4 Bounds F-testing

Function of variables	F-stats ($k = 4$)	Decision
F(LGDP/OPV, SP, RER, RIR)	3.14*	Reject

Note *denotes significant at 10% level using t-stats approach at upper bound I(1)

Table 48.5 Johansen-Julius co-integration test

Hypothesised	Trace statistics	5% critical value
None*	79.85	69.82
At most 1	42.98	47.86
At most 2	18.71	29.80
At most 3	8.82	15.50
At most 4	3.21	3.84

Notes Trace test indicates 1 co-integrating equation at 5% level
*denotes rejection of the hypothesis at 5% level

Table 48.6 Granger causality test

Null hypothesis	F-stats	Prob.	Decision
OPV does not Granger Cause LGDP	1.204	0.315	Do not reject
LGDP does not Granger Cause OPV	1.10475	0.3356	Do not reject
SP does not Granger Cause LGDP	2.048	0.095*	Reject
LGDP does not Granger Cause SP	2.079	0.091*	Reject
RER does not Granger Cause LGDP	1.476	0.217	Do not reject
LGDP does not Granger Cause RER	2.186	0.078*	Reject
RIR does not Granger Cause LGDP	1.586	0.185	Do not reject
LGDP does not Granger Cause RIR	8.842	0.000005*	Reject

Note *denotes significant at 10% level or lower

The reason is that causal analysis is different from regression analysis in such a way that any regression model would lend itself for causality test. It suggests that regression result would portray consequences or effects whilst causality test results would give the idea of causes before a consequence happens (Kmenta 2010). In this spirit, Table 48.6 displays the Granger causality test result.

As uttered in ARDL analysis earlier, it is apparent that there is a causal relationship between two (2) variables found significant which are stock price and real interest rate. Even though real exchange rate tends to provide a similar view, it is considered invalid. Further explanation of the affected variables is in the subsequent sub-sections.

48.4.7.1 Bi-direction Causality Between Real GDP and Stock Price

The outcome suggests that causality relationship between Malaysia's economic growth and stock price is bi-directionally, indicating that there is a strong long run and Granger causality relationships between these two variables. For instance, stock price may play a vital role to cause any change towards the country's growth and it is therefore rather important to keep it stable.

48.4.7.2 Uni-direction Causality Between Real GDP and Real Interest Rate

In addition, causality relationship between Malaysia's economic growth and real interest rate is uni-directionally. It means that in the short run, a change in real GDP may alter real interest rate outlook depending on the degree of change and whether it is positive or negative.

48.5 Conclusion

The study has examined the impacts of oil price volatility, stock price, real exchange rate and real interest rate towards Malaysia's economic growth supplemented by a long-run relationship overview. Several tests had been carried out which are OLS estimation of the model, unit root test using ADF and PP, ARDL model and Bounds F-testing, Johansen-Julius co-integration test and Granger causality test.

All variables displayed the predicted signs and they are significant at 10% level or lower. Stock price and real interest rates are found to play a crucial role to contribute towards Malaysia's economic growth in the long term. Nonetheless, oil price volatility together with real exchange rate, would indicatively seem stable and also act as the substance for Malaysia's economic growth in the short run.

The negative relationship between oil price volatility and economic growth in Malaysia is a helpful sign that oil shocks are a mere short term and would not deprive the country's ambition towards a modern economy and society.

The positive relationship between stock price and Malaysia's economic growth is somewhat more than expected as generally, stock market would be an instance indicator of the economic condition of a country. This positive stance simply shows that firms are profitable and therefore making their shares more attractive as a result of growing dividends.

A negative relationship was detected for both relationships of Malaysia's economic growth with either real exchange rate or real interest rate. In other words, either an appreciation of Malaysian Ringgit or an increase in real interest rates would slow down economic growth. To some extent, this would not be of much impact as these two variables are common players in shaping every country's growth. Therefore, there are normally comprehensive policy measures in place to cushion the undesirable effect before it becomes inferior.

Nonetheless, the findings are limited to the sample period studied in this research as well as the choices of the variables as the determinants of Malaysia's economic growth.

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