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Abstract
This paper examines empirically the concept of fiscal stability for Barbados and Jamaica over the period 1973-2010. Fiscal stability is defined within an extended public choice model of government expenditure attributed to Baumol (1967) and Spann (1977) by the incorporation of a government revenue equation. A tax price variable is used to test Kaldor’s cobweb theorem in measuring fiscal stability that is estimated using the bounds testing approach to cointegration. The results suggest fiscal stability for Barbados in contrast to Jamaica over the long run. In the short run, fiscal stability holds for Barbados but is inconclusive for Jamaica. The different results may be reflecting a greater unbalanced productivity gap in the Jamaica economy.

Keywords: Fiscal stability, Barbados, Jamaica, bounds testing, tax price, cointegration.

JEL Classifications: H10, H50

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1. **Introduction**

The four more developed countries\(^1\) (MDCs) in the Caribbean community are characterized by a persistent fiscal burden that is believed to have a negative effect on economic growth, the foreign reserves and the national debt in particular. In the post-1973 period, for the most part, fiscal deficits expressed as a percentage of GDP were much higher than the 3\% target, which Lewis (1966) observed as manageable for undeveloped countries. The lack of fiscal stability\(^2\) in the post-independence period\(^3\) has been observed by academics and policy makers alike. It is believed that expansionary fiscal measures undermined the notion of fiscal stability that was not clearly defined and examined.

Against this backdrop, the present paper investigates and examines fiscal stability for two small open economies, Barbados and Jamaica, for the period 1973-2010. The definition of fiscal stability follows the cobweb theorem developed by Kaldor (1934), which compares the coefficients of the price variables for ordinary demand and supply functions. The paper uses the Baumol (1967) model of unbalanced productivity to which Spann (1977) added a government expenditure function. The model required a further expansion by Mascoll (2014) in the form of an additional government revenue function. The latter two functions form the theoretical basis for defining and examining the concept of fiscal stability.

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\(^1\) Jamaica, Guyana, Trinidad and Tobago and Barbados.
\(^2\) Howard (1989) and Mascoll (1988) provide details on the fiscal performance for three of the MDCs.
\(^3\) The MDCs attained independence between 1961 and 1966.
The threat to fiscal stability emerged, especially after the first oil-crisis in 1973, when high and persistent fiscal deficits were accompanied by foreign exchange problems for Jamaica, while for Barbados the problems were less pronounced – see Figure 1 above. For the first two decades, Barbados’ fiscal deficit and foreign reserves as a proportion of GDP remained within the 10 percent range, while in Jamaica the fiscal deficit was more than 10 percent of GDP and foreign reserves were negative. The relationship between the fiscal deficit – when financed by domestic credit creation at the central bank – and the foreign reserves is the essence of the monetary approach to the balance of payments (MABOP). This approach was popularised by Polak (1957) and the Keynesians at the International Monetary Fund (IMF) as well as the monetarists at the University of Chicago4. An excess supply of money caused by credit creation triggers the purchase

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4 The justification is contained in two books entitled the Monetary Approach to the Balance of Payments, which were published by the University of Chicago and the International Monetary Fund in 1976 and 1977, respectively.
of foreign goods and services or investing abroad. Howard and Mamingi (2002), Coppin (1994), Leon and Molana (1988) found support for the negative impact of money creation on the foreign reserves of the two Caribbean economies.

Fiscal stability is not directly defined in the public finance literature, it is treated as a consequence of fiscal sustainability that is itself not always clearly defined. For a comprehensive review of the literature on debt and fiscal sustainability - See Worrell et al (2015). They identified the term being used interchangeably and inconsistently with solvency and liquidity from one study to another. Furthermore, Easterly, Irwin and Servén (2008) suggested the need for accrual accounting information that is not yet available to examine fiscal sustainability for the two Caribbean countries being studied. They also noted that “although accrual accounting generates valuable information missed by traditional cash accounting, it is not sufficient for the assessment of net worth, even in middle- and high-income countries.”

The earlier public finance literature focussed on explaining the growth of government expenditure. This started with a demand side search in the vein of Wagner’s (1893) law, followed by the Peacock and Wiseman (1961) displacement effect approach. Soon after, public choice models emerged that applied economic theory to political choices in an effort to explain government expenditure growth using a demand side approach. This resulted in the first set of empirical work being done by Borcherding and Deacon (1972) and Bergstrom and Goodman (1973).

Henrekson and Lybeck (1988) identified among other shortcomings, the need to derive both demand and supply functions from one unitary theory in an attempt to better understand the growth of government expenditure. Mascoll (2014) was inspired by such a need in the literature.
and added a further modification to the Baumol-Spann model in a way that makes it possible to define the concept of fiscal stability in the model of Kaldor (1934).

Previous attempts\(^5\) at macroeconomic models for Jamaica and Barbados treated the fiscal system as exogenous, which was typically represented by a government expenditure variable. The researchers therefore implicitly assumed that the behaviour of government is not affected by such variables as aggregate demand, tax prices and the national debt among others. Therefore the models could not define and/or test for fiscal stability, since the concept, as presented in this study, requires both government expenditure and revenue to be endogenised.

