TESTING THE RELATIONSHIP BETWEEN GOVERNMENT EXPENDITURE AND NATIONAL INCOME IN MALAYSIA

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ABSTRACT

The present study aims to investigate the relationship between national income and Government expenditure in Malaysia. The annual data over the period 1960 to 1998 were used. The result of Johansen multivariate cointegration revealed that no long run relationship among the non-stationary variables existed. Further, a unidirectional causality was observed, that is, from national income growth to Government expenditure growth. Thus, Wagner's law is supported by the data, in the short run. Some relevant policy issues and implications are discussed.

ABSTRAK

Kajian ini bertujuan menyelidik hubungan antara pendapatan negara dan perbelanjaan Kerajaan di Malaysia. Data tahunan bagi tempoh 1960-1998 telah digunakan. Keputusan daripada ujian Johansen mengesahkan bahawa tidak wujud hubungan jangka panjang antara pembolehubah-pembolehubah tak pegun. Tambahan pula, ujian sebab-menyebab menentukan hubungan sebab-menyebab sehala iaitu dari pertumbuhan pendapatan ke pertumbuhan perbelanjaan Kerajaan. Hukum Wagner disokong oleh data dalam jangka pendek. Beberapa isu polisi dan perlaksanaan telah dibincangkan.

INTRODUCTION

A study of the relationship between Government expenditure and national income is worthwhile and receive increasing attention from researchers both in public finance literature and in the literature dealing with macroeconomic modeling. A testable thesis in the present study is

whether public expenditure leads economic growth; or economic growth triggers an expansion of government expenditure. In developing countries, the public sector absorbs a relatively large share of country's economic resources. The development process itself leads to a variety of economic activity which, in turn, leads to further growth in the economy. The contribution of exports (export led growth) (Khalafalla and Webb, 2001) as well as the role of banking (Tang, 2000; and Tang and Idris, 2001) cannot be excluded in the development of Malaysia economy. However, a testing of Wagner and Keynesian thesis was hypothesized in the present study.

Wagner's hypothesis (Wagner, 1890) is a classical approach which views public expenditure as an endogenous factor or as an outcome of growth in national income. As per capita income increases, the share of public sector expenditure rises to meet the increased protective, administrative and educational functions of the state. Wagner's law perceived that public expenditure played no role in economic growth, and did not qualify as development finance. Hence it cannot be relied upon as a policy instrument (Ansari *et al.*, 1997, p. 544). The rationale behind Wagner's law (Bird, 1971) is that firstly, industrialization gives rise to an increased scale of government activities, which arise from the administrative and protective functions of the state; secondly, is to ensure the proper operation of market forces, and finally is the provision of social and cultural goods. Wagner's law is often considered as a long run relationship, which is expected to apply to countries during their early stages of growth and development (Ansari, 1993, p.31).

Contrary to Wagner's view, Keynesian hypothesis (Keynes, 1936) stressed that public expenditure is seen as an exogenous factor that can be used as a policy variable, and which can impact upon growth and development in the short run. This is related to the sources of public spending and its impact on economic activities. The public finance literatures have revealed that the Government is believed to harmonize conflicts between private and social interests, resist exploitation by foreign interests and increase socially desirable investments.

A number of existing studies empirically examined the validity of Wagner's and Keynesian thesis in developed or developing countries. Most of these studies have given greater attention to long term relationships (cointegration) and causality between Government expenditure and national output in aggregate level. Their results were mixed. Some of their findings support Wagner's paradigm and others support the Keynesian thesis. Using the annual data from 1929 to 1996 and a cointegration approach (Johansen, 1988, and Johansen and Juselius, 1990), Islam (2001) provided a strong support for Wagner's hypothesis for the USA. In addition, Kolluri *et al.*, (2000) examined Wagner's law of Public expenditure for the G7 industrialized countries. The study covered the annual sample period 1960-1993 and employed cointegration (Engle and Granger, 1987) and causality approaches (Engle and Granger, 1987). A major finding is that the long run elasticity of Government expenditure with respect to national income indicated that Government spending, whether expressed as an aggregate or by type, supports Wagner's law.

