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Real effects of government debt on sustainable economic growth in Malaysia

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Abstract. The persistent increase of government debt in Malaysia in the recent years has raised con-cerns as to whether the borrowings have spurred the economy or became a drag on econom-ic growth. The present paper investigates the real effect of government debt on sustainable economic growth in Malaysia using the Autoregressive Distributed Lag approach for the period of 1970-2015. The results show there are positive significant long- and short-run relationships between government debt and sustainable economic growth. There is also a unidirectional causality running from government debt to sustainable economic growth. The findings indicate that Malaysia's government debt is an important macroeconomic element for sustainability of economic growth in Malaysia. There is no evidence, however, to con-clude that the level of government debt had any adverse impacts on sustainable economic growth.

Keywords: government debt, sustainable economic growth, Malaysia.

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1. INTRODUCTION

Debt or borrowings, is a critical instrument for a government to fund the development of a nation. Debt is used for expenditures that will eventually generate productivity and stimu-late economy. However, literatures on public debt, such as Reinhart and Rogoff (2010), Panizza and Presbitero (2012), suggest that after a certain threshold value, public debt will result in adverse impacts on economic growth. According to Mankiw (2013), budget deficit implies that government spending surpasses its duty accumulations that can be funded by domestic and foreign sectors. Public debt comprises of both external and domestic debts. Rahman A. (2012) characterizes public debt as a situation when a government's securities holdings are insufficient to back past spending shortages. From the perspective of macroe-conomic theory, a government debt to fund expenditures should have a positive impact on economic growth, if the expenditures are utilized on productive sectors such as healthcare, education, and nutrition (Freeman, & Webber 2009).

In Malaysia, the level of government debt has increased significantly over the years (BNM, 2015). In the mid-1980s, the global financial crisis has affected Malaysian economy and consequently, the debt to GDP ratio has increased rapidly from 43% in 1980 to 101.7% in 1987. This is mainly because Malaysian government has focused on expenditures for devel-opment policies to stimulate economic growth, such as The First Industrial Master Plan (1985-1995) which was aimed at developing heavy industries mostly. Unfortunately, these industries require high costs of production, thus the government's budget consists of a large budget deficit and government debt.

On the other hand, the debt to GDP ratio peaked at approximately 100% in 1986 and 1987. This happened due to huge appreciation of the Yen after the denomination of a large portion of external debt in Yen (Twomey, 2010 as cited in Choong et al., 2010). After 1987, Malay-sian economy enjoyed high economic growth which has caused the debt to GDP ratio to decline to 32% in 1997. In addition, Malaysia ran a fiscal surplus for a short period from 1993 to1997. During the 1997 Asian financial crisis, the Ringgit depreciated but the impact on debt level is relatively small. This is because the portion of external debt was relatively low as compared to domestic debt. After the Asian financial crisis, the total government debt increased fivefold, from RM 112,119 billion to RM 539,858 billion between 1999 and 2013. Government debt increased sharply by approximately RM 45,000 billion annually from 2007 until 2015. The debt to GDP ratio had been pushed to 54.8% which is close to the debt ceiling of 55% imposed by the authorities. This significant increase in 2009 was the result of a substantial discretionary fiscal stimulus during the global financial crisis and significant reduction of oil prices. In 2015, the government debt to GDP ratio has reached 53.8% with the average of 47% from 1970 to 2015.

Despite the fact that Malaysia's public debt is viewed as moderate, it might limit the im-provement and objectives of Malaysia's economic transformation. The presence of high debt can influence economic growth and development negatively. According to Reinhart and Rogoff (2010) as well as Clements et al. (2003), instabilities of national debt service repayment will cause difficulties and thus may discourage the pursuit of economic reforms. The current economic growth refers to the real growth in GDP which is computed as the sum of the values of all final goods and services produced within a period of time at market prices. In addition, it is measured by adding a nation's personal consumption expenditure, government spending, net exports, and net capital formation. From the sustainability per-spective, computation of GDP ignores externalities, thus measuring only what is produced and discounting what is needed to generate this production. Hence, computation of GDP does not measure the sustainability of economic growth and ignores the measurement of social welfare (Zheng and Chen, 2007; Constanza et al., 2009; Vaghefi et al., 2015). It fo-cuses on all sectorial activities as the prime solution rather than the traditional GDP in order to have a more accurate measurement of the economic growth in a country (Hezri, 2011, 2014). In this context a few questions arise: Does the government borrowings spur econom-ic growth or have adverse impacts

on Malaysian economy? How do government borrowings affect sustainability of the economy in the short and long run?. Thus, the outcomes of the present study will certainly offer insights on the impact of government debt on the sustaina-bility of economic growth in Malaysia.

