

Federal government debt and private consumption: the Malaysian experience

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Abstract: The purpose of this paper is to investigate the short-run and the long-run relationships between private consumption expenditure and federal government debt in the case of Malaysia. Using yearly data (1970-2012), this study employs the bound testing method of cointegration and error correction models, developed within an autoregressive distributed lag (ARDL) approach. The results prove a significant relationship in the short-run and long-run periods between private consumption expenditure and federal government debt. In addition, government spending and private consumption are better described as complementary rather than as substitutes. This study uses empirical evidence to show the role of government debt towards private consumption of the country. Thus, demand management policies, particularly expansionary fiscal policy may be continued to foster private consumption and then boost economic growth.

Key words: Government debt; Private consumption fiscal policy; ARDL; Malaysia

1. Introduction

The government debt accumulations that arise from implementing expansion fiscal policies have attracted the attention of economists, financial market analysts and policymakers. However, the effect of these factors on the economic performance is still controversial amongst economists, especially on investment and consumption. Thus, this controversy raises the question of whether fiscal stimulus support domestic demand could. At first sight, some of major developed economies give a varied image. In Japanese the government tried to stimulate the economy by running high budget deficit, however private consumption decreased to reach its lowest level. On the other hand, the economy in the U.S has shown an improvement after providing fiscal stimulus, which has led to pull the country out of economic recession. Finally, fiscal stimuli have been limited by European policymakers because of the increasing public debt levels and constraints imposed by the Stability and Growth Pact. Regardless the imposed constraints, would more fiscal stimulus have raised private consumption in emerging markets.

In this study, we evaluate the extent to which the government debt level could explain variations in reactions of private consumers to change in fiscal policy. From a theoretical perspective, the evidence is different. In modern theory, movements in net wealth are linked to movements in private expenditure (Lettau & Ludvigson, 2001). Conversely, the neoclassical school assumes full employment of resources and circumventing government intervention advocates competitive markets. It

considers individuals planning their consumption for their entire life cycle. By shifting taxes to future generations, budget deficits raise current consumption. The increase in consumption means the decline in savings; as a result, interest rates have to increase to bring economic equilibrium to capital markets. Consequently, high interest rates, in turn, lead to a decline in private investment (AmirKhalkhali et al., 2003; Beck, 1993; Ganelli, 2003; Heijdra & Ligthart, 1997; Voss, 2002). As a result, budget deficits could "crowd-out" private investment. In contrast, the Keynesian view counters the crowding-out effect by signaling out the expansionary effects of budget deficits. It assumes that unemployment exists in the economy and that the sensitivity of interest rates to investment is low. Therefore, an expansionary fiscal policy will prevail with little or no increase in the interest rate and this will definitely raise output and income. The Ricardian Equivalence Theorem is another view regarding the impact of government expenditure on private investment and consumption. It assumes that as asset owners fully discount future tax liabilities implied in the deficits; thus, government debt does not classify as wealth. This means that the budget deficit is not relevant for financial decisions (Barro, 1974). This theorem predicts that budget deficits will accompanied by rising taxes in the future. As a result, individuals can expect that their future income will not change their consumption and savings, leaving interest rates and private investment also unchanged (Barro, 1978, 1989; Darrat & Suliman, 1991; Ghatak & Ghatak, 1996).

Therefore, it is essential issue to assess the role of government debt in explaining changes in private

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expenditure by empirically investigating the relationships between the government debt and private consumption expenditure. To our knowledge, this is the first study concentrates on private consumption - government debt nexus in Malaysia. The remainder of this paper is structured as following. Section 2 displays the previous literature. Section 3 discusses the model and the data. Section 4 provides the empirical outcomes. Section 5 concludes.

2. Literature review

Because of uncertain economic conditions, majority of economic studies suggest that governments rely on domestic demand in an attempt to increase their economic growth. Usually, domestic demand relies on private consumption and private investment (the major component of average demand), and the rest is generally consumed as an instrument to test economic health. The decrease in private consumption reflects that economic conditions of a country are not really good. Hence, governments tend to enhance production and employment in times of recession by more private expenditure through money handouts and more tax cuts.