Other empirical studies are summarised below. Thornton's (1999) study supported Wagner's law using six European country data of 19th century. Abizadeh and Yousefi (1998) found that the direction of causality is from economic growth to government expenditure, and is consistent with South Korea's economic status as an emerging industrialized economy, and with Kim and Cayer's (1997) finding of using various public spending components. In addition, Ansari *et al.*, (1997) used data from Ghana, Kenya and South Africa found no long run equilibrium between government expenditure and national income. Their main findings were that the hypothesis of public expenditure causing national income is not supported by all samples. Ansari (1993) used cointegration analysis and found support for Wagner's hypothesis as a long run phenomenon using Canadian data. Meanwhile, the estimation of error correction model provided evidence to support the Keynesian hypothesis as a short run phenomenon. The above studies used long run and short run dichotomy to explain the difference between Wagner's law and Keynesian hypothesis. Further, the studies of using disaggregated public spending were conducted extensively [see Biswal *et al.*, (1999), Chletsos and Kollias (1997), and Kim and Cayer (1997)].

The present study aims to empirically ascertain the causal relationship between aggregate Government expenditure and national income. In Malaysia the economic development has been significant with a high growth of 6.7 per cent for the years 1980 to 1990 and 8.5 per cent for the years 1991 to 1997 real Gross Domestic Product. In addition, Malaysia recorded the highest share of Government expenditure to GDP compared with five other ASEAN founding nations, that averaged 26.8 per

cent for the years 1960 to1998. The average share of Government expenditure to GDP for other countries were 18.6 per cent for Indonesia for the years 1964 to 1997; 18.9 per cent for Singapore for the years 1965 to 1998; 14.3 per cent for the Philippines for the years 1957 to 1998; and 15.7 per cent for Thailand for the years 1953 to 1998 [the raw data above were taken from *International Financial Statistics*, International Monetary Fund - *CD-ROM*].

The present study aims to examine the causal relationship among Government expenditure and national income in Malaysia. Public spending was used as a policy tool to improve the economic condition particularly after the Asian financial crises 1997-98. The annual growth of Government expenditure increased from 3.8 per cent in 1998 to 10.6 per cent in 1999, while Malaysian economy took a recovery signal from -7.5 per cent growth in 1998 to 5.4 per cent in 1999. At a disaggregated level (see Table 1), the share of defense and security expenditure was reduced significantly from 23.1 per cent in 1970 to 11.6 per cent in 1998. At the same time, an increase in the share of both economic and social services were a welcome boost to the economy. According to Mithani *et al.* (1998), more public expenditure is needed to be allocated for transport, public utilities, agriculture and rural development, education, health and family planning, housing, and community services.

Table 1
Share of Government Expenditure Components as %

Year	Defense and Security	Economic Services	Social Services
1970	23.1	19.6	28.8
1975	21.9	25.0	29.3
1980	19.1	31.4	25.1
1985	15.1	22.8	27.5
1990	13.6	25.2	27.8
1995	17.6	18.4	30.9
1997	14.8	19.2	33.1
1998	11.6	21.2	33.3

Note: The figures are calculated from data obtained from *Monthly Statistical Bulletin*, Bank Negara Malaysia, various issues.

The present study justifies the problems in causality testing procedures that yield invalid conclusions (Ansari *et al.* 1997, p. 543), by the concern of recent econometric literature that the result of the standard Granger causality test (Granger, 1969) is invalid if the included non-stationary time series are not cointegrated (Engle and Granger, 1987). The standard Granger causality is only applicable for stationary series. The present study justified those issues.