The proposed fiscal system is estimated using the autoregressive distributed lag (ARDL) bounds testing approach to cointegration developed by Pesaran et al (2001) to determine and test the concept of fiscal stability. The methodology has some advantages over the Sargan-Hendry type of error correction model (ECM) that includes some contemporaneous variables (levels or differences) as regressors and the Engle-Granger-Johansen type that is an expanded vector autoregression (VAR) à la Sims (1980). The ARDL approach does not require the variables to be all integrated of order zero or one that is I(0) or I(1); it accommodates a mixture of them but no I(2) that is variables integrated to the order of two. When the sample size is small, ARDL is superior to the other cointegration techniques as it yields unbiased estimators – see Pesaran et al (2001). Moreover, it provides valid test statistics even when some of the regressors are endogenous. In this study, the accuracy of the parameter estimates is crucial, which favours the ARDL as well.

The paper shows that for the period 1973-2010, fiscal stability - that is the absolute value of the estimated tax price coefficient from the government revenue/demand function is larger than the estimated coefficient from the government expenditure/supply function - holds for Barbados in both the long and short run. While for Jamaica, fiscal stability does not hold in the long run and is inconclusive in the short run. For Barbados, in the short run, the tax price and real income variables are dominant in explaining government revenue and expenditure behaviour, while for Jamaica, the two dominant variables are the tax price and national debt. In both countries, real income and debt are the two most important variables explaining government expenditure and revenue in the long run.

The paper makes contributions to the theoretical and empirical literature. To the best of our knowledge, it is the first paper to specify both a government expenditure and revenue equation from a unitary theory. This makes it the first attempt at defining fiscal stability in this direct way in the literature. It is also the first paper that utilises the ARDL bounds testing methodology in modelling fiscal stability in the vein of Kaldor (1934). The strength of this methodology in the study is the validity of the test statistics even when some of the regressors are endogenous.

From a policy perspective, reducing the productivity gap between the public and private sectors is one way of pursuing fiscal stability in the long run. Such an approach would lower the relative price of public sector goods and services, which results in desirable change in government expenditure. This encourages some adjustment in government revenue that may inspire economic growth. However, fiscal prudence is required as the empirical evidence suggests that government expenditure responses more than government revenue to growth, especially in the Jamaica economy.
Section 2 presents a literature review that emphasises the Baumol-Spann-Mascoll fiscal system; followed by the presentation of the fiscal stability model and the Autoregressive Distributive Lag (ARDL) approach to cointegration in the mode of Pesaran et al (1999, 2001) in Section 3. In the empirical section, diagnostic tests of the model along with the parameter estimates are presented and analysed with specific emphasis on the measure of fiscal stability. Conclusions are made in Section 5.

2. Literature Review

The search for an understanding of the growth of government expenditure started with a demand-side hypothesis proposed by Wagner (1893)\textsuperscript{6}, which assumes that the public sector grows in tandem with the economy. Almost a century later, Peacock and Wiseman (1961) argued that the time-profile of public spending is discontinuous as social disturbances produce a displacement effect. These early propositions lacked a well-articulated theory of public choice that is an application and extension of economic theory to the realm of political or governmental choices. However, Buchanan and Tullock (1962) are credited with laying the theoretical foundation of public choice literature.

The earliest empirical studies of public choice were done by Borcherding and Deacon (1972) and Bergstrom and Goodman (1973) for the United States economy, using a tax price variable that would become popular in the literature. Given the treatment of price and quantity in the two models, government expenditure was treated as an observation on the demand curve of a consumer with the median income. They both posited a government expenditure/demand function that is log-linear with constant income and price elasticities for the public good.

\textsuperscript{6} The Wagner hypothesis that the income elasticity of demand for the sort of goods the government supplies is greater than one dominated the early literature.
The first supply side attempt to explain government expenditure growth was suggested by Baumol (1967). The model is outlined below. Spann (1977) added the government expenditure function noted above to the model. Therefore, the production functions approach and the demand equation in the Baumol-Spann model below did not come from a unitary theory.

Henrekson and Lybeck (1988) identified two major shortcomings in the literature on government expenditure growth as: (1) the need to derive the demand and supply functions from one unitary theory; and (2) the importance of testing the different theories together by applying a coherent model which integrates the demand and supply equations in a common framework. Of these two, the first shortcoming is addressed in this paper.

To address the absence of a government revenue equation, Mascoll (2014) appealed to the Baumol-Spann model. It essentially assumes that the economy can be decomposed into two sectors: (1) a progressive one (identified here as the private sector) which exhibits a cumulative increase in productivity as a result of capital accumulation, economies of scale and innovation, and (2) a non-progressive one (the public sector) where technological progress and hence productivity is assumed to be less than in the progressive sector.

