Does government spending crowd out private consumption in Malaysia

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Abstract

This paper investigates the relationship between government spending and private consumption in Malaysia. The empirical results show that: first, in Malaysia, government spending and private consumption are best described as complementary rather than as substitutes. So, this paper rejects the arguments that there is a significant degree of substitutability between government spending and private consumption. Private consumption cannot be held responsible for any crowding-out effects that government spending might have on aggregate demand. Second, in Malaysia, the tax variable is significantly different from zero. So, the rejection of Ricardian equivalence is confirmed statistically. Therefore, demand management policies, especially expansionary fiscal policy should be continued to foster economic growth.

Keywords: government spending, private consumption, Ricardian equivalence

Introduction

One of the most intriguing features of traditional Keynesian theory (Keynes, 1936) is the multiplier effect, which holds that an increase in government spending can create an increase in consumption. However, the early Keynesian analysis was based on the extreme assumption that fiscal policies affect consumption only through their impact on current disposable income. This view implied powerful and predictable effects of tax reduction, transfers and deficit-financed government spending. Recently, several economists have revived a very old argument about the equivalence of debt and taxes that implies that government deficits have no effect on aggregate demand. This is because "rational" consumers perceive an increase in the deficit in the short term as an increase in taxes in the future, so they discount future taxes leaving private consumption unchanged, even in the short run. The revival of this idea is due to Bailey (1971) based on the theory by David Ricardo, a 19th century English economist. If Ricardian equivalence holds, government debt becomes a completely unimportant issue: neither its level, nor its form, affects the economy in any manner. Indeed, no reason seems to be left for governments to issue bonds. Furthermore, demand management policies need to be revised, because changes in fiscal policies would not affect aggregate demand.

Literature Review

Since Bailey (1971) proposed that there may be a degree of substitutability between government spending and private consumption, or a crowding out effect, a great deal of literature has explored this topic on both theoretical and empirical grounds. However, some empirical studies have found different results. Kormendi (1983) employs the permanent-income approach and finds a significant degree of substitutability between private consumption and government spending for the United States. Aschauer (1985) uses Euler equation to estimate the effects of budget deficit on private consumption and finds that a

budget deficit tends to crowd out private consumption. Ahmed (1986) uses an intertemporal substitution model to estimates the effects of government consumption using UK data. He finds that government consumption tends to crowd out private consumption. Aiyagari, Rao, Christiano and Eichenbaum (1992) and Baxter and King (1993) explore the effect of government spending shocks on various economic aggregates in a one-sector neoclassical growth model with constant returns to scale and variable labor supply. They find that an increase in government spending significantly leads to a decline in private consumption. Amino and Wirjanto (1997) apply a relative-price approach to estimate the intratemporal elasticity of substitution between government spending and private consumption. They found that in the US, the elasticity of substitution between government spending and private consumption is about 0.9. Hamori and Asako (1999) use Japanese data to estimate the marginal rate of substitution between private consumption and government spending using a nonlinear rational expectations model. They find that the marginal rate of substitution between government spending and private consumption is estimated to be between 0.57 and 0.75. This implies that government spending and private consumption are closer substitutes to each other in Japan than in the US. Ho (2001) extends the existing literature to panel data for OECD countries and uses panel cointegration methods. He finds that there is a significant degree of substitutability between government spending and private consumption. In other words this group of research indicates that an increase in government spending has a fiscal crowding-out effect on private consumption.

On the other hand, some other research finds that private consumption cannot be responsible for any crowding-out effect that government spending might have on aggregate demand. On the contrary, private consumption is probably crowded-in. For example, Devereux, Head and Laphalm (1996) examine the impact of government spending shocks using a neoclassical model with increasing returns to scale and monopolistic competition. They find that an increase in government consumption generates an endogenous rise in aggregate productivity. The increase in productivity raises the real wage sufficiently that there is a substitution of consumption for leisure. Thus, an increase in government spending leads to an increase in private consumption. Karras (1994) examines the change of private consumption in response to increases in government spending across a number of countries. He finds that increases in government spending tend to raise the marginal utility of private consumption. In other words, government spending and private consumption are better described as complementary rather than as substitutes. The strength of this complementary relationship is shown to be negatively affected by government size.