DATA AND METHOD

A major concern in the present study is that the results from regression analysis (Ordinary Least Square estimator) would be valid if the variables are stationary, the error term is serially uncorrelated and homoscedastic, and the time period used is sufficiently long enough to reflect the long run relationship presumed by Wagner (Islam, 2001, p.510). The variables used in analysis are real per capita Gross Domestic Product (Y) and real per capita Government expenditure (G). The Consumer Price Index (CPI, 100=1995) was used as a price deflator. Meanwhile, the effect of population growth was removed by using per capita values. The **sample span** covered the period from 1960 to 1998 (39 observations). Data were obtained from *International Financial Statistics*, International Monetary Fund - *CD-ROM)*. All variables are in natural logarithm form (Ln). The justification for the using annual data instead of quarterly in the present study is that '... *we believe that causality is a timely phenomenon, and the interaction of economic variables cannot work in short periods of a few quarters*" (Tao and Zestos, 1999, p. 122). The plots of the two variable series were cited in Figure 1. The real per capita income and real per capita Government expenditure have been moved smoothly over the period 1960 to 1986 with an upward trend.

The steps involved in the analysis are as follows. It is necessary to know the degree of integration of the included series, I(d), either in the stationary or non-stationary form. The Phillips-Perron (1988) unit root test (PP) was employed for this purpose. The PP test is designed to be robust for the presence of autocorrelation and heteroscedasticiy. The PP test is also more powerful, especially for small samples (Hallam and Zanoli, 1993, p.160). The regression equation for the PP [AR(1) process] is given as:

$$\Delta Y_t = a + bY_{t-1} + \varepsilon_t \tag{1}$$

Figure 1
Plot of Real Per Capita Gross Domestic Product (LnY) and Real Per Capita Government Expenditure (LnG) (in Log Form).
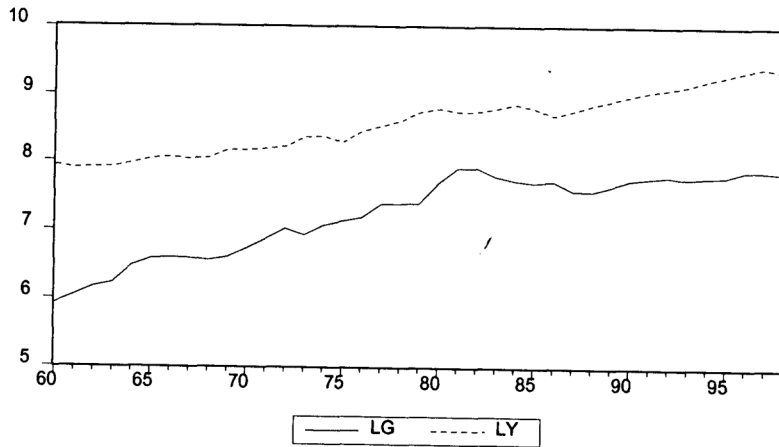
where Δ is first difference operator, ε_t is the regression error assumed to be stationary with zero mean and constant variance. Unit root tests were carried out to test the null of a Unit root ($b = 1$). The results were reported in Table 1, and reveal that the two interested variables are nonstationary or integrated in order one, I(1), i.e., both series are stationary in first difference form, $Y_t - Y_{t-1}$. The cointegration was carried out only on the first-difference stationary variables, I(1) (Thornton, 1999, p. 414).

Table 1
Results of Philip-Perron Unit Root Tests

Variable:	Level	First Difference	I(d)
LnY_t	-2.962186	-5.722205*	I(1)
LnG_t	-1.330354	-4.238962*	I(1)

Note: LnY log of real per capita income, and LnG is log of real per capita Government Spending. For level, constant and time trend were included into Unit root regression and constant only for first difference. Three truncation lag is included as Newey-West suggest, $q = 4(T/100)^{2/9}$.
* denote 1 per cent significant level based on MacKinnon's critical value.

Engle and Granger (1987) noted that even if an economic series (nonstationary) may wander through time, there might exist some linear combination of the variables that converges to an equilibrium i.e., that is the series are cointegrated. By following previous studies, the cointegrating equations used for testing Keynesian and Wagner's thesis are presented by equation (2) and (3), respectively.

$$LnY_t = a + b\, LnG_t + e_t \qquad (2)$$
$$LnG_t = a' + b'_1\, LnY_t + e'_t \qquad (3)$$

where LnY_t is Logarithm of real per capita GDP, LnG_t is logarithm of real per capita, Government expenditure. e_t and e'_t are residual.