As per the traditional Keynesian theory Keynes (1936), higher government expenditure produces higher consumption due to the multiplier effect. Nevertheless, early Keynesian analysis used a strict assumption that fiscal policy tends to influence consumption only through its impact on present disposable income. It leads to the view that robust and expected influences of tax decrease shifts and deficit-finance government expenditure. Under weak Ricardian equivalence, government payments of interest on public debt, government debt, and taxes do not have any influence, be it in any form or level, on household consumption. To a certain degree, government transfers, total income, public expenditure, and private wealth do not appear to have any influence on private consumption. The strong Ricardian equivalence advocates that effect of total income is equal, but adverse in sign with public expenditure. When total income is positive, government expenditure has the same size of an impact, but in the opposite direction. In the views of Ferreira, Prenzushi, and Ravallion (1999), these households respond to shocks in different ways. Production levels, consumption trends, and employment pattern change with the alteration in prices. Some of these responses have short-term welfare effects while others have long term irreversible impacts. For example, a decline in price effects to access public health and education has the tendency to hinder the potential of poor people to gather human influence on long term productivity. Tribulation sales of productive assets have the tendency to easily influence the tendency of households to take back productive activities next to crisis. This kind of responses has long term effects and is also likely to intensify inequality.

There are numerous studies that have recently focused on the influence of fiscal policy in private consumption and investment, and tend to identify the amount of government expenditure multiplier on output (Blanchard & Perotti, 2002; Fatás & Mihov, 2001; Perotti, 2005; Uhlig & Mountford, 2002). In views of Galí, López-Salido, and Vallés (2004), majority of the empirical literature on government purchases have positive influence on total output. On the contrary, fiscal policies are expected to affect consumption in different ways over the business cycle. Therefore, as a policy instrument, it is expected to be somewhat effective as per the economic conditions. According to the literature, there are mixed signals. It is suggested by Lettau and Ludvigson (2001) that during modern intertemporal macroeconomic, significant movements in net wealth are tied to trends in consumer behavior. However, Ricardian, Barro (1974), public debt is irrelevant to private expenditure, since government bonds, at the very instant, reflect assets for owners of bonds and a liability to tax payers; for a closer economy at least. It is therefore popular, apart from Ricardian equivalence, if consumed only for strict assumptions.

In accordance with traditional belief, fiscal stimulus policy helps to strengthen business cycles and boost economies under crises. Fiscal policy was freed in the US that flew the US economy out of its slump (Johnson, Parker, & Souleles, 2004). In the end, due to increased debt levels and constraints in Growth Pact and stability, European legislators limited the scope of fiscal stimulus. To analyze the relationship between government and private consumption in Malaysia, Ismail (2010) used the yearly time series data, from 1971-2006, in an attempt to reflect this relationship. She confirmed a positive relationship between private and public consumption. Public debt does not have an effective impact on private spending. Furthermore, there appears to be no crowding out effect of public spending on private spending, and it is statistically confirmed the rejection of Ricardian equivalence. Eventually, expansionary fiscal policy will continue to boost the economy.

Empirical studies have recently produced mixed results regarding the relationship between private consumption and public debt. Regarding the US, Peersman and Pozzi (2004) have inferred that government debt determines increased sensitivity of private consumption to current income. Pozzi et al. (2004) concluded the same by using data from OECD economies. Hogan (2004) used statistics from 18 industrial countries and explained that private consumption spending is increases if government consumption spending is declines as a consequence of fiscal crises (as explained by increased debt). Panel data from 17 OECD countries was used by Berben and Brosens (2007), from 1983-2003, in order to determine the influence of government debt on private consumption. They discovered that for OECD economies having high public debt levels, expanded fiscal policy slightly crowds out private

expenditure. Nevertheless, for low debt countries, consumer expenditure does not respond to alterations in government debt. Thus, the effectiveness of fiscal policy to stabilize business cycles changes at higher levels of public debt is effective. Vector Autoregressive Model (VAR) was used by Safdari, Mehrizi, and Elahi (2011) to check the long term association of six variables i.e. public consumption, private consumption, budget deficit, GDP growth, public debt, and population rate in Iran. These variables influenced each other for the period between 1973-2008. It reflects a negative effect of budget deficit and population rate on private consumption. Nevertheless, other variables have a positive impact.