Given the wide range of empirical results, there appears to be no clear consensus among research works on this issue. Methodologically, the statistical inference of the above-mentioned research works, especially studies for developing countries ignore the effects of total wealth upon consumption because of the presence of imperfect capital markets. Still, even if credit restrictions are binding, wealth should affect consumption since it helps wealthy individuals to smooth their consumption over their life spans. Different forms of wealth have different propensities to consume depending on their liquidity. Furthermore, the timing of taxes affects consumption if individuals have lower discount rates than Ricardian consumers. Therefore, this paper augments existing literature by introducing wealth, tax and debt variables into the model to examine the influence of these variables on private consumption decisions. This is because taxes used to finance government spending enter directly into budget constraints of individual. The substitution of debt financing for taxes can be expected to generate expansionary impacts if the household's perception of its net wealth is enhanced.

In this empirical research, I use annual data from year 1971 to 2006. The data were compiled from International Financial Statistics and Government Financial Statistics. The private consumption (PC) includes consumer spending on goods and services (line 96f). The government spending (GC) consists of government spending on goods and services and collective-consumption services (line 91f). The income (Y) is the Gross Domestic Product (line 99b). The government debt (B) consists of internal debt (line 88a) and external debt (line 99a). The tax (T) is the lump-sum tax. The wealth (Wp) is a proxy of demand deposit (line 24) plus time and savings deposit (line 25) and currency (line34).

The model

In order to explicitly derive the relationships relevant to this paper, I have constructed a model to test consumer behaviour after a tax change by assuming a representative agent with rational behaviour. Consumers are assumed to incorporate the government budget constraints when selecting their optimal consumption path. The intertemporal maximization problem is the following,

$$U_t = E_t \left(\sum_{i=0}^{\infty} \beta^i \, U(C^*_{t+i}) \right) \qquad (1)$$

where E is the expectation operator, β is the subjective discount factor and C* is effective consumption. Following Bailey (1971), effective consumption is defined as follows,

$$C^*_t = PC_t + \theta GC_t \qquad (2)$$

where PC is private consumption, GC is government consumption and θ measures the substitutability between PC and GC. Private consumption is a function of income, tax and wealth. Therefore, the consumer intertemporal budget constraint is,

$$\sum_{t=0}^{\infty} \frac{PC_{t+i}}{(1+r)^i} = \sum_{i=0}^{\infty} \left(\frac{Y_{t+i} - T_{t+i}}{(1+r)^i} \right) + Wp_t \qquad (3)$$

where Wp is an individual's financial wealth, Y is labour income, T is tax net of government transfers, PC is private consumption and r is a time invariant interest rate.
From equation (3), (2) and (1), the consumer's utility function can be written as follows,

$$U = U\left(\beta^0 C^*_0, \ldots, \beta^t C^*_t, \ldots, \beta^{\infty} C^*_{\infty} \right) \qquad (4)$$

Equation (4) shows that the consumers' lifetime utility U is a function of his effective consumption in all time periods. The consumer will try to maximize his utility subject to the constraint that the present value of his total consumption in life cannot exceed the present value of his total wealth in life, that is,

$$\sum_{t=0}^{\infty} \frac{C^*_t}{(1+r)^t} = \sum_{t=0}^{\infty} \frac{A_t}{(1+r)^t} \quad (5)$$

where A is total wealth (financial wealth plus labour income). Based on Branson (1989), I assume that consumers' utility function is logarithmic, that is,

$$U(C^*) = \ln C^* \quad (6)$$

This utility function has the properties that marginal utility is positive, $U'(C^*) = 1/C^*$ and is diminishing in consumption, $U''(C^*) = -1/C^{*2}$. Second, I assume that the utility function is additively separable over time. This means that each period's marginal utility is independent of the consumption in all other periods. Third, I assume that future utilities are discounted at the subjective rate ρ. These three assumptions give us the particular specification of the utility function as follows,

$$U = \ln C^*_0 + \frac{\ln C^*_1}{(1+\rho)} + \ldots + \frac{\ln C^*_t}{(1+\rho)^t} + \ldots + \frac{\ln C^*_\infty}{(1+\rho)^\infty} \quad (7)$$

To solve this problem and obtain the maximizing stream of consumption, the method of the Lagrange multiplier is used, and is given by Equation (8).

$$\underset{C^*_t,\,\lambda}{\text{Max}}\ L = \sum_{0}^{\infty} \frac{\ln C^*_t}{(1+\rho)^t} + \lambda \left(\sum_{0}^{\infty} \frac{A_t}{(1+r)^t} - \sum_{0}^{\infty} \frac{C^*_t}{(1+r)^t} \right) \quad (8)$$

The Lagrange multiplier λ is a positive constant that will turn out to measure the marginal utility of additional wealth.