It is further postulated that labour is the only factor input that produces these two products in the market. A constant returns to scale technology is posited. Thus the production functions for the private and public sectors are given by:

\[\begin{align*}
Q_{pt} &= \alpha L_{pt} e^{yt} \\
Q_{gt} &= \beta L_{gt}
\end{align*}\]
where $Q_g$ is public sector output; $Q_p$ is private sector output; $L_g$ is labour input in the public sector; $L_p$ is labour input in the private sector; $\gamma$ is the rate of technological progress in the private sector and $\alpha$ and $\beta$ are positive constants that represent the relative size of the private- and public sector, respectively; where $\beta$ is less than $\alpha$. Wage rates are identical in both sectors that compete for workers in the same labour market. In relation to the private sector productivity, the wage rate ($W$) grows in time as

$$W_t = W_0 e^{\gamma t}$$

where $W_0$ is a constant and is the initial level of wages. Given the above specifications, the average cost per unit of output $AC$ in each sector is

$$AC_{gt} = \frac{W_t L_{gt}}{Q_{gt}} = \frac{W_0 e^{\gamma t}}{\beta} = \frac{W_t}{\beta}$$

$$AC_{pt} = \frac{W_t L_{pt}}{Q_{pt}} = \frac{W_0}{\alpha}$$

From Equations (4) and (5) the average cost in the public sector will rise while it remains constant in the private sector. In a similar vein, the relative price of public services will increase since

$$\frac{P_{gt}}{P_{pt}} = \frac{\alpha e^{\gamma t}}{\beta}$$

where $P_g$ is the price of services in the public sector and $P_p$ is the price of services in the private sector. If $\gamma$ is equal to zero, then the price of the public good is higher than that of the private good, once $\beta$ is less than $\alpha$. 

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Spann (1977) introduced a median voter demand schedule into the model to account for the effect of the rising relative price of public sector goods on the rate of growth in real public expenditure. In addition, it took care of the criticisms levelled by Lynch and Redman (1968) and Keren (1972) that Baumol (1967) ignored the effect of the positive rate of productivity in the private sector on income and its consequent effects on to the demand for public services. The median voter’s schedule is specified in log-linear form as

\[
\frac{Q_g^d}{L} = A \left( \frac{P_{gt}}{P_{pt}} \right)^{\eta} \left( \frac{Y}{P_{pt}} \right)^{\delta}
\]  

(7)

where \( \frac{Q_g^d}{L} \) is the demand for public good per capita; \( \frac{Y}{L} \) is the nominal national income per capita; \( \eta \) is the price elasticity of demand; \( \delta \) is the income elasticity of demand and \( A \) and \( L \) the sum of \( L_G \) and \( L_P \) are constants.

Mascoll (2014) introduced a supply function of the government – which is observed on the expenditure side - in the vein of the median voter’s demand schedule and is specified to capture the rising relative wage of the public sector workers and a government revenue variable that considers its constraining influence on government expenditure. It is log-linear such that

\[
\frac{Q_g^s}{L} = B \left( \frac{W}{P_g} \right)^{\phi} \left( \frac{R}{P_g} \right)^{\theta}
\]  

(8)

where \( W \) is the relative wage rate; \( R \) is the revenue of government; \( \phi \) is the wage elasticity of supply; and \( \theta \) is the revenue elasticity of supply. Recall that

\[
R = P_g \times Q_g^d
\]  

(9)

and note that
\[ \frac{R}{R_L} = \frac{Q_g}{P_g} \mid (10) \]

It is important to point out that the demand function in Equation (10) is derived from the revenue function of the government, which differs from the way that previous studies cited above interpreted demand using government expenditure as the dependent variable. In addition, it is assumed that the price variable is positively correlated with the demand/government revenue function. Therefore using equations (8), (7) and (10) leads to

\[ \frac{Q_g}{L} = B(W_t) \left[ A \left( \frac{P_{gt}}{P_{pt}} \right)^{\eta} \left( \frac{Y_t}{P_t} \right)^{\delta} \right]^{\theta} = B'(W_t)^{\theta} \left( \frac{P_{gt}}{P_{pt}} \right)^{\eta} \left( \frac{Y_t}{P_t} \right)^{\delta} \mid (11) \]

The relative price variable is negatively related to government expenditure suggesting that at lower prices the government is able to supply more goods and services to the public. As the relative price increases, it reduces the government’s capacity to supply the quantity of goods and services. The government expenditure/supply function is therefore negatively sloped. Likewise as the wage rate increases the government’s ability to supply goods and services to the public is expected to fall that is there is an inward shift of the supply curve. On the other hand, an increase in real income per capita shifts the supply curve outwards.

The government revenue/demand function is positively related to the relative price variable. As the price rises the quantity of goods and services demanded by the public increases; conversely the quantity reduces with a fall in the price. As the real income per capita increases the demand curve shifts outwards.
Using the model outlined above, the concept of fiscal stability in the Kaldor (1934) sense is represented in Figure 2. Unbalanced productivity between the private and public sectors is the trigger for point a on $Q^s$, which leads to excess demand. This decreases the relative price that creates excess supply at $Q_1$. The relative price increases at $Q_2$, and generates excess demand that once again lowers the price at $Q_3$. This process continues at $Q_4$, where the price rises again, until the cobweb movement converges to the equilibrium point at $Q_0$ with a price $P_0$. The attainment of relative fiscal stability is possible via a reduction in the price of the public goods relative to private goods, which from a policy perspective is achievable with productivity improvements in the public sector relative to the private sector.