3. Methodology, estimation techniques and model specification

According to Lettau and Ludvigson (2001), all forms of wealth, such as consumption, household wealth, labor income and human capital, are tradable and move together over the long-run. Substantially, this follows from the consumers' budget constraint. Due to the absence of perfect capital markets, the impacts of overall wealth on the consumption level have been neglected in most of the researches for developing economies. Hence, even if we assume that credit restrictions are bound, wealth has to influence consumption since it assists wealthy individuals to easily distribute their consumption over their life spans. Consumption depends on the individuals' liquidity because various types of wealth have different tendencies in consumption. Thus, in this section, we follow Berben and Brosens (2007) model to investigate whether the government debt has an effect on household consumption. Therefore, the long term linkage among variables such as consumption, labor income, components of wealth (demand deposit, time deposit and savings deposit and currency) and federal government debt is documented as follows:

$$\log PC_t = \beta_0 + \beta_1 \log D_t + \beta_2 \log W_t + \beta_3 \log C_t + \beta_4 \log GC_t + \epsilon_t \quad t = 1, 2, \dots, T \quad (1)$$

Where $\log PC$ is the log of real per capita of household consumption; $\log DI$ is the log of per capita real disposable income of household (GDP minus income tax). Meanwhile, $\log W$ = components of wealth, demand deposit plus time deposit and savings deposit and currency used as a proxy for wealth, thus, $\log W$ is the log of real per capita of wealth; $\log D$ is the log of per capita real government debt, and $\log GC$ is the log of real per capita of government consumption†. Lastly, ϵ is an error term; $\beta_{12\dots}$ are regression coefficients and t donates the time.

To capture structure breaks, we add a dummy variable (DUM), as a proxy for the Financial Crises, to the above model:

$$\log PC_t = \beta_0 + \beta_1 \log D_t + \beta_2 \log W_t + \beta_3 \log C_t + \beta_4 \log GC_t + \beta_5 DUM_t + \epsilon_t \quad (2)$$

We compute real per capita series by deflating the previous variables with private consumption deflator (PCD) and with total population (POP). All the variables are in real terms and transferred to logarithm. The data are sourced from Department of Statistics Malaysia and Monthly statistical bulletin (Negara Bank Malaysia).

In our empirical study, we use the ARDL method developed by Pesaran et al. (2001) in order to examine the impact of the government debt on the private consumption. By following Bourbon and Brosens (2007), we employ the consumption function for evaluating such relationships. As a first procedure, the study uses the ARDL bound test based on unrestricted error-correction models (UECM) to test the existence of the long-run relationship among mentioned variables. The first step in performing the ARDL technique is computing F-statistics in order to test the null hypothesis of no cointegration among variables against the alternative hypothesis of cointegration. That's why we need to see whether or not all coefficients are jointly equal to zero. Thus the first step is calculating F-statistic and then comparing its value with critical values suggested by Pesaran et al. (2001) and Narayan (2004). In general, we can reject the null hypothesis if the calculated F-statistic is higher than the upper bounds proposed by Pesaran et al. (2001) and Narayan (2004). However, we cannot reject the null hypothesis when the computed F-statistic smaller than the lower bounds, whereas, if the value of F-statistic falls between the upper and lower bounds, the result is inconclusive. Therefore, for computing F-statistics, the whole variables have been shifted to be dependent variables. As a result, An ARDL representation of equations (1) and (2) are:

$$\begin{aligned} \log PC_{t_n} &= \beta_0 + \sum_{i=1}^n \beta_{1i} \log PC_{t_{i-1}} + \sum_{i=1}^n \beta_{2i} \log D_{t_{i-1}} \\ &+ \sum_{i=1}^n \beta_{3i} \log W_{t_{i-1}} + \sum_{i=1}^n \beta_{4i} \log C_{t_{i-1}} + \sum_{i=1}^n \beta_{5i} \log GC_{t_{i-1}} \\ &+ \alpha_1 \log PC_{t_{i-1}} + \alpha_2 \log D_{t_{i-1}} + \alpha_3 \log W_{t_{i-1}} + \alpha_4 \log C_{t_{i-1}} \\ &+ \alpha_5 \log GC_{t_{i-1}} + \epsilon_t \dots \dots \dots (3) \end{aligned}$$

$$\begin{aligned} \log PC_{t_n} &= \beta_0 + \sum_{i=1}^n \beta_{1i} \log PC_{t_{i-1}} + \sum_{i=1}^n \beta_{2i} \log D_{t_{i-1}} \\ &+ \sum_{i=1}^n \beta_{3i} \log W_{t_{i-1}} + \sum_{i=1}^n \beta_{4i} \log C_{t_{i-1}} + \sum_{i=1}^n \beta_{5i} \log GC_{t_{i-1}} \\ &+ \sum_{i=1}^n \beta_{6i} DUM_{t_{i-1}} + \alpha_1 \log PC_{t_{i-1}} + \alpha_2 \log D_{t_{i-1}} \\ &+ \alpha_3 \log W_{t_{i-1}} + \alpha_4 \log C_{t_{i-1}} + \alpha_5 \log GC_{t_{i-1}} \\ &+ \alpha_6 DUM_{t_{i-1}} + \epsilon_t \dots \dots \dots (4) \end{aligned}$$

Where: Δ denotes the first difference operator, γ is the drift component, and ϵ_t is the usual white noise residuals. On the left-hand side is the consumption function whereas on the right hand

† The variables are deflated by the private consumption deflator and with total population.

side is parameters (1, 2, 3, ...,and 6) of long-run relationships. The rest of parameters (1, 1, 3,... and 6) denote the short-run dynamics of the model.

since we determine the optimal lag length, taking a number of one, as proposed by SIC for our estimated model equations, we can run the bound test, based on unrestricted error-correction models (UECM), over the time-series data to obtain the values of computed F-statistic and then to compare these values with the above mentioned critical values. The table below summarizes results of computed F-statistics values for both equations as well as displays the critical values under their levels of significance of five and ten percent.

Based on the results above for both of equations, the F-statistic values are 6.13 and 5.25. By comparing these values with the lower and upper critical values, we can clearly see that they are higher than the upper critical values of (4.049 and 4.000) and (3.805 and 3.920) suggested by Pesaran and Pesaran (2009) and Narayan (2004) at the five percent level of significance. As a result, it can be reject the null hypotheses of no cointegration relationship among used variables in the private consumption models. We, therefore, confirm the presence of a long-run cointegration relationship among the variables in estimated private consumption equations. So, we can investigate the long-run coefficients for both of equations.

4. Empirical findings

In the process of a cointegration test, an existence of unit roots for variables used in the test might create spurious results. Thus, it is very important to test the existence of unit roots and check whether the variables are stationary at I (1) or I (0) or both. This procedure can help to avoid problems of estimating spurious relationships. Furthermore, it can help to identify whether or not the ARDL method is a beneficial technique in investigating the relationship between variables. For this reason, we run three unit root tests on all time-series, these tests are the Augmented Dickey-Fuller (ADF) test, Philips-Perron (PP) test, and Dickey-Fuller –GLS (DF) test. They are aimed to identify the order of all employed variables. Each unit root test attempts to test the null hypothesis of a unit root against the alternative of stationarity as well as all variables are tested at level and first difference under assumption of constant and trend. At level, with an intercept and Intercept & Trend, the ADF, PP and DF-GLS tests shows that the null hypothesis cannot be rejected for all variables (LOGPC, LOGDI, LOGW, LOGD, LOGGC) at level (not integrated), with an exception for LOGGC. Therefore, it can be concluded that LOGPC, LOGDI, LOGW, LOGD and LOGGC are not stationary at level. On other hand, at the first difference form (intercept and Intercept & Trend), the results of the three unit root tests reveal that all variables that used in estimating the model have no unit root at 1st difference, and the rejection of the null hypothesis of unit root can be confirmed because the values of

computed F statistics are less than the critical value of five per cent significant level. Thus, a clear conclusion can be made that all variables (LOGPC, LOGDI, LOGW, LOGD, and LOGGC) are integrated at order of one.