$$\frac{\partial L}{\partial C^*_0} = \frac{1}{C^*_0} - \lambda = 0 \quad (9)$$

$$\frac{\partial L}{\partial C^*_t} = \frac{1}{(1+\rho)^t} \times \frac{1}{C^*_t} - \frac{\lambda}{(1+r)^t} = 0 \quad (10)$$

$$\frac{\partial L}{\partial C^*_{\infty}} = \frac{1}{(1+\rho)^{\infty}} \times \frac{1}{C^*_{\infty}} - \frac{\lambda}{(1+r)^{\infty}} = 0 \qquad (11)$$

$$\frac{\partial L}{\partial \lambda} = \sum_{0}^{\infty} \frac{A_t}{(1+r)^t} - \sum_{0}^{\infty} \frac{C^*_t}{(1+r)^t} = 0 \qquad (12)$$

If λ is moved to the right-hand sides of (10) and then divide equation (10) by (11), we get,

$$\frac{C^*_t}{C^*_0} = \left(\frac{1+r}{1+\rho} \right)^t \qquad (13)$$

In general for any two adjacent periods, we would have,

$$\frac{C^*_t}{C^*_{t-1}} = \frac{1+r}{1+\rho} \quad \text{or} \quad C^*_t = \left(\frac{1+r}{1+\rho} \right) C^*_{t-1} \qquad (14)$$

The general expression of (14), could be written as,

$$\frac{U'(C^*_t)}{U'(C^*_{t-1})} = \frac{1+\rho}{1+r} \qquad (15)$$

To investigate the empirical implication of the model, I follow Ho (2001) by assuming that the change in marginal utility is negligibly small over time, so the optimal consumption path, for a given expectation of future income is,

$$C^*_{t+1} = \left(\frac{1+r}{1+\rho} \right) C^*_t \qquad (16)$$

Hence, the econometric relationship below is derived,

$$C^*_{t+1} = \beta\, C^*_t \tag{17}$$

where $\beta = [(1+r) / (1+\rho)]$. Since consumers are assumed to have perfect foresight, then the discounted rate of the time preference is equal to the interest rate, so $\beta = 1$. Using the definition of effective consumption $C^*_t = PC_t + \theta\, GC_t$, equation (17) could be written as follows:

$$PC_{t+1} + \theta GC_{t+1} = PC_t + \theta GC_t \tag{18}$$

$$\Delta PC_t = -\theta \Delta GC_t \tag{19}$$

From (19) we see that the sign of θ determines how government consumption will affect private consumption. If $\theta < 0$ the marginal effect of government consumption growth on private consumption is positive, that is private and government consumption are complements. The opposite reasoning applies when $\theta > 0$. In this case, private consumption and government consumption will move in opposite directions. Therefore, government consumption will be a substitute for private consumption.

To test for Ricardian equivalence, households must incorporate the government budget constraint,

$$\sum_{t=0}^{\infty} \frac{GC_{t+i}}{(1+r)^i} = \sum_{i=0}^{\infty} \left(\frac{T_{t+i}}{(1+r)^i} \right) + B_t \tag{20}$$

where B_t is a government bond, indicating that present discounted total taxes are equal to present discounted government consumption plus government current debt, .
Solving for consumption under Hall's (1978) permanent income hypothesis model, it is possible to get,

$$PC_t = \gamma + \beta \sum_{t=1}^{\infty} (1+r)^{-i} E_t (Y_{t+i}) - \beta \sum_{t=1}^{\infty} (1+r)^{-i} E_t (T_{t+i}) + \beta\, B_{t+i} + Wp_t \tag{21}$$

where $\gamma = \alpha\beta\, (1 + r)^2 / (r^2 + 2r - \delta - 1)$ and $\beta = (1 + r) / (1 + \delta)$

substituting in the government budget constraint the equation changes as follows:

$$PC_t = \gamma + \beta \sum_{t=1}^{\infty} (1+r)^{-i} E_t (Y_{t+i}) - \beta \sum_{t=1}^{\infty} (1+r)^{-i} E_t (GC_{t+i}) + \beta\, Wp_t \tag{22}$$

Assuming that government consumption and household labor income follow a random walk with drift, the model could be simplified to:

$$PC_t = \beta_0 + \beta_1 Y_t + \beta_2 GC_t + \beta_3 B_t + \beta_4 Wp_t + \beta_5 T_t \quad (23)$$

where β_0 is a the constant term. This equation nests several hypothesis regarding household behaviour after a tax change under a very simplified process for expected government spending and permanent income gross of taxes. The timing of taxes affects consumption when there are liquidity constraints ($\beta_5 < 0$). In other words, Ricardian equivalence will not be rejected when liquidity constraints are absent ($\beta_5 = 0$).

Estimation and comment

Following the procedures developed by Dickey and Fuller (1981), an augmented unit root test was employed to examine the stationarity of the variables. The results are reported in table 1.

