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Impact of Government Expenditure, Exchange Rate and Unemployment Rate on Economic Growth of Malaysia

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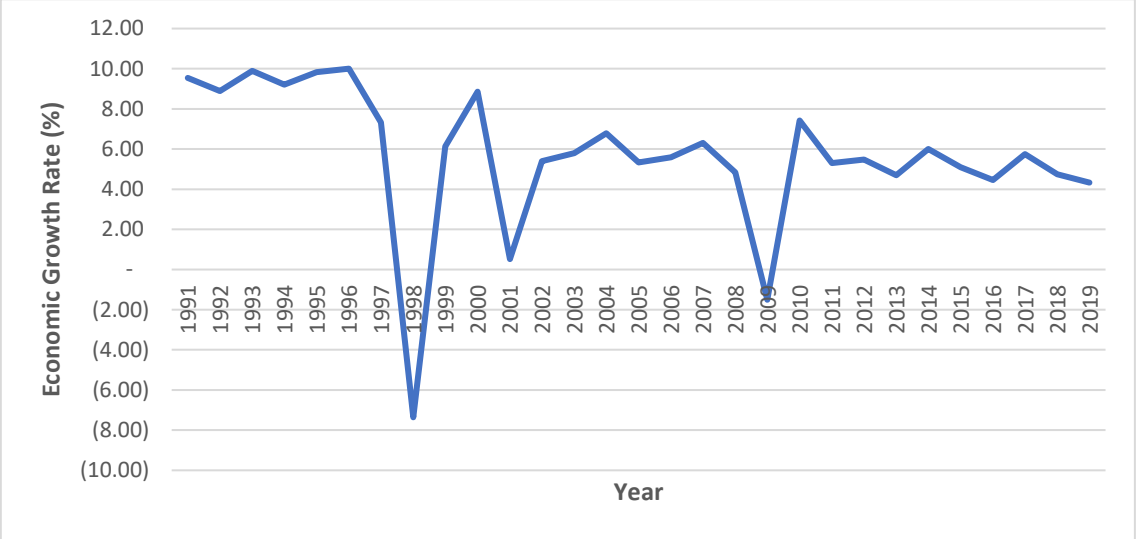
Abstract
The objective of the study is to investigate the association between government expenditure, exchange rate and unemployment rate on economic growth of Malaysia from 1988 to 2017. All variables in the model are cointegrated with two cointegrating vectors and implies that long-run relationship exist. Granger Causality based on Vector Error Correction Model (VECM) revealed an unidirectional short run causality from government expenditure to economic growth, economic growth to unemployment, unemployment to exchange rate and unemployment to government expenditure. Policies such as fiscal policy and exchange rate policy need to be implemented by policy makers in Malaysia to ensure empowering economic growth.

Keywords: Economic growth, exchange rate, government expenditure, Malaysia, unemployment rate

Introduction

Major change in worldwide financial structure matters where globalization, advancement, government strategies of countries will have significant global impact. According to World Bank (2017), reports by Malaysia Economic Monitor, Malaysia's growth accelerated to 2017, development conjecture of 5.8%, which is the nation's most astounding yearly development rate from 2014 then relied upon to stay powerful at 5.2% in 2018. However, accelerated growth is affected by increased domestic demand, enhanced labour market circumstances, wage advancement, and enhanced external demand for made goods and product export in Malaysia. The use of capital expenditures has further expanded due to an increase in private and public investment. According to Abas (2017), reports by New Straits Times, the third quarter of 2017, Malaysian economic development is the fastest in the Asia region. Malaysia leads Indonesia, Taiwan, Singapore and so on. A nation's economy grows at quicker rate during third quarter of 2017 (6.2%) in contrast with 4.3% in similar period in 2016. Domestic demand continues to grow, external sector improves, service sectors economic growth, manufacturing sectors and agriculture sectors.



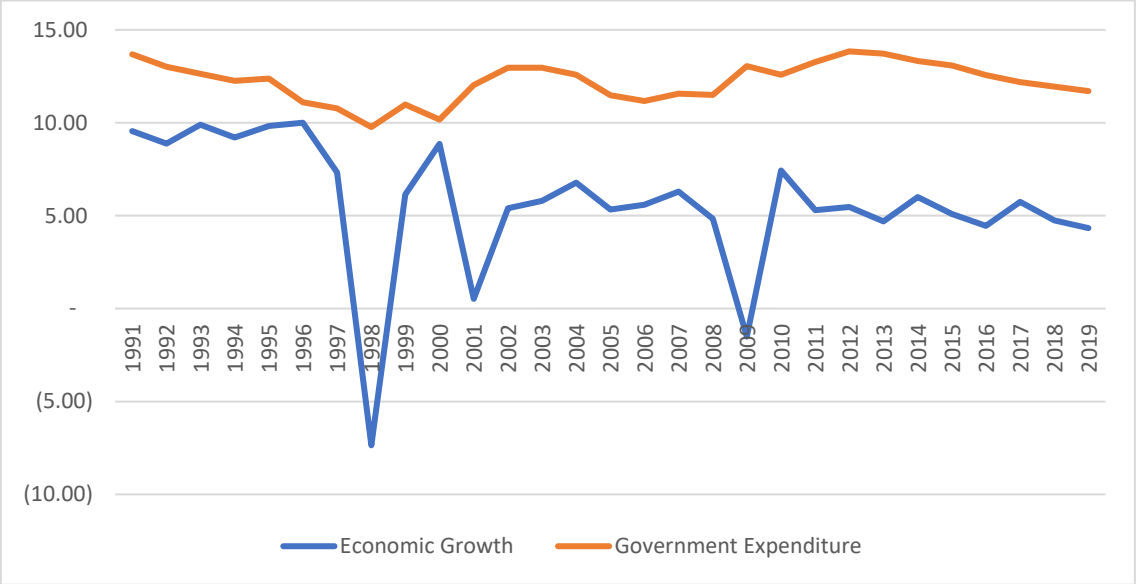
(Sources: World Bank data 2020)