This paper is organized as follows: Section 2 presents the literature review. Section 3 describes the data and methodology. Section 4 discusses the findings and finally, Section 5 draws the conclusions.

2. LITERATURE REVIEW

2.1. The debt overhang theory

The term debt overhang in the corporate finance literature, demonstrates a situation in which an association's debt is too large for any profit created by new investment projects to serve the current debts. Thus, the positive rates of profitability are not able to decrease the association's supply of debt or increase the value of the firm (Myers, 1977). Krugman (1988, 1989) and Sachs (1989) propose that as sovereign governments stand to benefit from their debt, high levels of debts suggest an expansion in expected future taxation rates. Therefore, the debt overhang hypothesis expresses that there will be a bigger sum of debt than the nation's ability to pay. Indeed, the expected debt-service expenses will debilitate foreign and domestic investments. In fact, the expected rate of return from the productive investments projects will be too low to boost the economy. Hence, it scales back the eco-nomic growth (Krugman, 1988). In addition, Claessens and Diwan (1990) as well as Clem-ents et al. (2003) propose that debt overhang is a situation in which the illiquidity effect, the disincentive effect, or both effects are strong enough to discourage growth in the absence of concessions by creditors. Moreover, a state of debt overhang discourages economic devel-opment due to private investor's uncertainty. The government needs to meet the current ob-ligations that require the incorporation of an increment in money supply and causes the ex-pansion of government debt to rise and mutilation of future tax approaches.

2.2. Government Debt and Sustainable Economic Growth

According to the World Bank's Report (2015), government debt is defined as the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money de-posits, securities other than shares, and loans. It is the gross amount of government liabili-ties reduced by the amount of equity and financial derivatives held by the government.

A strand of studies has established the relationship between government debt and economic growth such as Reinhart and Rogoff (2010, 2012), Daud M. et al., (2013); Choong et al. (2010); and Abu Bakar and Hassan (2008). However, the findings are rather contradictory. Reinhart and Rogoff (2010, 2012), Chong et al. (2010) and Daud M. et al. (2013) found that external debt negatively affects Malaysia's economic growth. Meanwhile, Abu Bakar and Hassan (2008) find that external debt positively affects Malaysia's economic growth and development. In addition, Greiner (2011) indicates that the impact of government on sus-tainable economic growth is really relying upon the nearness of rigidities in the economy. The closer an economy is to wage rigidities and unemployment, government debt has no impact on the allocation of assets and may have the capacity to positively affect economic growth in the event that it uses the debt to fund productive investments.

Empirical literatures on the relationship between government debt and debt rebuilding on economic growth such as Diamond (1965) observed that government debt diminishes the accessibility of lifetime utilization of citizens as well as their savings and capital stock when there is an impact of taxes on capital

stock. However, Adam and Bevan (2005); Saint-Paul (1992) and Aizenman et al., (2007), demonstrate a negative relationship between gov-ernment debt and economic growth rate. Aschauer (2000) indicates that at whatever point the government debt is utilized to fund gainful public capital, an expansion in debt has a beneficial outcome up to a specific limit and negative above it. Smyth and Hsing (1995) show that the optimal debt proportion is at 48.9% of aggregate debt. Besides, Patillo et al. (2002) did an examination on debt to economic growth relationship by utilizing a huge in-formation set of 93 creating nations for a period of 30 years (1969-1998) and discovered that the negative effect of debt on economic growth exists just when the net present estima-tion of debt levels are over 35%-40% of GDP. Furthermore, Clements et al. (2003) using data from a panel of 55 low-wage nations information for the period of 1970-1999 also ob-served the negative effect of debt but over a lower level of between 20% and 25% of GDP.

Reinhart and Roggof (2010) in their study on sustainable economic growth at various levels of government debt, in light of new information on 44 nations for a period of 40 years (1970-2009) found that the relationship between government debt and economic growth is weak for a GDP proportion of below 90%. The issue of government debt continues to be critical with the because of the increasing trend in government expenditures. High govern-ment expenditures accelerate sustainable economic growth. As consumption surpasses the level of incomes, the size of the budget deficit will increase. The government can increase its borrowings to finance the deficit either from local or external source. Even though the financial position may improve, yet it is highly susceptible to changes in current economic condition and the level of government debt.