Table1: Long run coefficients for equation (2)

Variables	Equation 2		
	ARDL (1.1.0.0.0)		
	Coefficient	Std.Error	[P-value]
LOGDI	0.8411	0.2192	[0.000]
LOGW	0.1347	0.0921	[0.153]
LOGD	0.1632	0.0722	[0.030]
LOGGC	0.0416	0.0172	[0.021]
INPT	-0.1423	0.0562	[0.016]

Since the existence of the long-run relationship amongst employed variables in the estimated model equations is proven, it can be safely moving into the stage of estimating the long-run coefficients values for the private consumption model equations by using the ARDL method. As can be seen, there are positive relationships between the private consumption, government debt, disposable household income and public consumption at high levels of significance (5%) in the long-term. For instance, the disposable household income positively impacts the private consumption at a high level of significance (five percent), with value of coefficient of 0.841. This implies that in the long-run one percent increase in the disposable income could lead to an increase in the private consumption by .084 percent. The positive sign for the disposable household income coefficient in our model is in line with the explanations of economic theory which state that the relationship between the income and the private consumption is positive, reinforcing the findings of (Berben & Brosens, 2007; Ludwig & Slok, 2002). In addition, with a coefficient value of 0.163, the government debt is found to have a significant positive effect on household consumption at five percent significant level, implying that a fiscal expansion, which leads to raise the level of public debt, will be partly crowded in by an increase in private consumption. This result can be interpreted as follows if the government debt increased by one percent, the private consumption on the average would be increased by 0.163 percent. This outcome is consistent with the findings of (Peersman & Pozzi, 2004) who find that the excess sensitivity of household spending to current income relies positively on public debt in the U.S. Moreover, the household consumption is positively related to government consumption expenditure in the long run. The estimated coefficient of the government consumption is positive and significant at five percent level of significance. As can be seen, one percent increase in government consumption increases the household consumption by 0.042 percent. Thus, it can be said that the best description for private consumption and government consumption is complementary to each other, and the government spending is not responsible for any

crowding-out effect on private consumption in Malaysia. Karras (1994) mentions that an increase in government spending does not tend to decrease the marginal utility of private consumption. Furthermore, Ismail (2010) finds that the relationship between private consumption and government consumption is significant and positive as well as the government consumption has no crowding out effect on private consumption in Malaysia.

Table 2: Long run coefficients for equation (3)

Variables	Equation 3		
	ARDL (1,1,0,0,0)		
	Coefficient	Std.Error	[P-value]
LOGDI	0.6214	0.2077	[0.005]
LOGW	0.0096	0.0832	[0.908]
LOGD	0.0820	0.0643	[0.211]
LOGGC	0.0267	0.0149	[0.082]
INPT	-0.0812	0.0493	[0.109]
DUM	-0.0736	0.0197	[0.001]

In relation to the financial crises as expressed by the dummy variable (DUM), it is found that the financial crises had a statistically significant and negative impact on the private consumption. The estimated coefficient of the financial crises is negative and significant at five percent significance level, with a value of 0.074, which suggests that in the long run the private consumption would decrease by 0.074 % during the financial crises. As for the short run, it is found that the disposable income, government debt and the government consumption are positively and statistically related to private consumption at 5 % level of significance. On other hand, the dummy variable for the financial crises negatively affect the private consumption at 5 % significant level.