Figure 1: Economic Growth of Malaysia from 1988 to 2019

Figure 1 shows the economic growth of Malaysia from year 1988 to 2019. In year 1998, the economic growth rate decreased sharply from 7.31% in 1997 to -7.34% in 1998. This is because of the regional financial crisis on the Malaysian economy was felt in 1998. However, the economic growth rate bounced back from -7.34% in 1998 to 8.86% in 2000. This is due to the real output increased strongly by 10%, and the second half of the year maintained a strong growth of 7.2%. Exports of manufactured goods also rose by 19.1% in the first half of the year due to increased export (12.9%) and prices (5.5%). This export strength is due to the continued strong demand for electronic and electrical products and the substantial expansion of oil-based exports such as petroleum and chemical products. However, by the end of 2000, the global economy began to slow down. This has an adverse effect on exports, especially semiconductors.

However, Malaysia's economic growth decreased again from 8.86% in 2000 to 0.52% in 2001. The economy stayed versatile during 2001 because of face challenges from the outside condition. Slowdown of the global economic will affect export performance, which will also affect the imports of goods and services for fare creation. In the year 2007, Malaysia had the highest economic growth rate, which is 9.43%. The robust development accomplished reflects the advantages of the progressively various financial base, which enhances the capacity of economy to withstand external conditions. In an environment of declining external demand, domestic demand, particularly in the private sector, prompted economic growth in 2007. Domestic market developed unequivocally to 10.5% during 2007 compared to 2006 by 7%, mainly due to the booming private consumption and investment. Buyer expenditure increase is also maintained by stable growth in discretionary income, firm work advertises and positive funding circumstances. Private investment invested activity remains powerful with larger capital expenditures in industrial, serving and structure sectors. Simultaneously, the public sector continues to support growth after implementing plans and actions to strengthen framework and community area conveyance systems. In the year 2009, the Malaysia economy shrank by -2.53%, a worldwide economy that encountered the worst depression in present day history. The domestic economy experienced this circumstance in the first quarter of the worldwide financial recession, a full-scale influence, down 6.2%, making the first year of real GDP since the third quarter withdrawal in the fourth quarter in 2001. Global demand and the

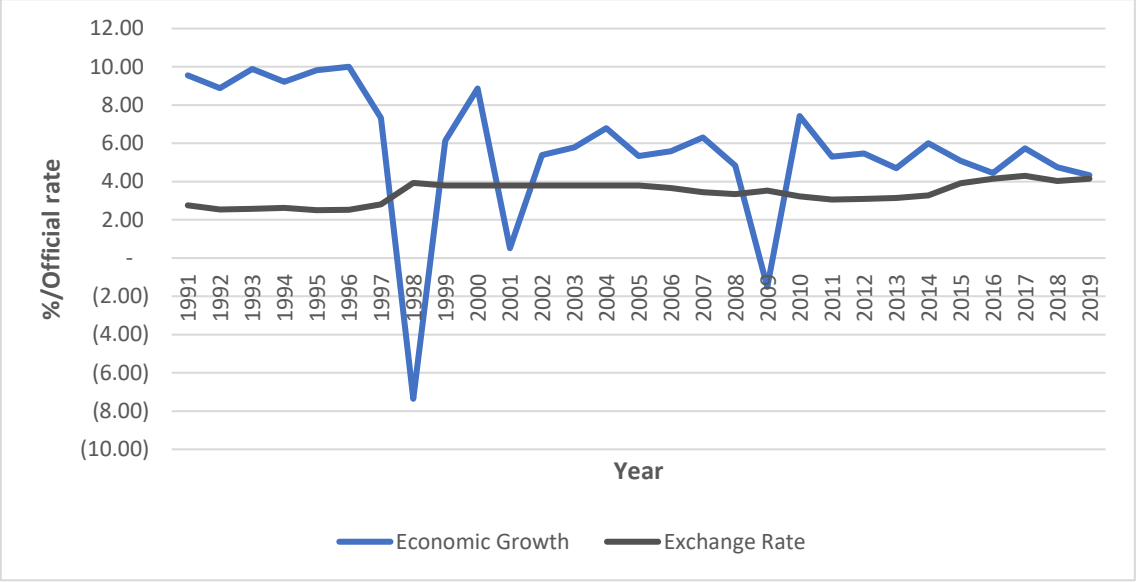
fall of global exchange have prompted a twofold digit to decrease Malaysia's export and mechanical production. The specific economy is exceptionally turned on. External interest deterioration affects engagement, salary and business, and consumer confidence, leading to a decrease in private consumption and private investment activities this year during the first quarter. The development quarter of the period was likewise influenced by the decline in large inventories, especially in the manufacturing and commodity sectors. The economic growth in 2018 and 2019 portrayed growth at average 4.74% and 4.33%, respectively. In a nutshell, the trend of economic growth of Malaysia from year 1988 to year 2019 is decreasing.