Notable references to fiscal stability in the literature include the laying of a “Code of Fiscal Stability” in parliament by the United Kingdom government in 1998. The purpose of the Code was “to improve the conduct of fiscal policy by specifying the principles that shall guide the

\footnote{Under Section 155(7) of the Finance Act 1998, the government was required to lay the Code for Fiscal Stability before Parliament.}
formation and implementation of fiscal policy.” Fiscal stability was not defined. Stability was identified as one of the five principles of fiscal management along with transparency, responsibility, fairness and efficiency.

According to the Code for Fiscal Stability, “the principle of stability means that, so far as reasonably practicable, the government shall operate fiscal policy in a way that is predictable and consistent with the central economic objective of high and stable levels of growth and employment.” Buiter (2001) in commenting on the Code raised concerns about the so-called golden rule of public sector borrowing, which suggests that government borrowing should not exceed government capital formation. His second major concern was about the benefit of constructing a more comprehensive balance sheet of public sector assets and liabilities. Buiter (2001) identified a body of work that discussed the technical and conceptual issues, which informed his second concern.

In accordance with the definition of sustainability used by Blanchard et al (1990) in the context of fiscal policy, the literature focused on fiscal sustainability rather than fiscal stability. They noted that “sustainability is basically about good housekeeping. It is essentially about whether, based on the policy currently on the books, a government is headed towards excessive debt accumulation.” This focus led to the notion that the behaviour of the debt-GDP ratio is a good indicator of fiscal sustainability. The emphasis is then placed on “…the use of a small set of indicators…, each associated with a specific time horizon. For each horizon, the indicator is defined as the difference, or “gap”, between the “sustainable” tax rate over the horizon and the current tax rate.”

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There is however a stage before debt accumulation that has to do with understanding the behaviour of the fiscal deficit/surplus, which is a focus in this paper as seen in Figure 2 above. The change in the relative price causes the fiscal stability as adjustments are made to both government revenue and expenditure. Herein lies the need to appreciate, from a policy perspective, that debt sustainability must be addressed via policies that, first and foremost, affect the fiscal deficit/surplus.

3. Model and Econometric Methodology

The model that is to be estimated is not of the per capita variety developed in the theoretical section, which does not change the underlying analysis. Furthermore, given that demand and supply quantities for government goods and services are not available, values for government revenue and expenditure have to be used. The specification is initially in levels with the addition of a national debt variable to capture the fiscal reality in the two Caribbean economies in the post-1973 period. The following equations for Barbados and Jamaica are therefore considered:

\[ Q^s = f(P_G, D, W, Y) \]  (12)
\[ Q^d = f(P_G, D, Y) \]  (13)

Where \( Q^s \) is the total government expenditure; \( Q^d \) is the total government revenue; \( P_G \) is the tax price; D is the total national debt; W is the national real wage index and Y is the real national income.

It is tempting to introduce an equilibrium condition to represent a system of simultaneous equations. The system would be of a structural form to the extent that it is a representation of the structure of a fiscal deficit/surplus in the two countries, reflecting the behaviour of the government.
Given the focus on measuring fiscal stability, the explanatory variables ought to be exogenous or predetermined. Of equal concern is the notion that what constitutes an endogenous variable is very relative. Mamingi (2005, 124) noted that “a variable that is endogenous in a given environment can become exogenous in another environment.”

If the two theoretical specifications in equations (12) and (13) are put in the form of econometric models, then any shock to the disturbance term in the revenue equation affects the expenditure equation, which in turn affects the overall fiscal deficit/surplus. In this sense, simultaneity is established in the system of equations.

The dynamic process involved in reaching the condition of fiscal stability, as demonstrated in Figure 2 above, is not the issue in the paper. Rather, the condition that gives rise to fiscal stability is. The former could be the basis of another study.

Following on the Pesaran et al (2001) bounds testing approach to cointegration, it must be checked that no variable is I(2). Once the order of cointegration of the variables is resolved, an ARDL model is formulated with any combination of I(0) and I(1), using a conditional unrestricted ECM. The ranges of summation of the various terms in the $z$ vector defined in the model below and the maximum lags are determined by the Akaike and Schwarz Bayesian Information criteria. It must be established that the errors in the ARDL model are serially independent. Furthermore, the model must be dynamically stable. Given the above, bounds testing is performed using the calculated F-statistic and T-statistic and comparing them to the respective tabulated statistics provided in Pesaran et al (2001). Once the bounds tests support cointegration, the long-run equilibrium relationship between the variables is estimated as well as the usual ECM. The long-run coefficients are extracted from the unrestricted/conditional ECM. Since long-run equilibrium requires that the short-run variables are equal to zero, the long-run coefficients are determined by
dividing the estimated coefficients on these variables by the coefficient of the lagged dependent variable.