Table 3: Error correction model for equation (2)

Variables	Equation2		
	ARDL (1,1,0,0,0)		
	Coefficient	Std.Error	[P-value]
dLOGDI	0.6281	0.1646	[0.001]
dLOGW	0.1544	0.1045	[0.149]
dLOGD	0.1870	0.0841	[0.033]
LOGGC	0.0477	0.0197	[0.021]
dINPT	-0.1631	0.0640	[0.015]
ecm(-1)	-0.7456	0.1435	[0.000]
R ²		0.8246	
R ²		0.6924	
S.E. of regression		0.0171	
DW-statistic		1.8204	
F-statistic		16.2181	
Prob(F-statistic)		[0.000]	

In the short-run, one percent increase in the disposable income is related with (0.63) percent increase in the private consumption, as well as one percent an increase in the government debt can result in increasing the private consumption of about (0.19). One percent increase in the government consumption could lead to a decrease in the private consumption within arrange of 0.05-0.03 percent in

the short term. However, whenever the economy shocked by any financial crisis would lead to 0.081percent decrease in the private consumption.

In the short-run, it can be seen that the Asian crisis had significant effects on most of macroeconomic variables, where the values of the coefficients and the levels of significance were changed dramatically. In addition, the error correction term is highly significant and carries the expected negative sign, which indicates that the variables will speedily return to equilibrium and a faster adjustment process. The coefficients in both of equations suggest that there has been a high speed of adjustment to the equilibrium levels once the economy is shocked, roughly 75 % and 81% convergence to the long-term equilibrium is completed after one year.

The high speed for correcting the disequilibrium and the rapid return to long-run equilibrium is due to financial, economic policies and structural adjustments that implemented by government such as deregulation, adopting a private sector led growth strategy and privatizing public sector enterprises as well as providing fiscal stimulus packages in form of a direct cash insertion. Furthermore, the economy shows a high speed of adjustment to the equilibrium levels, which indicates that the economy is exposed to a low degree of vulnerability to any sudden shock. This outcome also gives further evidence of the existence of a stable long-run level cointegration relationship among the variables of the model.

Table 4: Error correction model for equation (3)

Variables	Equation3		
	ARDL (1,1,0,0,0)		
	Coefficient	Std.Error	[P-value]
dLOGDI	0.2229	0.1654	[0.187]
dLOGW	0.0107	0.0920	[0.908]
dLOGD	0.0907	0.0725	[0.220]
LOGGC	0.0295	0.0166	[0.085]
dINPT	-0.0897	0.0551	[0.113]
dDUM	-0.0814	0.0193	[0.013]
ecm(-1)	-0.9048	0.1178	[0.000]
R ²		0.8081	
R ²		0.7674	
S.E. of regression		0.0139	
DW-statistic		1.7903	
F-statistic		23.1565	
Prob(F-statistic)		[0.000]	

Four diagnostic tests were applied to investigate functional form, serial correlation, normality and heteroscedasticity. The LM test of serial correlation in the residuals confirmed that these models did not suffers from any serial correlation problem while the Ramsey's RESET indicated that there are no specification errors related to these models. The test of kurtosis and skewness of residuals showed normal behavior of the estimated residual series of the models. Moreover, the ARCH test of residuals did not show any evidence of heteroscedasticity in the residuals for the private consumption model equations. For stability test, two graphs, (CUSUM and CUSUMSQ), show that there is no line crossed the

null hypothesis at five percent level of significance. Hence the equations are stable and correctly specified.

5. Conclusion and policy discussion

It is concluded that the disposable income, government debt and government consumption can play roles in explaining private consumption function for Malaysia during the sample period, and they are the most effective factor in the short and long term. Moreover, this result consistent with an explanation of economic theory which states the consumption can be positively affected by the income as well as the fiscal expansion would be partly crowded in by an increase in private consumption even though it results in rising levels of public debt. In addition, there is an existence of a complementary relationship between private consumption and public consumption, suggesting that the government consumption is not responsible for any crowding-out effect on aggregate demand through its impact on private consumption. Furthermore, a high speed of adjustment to the equilibrium levels has been shown by the economy which indicates that the economy is exposed to a low degree of vulnerability to any sudden shock. However, by the early of 1998, the economy showed a slowdown in its macroeconomic variables, but it has got recovery by the end of the decade. Finally, our empirical study emphasizes on a continuation of demand management policies because the aggregate demand is indeed affected by changes in fiscal policies in Malaysia. Thus, expansionary fiscal policies could enhance aggregate demand by its effects on private consumption.

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