(Sources: World Bank data 2020)

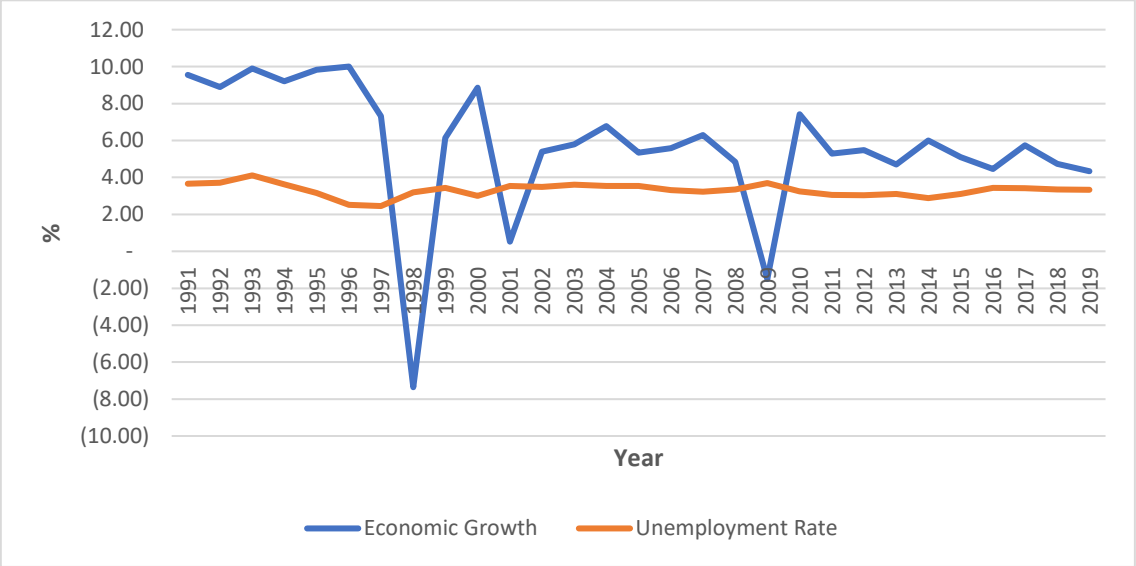
Figure 2: Government Expenditure and Economic Growth of Malaysia

Figure 2 shows the association between government expenditure and economic growth of Malaysia from 1988 to 2019. The trend of government expenditure is increasing, while the economic growth is decreasing. Academically, the economic growth will increase when the government expenditure is expenditure more. This is due to spending more on infrastructure, health, and others can create job opportunities to unemployed and lead to increase the GDP and the unemployment rate will decrease. Such as above, government expenditure in 2012 increase from 13.20% to 13.80%, the economic growth rate also increases from 5.29% to 5.47%. It can prove that when government expenditure is in above, the economic growth rate also will be in above. The government expenditure stood at approximately 11.6% in 2019.
Figure 3 shows the trend of Malaysia's exchange rate and economic growth from year 1988 to 2019. The exchange rate trend has slightly changed while the trend of economic growth is drastically decreased and increased. Based on the data above, there is not much impact exchange rate on economic growth from year 1988 to 2019. In theoretically, the exchange rate supposed to has negative association on the economic growth rate. The exchange rate had increased from 2.81% in year 1997 to 3.92% in year 1998. The Malaysian ringgit fell to 4.04 MYR per USD and bringing the exchange rate to its most reduced dimension since Asian money related emergency in late 1990s. Ringgit suffers from several factors, both domestically and overseas (Hill, 2015). In 2019, the exchange rate was 4.14.



(Sources: World Bank data 2020)

Figure 3: Exchange Rate and Economic Growth of Malaysia



(Sources: World Bank data 2020)

Figure 4: Unemployment Rate and Economic Growth of Malaysia

Figure 4 shows the relationship between the unemployment rate and economic growth of Malaysia from 1991 to 2019. Based on Figure 4, the trend of the unemployment rate has slightly changed while the pattern of economic growth is drastically fluctuating. The economic growth rate had dropped from 7.32% in year 1997 to -7.34% in year 1998. The unemployment rate had increased from 2.45% in year 1997 to 3.20% in year 1998. In year 2009, Malaysia had a highest unemployment rate which is 3.7% where during that year the global economy (Europe – the largest economy country) had fall into recession and it directly affects the Malaysia's economic. Recession happened encouraged a lot of firms especially small and medium firms

had closed their business. So, it leads to cyclical unemployment, which means the labor has to quit their job and become unemployed for the time being. The Malaysian economy in year 2010 rose sharply from -1.5% in 2009 to 7.5% while the unemployment rate declined from 3.7% in 2009 to 3.3% in 2010. Growth was determined essentially by strong domestic demand, and principally by private segment movement. Thus, economic growth continuously falls from 7.5% in 2010 to 4.7% in 2013, while the unemployment rate decreases from 3.3% in 2010 to 3.0% in 2012 and increase again to 3.1% in 2013. The economy of Malaysians extended to 4.69% during 2013 determined by the powerful development of domestic demand amid a weak external condition. Domestic demand stayed strong consistently, driven by vigorous private segment movement. In addition, unemployment rate in 2014 recorded the lowest rate which is 2.9%, while the economic growth increase from 4.7% in 2013 to 6.0% during 2014. The unemployment rate stood at 3.32% in 2019. In conclusion, the association between unemployment rate and economic growth clearly represents both negative and opposite relationships.