To investigate the possible existence of a long run equilibrium relationship between national income and Government expenditure, the Johansen-Juselius technique was adopted (Johansen, 1988; Johansen and Juselius, 1990). This approach is found to be more efficient than the Engle-Granger (1987) method. One of the problems of using Engle-Granger the approach is that the results of the tests are sensitive to the left-hand side variable of the regression, that is, to the normalization applied to the cointegrating vector (Verbeek, 2000, p. 295). According to Hallam and Zanoli (1993, p. 153), the Johansen (1988) analysis provides more accurate estimate for the parameters of the long run relationship.

If the series found cointegrated (by rejecting the null of no cointegrating vector) then an error correction-term, EC_{t-1} and EC'_{t-1} obtained from one lagged period of e_t and e'_t in (2) and (3) respectively, should be included into the standard Granger causality procedure as in model (4) and (5). More formally, it refers to the error-correction model (ECM).

$$\Delta LnY_t = b_0 + \sum_{i=1}^{n} b_{1i}\Delta LnY_{t-1} + \sum_{i=1}^{n} b_{2i}\Delta LnG_{t-i} - b_3 EC_{t-1} + u_t \qquad (4)$$

$$\Delta LnG_t = b'o + \sum_{i=1}^{n} b'_{1i}\Delta LnG_{t-i} + \sum_{i=1}^{n} b'_{2i}\Delta LnY_{t-i} - b'3 EC'_{t-1} + u'_t \qquad (5)$$

equations (8) and (9) are presented in Figure 2. The estimated residual series are not oscillating around their mean values - non-stationary process. This observation provides alternative evidence that real per capita income and real per capita Government expenditure in Malaysia are not cointegrated (see Engle and Granger, 1987).

Figure 2
The Plots of Residual for Models (8) and (9)

Model (8)   Model (9)
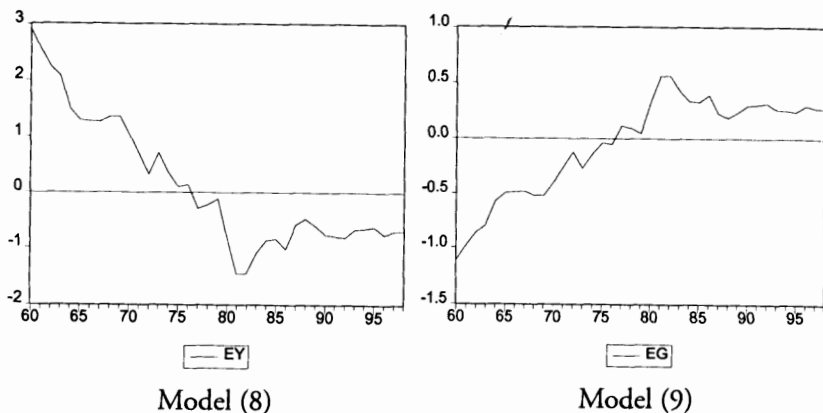
Further, the causality specifications were estimated without error correction term, that is Standard Granger causality test (Granger, 1969). The series used were differenced once to assume stationary. The estimated VAR for Granger causality analysis are reported as models (10) and (11) (see below).

The results of causality analysis are summarized in Table 3. The hypothesis (1) is rejected at 5 per cent significance level. This implies that national income growth causes Government expenditure growth - Wagner's law is supported as a short run phenomenon. The estimated elasticity of economic growth to Government spending growth is 0.73 with one-year lag (significant) [see equation (11)]. This figure indicates that Government spending is driven by economic activities in the previous year. This statement is consistent with Malaysia's budget proposal practice for the following year's allocations. Further, there is no evidence to support Keynesian thesis as a short run phenomenon. Hypothesis (2) cannot be rejected at 10 per cent significance level implying that the real per capita

$$\hat{\Delta LnY_t} = 0.04125 + 0.10782 \ \Delta LnY_{t-1} - 0.31067 \ \Delta LnY_{t-2}$$
$$\text{(t-value) (2.5910) \quad (0.6147) \qquad\qquad (-1.6451)}$$

$$+ \ 0.0088 \ \Delta Ln \ G_{t-1} + 0.1205 \ \Delta LnG_{t-2} \qquad\qquad (10)$$
$$\text{(0.0716) \qquad\qquad\qquad (1.0584)}$$