Table 1: The results of ADF unit root test

Variables	PC	GC	B	Y	T	Wp
ADF-t statistics	5.7772	6.2078	1.6272	6.6920	2.4596	4.9496
P value	1.0000	1.0000	0.9992	1.0000	1.0000	1.0000
Critical values at (%) significance level :						
1%	-3.65					
5%	-2.95					
10%	-2.61					

According to the ADF statistics, all variables appear to be integrated of order 1, and the estimated roots for the levels are close to unity. Since all the variables have a unit root, the existence of a cointegrating vector is a necessary condition for any sensible interpretation of the results (Engle and Granger 1987). Table 2 reports Johansen Cointegration Test and shows that the maximal eigenvalue and trace eigenvalue statistics rejects the null of no cointegration.

Table 2 The results of Johansen Cointegration Test

Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.8415	160.5704	95.7536	0.0000
At most 1 *	0.6634	97.9240	69.8188	0.0001
At most 2 *	0.5327	60.8965	47.8561	0.0019
At most 3 *	0.4409	35.0250	29.7970	0.0114
At most 4	0.3574	15.2552	15.4947	0.0543
At most 5	0.0062	0.2141	3.8414	0.6436

Trace test indicates 4 cointegrating equations at the 0.05 level

*Denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-value

Hypothesized No. Of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.8415	62.6463	40.0775	0.0000
At most 1 *	0.6634	37.0274	33.8768	0.0203
At most 2	0.5327	25.8715	27.5843	0.0815
At most 3	0.4409	19.7697	21.1316	0.0766
At most 4*	0.3574	15.0411	14.2646	0.0376
At most 5	0.0062	0.2141	3.8414	0.6436

This study uses White Heteroskedasticity-consistent Standard Errors & Covariance to overcome the problem of heteroscedastisity. The estimation results are shown in table 2.

Table 2 Estimation results using OLS

Variables	**Estimation result**
Constant	0.0897
	(1.3153)
Y	0.6104*
	(0.0910)
GC	0.2424*
	(0.0634)
B	-0.0158
	(0.0523)
Wp	-0.0403*
	(0.0129)
T	0.1470*
	(0.0423)
R^2	0.8670
DW statistics	1.9828
F statistics	37.8120
Prob F statistics	0.0000

Note: * shows significance at the 1% significance level, the standard deviation in parentheses

The parameter estimates corresponding to the national income measure of Y will be discussed first. The estimated coefficient of the income variable is positive and significant at a 1% significance level. It shows there is a positive correlation between income and private consumption in Malaysia. The estimated coefficient of the debt variable is insignificant. It shows that the growth of government debt does not have a significant effect on private consumption. The estimated coefficient of the wealth variable is negative, which is contradicts with the economic theory. The coefficient of government spending is positive and significant at a 1% significance level. As can be seen, a 10 percent increase in the growth rate of government spending, increases the growth rate of private consumption by 2.4 percent. Therefore, private consumption and government spending are best described as complementary goods in Malaysia. Private consumption cannot be held responsible for any crowding-out effect that government spending might have on aggregate demand. This evidence strongly contradicts the view that variations in government spending induce equal offsetting changes in private consumption. Furthermore, the estimated coefficient of the tax

variable is positive. This introduces a positive correlation between taxes and consumer spending that biases the coefficient of the tax variable towards zero. Moreover, this result shows that the timing of tax matters in economic terms. So, the rejection of Ricardian equivalence is confirmed statistically. The empirical results suggest that demand management policies should be continued, because changes in fiscal policies do affect aggregate demand in Malaysia. Especially, an expansionary fiscal policy can boost aggregate demand through its influence on private consumption.

Conclusions

The impact of fiscal policy on private consumption is an important question for both short-term macroeconomic stabilization and long-run growth prospects. However, it is also a question that remains theoretically and empirically controversial. Some economists suggest that an expansionary fiscal policy is ineffective to boost aggregate demand because of the substitution effects between government spending and private consumption. Some empirical studies have found that in some countries, there is positive correlation between government spending and private consumption. However, on the other hand, there are also other empirical studies that have found that in some countries there is negative correlation between government spending and private consumption. The evidence presented in this paper indicates that an increase in government spending tends to raise private consumption in Malaysia. Government spending and private consumption are complementary to each other in the Malaysian context. Thus, private consumption would not appear responsible for aggregate demand suffering any crowding-out effect due to governnment spending. The timing of taxes matter in economic terms. So, the rejection of Ricardian equivalence is confirmed statistically. Therefore, changes in government spending can have positive effects on aggregate demand in Malaysia.

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