Pesaran et al (2001) utilised the conditional error correction representation of the ARDL model as:

\[
\Delta y_t = c_0 + c_1 t + \pi_{yy} y_{t-1} + \pi_{yx,x} x_{t-1} + \sum_{i=1}^{p-1} \psi_i' \Delta z_{t-i} + \omega' \Delta x_t + u_t
\]

\(t=1,2,\ldots\), where

\[
c_0 = -(\pi_{yy}, \pi_{yx,x})\mu + [y_{yx} + (\pi_{yy}, \pi_{yx,x})]y, c_1 = -(\pi_{yy}, \pi_{yx,x})\gamma
\]

Case III, where there is an unrestricted intercept and no trend, is employed. Alternatively, \(c_0 \neq 0; c_1 = 0\) and \(\gamma = 0\). The intercept restriction that \(c_0 = -(\pi_{yy}, \pi_{yx,x})\mu\) is ignored.

The two equations (12) and (13) can be approximated by a log-linear VAR (p) model, with the appropriate intercept. Let \(z_{1t} = (Q_t^s, P_{Gt}, Y_t, D_t, W_t)' = (Q_t^s, x_{1t})'\) from equation (12). In similar vein, let \(z_{2t} = (Q_t^d, P_{Gt}, Y_t, D_t)' = (Q_t^d, x_{2t})'\) from equation (13). Using equation (14) and recognising \(y_t = Q_t^s\) and \(y_t = Q_t^d\) respectively, the conditional ECMs of interest in the vein of Pesaran et al (2001, p.296) can be written as:

\[
\Delta Q_t^s = c_0 + \pi_{Q^sQ^s} Q_{t-1}^s + \pi_{Q^sQ^s} x_{1t-1} + \sum_{i=1}^{p-1} \psi_i' \Delta z_{1t-i} + \delta^s' \Delta x_{1t} + u_{1t}
\]

\[
\Delta Q_t^d = c_0 + \pi_{Q^dQ^d} Q_{t-1}^d + \pi_{Q^dQ^d} x_{2t-1} + \sum_{i=1}^{p-1} \psi_i' \Delta z_{2t-i} + \delta^d' \Delta x_{2t} + u_{2t}
\]

The approach to choosing the dynamic lag structure in (15) and (16) is flexible, in the sense that allowance is made for short-run feedbacks from the lagged dependent variables, \(\Delta Q_t^s\) and \(\Delta Q_t^d\), \(i = 1, \ldots, p\), to \(\Delta x_{1t}\) and \(\Delta x_{2t}\), respectively.

It is essential to explain the bounds procedures for testing for the existence of a level relationship between \(Q_t^s\) and \(x_{1t}\), and \(Q_t^d\) and \(x_{2t}\). The approach is to test for the absence of any level relationship via the exclusion of the lagged level variables \(Q_{t-1}^s\) and \(x_{1t-1}\), and \(Q_{t-1}^d\) and \(x_{2t-1}\) in equations (15) and (16), respectively. For equation (15), the respective null hypotheses
are $H_0: \pi_{Q^sQ^s} = 0$, $H_0: \pi_{Q^sX} = 0'$, and the alternative hypotheses $H_1: \pi_{Q^sQ^s} \neq 0$, $H_1: \pi_{Q^sX} \neq 0'$. For equation (16), the respective null hypotheses are $H_0: \pi_{Q^dQ^d} = 0$, $H_0: \pi_{Q^dX} = 0'$, and the alternative hypotheses $H_1: \pi_{Q^dQ^d} \neq 0$, $H_1: \pi_{Q^dX} \neq 0'$. The absence of a long-run equilibrium relationship between the variables coincides with zero coefficients on the lagged variables. Therefore a rejection of the null hypothesis implies that there is a long-run relationship.

The test statistic is non-standard and so Pesaran et al (2001) provide lower and upper bounds for the critical values. If the computed F-statistic falls below the lower bound, we conclude that variables are I(0), so no cointegration is possible. If the computed F-statistic exceeds the upper bound, then we have cointegration among the variables. Any computed F-statistic that lies between the bounds indicates that the test is inconclusive.

In similar vein, the t-statistic for equation (15) is tested with the null hypothesis of $H_0: \pi_{Q^sQ^s} = 0$, against the alternative hypothesis of $H_1: \pi_{Q^sQ^s} < 0$. For equation (16), the null hypothesis is $H_0: \pi_{Q^dQ^d} = 0$, against the alternative hypothesis of $H_1: \pi_{Q^dQ^d} < 0$. If the t-statistics for the lagged dependent variables in the two equations are greater in absolute value than the I(1) bound tabulated by Pesaran et al (2001), then there is support for a long-run relationship between the variables. If the t-statistics are less in absolute value than the I(0) bound, then we conclude that the data are all stationary. Again any computed t-statistic that lies between the bounds indicates that the test is inconclusive.

Once the bounds tests confirm cointegration among the variables, a meaningful estimate of the existence of a long-run relationship can be determined. In addition, the conventional ECM can be estimated. The long-run coefficients can then be extracted from the conditional unrestricted ECM in equations (15) and (16). This is achieved by noting that in the long-run equilibrium
In the circumstances, the long-run coefficients are extracted as \( \frac{\pi_{qs,xs}}{\pi_{qs,qs}} \) and \( \frac{\pi_{qd,xa}}{\pi_{qd,qd}} \) from equations (15) and (16), respectively. The bounds testing approach to cointegration leads to a system of long-run equations that accommodates the testing of fiscal stability as defined in this paper.