As indicated by Freeman and Webber (2009), Malaysia's government expenditure ought to have a positive association with the level of economic growth. The types of productive ex-penditures which can produce a positive return include expenditures on education, wellbe-ing and nourishment, as well as development. These types of expenditures have a direct ef-fect on the change of the prosperity and essential welfare of the workers. This will inevita-bly add to their efficiency and in this way, sustainable economic growth can be accom-plished. According to Teles and Cesar Mussolini (2014), if the government expenditures are directed to unproductive expenditures such as subsidies and pensions, hence resulting in a decrease in economic growth.

In short, the existing literature demonstrates that there is a considerable ambiguity back-ground about the magnitude and effectiveness of government debt on sustainable economic growth.

3. DATA AND METHODOLOGY

This study utilizes time series data for a period of 1970-2015 from the World Bank, Bank Negara Malaysia, Economic Planning Unit of Malaysia, International Monetary Fund, and the Department of Statistics Malaysia. The main focus of this study is to analyze whether government borrowings spur economic growth or have an adverse impact on the Malaysian economy. The empirical specification is formulated as follows:

$$lnSEGt = a0 + a1ln(GD)t + a2ln(GFCF)t + a3ln(LF)t + \varepsilon t \quad (1)$$

where lnSEG denotes natural log of sustainable economic growth, ln(GD) is the natural log of government debt, ln(GFCF) is the natural log of gross fixed capital formation, and ln(LF) is the natural log of labor forces. Government debt is defined as the gross amount of gov-ernment liabilities reduced by the amount of equity and financial derivatives held by the government. The subscript t is the time period and εt is a stochastic disturbance term. Meanwhile, gross fixed capital formation is defined as settled resources

aggregation, for example, arrive upgrades, hardware, apparatus development of streets and railroads as well as working of schools which are required for increasing a nation's economic productivity. Beam (2013) suggests that gross fixed capital formation brings about expanded generation over the long run which in the end causes share costs to rise, subsequently expanding productivity which at last has a positive overflow impact on a nation's economic growth. The value of α2 is expected to be positive. The labor force includes people aged 15 years old and older who meet the International Labour Organization's definition of the economically active population: all people who supply labor for the production of goods and services during a specified period. Labor forces are expected to contribute positively to economic growth (Pianta, Evangelista, & Perani, 1996).

This study utilizes the Autoregressive Distributed Lag (ARDL) co-integration tests. The routine co-integration approach at first utilized in this study depends on the ARDL model (Pesaran and Shin, 1999; Pesaran et al., 2001), which performs better to determine co-integration connections in small samples (Romilly et. al., 2001). It can be applied irrespec-tive of the regressors order of integration, I(0) or I(1). In any case, the linear ARDL co-integration method is not legitimate within the presence of I(2) factors. If government debt and sustainable economic growth are observed to be co-integrated, this implies that, despite the fact that they may incidentally drift apart from each other, over the long run they tend to come back to equilibrium. The ARDL method to deal with co-integration (Pesaran and Shin, 1999, 2001) includes evaluating the restrictive error correction (EC) rendition of the ARDL model for sustainable economic growth and its determinants. The F test is utilized for test-ing the presence of long-run relationship. At the point when long-run relationship exists, F test demonstrates which variable ought to be standardized.

The F-test has a non-standard distribution, which relies on (i) whether the factors incorpo-rated into the model are I(0) or I(1), (ii) the number of regressors and (iii) whether the mod-el contains an intercept or potentially a pattern. The test includes asymptotic critical value bonds, depending on whether the variables are I(0) or I(1) or a mixture of both. Two ar-rangements of critical values are produced which one set alludes to the I(1) series and the other for the I(0) series. Critical values for the I(1) series are alluded to as the upper bound critical values, while the critical values for I(0) series are alluded to as the lower bound crit-ical values (Pesaran et al., 2001).

