

## TAX-AND-SPEND OR SPEND-AND-TAX? EMPIRICAL EVIDENCE FROM MALAYSIA

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### ABSTRACT

*The paper investigates the causal relationships between government spending and revenue for Malaysia. The study uses annual data, a Johansen cointegration test and an error-correction model. A preliminary test shows that government revenue and expenditure are cointegrated. Empirical results support the spend-and-tax hypothesis. Furthermore, they underscore the fact that fiscal policy may not be effective enough to curb the rising budget deficits over the long term and may even reduce private saving and investment. Extensive expenditure reforms through fiscal synchronisation are suggested.*

**Keywords:** fiscal policy, government spending and revenue, cointegration, error-correction model

### INTRODUCTION

The Asian financial crisis of 1997–1998 has generated much interest among the countries that were affected by it and has caused them to contemplate the effectiveness of their monetary policy in a turbulent monetary market. Given the market's instability, these countries, including Malaysia, may have to reconsider their fiscal policy as an alternative viable macroeconomic tool as well as its role in stabilising the economy. At the height of the financial crisis in 1998, Malaysia experienced a negative real output growth and currency depreciation culminating in a higher rate of unemployment. To circumvent the prevailing economic instability, the Malaysian government introduced the capital controls policy and a fixed exchange rate regime against the US dollar by the end of September 1998 to curb capital flights and erroneous exchange rate fluctuations, respectively. However, these financial restrictions were lifted in July 2005 due to a perceived increase in stability in the monetary sector.

Malaysia achieved relatively impressive growth during the 1980s with an average real gross domestic product (GDP) growth of 8% annually. Many of the growth factors were the result of foreign direct investment and an expansionary monetary policy. However, the growth euphoria halted as the Malaysian economy succumbed to the financial crisis in 1997–1998. Thereafter, average real output growth hovered around 5%–6% annually. To sustain the economic growth momentum, the government implemented an expansionary fiscal policy in the late 1990s, which has exacerbated the budget deficits (see Figure 1). The budget deficit in 2007 stood at 3.2% of GDP. For Malaysia, a healthy and sustainable growth rate of at least 6% of real GDP per annum is crucial to reduce unemployment and maintain it at 3%–4% annually. Furthermore, the expansionary fiscal policy introduces an episode of high inflationary pressure, which is fundamentally tackled by using supply-side economics such as price controls.

The study purports to investigate the causal relationships between the fiscal components (namely, government revenue and expenditure) and their effectiveness in stimulating real output growth of the economy. Specifically, the study aims to examine the relationships between government revenue through taxation and government spending (covering both operating and development expenditures). These relationships would provide empirical evidence for whether 'fiscal synchronisation' is supported statistically in the macroeconomic context. This hypothesis implies that both revenue and spending decisions are decided simultaneously, in relation to other macroeconomic considerations.

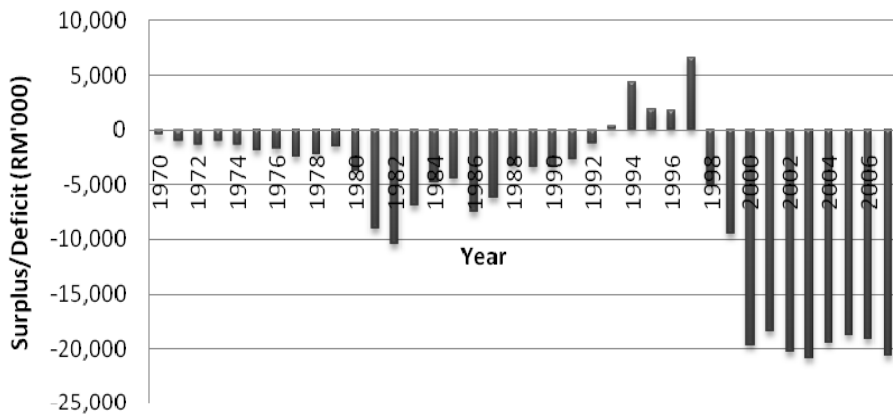


Figure 1. Matching government expenditure and revenue (1970–2007).

Source: Annual Report, Bank Negara Malaysia (various issues).

The paper is organised as follows: the next section briefly describes the theoretical and empirical background of fiscal policy. It is then followed by the discussion of data source, methodology and statistical results. The last section provides the conclusions and some policy implications.