Based on Jaiswal (2016), the relationship between government expenditure and economic growth is positive, which implies the rise of government expenditure will build economic growth (GDP). Nevertheless, Malaysia faced a financial shortfall in previous decades because the government spend too much, however, the economic growth was yet fallen behind other nations' s economy. On the other hand, some researchers study that the relationship between these two variables is negative and does not necessarily positively impact. It can be explained in the year of 2001 indicate the relationship between government expenditure is negatively. The government expenditure increases from 10.17% to 12.04%, but the economic growth is decreased from 8.86% to 0.52%. The year in 2002 shows the positive relationship: government expenditure increases from 12.04% to 12.96% and the economic growth increases from 0.52% to 5.39%. Exchange rate have negative toward economic growth. The ringgit had depreciated for two days since 1997-98 Asian financial crisis. At the close, it fell 2.4% from the US dollar to US$3.43 to 3.43. The ringgit fell for four consecutive weeks on 12 June 2015, which is the longest loss period so far. The ringgit has become the worst performing currency in Asia. Depreciation of the currency rate may foster the export to the other country. From another point of view, it will reduce imports to the domestic country since it required foreign investors to pay more for their capital cost. Thus, an increase of export will lead to an increasing of GDP. However, Malaysia had experienced currency depreciation in the past decades, but Malaysia's economic growth is lagged behind other economies. Finally, the relationship between unemployment rate and economic growth is negative because when the unemployment rate is increased, the economic growth rate is decreased. However, the constriction in real GDP during the 1997 Asian financial crisis has affected the labour market, leading to a slowdown in employment growth and raised in the unemployment rate. In 1998, the labor force's negative growth rate was 2.1%, and the employment rate fell by 2.8%, while the economy growth rate in 1996 and 1997 was 4.9% and 4.6%, respectively. The unemployment rate rose slightly in the same year at 3.1%. The number of layoffs soared to 83,865 in 1998 compared to 19,000 in 1997. As a result, unemployment will consume a ripple result on country's economy. In the long run, high unemployment drives lead to a slowdown in the country economic growth, a decline in production, and a reduction in taxes. Therefore, the objective of this research is to explore the relationship among the government expenditure, exchange rate and unemployment rate on economic growth in Malaysia.

Literature review

There are several literatures related to government expenditure, exchange rate and unemployment rate on economic growth as followed.

Government Expenditure and Economic Growth

Sinha (1998) examined relationship among GDP and government expenditure in Malaysia from 1950 to 1992. Johansen cointegration test showed existence of a long run positive relationship. Awan, Azid and Sher (2011) found out that government expenditure does not necessarily consume positively influence economic growth. Thus, economic growth very important to reflect a nation image of economy which the good and bad economy will affect the citizen of nation such as cost of living. Hasnul (2015) investigated the association between government expenditure and economic development in Malaysia from year 1970 to 2014 using OLS (Ordinary Least Squared). This study indicated that there is a negative association between government expenditure and economic growth. Hong, Khin and Alexander (2016) studied the relationship between development expenditure, investment and trade balance in relation to GDP using two-stage least squares method to examine the variables. Their findings indicated that investment and trade balance are most essential variables to decide GDP.

Exchange rate and Economic Growth

The association between the exchange rate and economic growth frequently arouse various debates amid economists. It had been unquestioned exchange rate assumes crucial job in global exchange. When the domestic exchange is facing depreciate against foreign currency, it tends to stimulate exports to other countries and reduce imports. In short, this will improve of the present record in equalization of expenses and absolutely effect on domestic GDP. This is supported by the researcher, Rodrik (2008) stated that undervaluation of the currency promoted economic growth. Minescu (2012) stated real exchange rate is vital for economy due to that its direct impacts on the prices of export. This can be explained by the theory of export-led growth and the growth of production for export; hence, the real exchange rate affected economic growth. Besides, Kogid, Asid, Lily and Loganathan (2012) studied the influences of exchange rate on Malaysia's economic growth from year 1971 to 2009. Results indicated that exchange rate affect economic growth not only in short run, yet it likewise recorded emphatically noteworthy impacts over the long haul. Furthermore, Lee and Law (2013) studied the effect of exchange receptiveness on Malaysian exchange rate. Method used in this study are ARDL test. The result shows that increment in exchange receptiveness and financing cost, it will prompt devaluation of Malaysian Ringgit. Hence, outcomes proposed that an ascent in money supply distinction made Malaysian Ringgit rise. Yet, increment in exchange balance caused the devaluation of Malaysian Ringgit.

Unemployment rate and economic growth

Mosikari (2013) studied the impact of the unemployment rate on total national output in South Africa from year 1980 to 2011. The Johansen cointegration result indicated that there is a long run relationship between the variables. Alhdiy, Johari, Nurazira and Asma (2015) studied the short- and long-term relationship between economic development and unemployment in Egypt from 2006:Q1 until 2013:Q2. Result shows no cointegrated relationship between unemployment rate and economic growth and also no long-haul relationship between the variables.