If the F-test measurement surpasses their separate upper critical values, we can infer that there is proof of long-run relationship between the variables regardless of the order of inte-gration of the variables. However, if the test measurement is below the upper critical value, the invalid theory of no co-integration and it lies between the bounds, a definitive induction cannot be made without knowing the order of integration of the underlying regressors (Is-lam F., 2013). If there is confirmation of long-run relationship (co-integration) of the varia-bles, the accompanying long-run model is assessed:

$$lnSEG_t = \beta 0 + \sum_{i=1}^{n} \beta_1 \, ln(SEG)_{t-1} + \sum_{i=1}^{n} \alpha_1 ln(GD)_{t-1} + \sum_{i=1}^{n} \alpha_2 ln(GFCF)_{t-1} + \\ + \sum_{i=1}^{n} \alpha_3 ln(LF)_{t-1} + \varepsilon t \quad (2)$$

The requests of the lags in the ARDL model are chosen by either the Akaike Information Criterion (AIC) or the Schwarz Bayesian Criterion (SIC). The ARDL model details of the short-run flow that can be inferred by developing an error correction model (ECM) in light of the accompanying conditions:

$$lnSEG_t = \beta 0 + \sum_{i=1}^{n} \beta_1 \, \Delta ln(SEG)_{t-1} + \sum_{i=1}^{n} \alpha_1 \Delta ln(GD)_{t-1} + \sum_{i=1}^{n} \alpha_{2\Delta} ln(GFCF)_{t-1} + \\ + \sum_{i=1}^{n} \alpha_3 \Delta ln(LF)_{t-1} + ECMt\text{-}1 + et \quad (3)$$

where ECMt-1 is the error correction term, that is the ordinary least square residuals series from long run cointegration regression. All coefficients of short-run equation are coeffi-cients identifying with the short run dynamics of the model's meeting to balance and repre-sent the speed of adjustment.

4. FINDINGS AND DISCUSSION

4.1. Unit Root Test

The present study uses the Augmented Dicky-Fuller (ADF) (1984) and Phillips Perron (1988) methods. The results shown in Table 1 indicate that Gross Fixed Capital Formation (LGFCF) statistically significant at the 5 percent level I(0), which is integrated at both the ADF and PP tests. Another three variables consist of Capital Fixed Formation (LGFCF), Labor Force (LF) and Government Debt (LGD) are significant at 1 percent and integrated at both the ADF and PP methods and at first difference I(1).

Table 1

Unit root test

Series	LEVEL I(0)		FIRST DIFFERENCE I(1)	
	ADF	**PP**	**ADF**	**PP**
LSEG	-2.1839	-2.0998	-5.0506*	-5.0506*
LGD	-1.2363	-1.5442	-3.3263*	-3.2268*
LGFCF	-1.862**	-2.0947**	-4.3582*	-4.1763*
LLF	-0.4044	-0.5208	-6.8767*	-7.7390*

Notes: Symbol *, **, *** indicates statistical significance at 1%, 5% and 10% level. All variables are in natural logarithms.

The ARDL approach can be utilized independent of whether the factors are coordinated at I (0), I (1) or different order but no variables is incorporated at I (2) or higher request. Pe-saran et al. (1996) provided two basic bound qualities. The lower bound basic qualities ex-pect that all factors are of I(0) and upper bound basic qualities accept that all factors are of I(1). The computed F-statistic for the co-integration test is exhibited in Table 2. For Model 1 the estimation of F-statistic is 5.11349 which is higher than the lower bound critical value at the 5 percent level of significance. The estimation of the F-statistic surpasses the lower bound yet beneath the upper bound at the 5 percent significance level. The results show that there is an uncertainty of a long-run relationship between government debt and sustainable economic growth. The computed F-statistic for Model 2 is 21.13524 which is higher than the upper bound critical value at 1 percent level of significance. The estimation of the F-statistic surpasses the upper bound at the 1 percent significance level. Thus, this means there is at least a long run or short run relationship among these variables.

Table 2

Bound Test

Test F-Statistic	Value	Lag	Significance Level	Bound Critical Values	
				I(0) (Lower Bound Value)	I(1) (Upper Bound Value)
Model 1	5.113491		10%	4.04	4.78
		1	5%	4.94	5.73
Model 2	21.13524		2.5%	5.77	6.68
			1%	6.84	7.84

Notes: Computed F-statistic: 21.13524 (Model 2) and 5.113491(Model 1) (Significant at 0.01 marginal values). Critical Values are cited from Pesaran et al. (2001).

4.2. Long Run Regression Model

The long run models are developed to show the single impact of government debt and the integration impact of government debt in a set of variables.