## **THEORETICAL AND EMPIRICAL BACKGROUND**

Empirical studies on the causality between government revenue and spending have been voluminous, yet mixed. The advocates of the tax-and-spend hypothesis proposed by Friedman (1978), as well as Buchanan and Wagner (1978), theorise a causal relationship running from revenue to spending. The argument suggests that spending should be controlled and adjusted to the level of revenue. In that sense, a country with a persistent budget deficit should not rely heavily on taxation, as it could jeopardise growth. Empirical support for the tax-and-spend hypothesis includes a study by Chang, Liu and Thompson (2002) for Taiwan. Narayan (2005) finds that the short-run tax-and-spend hypothesis is applicable to Indonesia, Singapore, Sri Lanka and Nepal. AbuAl-Foul and Baghestani (2004) also support the tax-and-spend hypothesis for Egypt.

On the other hand, the spend-and-tax hypothesis suggests a causal relationship running from government spending to taxation. Peacock and Wiseman (1979) argue that economic and political uncertainties would justify the reverse fiscal policy for spending and would subsequently hike taxes. In effect, an increase in government spending temporarily would raise taxes permanently. In essence, it equates to the Ricardian equivalence theorem assuming an absence of fiscal illusion (Barro, 1989). Empirical studies that support this hypothesis include Mithani and Goh (1999) for Malaysia, Chang et al. (2002) for South Korea, while Narayan (2005) finds support for the long-run spend-and-tax hypothesis for Indonesia, Sri Lanka and Nepal.

Fiscal synchronisation, as suggested by Meltzer and Richard (1981), indicates bidirectional causality between government spending and taxation. This hypothesis suggests that government revenue and spending are decided simultaneously in relation to other economic considerations. Gounder et al. (2007) found strong evidence of fiscal synchronisation for the Fiji Islands in the long-run, implying that expenditure decisions are not made in isolation from revenue decisions. Similarly, AbuAl-Foul and Baghestani (2004) support the fiscal synchronisation hypothesis for Jordan.

Finally, when no apparent causality between government revenue and spending exists, this implies that spending and revenue decisions are made independently. The study by Chang et al. (2002) concludes that Thailand has no

apparent approach to fiscal policy. Narayan (2005) finds neutrality of fiscal reaction for Thailand, India, Malaysia, Pakistan and the Philippines.

## DATA AND EMPIRICAL RESULTS

The study uses annual data of government spending (S), government revenue (R) and GDP for the period 1970 till 2007. The time series data are retrieved from the various issues of *Annual Report* of Bank Negara Malaysia. To convert government spending and revenue in real terms, these fiscal variables are deflated by the GDP, respectively. Henceforth, the study uses logarithms of the ratio of S/GDP (denoted by s) and the ratio of R/GDP (denoted by r) as macroeconomic variables in the methodology. The logarithmic series would ensure variance stationarity for the purpose of regressions.

Macroeconomic time series typically contain unit roots and stochastic trends. The first step in the analysis is to utilise the Augmented Dickey-Fuller (ADF) unit root test to detect the presence of nonstationarity among the variables. In this test, the minimising of Akaike Information Criteria (AIC) determines the optimal lags and specification. Table 1 reports the empirical results of ADF unit root tests with intercept as well as with intercept and trend.

Table 1  
*Augmented Dickey-Fuller (ADP) Unit Root Test.*

Variable	Level		First-difference	
	Intercept	Intercept & trend	Intercept	Intercept & trend
s	-1.2433 (2)	-3.0074 (6)	-6.1013*** (1)	-6.0115*** (1)
r	-2.2373 (0)	-2.3303 (0)	-8.1230*** (0)	-8.2894*** (0)

*Note:* Figure in parenthesis ( ) denote lags.  
Optimal lags are determined by Akaike Information Criteria (AIC).  
\*\*\* denotes significance at the 1% level.

Based on these statistics, the null hypothesis of unit root could not be rejected at the levels for both fiscal variables. However, stationarity could be rejected at the first-difference, which implies that these series are integrated of order one,  $I(1)$ .

Given that these series are found to be integrated of order one, the study proceeds with the Johansen cointegration test to determine whether there exists a long-term relationship between these two fiscal variables. The trace and maximum eigen-value statistics are used to test the null hypothesis of no cointegration for these time series. The summary of the Johansen cointegration

test results is shown in Table 2. This test includes various assumptions on intercept, trend, linear and non-linear models.