Methodology

This study will use annual data of 30 years starting from the year of 1988 until year 2017. The dependent variable is economic growth whereas explanatory variables are government expenditure, exchange rate and unemployment rate. All the variables are obtained from World Bank. The government expenditure is measured as the rate in percentage of GDP. The

exchange rate is measured on the annual average of the year and the unemployment rate is measured as the rate in the percentage of total labor force.

The most common used theories are Keynesian macroeconomics theory and Monetary model of exchange rate. The Keynesian theory explains the amount of spending and the impact on inflation and production in the economy. This theory states that aggregate demand will be influenced by government and the private sector. There are two policies that are often used by government to improve economy of country which is fiscal policy and monetary policy. However, some of researchers argue that fiscal policy and monetary policy do not affect to the economic growth. The other theory is the Monetary models of exchange rate. This model explains exchange rate moves to equilibrate to progressions in interest rate, income and money. Two sorts of monetary such as flexible-price monetary model created by Frenkel (1976) and Bilson (1978) and sticky-price monetary model developed by Dornbusch (1976).

The empirical model as below:

$$EG_t = \beta_0 + \beta_1 GE_t + \beta_2 ER_t + \beta_3 UNEMP_t + \varepsilon_t \quad (1)$$

Equation (1) shows the relationship between government expenditure, exchange rate, unemployment rate and economic growth. Subscripts *t* for time, ε_t is error term at time. EG_t is the gross domestic product growth rate, $GEXP_t$ is the government expenditure, EXR_t is the exchange rate and $UNEMP_t$ is the unemployment rate.

Unit Root Test

ADF Unit Root Test (Dickey & Fuller, 1981) is widely used to verify stationarity of time series variables. The deterministic terms like constant or constant and trend should be considered to the analysis. The null hypothesis of non-stationary will be rejected if *p*-value of ADF test statistics is less than 0.05 significant level. ADF model tests unit root as follow:

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \Sigma_{j=1}^{k} \beta_i \Delta Y_{t-j} + \varepsilon_t \quad (2)$$

where,

ε_t = white noise

ΔY_t = first difference of y_t, i.e. $Y_t - Y_{t-1}$

Other than that, Philips-Perron (1988) test also suitable in this study because it also tests for the presence of unit root and expressed as below:

$$X_t = \mu + \beta X_{t-1} + \mu_t \quad (3)$$

where t=1, 2, 3, …T, X_t represents time series, and μ_t is the innovation term.

The null hypothesis for both ADF and PP unit root test is the presence of unit root or it is non-stationary against the alternative of stationary.

$$H_0 = \text{Unit root exists}$$
$$H_1 = \text{Unit root does not exist}$$

Besides, in KPSS test, null hypothesis is stationary and alternative hypothesis is non-stationary. KPSS test equation is as following:

$$yt = xt{-}1 + ut + et \quad (4)$$

Johansen and Juselius Cointegration Test (JJ Test)

Generally, Johansen cointegration test are utilized to distinguish the cointegration association between non-stationary time series. There are two measurements, which are Trace test and

Maximum eigenvalue test. Rejection of null hypothesis of number of cointegrating vectors implies existence of long run equilibrium.

$$\lambda_{trace} = -T \sum_{i=r+1}^{n} \quad ln\,(1 - \hat{\lambda}_i) \quad (5)$$

where *T* represents the number of valid observations, $\hat{\lambda}_i$ is the i^{th} largest estimated eigenvalue. The equation for maximum eigenvalue test is expressed as below:

$$\lambda_{max} = -T\ ln\,(1 - \hat{\lambda}_{r-1}) \quad (6)$$

where T represents the number of valid observations, $\hat{\lambda}_i$ is the i^{th} largest estimated at (r-1).

Granger Causality Test

Granger causality test is adopted to examine the causality relationship among the variables. There are three possibilities while testing the direction, which are unidirectional, bidirectional and independent that described as no direction of causality.

$$EG_t = \beta_0 + \sum_{i=1}^{q} \quad \beta_{1i} EG_{t-i} + \sum_{i=1}^{q} \quad \beta_{2i} GEXP_{t-i} + \varepsilon_{1t} \quad (7)$$

$$GEXP_t = \beta_0 + \sum_{i=1}^{q} \quad \beta_{1i} GEXP_{t-i} + \sum_{i=1}^{q} \quad \beta_{2i} EG_{t-i} + \varepsilon_{1t} \quad (8)$$

where, EG_t and $GEXP_t$ represent GDP growth rate and government expenditure respectively. ε_{1t} represent the error term or uncorrelated with the independent variable. Rejection rule for the granger causality is

$$H_0 = EG_t\ does\ not\ Granger\ cause\ GEXP_t$$

$$H_1 = EG_t\ does\ Granger\ cause\ GEXP_t$$

Failing to reject $H_0 = EG_t\ does\ not\ granger\ cause\ GEXP_t$ implies non-causality direction between the variables. Rejection of null hypothesis denotes emerge of directional causality between economic growth and government expenditure.

