Beyond Wagner's Law for Three Caribbean Countries 1960-84

Some Thoughts on Government Expenditure

by

Clyde Mascoll

RESEARCH DEPARTMENT
CENTRAL BANK OF BARBADOS

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the structural change has not been caused solely by surplus funds being generated in the agricultural sector. Rather, a policy of industrialisation by invitation brought with it increasing levels of foreign investment and the base for economic diversification.

This meant that governments became very much involved in providing the necessary infrastructure which included a proper road network, communication links, educational and health facilities. Of course the provision of these services put a lot of strain on government revenues which were acquired via taxation or borrowing, whether domestic or foreign. It is in this context that we try to assess the growth pattern of government expenditure in the three Caribbean economies.

Review

Previous studies on public expenditure in the Caribbean concentrated on its impact on output and its effects on employment, redistribution of income, prices and the balance of payments. Goffman and Mahar suggested that even though there is an observable income elasticity often in excess of unity and this may be a necessary condition; it may not be a sufficient condition for proving income to be the cause of government expenditure increases. They found that Wagner's law did not adequately explain the pattern of behaviour of the relevant aggregate public expenditures for the six Caribbean countries investigated.

Odle in his article 'the impact of public expenditure in Guyana' looked at its effects on output. From the empirical evidence it seems that between 1952-67 government activity in Guyana had effects on economic growth, though not very significant relative to the size of public expenditure. He reasoned that growth in Guyana was probably more export propelled than Govenrment. Secondly, the composition of public expenditure was too much in favour of administration at the expense of the economic and social sectors. In addition geographical factors demanded a considerable amount of infrastructure expenditure of a type which did not have a direct incremental effect on the rate of growth.

For Barbados Howard (1979) found for the period 1946-64 expenditure elasticities which measure the responsiveness of various categories of government expenditure to changes in the gross domestic product. The category general administration had the highest elasticity of 1.632 which supports the view of the high cost of maintaining the civil service. Saunders and Worrell found that extensive development in Barbados' social and economic infrastructure in the period 1946-79 has resulted from increases in the scope of Government activity, rather than from any major shift in emphasis. They did not estimate any elasticity measures but showed that education and health dominated government spending throughout the period. And administratives costs declined in relation to the size of the government budget.

Interpretation of Wagner's Law

Though Wagner argued that the size of government expenditure increases in relation to the rate of economic growth, there was never any explicit formulation suggested for testing the law empirically. As a result, numerous specifications have been put forward in the hope of finding an adequate measure when conducting tests of Wagner's hypothesis. In this study we look at four different interpretations of the law referred to as the 'traditional' Peacock-Wiseman version, the Goffman version, the modified Peacock-wiseman version and the Musgrave version see Mann [4] June 1980.

In estimating the different elasticities of the various forms of Wagner's law, a log linear formulation is employed such that the elasticity is simply the coefficient of the explanatory variable. In algebraic form we specify a multiplicative function such that

$$E = a\, Y^{b} \qquad (1)$$

E is government expenditure
Y is nominal gross domestic product
a, b - are constants

Taking logs of equation (1) we get

$$\text{Ln } E = \text{Ln } a + b\, \text{Ln} Y \qquad (2)$$

This gives the general formulation used in this study with appropriate adjustments made where necessary. According to the

wagnerian expectations, the elasticity of E with respect to Y should exceed unity that is b > 1.

The 'Traditional" Peacock-Wiseman version postulates that government expenditure increases at a faster rate than output thus we tested the equation Ln E = Ln a + b Ln Y and got the following results

Table I

Country	Period	Elasticity Coefficient	R^2
Barbados	1960-82	0.9225	0.877
Jamaica	1961-81	1.433	0.997
Trinidad	1960-81	1.461	0.995

Except for Barbados with a 0.9225 elasticity coefficient, the figures of 1.433 and 1.461 for Jamaica and Trinidad respectively support the wagnerian expectations that the elasticity should exceed unity.

The Goffman version argues that as a nation experiences economic development and growth, an increase must occur in the activities of the public sector and that the ratio of increase, when converted into expenditure terms would exceed the rate of increase in output per capita. Therefore we tested the equation

$$\text{Ln } E = \text{Ln } a + b \text{ Ln } (Y/P)$$

and obtained the following results in Table II below:-

Table II

Country	Period	Elasticity Coefficient	R^2
Barbados	1960-82	1.118	0.996
Jamaica	1961-81	1.614	0.997
Trinidad	1960-81	1.605	0.996

The elasticities obtained of 1.118, 1.614 and 1.605 for Barbados, Jamaica and Trinidad respectively all support the wagnerian expectations. The formulation is sound not only at the theoretical level but as the evidence suggests an empirical one as well. In the provision of public expenditure government would not only take into consideration its income/revenue but the size of the population as well. As the population grows either through higher birth rates or longer life expectancy, the government has to provide additional primary schools, more health facilities in addition to various other social services.

The 'modified' Peacock-Wiseman version converts the traditional Peacock-Wiseman formulation into a share version, it

assumes that $E/Y = f(y)$. In log-linear form we get

$Ln(E/Y) = Ln\ a + b\ Ln\ Y$ which produced the following results in table III.

Table III

Country	Period	Elasticity Coefficient	R^2
Barbados	1960-82	0.087	0.66
Jamaica	1961-81	0.426	0.974
Trinidad	1960-81	0.447	0.917

The results obtained in table III provided some interesting results in that the elasticity for each country was below unity and not surprisingly so. The processes of determining government expenditure and national income are distinctly different. Therefore, it means that finding variables to explain government expenditure as a ratio of the gross domestic product will be a difficult exercise.