Table 2  
*Summary of Johansen Cointegration Test.*

<b>Data Trend:</b>	<b>None</b>	<b>None</b>	<b>Linear</b>	<b>Linear</b>	<b>Quadratic</b>
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	0	0	2	0	0
Max-Eig	0	0	0	0	0

<b>Information Criteria by Rank and Model</b>					
Rank or No. of CEs	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
<b>Log Likelihood by Rank (rows) and Model (columns)</b>					
0	81.41907	81.41907	81.58782	81.58782	82.81822
1	86.93355	87.37725	<b>87.37736</b>	87.40846	87.86280
2	86.96865	89.50547	89.50547	90.86678	90.86678
<b>Akaike Information Criteria by Rank (rows) and Model (columns)</b>					
0	-4.301060	-4.301060	-4.199323	-4.199323	-4.156568
1	-4.385197**	-4.354291	<b>-4.298742</b>	-4.244915	-4.214600
2	-4.164925	-4.194748	-4.194748	-4.159266	-4.159266
<b>Schwarz Criteria by Rank (rows) and Model (columns)</b>					
0	-4.125113**	-4.125113**	-3.935404	-3.935404	-3.804675
1	-4.033304	-3.958412	<b>-3.858876</b>	-3.761062	-3.686761
2	-3.637086	-3.578935	-3.578935	-3.455480	-3.455480

Note: \*\* denotes significance at the 5% level. Critical values based on MacKinnon-Haug-Michelis (1999).

Based on the statistical results, the maximum eigenvalue statistics fail to reject the null hypothesis of no cointegration for all models.

However, the trace test rejects the null hypothesis of no cointegration with two cointegrating vectors, suggesting a linear model with intercept but no trend. The trace test suggests that a long-run causality between these fiscal variables does persist. In an econometric sense, the use of an error correction model (ECM) is appropriate. For further analysis, the unrestricted ECM will be used to investigate the causality between government revenue and expenditure.

Following the information by rank and model, the log likelihood (LR) test fails to reject the null hypothesis of no cointegration. The Schwarz Criteria (SC) rejects the null hypothesis of no cointegration, but it accepts the null hypothesis of at most one cointegration. Based on the Akaike Information criteria (AIC = -3.8589), a long-run cointegrating equation  $\{r_t = f(s_t)\}$  will be estimated. The estimated cointegrating equation is tabulated as follows:

$$r_{t-1} = -0.7425 + 0.5655s_{t-1} [3.6859]^{***}$$

(Note: Figures in bracket [ ] denote  $t$  statistic, \*\*\* denotes significance at the 1% level)

The estimated slope-coefficient shows an expected positive sign and it is statistically significant at the 1% level. The government expenditure with respect to government revenue elasticity is estimated at 0.57, implying a widening fiscal budget deficit in the long-run period.

The study continues to estimate the unrestricted error-correction model (ECM) to test the Granger's causality of these fiscal series. The optimal lag length follows the Akaike Information Criteria (AIC). The theoretical unrestricted vector ECM specification is shown as follows:

$$\theta(L)\Delta r_t = \delta + \varphi(L)\Delta S_{t-1} - \pi\Delta ect_{t-1} + \epsilon_t$$

where  $\epsilon_t$  is the white noise at time  $t$ ,  $\Delta$  is the first-difference,  $\theta(L)$  and  $\varphi(L)$  are polynomials in the lag operator ( $L$ ) (with  $\theta_0 = 1$ ),  $\pi$  is the coefficient for one-period lagged error-correction term ( $ect$ ), and  $\delta$  is the constant term.

Table 3 summarises the empirical results of the linear ECM with AR(2). The statistical results show that the estimated coefficient of  $ect$  for the revenue ECM equation is statistically significant at the 1% level. Moreover, it has the expected negative sign. However, the estimated coefficient of  $ect$  for the spending ECM equation is found to be insignificant. In short, the empirical evidence rejects the hypothesis of fiscal synchronisation theory for Malaysia. Instead, the findings indicate a unidirectional relationship and support the hypothesis of spend-and-tax policy. In essence, the statistical results indicate that spending causes revenue and revenue does not cause spending.

Additionally, the joint residual tests show the adequacy and robustness of the models used. The Jarque-Bera (JB) statistic shows normality of residuals, while LM and Pormanteau statistics depict no serial correlation problem.

Table 3  
Estimates of linear error correction model (ECM).