$$EG_t = \beta_0 + \sum_{i=1}^{q} \quad \beta_{1i} EG_{t-i} - \sum_{i=1}^{q} \quad \beta_{2i} EXR_{t-i} + \varepsilon_{1t} \quad (9)$$

$$EXR_t = \beta_0 + \sum_{i=1}^{q} \quad \beta_{1i} EXR_{t-i} - \sum_{i=1}^{q} \quad \beta_{2i} EG_{t-i} + \varepsilon_{1t} \quad (10)$$

where, EG_t and EXR_t represent GDP growth rate and exchange rate respectively. ε_{1t} represent the error term or uncorrelated with the independent variable. Rejection rule for the granger causality is

$$H_0 = EG_t\ does\ not\ Granger\ EXR_t$$

$$H_1 = \ EG_t does\ not\ Granger\ EXR_t$$

Failing to reject $H_0 = EG_t\ does\ not\ Granger\ EXR_t$ implies non-causality direction between the variables. Reject the null hypothesis denotes emerge of causality between economic growth and exchange rate.

$$EG_t = \beta_0 + \sum_{i=1}^{q} \beta_{1i} EG_{t-i} - \sum_{i=1}^{q} \beta_{2i} UNEMP_{t-i} + \varepsilon_{1t} \quad (11)$$

$$UNEMP_t = \beta_0 + \sum_{i=1}^{q} \beta_{1i} UNEMP_{t-i} - \sum_{i=1}^{q} \beta_{2i} EG_{t-i} + \varepsilon_{1t} \quad (12)$$

where, EG_t and $UNEMP_t$ represent GDP growth rate and unemployment rate, respectively. ε_{1t} represent the error term or uncorrelated with the independent variable. Rejection rule for the granger causality is

$$H_0 = EG_t \; does \; not \; Granger \; UNEMP_t$$

$$H_1 = EG_t does \; not \; Granger \; UNEMP_t$$

Results and discussion

Results in Table 1 indicate that all the variables are non-stationary at level but become stationary after the first differences. This implies that all the variables are integrated with the same order of integration.

Table 1: Results of ADF, PP and KPSS Unit Root Test

	Test Statistics					
	ADF*t*	ADF*x*	PP*t*	PP*x*	KPSS*t*	KPSS*x*
			Level			
LNEG	-2.623(3)	-2.916(2)	-5.401(1) **	-5.297(1) **	0.483(28) **	0.157(10) **
LGEXP	-2.927(2)	-2.975(3)	-2.163(0)	-2.134(1)	0.483(28) **	0.155(12) **
LEXR	-1.400(1)	-2.051(1)	-1.225(1)	-1.773(1)	0.476(3) **	0.153(12) **
LUNEMP	-2.570(3)	-3.110(6)	-5.207(2) **	-4.363(2) **	0.483(28) **	0.158(11) **
			First Differences			
ΔLNEG	-6.424(1) **	-6.305(1) **	-25.991(27) **	-27.458(27) **	0.298(16)	0.031(1)
ΔLGEXP	-5.642(0) **	-5.626(0) **	-5.642(0) **	-5.621(1) **	0.148(1)	0.074(2)
ΔLEXR	-4.125(0) **	-4.060(0) **	-4.114(2) **	-4.048(2) **	0.105(0)	0.109(0)
ΔLUNEMP	-4.252(1) **	-4.472(1) **	-4.683(3) **	-4.971(3) **	0.382(3)	0.133(4)

Notes: The *t* and *x* term in the model represent intercept as well as trend and intercept. While the asterisks (**) represent statistically significant at 5% level of significance. Figure in bracket [ ] are the lag lengths and Δ represent first difference.

Based on Table 2, the result of cointegration shows rejection of the null hypothesis, which is *r* is equal and less than 1 at 5% significance level since the statistic values are larger than 95% critical value. Thus, all variables in the model are cointegrated with two cointegrating vectors and imply long-run relationships.

Table 2: Results of Johansen and Juselius Cointegration Test

Null	**Alternative**	**Trace**		**Max-Eigen Value**	
		Unadjusted	**95% CV**	**Unadjusted**	**95% CV**
			k =1	*r* =1	
r =0	*r* =1	78.698 **	47.856	37.834 **	27.584
r ≤ 1	*r* =2	40.864 **	29.797	26.109 **	21.132
r ≤ 2	*r* =3	14.756	15.495	12.669	14.264
r ≤ 3	*r* =4	2.086	3.841	2.086	3.841

Notes: The asterisks (*) denote statistically significant at 5% level of significance. The *k* is the lag length and *r* is the cointegrating vector(s).

The equation below shows there is an existence of long-run relationships between LNEG and LGEXP as well as LNEG and LUNEMP. The relationship between LGDPGR and LGEXP increases 1% in LGEXP will increase by 17.65% in LNEG. The positive impact of government expenditure on growth is consistent with studies of Hong et al. (2016), Hasnul (2015) and Sinha (1998). For the relationship between LNEG and LUNEMP, an increase 1% in LUNEMP will increase 19.91% in LNEG. This result is supported by studies of Kogid et al. (2012) and Minescu (2012). While LNEG has a negative relationship with LEXR, increasing 1% in LEXR will decrease 18.15% in LNEG. This is consistent with the study by Mosikari (2013).

$$LNEG = -43.9373 + 17.6508*LGEXP - 18.1512*LEXR + 19.9146*LUNEMP$$

Table 3: Results of Normalized Equation Test

LNEG	C	LGEXP	LEXR	LUNEMP
1.0000	-43.9373	17.6508	-18.1512	19.9146
		(-3.5441)	(4.8426)	(-4.6379)

Notes: (**) denotes statistically significant at 5% level. Numbers in brackets are *t*-statistics