Table 3

Long run coefficients

Independent Variables	Dependant Variables ($LSEG_t$	
	Model 1	**Model 2**
Constant	1.8616**	-9.8938
	(0.7043)	(1.8393)
LGD_t	0.5619*	0.0210
	(0.0565)	(0.0996)
$LGFCF_t$	-	0.5129*
		(0.0649)
LLF_t	-	0.6137**
		(0.2963)
R^2	0.9858	0.9921
Adjusted R^2	0.9839	0.99057

Notes:The values of standard error are in parentheses. *, **, *** Significant at 1%, 5%, and 10% level, respectively.

Table 3 provides the results from the long-run regression. Model 1 indicates that govern-ment debt is positive and significant in affecting sustainable economic growth at the 1 per-cent level of significance. The finding suggests that a one percent increase in government debt results in an increase of 0.561907 percent in economic growth. Meanwhile, Model 2 shows that government debt is not significant at the 5 percent level of significance. Howev-er, gross fixed capital formation and labor force are positive and significantly affecting sus-tainable economic growth at the 1 percent and 5 percent levels, respectively. The results are consistent with the findings from Pattilo et al. (2002); Clements et al. (2003); Smyth and Hsing (1995) as well as Reinhart and Roggof (2010).

4.3. Short run regression model

The study employs the Error Correction Model using the reduced form. Table 4 below shows the findings for the short run models. The results indicate that government debt has a positive and significant impact to economic growth for both models. Moreover, gross fixed capital formation and labor forces are positive and significantly affecting sustainable eco-nomic growth at the 5 percent level of significance. The significance of an error correction term shows the evidence of causality in at least one direction. The lagged error term (ECT) indicates a negative and significant at the 1 percent level. The result confirmed the co-integration between the variables. The values imply that the speed of adjustment for the short run is at 26.48% and 74% for Model 1 and 2, accordingly. The result indicates the rate of convergence towards long run equilibrium. Any disequilibrium between variables in the model is corrected within one year.

Table 4

Short run coefficients

Independent Variables	**Dependent Variables : (ΔLSEG)$_{t-1}$**	
	Model 1	**Model 2**
Constant	0.4929**	-7.32366*
	(0.1837)	(1.6984)
ΔLGD_{t-1}	0.6586*	0.7968*
	(0.3428)	(0.2652)
$\Delta LGFCF_{t-1}$	-	0.3797*
		(0.0741)
ΔLLF_{t-1}	-	0.4543**
		(0.2239)
ECM_{t-1}	-0.2648*	-0.7402*
	(0.0949)	(0.1153)
R^2	0.3742	0.6509
Adjusted R^2	0.2918	0.5831

Notes: The values of standard error are in parentheses.*, **, *** Significant at 1%, 5%, and 10% level, respectively.

4.4. VECM Granger Causality Approach

Causal link is examined by applying the Granger procedures within the VECM framework. The existence of cointegration implies the existence of causal link in at least one direction.

Table 5 suggests that in the short run there is a significant unidirectional causality from government debt and labor force to sustainable economic growth. The findings reveal that government debt and labor force are important elements to stimulate sustainable economic growth. The level of government debt does not have an adverse impact on economic growth. This is also supported by Pattilo et al. (2002); Clements et al. (2003); Smyth and Hsing (1995); as well as Reinhart and Roggof (2010).

Table 5

The VECM Granger Causality

DEPENDENT VARIABLES	**INDEPENDENT VARIABLES** X^2**-Statistics of lagged 1st differenced term (p-value)**			
	$\Delta(\ln SEG)_t$	**$\Delta(\ln GD)_t$**	**$\Delta(\ln GFCF)_t$**	**$\Delta(\ln LF)_t$**
$\Delta(\ln SEG)_t$	-	5.48376* (0.0080)	0.8589 (0.431)	3.947** (0.0275)
$\Delta(\ln GD)_t$	0.8284 (0.445)	-	0.0384 (0.962)	2.535* (0.0922)
$\Delta(\ln GFCF)_t$	2.3308 (0.110)	5.9301* (0.0056)	-	3.873** (0.0292)
$\Delta(\ln LF)_t$	0.7226 (0.491)	1.41490 (0.2551)	2.0758 (0.139)	-

Notes: *, ** and *** denotes significant at 1%, 5% and 10% significance level, respectively. The figures in the parentheses denote as t-statistics.

4.5. Statistical Output for Sensitivity Test

Table 6 presents the statistical output for sensitivity tests. The models passed the long and the short run specification with respect to serial correlation, normality, heteroscedasticity, and specification tests.