For convenience, the logarithmic version of the long-run equations, which is applied in the multivariate cointegration technique is shown follows:

\[
\begin{align*}
LQ_t^s &= \beta_0 + \beta_1 LP_{gt} + \beta_2 LD_t + \beta_3 LY_t + \beta_4 LW_t + \epsilon_{1t} \\
LQ_t^d &= \theta_0 + \theta_1 LP_{gt} + \theta_2 LD_t + \theta_3 LY_t + \epsilon_{2t}
\end{align*}
\]

The error correction representation of the ARDL models is:

\[
\begin{align*}
\Delta \ln Q_t^s &= \tau_1 + \sum_{i=0}^{q-1} a_i \Delta \ln P_{gt-i} + \sum_{i=0}^{q-1} b_i \Delta \ln D_{t-i} + \sum_{i=0}^{q-1} c_i \Delta \ln W_{t-i} + \sum_{i=0}^{q-1} d_i \Delta \ln Y_{t-i} + \phi_1 EC_{t-1} + \epsilon_{1t} \\
\phi_1 EC_{t-1} + \epsilon_{1t}
\end{align*}
\]

\[
\begin{align*}
\Delta \ln Q_t^d &= \tau_2 + \sum_{i=0}^{q-1} e_i \Delta \ln P_{gt-i} + \sum_{i=0}^{q-1} f_i \Delta \ln D_{t-i} + \sum_{i=0}^{q-1} g_i \Delta \ln Y_{t-i} + \phi_2 EC_{t-1} + \epsilon_{2t} \\
\phi_2 EC_{t-1} + \epsilon_{2t}
\end{align*}
\]

The tax price coefficients, \( e_i \) and \( a_i \), carry a positive and a negative \textit{a priori} sign for the revenue and expenditure equation, respectively. To achieve fiscal stability, \textit{ceteris paribus}, the absolute value of the estimated tax price coefficient, \( \hat{e}_i \), from the government revenue/demand function must be larger than the estimated coefficient, \( \hat{a}_i \), from the government expenditure/supply function. This fiscal stability condition is an important testable hypothesis, both in the short- and long run. The analysis above is the same for the tax price coefficients, \( \beta_1 \) and \( \theta_1 \), from the long-run
ARDL models in equations (17) and (18) for the government expenditure and revenue equations, respectively.

The income coefficients, $g_i$ and $d_i$, have positive a priori signs. If the estimated income coefficient, $\hat{d}_i$, from the expenditure/supply function exceeds that from the revenue/demand function, $\hat{g}_i$, this will reflect the persistence of fiscal deficits; the converse would suggest fiscal surpluses. If the coefficients are equal the fiscal position would be in balance, given that the initial condition was in balance. The analysis above is the same for the income coefficients $\beta_3$ and $\theta_3$ from the long-run ARDL models in equations (17) and (18) for the government expenditure and revenue equations, respectively.

The national debt coefficients, $f_i$ and $b_i$, have positive a priori signs. Increasing national debt forces the governments to raise revenue, especially via taxation. While on the expenditure side, a rising national debt simply increases interest payments. The analysis above is the same for the income coefficients $\beta_2$ and $\theta_2$ from the long-run ARDL models in equations (17) and (18) for the government expenditure and revenue equations, respectively.

The real wage coefficients $\beta_4$ and $c_i$ have negative a priori signs. Increasing real wages reduce the capacity of the government to supply goods and services in both the short and long run.

To estimate the theoretical model for the two Caribbean economies, there is a need to find a proxy for a tax price. This is addressed by utilising the Niskanen (1978) tax price variable defined as the ratio of total government (tax) revenues divided by total government expenditure. This tax price variable was developed by Borcherding and Deacon (1972), Bergstrom and Goodman (1972) for the United States and used by Craigwell (1991) and Craigwell and Rock (1991) in an empirical test of the Buchanan-Wagner hypothesis for Barbados and Trinidad and Tobago. All of the
variables used in the paper are available from various Annual Statistical Digests and the Online Statistics of the Central Bank of Barbados.