Table 4 shows the result of causality test with the *ECT* based on VECM. LNEG equation is the only one in the system where the *t*-statistics of the ECT is statistically significant. The *ECT* coefficient indicates the responsiveness of the short adjustment to the long-run equilibrium. The adjustment is about 21.06 percent annually, 57 months or 4.75 years to respond to the long-run equilibrium due to temporary shocks. Full adjustment (100%) = 12 months/21.06% × 100% = 57 months

Table 4: Results of Vector Error Correction Model on Granger Causality Test

Dependent Variables	**Δ LNEG**	**ΔLGEXP**	**ΔLEXR**	**ΔLUNEMP**	**ECT**	
		χ^2 Statistics			**Coefficient**	***t*-ratio**
Δ LNEG	-	6.976	2.070	2.575	**-0.211**	**-2.209**
		(0.031) **	(0.355)	(0.276)		
ΔLGEXP	0.558	-	0.337	12.254	0.009	1.761
	(0.757)		(0.845)	(0.002) **		
ΔLEXR	1.179	3.082	-	8.578	0.010	1.557
	(0.555)	(0.214)		(0.014) **		
ΔLUNEMP	8.006	1.169	2.003	-	0.028	7.026
	(0.018) **	(0.557)	(0.367)			

Notes: Δ refers to first difference operator. Asterisks (**) indicate statistically significant at 5 percent level. Values in parentheses indicate the probability value.

Diagram below shows the causality association between LNEG, LGEXP, LEXR and LUNEMP. There is no bidirectional causality that runs among the variables. However, there is a unidirectional causality that run from LNEG to LUNEMP, LUNEMP to LEXR and LUNEMP to LGEXP in short-run. There is also a unidirectional causality from LGEXP to LNEG which is consistent with Jiranyakul (2007) result. Thus, there is an indirect causality that runs from LGEXP to LEXR through LNEG to LUNEMP, which is consistent with the result of Minescu (2012).

In order to further examine the dynamic aspect of the relationship between government expenditure, exchange rate and unemployment, this study employs Variance Decomposition and Impulse Response. The purpose of the Variance Decomposition is to identify which variable is the most exogenous in the system in the long term. Meanwhile, Impulse Response aims to examine the decay period of the effect of short-run shock. Based on Table 5, LUNEMP is the most interactive variable in the system where 97 percent of the error variance can be

described by LNEG (36 percent), LGEXP (24 percent) and LEXR (37 percent) at the end of 50 years horizon. Furthermore, LUNEMP is the most endogenous variable and LNEG is the most exogenous variable in the system.

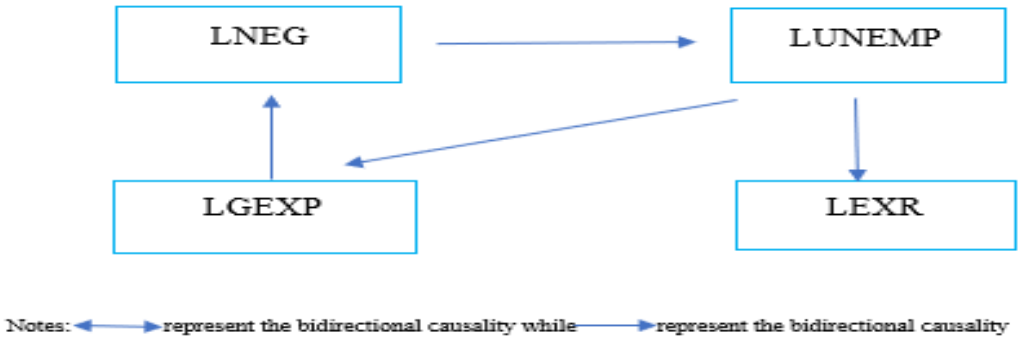


Figure 6: Summary of Short-Run Causal Linkage

Table 5: Results of Variance Decomposition

Percentage of variations in	Horizon (Years)	Due to innovation in:				
		ΔLNEG	ΔLGEXP	ΔLEXR	ΔLUNEMP	ΔCU
Years relative variance in: ΔLNEG						
	1	**100.000**	0.000	0.000	0.000	0.000
	4	**68.028**	9.108	12.736	10.129	31.972
	12	**66.946**	10.281	15.422	7.351	33.054
	20	**67.681**	10.346	16.097	5.876	32.319
	30	**68.189**	10.400	16.482	4.929	31.811
	40	**68.484**	10.433	16.706	4.377	31.516
	50	**68.678**	10.455	16.852	4.015	31.322
Years relative variance in: ΔLGEXP						
	1	33.248	**66.752**	0.000	0.000	33.248
	4	28.645	**63.948**	1.410	5.997	36.052
	12	21.077	**64.840**	5.268	8.814	35.160
	20	18.887	**64.964**	6.404	9.745	35.036
	30	17.473	**65.035**	7.146	10.345	34.965
	40	16.673	**65.078**	7.564	10.685	34.922
	50	16.158	**65.106**	7.833	10.904	34.894
Years relative variance in: ΔLEXR						
	1	51.101	1.041	**47.858**	0.000	52.142
	4	44.519	3.943	**50.132**	1.406	49.868
	12	47.741	7.385	**44.387**	0.487	55.613
	20	48.565	7.417	**43.686**	0.332	56.314
	30	48.991	7.465	**43.295**	0.249	56.705
	40	49.209	7.488	**43.096**	0.207	56.904
	50	49.341	7.502	**42.976**	0.182	57.024
Years relative variance in: ΔLUNEMP						
	1	5.235	10.425	0.049	**84.291**	15.709
	4	26.849	6.388	50.569	**16.194**	83.806
	12	34.496	20.331	40.965	**4.209**	95.791
	20	35.449	22.718	38.437	**3.396**	96.604
	30	35.866	23.735	37.388	**3.010**	96.990
	40	36.063	24.216	36.891	**2.830**	97.170
	50	36.177	24.496	36.602	**2.725**	97.275

Notes: The last column provides the percentage of forecast error variances of each variable explained collectively by the other variables. The column in bold represent the impact of their own shock.