R-squared: 0.1502	Adjusted R-squared: 0.0406
DW-d: 1.8351	F-statistic: 1.3699 (Prob: 0.2670)

$$\hat{\Delta LnG_t} = 0.0039 + 0.3621 \ \Delta LnG_{t-1} - 0.1217 \ \Delta LnG_{t-2}$$
$$\text{(t-value) (0.1694) \quad (2.0472) \qquad\qquad (-0.7404)}$$

$$+ \ 0.7278 \ \Delta LnY_{t-1} + 0.0038 \ \Delta LnY_{t-2} \qquad\qquad (11)$$
$$\text{(2.8731)* \qquad\qquad (0.0139)}$$

R-squared: 0.2859	Adjusted R-squared: 0.1938
DW-d: 2.0227	F-statistic: 3.1031 (Prob: 0.0294)**

Note: *, ** denote significant at 1 per cent and 5 per cent respectively. The lag of 2 is selected in making sure that the residuals are white noise and normal distribution.

Table 3
Results for Standard Granger Causality Tests (Granger, 1969)

Null Hypothesis:	F-Statistic	Probability
(1) ΔLnY does not *Granger* Cause ΔLnG	4.20446	0.02423*
(2) ΔLnG does not *Granger* Cause ΔLnY	0.67004	0.51894

Note: Δ refers to fist differed form series. * denotes significant at 5 per cent level.

Government expenditure growth does not lead to a real per capita national income growth. These results indicate an unidirectional causality from real per capita income growth to real per capita Government expenditure growth.

CONCLUSION AND POLICY IMPLICATIONS

The major concern of the present study is to ascertain the Wagner-Keynesian Hypothesis in a developing economy like Malaysia. The results of Johansen cointegration test indicate that there is no long run relationship among real per capita national income and real per capita public expenditure over the sample period 1960 to 1998. Thus, Wagner thesis is not applicable in Malaysia. Further, standard Granger causality tests reveal an unidirectional causality, that is, from real per capita income growth to real per capita public expenditure growth. This indicates that Wagner's law is a short run phenomenon in Malaysia. The implication is that as economy activities expand, more Government expenditure is required. However, there is no evidence to support Keynesian proposition that Government expenditure as a policy instrument can be used to encourage growth in the Malaysian economy.

In reality, however, the role of public spending on Malaysian economy development remains a key fiscal policy. Mithani *et al.* (1998) used a comprehensive approach and analytical outlook over the annual period 1970 to 1998, revealing that expenditure management is the key to fiscal macro balancing. From available data, the Malaysian Government experienced continuous budget deficits over the period 1972 to 2000. The country enjoyed a surplus in the period of 1993-1997 (*Economic Report*, various issues). The budget deficit policy is continued with RM22,379 million deficit in 2001 (estimated) and it has been forecasted to be RM18,624 million deficit in the year of 2002 (Malaysia, 2001a).

Meanwhile, under the Third Outline Perspective Plan (OPP3), the Malaysian Government will continue to pursue a prudent fiscal policy. The overall fiscal deficit will be kept at a sustainable level so that the country's external debt servicing ratio remains within a manageable level. The Government will return to the fiscal surplus policy if the private demand is recovered. Government expenditure will continue to focus on infrastructure for capacity expansion and the provision of social services (Malaysia, 2001b). Nelson and Singh (1994) found that fiscal deficits of less developing countries (LDCs) have generally increased over the past two decades; there is little or no conclusive evidence that such deficits retard GDP growth rate. They concluded that fiscal deficits associated with public infrastructure improvements or with the promotion of private investment most likely will enhance economic growth (Nelson, and Singh, 1994, p. 184). They classified Malaysia as a middle-income country in accordance with the criterion used by the World Bank. Ahmed and Khalid (1996) found that the growth rate in Government budget deficits affect the growth rate of output positively.

ENDNOTE

1. The residual series is said to be a white noise process if each value in the sequence has a mean of zero, a constant variance, and is serially uncorrelated.

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