Table 6

Sensitivity Test

Model	**Ramsey Test**	**Serial correlation LM Test**	**Heteroscedasticity Test**		**Normality Test**		
			Breusch-Pagan-Godfrey	White Test	Skewness	Kurtosis	Jarque Bera
1	0.217731 (0.6435)	0.7784 (0.4017)	1.0320 (0.3849)	1.6066 (0.1686)	-0.2704	2.4569	1.0771 (0.5835)
2	1.207533 (0.2793)	1.3635 (0.1952)	0.9193 (0.4637)	0.5646 (0.7426)	0.1028	2.6049	0.3636 (0.8337)

Notes: The P-values are given in the parentheses. Tests show that the errors are normal and homoscedastic.

The diagrams in Figure 1 show the short run models stability investigated by the CUSUM and CUSUMsq tests on the recursive residuals. The results suggest that the values fall inside the critical bends at the 5% level. Therefore, the models are stable.

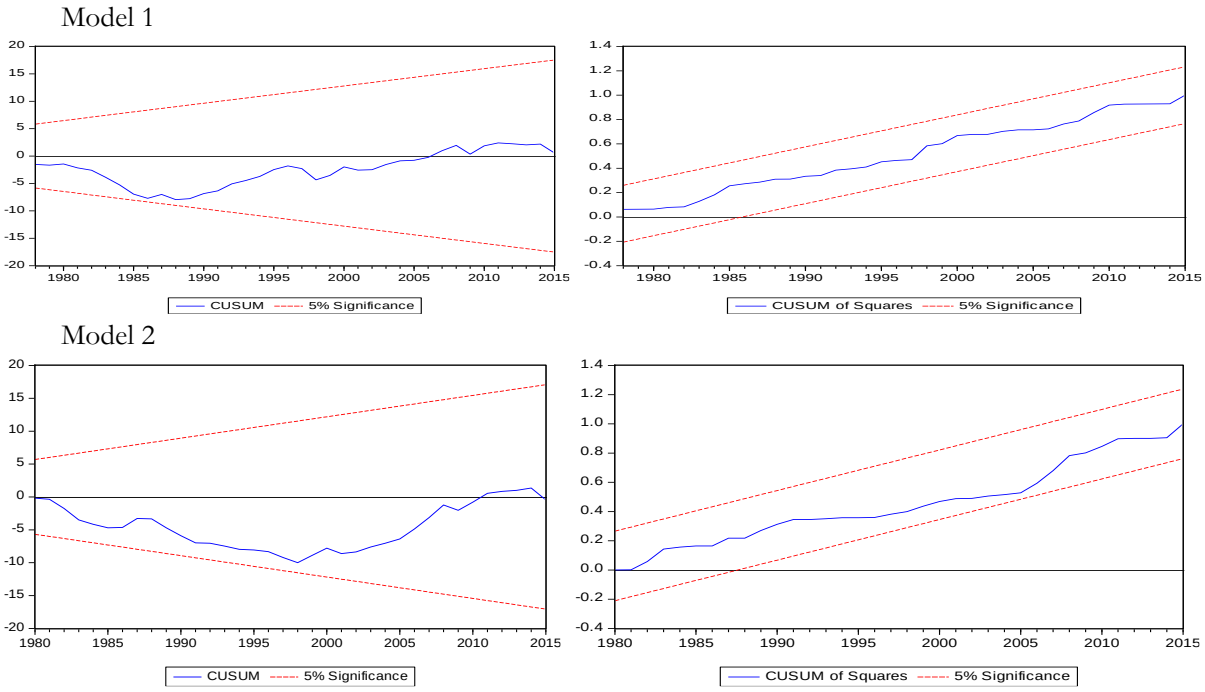

Figure 1. Plots Of Cumulative Sum Of Recursive Residuals

5. CONCLUSIONS

The present study investigated the effect of government debt on sustainable economic growth in Malaysia. The aim is to confirm whether government debt spurs economic growth or it may have adverse impacts to the economy. The findings indicate that government debt has a posi-tive and significant effect on sustainable economic growth in the short and long run. There is no evidence to conclude that the level of government debt has adverse impacts on sustainable economic growth. The government debt should be allocated to productive expenditures that will eventually contribute to the short and long run sustainable economic growth. Therefore, government debt should not become a burden of responsibility to future generations who will be living in an economy where a large amount of debt exceeds the ability to repay.

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