Equation	Coefficient	ECM estimate for $\Delta r_t$	ECM estimate for $\Delta s_t$
ect $t-1$	$\pi$	-0.4584 [-3.0053]***	-0.2625 [-1.0868]
$\Delta(r_{t-1})$	$\theta_1$	-0.0942 [-0.4274]	-0.1598 [-0.4578]
$\Delta(r_{t-2})$	$\theta_2$	0.2390 [1.3946]	0.3505 [1.1268]
$\Delta(s_{t-1})$	$\psi_1$	-0.2274 [-1.5489]	0.0241 [0.1038]
$\Delta(s_{t-2})$	$\psi_2$	-0.3653 [-2.4331]**	-0.6382 [-2.6843]**
Constant	$\delta$	0.0006 [0.0491]	-0.0058 [-0.3085]

Joint test:  
 JB = 6.4049 [0.1709]  
 LM (L = 1) = 1.3291 [0.8564]  
 LM (L = 2) = 2.0263 [0.7309]  
 LM (L = 4) = 5.1253 [0.2747]  
 Portmanteau (L = 12) = 26.6570 [0.7315]  
 AIC = -4.26667  
 Estimated cointegration equation:  $r_{t-1} = -0.7425 + 0.5655s_{t-1}$  [3.6859]\*\*\*

Notes: Figures in bracket [ ] denote t-statistics  
 \*\*\* denotes significance at the 1% level  
 \*\* denotes significance at the 5% level  
 $\Delta(\cdot)$  denotes first-difference

Table 4 presents the results of variance decompositions for government revenue and expenditure. The forecast error variance of government spending ( $s_t$ ) on revenue ( $r_t$ ) is relatively low. For the first 5 years, the forecast error variance of government revenue ( $r_t$ ) due to government spending ( $s_t$ ) increases from 0.1% to 13.1% as expected. For the same period, the forecast error variance of government spending ( $s_t$ ) due to government revenue ( $r_t$ ) decreases from 48.0% to 34.4%.

After the tenth year, the forecast error of government revenue ( $r_t$ ) attributed to government spending ( $s_t$ ) is relatively high at 45.2%, while the forecast error of government spending ( $s_t$ ) attributed to government revenue ( $r_t$ ) declines to 26.9%.

Furthermore, after the twentieth year, the forecast error of government revenue ( $r_t$ ) attributed to government spending ( $s_t$ ) increases further to a larger elasticity of 66.1%, while the forecast error of government spending ( $s_t$ ) attributed to government revenue ( $r_t$ ) declines further to 22.1%.

In summary, the statistical results of the forecast error variance suggest that the feedback from government revenue (through taxation) to government spending (expenditure) is relatively weak as evidenced by the relatively low elasticity, while the opposite relationship (spend-and-tax) between these fiscal instruments holds stronger.

Table 4  
Results of forecast error variance decompositions.

Period	Variance decomposition of revenue ( $r_t$ )		Variance decomposition of spending ( $s_t$ )	
	$r_t$	$s_t$	$r_t$	$s_t$
1	100.00	0.00	47.96	52.04
2	99.89	0.11	38.60	61.40
3	99.24	0.76	38.10	61.90
4	96.26	3.74	36.71	63.29
5	86.94	13.06	34.38	65.62
10	54.79	45.21	26.87	73.13
20	33.91	66.09	22.08	77.92

Note: Cholesky ordering:  $r_t$   $s_t$

## SUMMARY AND CONCLUSION

The study investigates the causal relationships between government revenue and government expenditure by using the cointegration test and error correction model for the period 1970 to 2007. Using annual time series, these fiscal variables are found to be cointegrated, implying the existence of a long-term relationship. Using the unrestricted ECM regressions, the empirical evidence does not lend support to the fiscal synchronisation hypothesis for Malaysia. However, the empirical results do support the spend-and-tax hypothesis. This would imply that increases in government spending would consequently raise taxes permanently, thus subscribing to the Ricardian equivalence. The empirical evidence of "spend-and-tax" fiscal policy would raise public concerns about future tax liability as it relates to borrowing. As such, Malaysia's fiscal policy calls for radical spending reforms with the ultimate goal of reducing the budget deficits. These reforms may include the cutback of federal subsidies and public employment.

Theoretically, privatisation should improve the fiscal standing of the government by curbing government spending while enhancing revenue. As such, privatisation will increase private domestic saving and investment, which will increase job opportunities, thereby reducing the yearly budget deficit of the government. Over the years, the privatisation of state and public enterprises in



Malaysia, with the aim of reducing the financial burden of the government, has not met with remarkable economic achievements.

Given the current political and economic uncertainties in Malaysia, the implementation of a fiscal budget deficit strategy should be for a short-term measure to mitigate sluggish economic growth momentum. The longer-term policy is to adopt a two-prong measure, namely private-sector-led growth and export-oriented economy, so as to allow more competition, which would improve productivity, efficiency and innovations. The way forward is to adopt an opposite fiscal policy through comprehensive expenditure reforms and subsidy reduction *vis-à-vis* a more liberalised, transparent and vibrant economy.

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