The impulse response is generated to describe how the variable tends to react over the time due to exogenous impulse. Generally, all variables become stable in long-run and start 20 years interval. Based on the graph above, when the shock is variable LUNEMP, the variable LGEXP is facing a big fluctuate at the beginning but later become stable after 20 years, the same cases when the shock is LEXR to response to LGEXP. When the shock is LUNEMP, the variable LENG decrease at the beginning until 10 years and increase again to 15 years, after that is becomes stable starting 20 years.

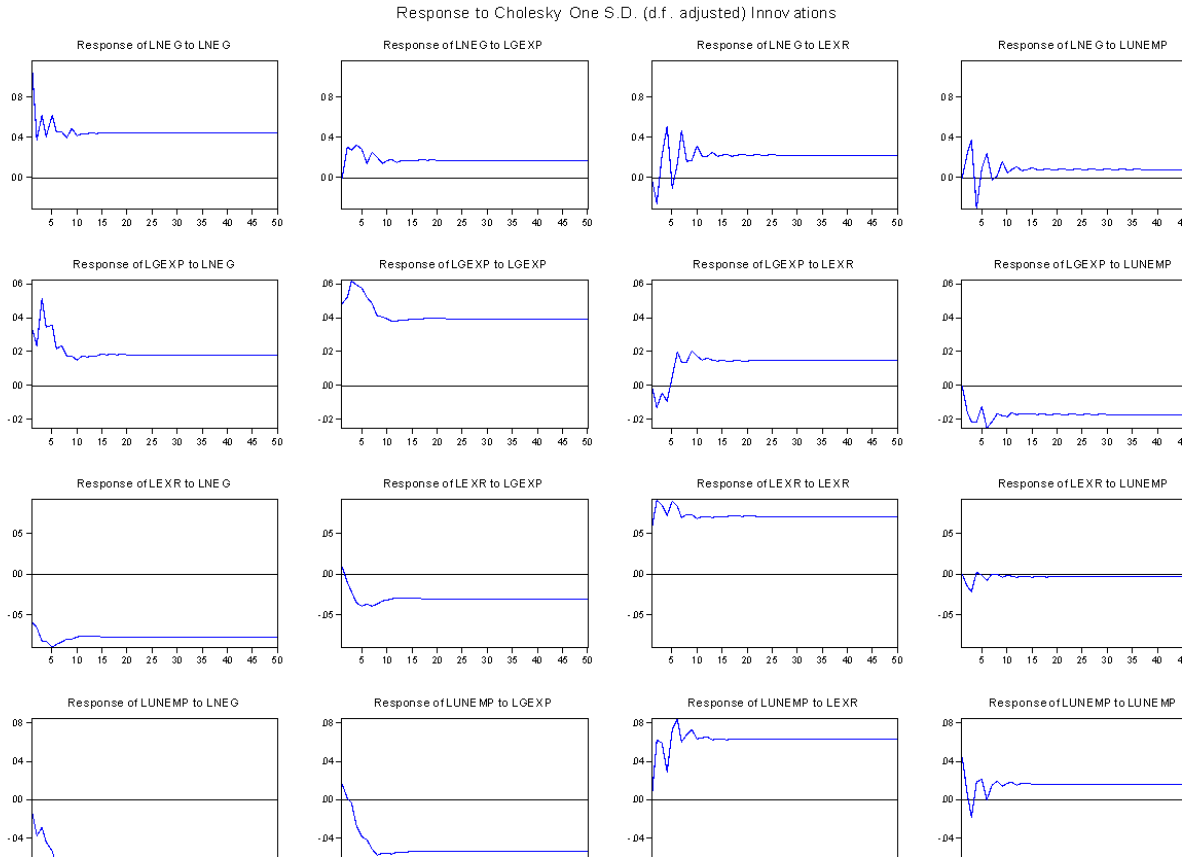


Figure 7: The results of Impulse Response Function

Conclusion

The study aims to examine the impact of government expenditure, exchange rate, and unemployment rate on Malaysia's economic growth. The outcome shows that government expenditure has a positive association with Malaysia's economic growth in the long run. In contrast, the exchange rate and unemployment rate have a significant negative and positive relationship with Malaysia's economic growth. Besides, there is unidirectional causal relationship among the variables that run from LGEXP to LNEG, LNEG to LUNEMP, LUNEMP to LEXR and LUNEMP to LGEXP. Thus, there is an indirect causality that runs from LGEXP to LEXR through LNEG to LUNEMP. Therefore, policymakers should focus on fiscal policy and exchange rate policy. Government expenditure remains an essential tool in stimulating the economic growth of Malaysia. In the meantime, ensuring manageable level of exchange rate and unemployment also critical in providing stability and conducive business environment.

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