The Musgrave version must be interpreted as a functional relationship between a rising share of the public sector or a ratio of public expenditure to GNP and the level of per capita income. Thus we write:

$E/Y = f(Y/p)$. In log-linear form we get

$Ln(E/Y) = Ln\ a + b\ Ln\ (Y/P)$. The following results were obtained (See table IV).

Table IV

Country	Period	Elasticity Coefficient	R^2
Barbados	1960-82	0.090	0.661
Jamaica	1961-81	0.482	0.974
Trinidad	1960-81	0.510	0.958

Again the results do not satisfy the wagnerian expectations of the b's (coefficients) exceeding unity. Similar difficulty is recognised in this specification as the dependent variable remains the same as the modified Peacock-Wiseman version. And there is little difference between the independent variables GDP and Per Capita Income.

Model

Having identified that Goffman's version/interpretation best explains the wagnerian hypothesis, we expand the equation to incorporate other explanatory variables. We consider that government expenditure is influenced by the size of the country which is specified as a composite measure of population, gross domestic product and land area. We use the method of principal components as described by Downes [1] to determine this measure. Principal components analysis can be used to derive a 'composite' index of country size, based on the assumption of significant correlation among variables. This

procedure according to Downes allows us to overcome, to some extent, the a prior imposition of equal weights in the construction of a 'composite' index of a country size.

Expenditure on health and educational services represented the major components of total expenditure in the three countries over the period. Therefore factors which influenced such expenditures would ultimately affect total government spending. The ratio of the dependent population to the total population and the number of children 15 and under as a ratio of the total population are expected to impact positively on government expenditure. We adopt these two factors as explanatory variables in our expenditure function.

Population growth and longer life expectancy gave rise to a larger dependent population. As a result the demand for health services increased and as expected government responded by providing free or heavily subsidised services wherever possible.

The increase in birth rates caused by higher teenage pregnancies resulted in significant growth in the young population. As the percentage of children being enrolled in the primary and secondary schools rose, governments were required to provide more schools. This meant that more teachers were also needed to cope with the ever-increasing educational needs of the people.

From the above we speficy:

$$GE = F(cs, \frac{DP}{P}, \frac{Sc}{P})$$

where
- GE - government expenditure
- DP - dependent population
- SC - number of children in school 15 yrs. and under
- P - total population
- CS - country size

We intend to estimate the above equation using regression analysis. This is followed by a review of fiscal policy in the three countries over the period 1960-84 with particular emphasis on the expenditure side. In the analysis the categories of health, education and general administration are highlighted.

Shift in Emphasis

According to Musgrave, the objectives of the fiscal policy in a mixed economy can be divided into three categories. Fiscal policy is conducted to secure the efficient allocation of resources. Secondly fiscal policy is pursued to achieve a more equitable distribution of income and wealth. And finally to stabilise the price of domestic goods and services and the exchange rate value of foreign currencies. The expenditure policies to achieve the above objectives are implemented primarily through the annual budgetary proposals of the three countries. We must note however, that expenditure policies cannot be separated from revenue policies.

We now assess the change in fiscal emphasis pursued in the management of the three economies over the period 1960-84. For convenience we identify the periods 1960-73 and 1973-84 as periods of contrast in the prescription of fiscal policy. This division is guided by the ratio of government expenditure to GDP which soared in Trinidad and Jamaica between 1973 and 1974.

Prior to 1973, Jamaica, Trinidad and Barbados were experiencing significant economic growth with little balance of payments difficulties. Therefore, it appeared that the various governments fiscal measures were meeting their desired objectives. But while there might have been domestic price stability and some initiatives to correct the distribution of income, unemployment remained a major concern.

The arrival of the oil crisis in 1973 brought balance of payments difficulties, high rates of inflation and declines in output. Of course Trinidad was the exception as it prospered from the astronomical increase in oil prices. However, this created problems of a different kind for Trinidad as its people expectations rose with the new found wealth of the country. As a consequence all the governments were expected to proceed cautiously with fiscal expansionary measures.

According to Worrell [8] Trinidad and Tobago with large foreign exchange surpluses, embarked on a programme which boosted national expenditure reversing earlier policies which contributed to increased savings. The Barbados government's policy was mildly restrictive, with growing fiscal saving on the current account and some credit restrictions as the main levers. The Jamaican government made attempts to contain national expenditure and to divert it from foreign to domestic goods using adjustments to the government budget, exchange rate changes, credit restrictions and directives on the disposition of foreign exchange.

The objectives of fiscal policy as outlined by Musgrave are expected to be achieved but no time frame is recommended. This creates problems for the economic managers, since the objectives can be met only through a combination of short-term and long-term measures. And accomplishing one objective with a particular set of measures could go against some other objective/objectives. With these difficulties in mind, we analyse the growth pattern of government's expenditure on health, education and general administration for three countries. These categories were selected because of their importance in the pursuit of economic development as well as their share of total expenditure.

Having analysed the three major categories of government expenditure we now specify the following functional equations:

$$\frac{EE}{GE} = f(CS, SC/p) \qquad (2)$$

$$\frac{HE}{GE} = f(CS, DP/p) \qquad (3)$$

where EE - educational expenditure;

HE - health expenditure

We intend to

i) estimate the above functional equations.

ii) make projections for the key variables.

iii) predict EE/GE and HE/GE for '86 and '87.

iv) make policy recommendations on the basis of the analysis.

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