4. Empirical Results

The empirical analysis requires that the order of integration of the variables is determined to ensure that none are I(2). In this regard, the augmented Dickey-Fuller (ADF) test is used to test for unit roots in the series. The null hypothesis of the ADF test is that the series is non-stationary. If the null hypothesis is not rejected, then the time series has a unit root. In Table 1 below, the results suggest a combination of I(0) and I(1) variables; more importantly none are I(2). Therefore, the ARDL bounds testing procedure is performed on the respective equations.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Augmented Dickey-Fuller Level</th>
<th>Nature of the series</th>
<th>1st difference</th>
<th>Nature of the series</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGRJ</td>
<td>-0.769</td>
<td>Intercept</td>
<td>-4.549</td>
<td>Intercept</td>
<td>I(1)</td>
</tr>
<tr>
<td>LGRB</td>
<td>-5.088***</td>
<td>Intercept</td>
<td>N.A</td>
<td>N.A</td>
<td>I(0)</td>
</tr>
<tr>
<td>LNDJ</td>
<td>-2.055</td>
<td>Intercept</td>
<td>-5.204***</td>
<td>Intercept</td>
<td>I(1)</td>
</tr>
<tr>
<td>LNDB</td>
<td>-4.356***</td>
<td>Intercept</td>
<td>N.A</td>
<td>N.A</td>
<td>I(0)</td>
</tr>
<tr>
<td>LTPJ</td>
<td>-2.000</td>
<td>Intercept</td>
<td>-6.276***</td>
<td>Intercept</td>
<td>I(1)</td>
</tr>
<tr>
<td>LTPB</td>
<td>-3.677***</td>
<td>Intercept</td>
<td>N.A</td>
<td>N.A</td>
<td>I(0)</td>
</tr>
<tr>
<td>LRWJ</td>
<td>-0.955</td>
<td>Intercept</td>
<td>-5.838***</td>
<td>Intercept</td>
<td>I(1)</td>
</tr>
<tr>
<td>LRWB</td>
<td>-3.785***</td>
<td>Intercept</td>
<td>N.A</td>
<td>N.A</td>
<td>I(0)</td>
</tr>
<tr>
<td>LGEJ</td>
<td>-1.851</td>
<td>Intercept</td>
<td>-4.454***</td>
<td>Intercept</td>
<td>I(1)</td>
</tr>
<tr>
<td>LGEB</td>
<td>-3.150**</td>
<td>Intercept</td>
<td>N.A</td>
<td>N.A</td>
<td>I(0)</td>
</tr>
<tr>
<td>LRYJ</td>
<td>-1.582</td>
<td>Intercept</td>
<td>-4.344***</td>
<td>Intercept</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Notes: FD – First Difference. *, ** and *** mean significant at the 10%, 5% and 1% levels, respectively. Critical values at 2 decimal points are the same for levels and first differences at -3.62, -2.94 and -2.61 for 1%, 5% and 10% respectively. N.A.: not applicable; L.T.: Linear Trend; T.S.: Trend Stationary. Variables are defined as in the text with J and B added to denote Jamaica and Barbados, respectively.
The bounds testing approach to cointegration developed by Pesaran et al (2001) is used to determine whether or not a long-run relationship exists between the dependent variable and the regressors in the ARDL model. The null hypothesis is that no long-run relationship exists. The ARDL regression is applied to equations (17) and (18) using Case (III), the unrestricted intercept and no trend, to perform the bounds test for the two countries. The calculated F-statistics yielded much larger figures of 9.3 and 8.6, for the Barbados and Jamaica government expenditure equation respectively, when compared to 3.41 and 4.68 for the lower and upper bounds at the 1% level of significance. In each case, there is the existence of a long run relationship among the variables. In similar vein, the calculated F-statistics of 7.7 and 7.6 for the government revenue equations of Barbados and Jamaica respectively, are bigger than the tabulated figures of 4.29 and 5.61 for the lower and upper bounds at the 1% level of significance. Again this demonstrates the existence of a long-run relationship among the variables.

The t-statistic (see also the t-statistic of the error correcting term) provides a clear case for supporting a long-run relationship among the variables in the government expenditure equation for both Barbados and Jamaica. Indeed, the calculated t-statistics of -5.672 and -7.361 for Barbados and Jamaica, respectively, are in absolute value greater than both the I(1) bound of -5.19 and the I(0) bound of -3.43 at the 1% level of significance. In the case of the revenue equation, the t-statistics of -5.850 and -5.756 for Barbados and Jamaica, respectively, are again in absolute value greater than I(1) bound of -5.39 and the I(0) bound of -3.43 at the 1% level of significance.

Given the existence of the cointegrating relationships, the long run conditional ARDL models and error correction models are estimated. Since ARDL can be estimated using least squares regression, standard Akaike (AIC) and Schwarz-Bayesian (SBC) information criteria are used for model selection and optimal lag length. The optimal lag order criteria support one lag in
the ARDL model used to estimate the four equations in the paper. The results for the two criteria are shown below in Table 2.

<table>
<thead>
<tr>
<th>Barbados Equation</th>
<th>Akaike</th>
<th>Schwarz</th>
<th>Optimal Lag</th>
<th>Jamaica Equation</th>
<th>Akaike</th>
<th>Schwarz</th>
<th>Optimal Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGE</td>
<td>-3.1053</td>
<td>-2.8387</td>
<td>(1, 1)</td>
<td>LGE</td>
<td>-1.9847</td>
<td>-1.7180</td>
<td>(1, 1)</td>
</tr>
<tr>
<td>LGR</td>
<td>-3.9214</td>
<td>-3.6551</td>
<td>(2, 1)</td>
<td>LGR</td>
<td>-2.1758</td>
<td>-1.9536</td>
<td>(1, 1)</td>
</tr>
</tbody>
</table>

In addition to the optimal lag length, Eviews 9 provides a model selection summary of the top twenty models using the AIC and SBC along with other criteria. Given that annual data is used in this study, there is an effort to avoid over-parameterization of the model that is likely to affect the main coefficients of interest. From a practical perspective, some of the more parsimonious in the top models support the short and long run coefficients that best satisfy the theoretical model in each of the four estimated equations for the two countries. In this regard, the government expenditure model in equation (17) is estimated using current and lagged exogenous variables along with the lagged dependent variable as the general model. The more specific model keeps only the lagged of the tax price variable in the preferred model. In the case of government revenue equation (18), the preferred model is the general model with current and lagged exogenous variables and the lagged dependent variable. The results for the estimated long run coefficients in the respective equations are shown in Tables 3 and 4 below.

The main focus in the paper is on the relationship between the perceived tax price variable (LTP) and the respective dependent variable. The long run estimates of the ARDL(1,0,0,0,0,0) for Barbados in Table 3 provide evidence of a negative relationship between government expenditure and the tax price. While the relationship is positive in the ARDL(1,1,1,1) for the government
revenue equation. Furthermore, as hypothesized in the previous section, the absolute size of the
tax price coefficient (1.2) in the revenue/supply equation is larger than that of (0.9) in the
expenditure/demand equation. Thus fiscal stability, in the cobweb theorem sense, is found for
Barbados in the long run.

Table 3
Estimation of long-run coefficients: Barbados

| Government Expenditure Equation for Barbados: ARDL(1,0,0,0,0,0) |  |
|---|---|---|---|---|
| Variable | Coefficient | Standard Error | t-ratio | p-value |
| LRW | -0.326975 | 0.403084 | -0.811184 | 0.4236 |
| LTP | -0.972463*** | 0.352381 | -2.759694 | 0.0098 |
| LRY | 1.915952*** | 0.474210 | 4.040304 | 0.0003 |
| LND | 0.357578*** | 0.094756 | 3.773684 | 0.0007 |
| LTP(-1) | 1.121597** | 0.423967 | 2.645480 | 0.0129 |

| Government Revenue Equation for Barbados: ARDL(1,1,1,1) |  |
|---|---|---|---|---|
| Variable | Coefficient | Standard Error | t-ratio | p-value |
| LTP | 1.208017*** | 0.302266 | 3.996540 | 0.0004 |
| LRY | 1.634960*** | 0.398735 | 4.100372 | 0.0003 |
| LND | 0.390068*** | 0.088360 | 4.425424 | 0.0001 |

Note, ***, ** and * mean significant at the 1, 5 and 10 percent levels, respectively.

Table 4
Estimation of long-run coefficients: Jamaica

| Government Expenditure Equation for Jamaica: ARDL(1,0,0,0,0,0) |  |
|---|---|---|---|---|
| Variable | Coefficient | Standard Error | t-ratio | p-value |
| LRW | -0.928048** | 0.451688 | -2.054622 | 0.0487 |
| LTP | -2.029962*** | 0.543239 | -3.736777 | 0.0008 |
| LRY | 4.247781*** | 1.162588 | 3.653729 | 0.0010 |
| LND | 0.718274*** | 0.039966 | 17.972124 | 0.0000 |
| LTP(-1) | 1.879481** | 0.747082 | 2.515761 | 0.0175 |

| Government Revenue Equation for Jamaica: ARDL(1,1,1,1) |  |
|---|---|---|---|---|
| Variable | Coefficient | Standard Error | t-ratio | p-value |
| LTP | 0.918003* | 0.467734 | 1.992658 | 0.0593 |
| LRY | 2.640515*** | 0.624242 | 4.229953 | 0.0002 |
| LND | 0.704231*** | 0.037387 | 18.836280 | 0.0000 |

Note, ***, ** and * mean significant at the 1, 5 and 10 percent levels, respectively.
In the case of Jamaica as shown in Table 4, the long run estimates of the ARDL(1,0,0,0,0,0) and ARDL(1,1,1,1) also find a negative and positive coefficient for the LTP variable, for government expenditure and revenue, respectively. However, the absolute size of the tax price coefficient (0.9) in the revenue/supply equation is smaller than that of (2.0) in the expenditure/demand equation. Thus fiscal stability, in the cobweb sense, is not found for Jamaica in the long run.

Given the estimates in Tables 3 and 4, it is evident that national income and national debt are significant variables in explaining the behaviour of government expenditure and revenue in the two countries over the period of estimation. The national debt variable affects both government expenditure and revenue positively, given the sign of the coefficients in each of the equations. But of equal importance is the similarity in the size of the coefficients across the two equations, which suggests a neutralising effect on the fiscal deficit, ceteris paribus.

In terms of the income elasticities, government expenditure is more responsive than government revenue, which is consistent with the persistence of fiscal deficits in both economies over the long run. The income coefficients for the expenditure equations are 1.9 and 4.2 are larger than their revenue counterparts of 1.6 and 2.6 for Barbados and Jamaica, respectively.

The short run estimates associated with the ARDL government expenditure and revenue equations from which the long run estimates came are presented in Tables 5 and 6 below. The estimates suggest that the error correction model holds for all four equations, as the coefficient of the error (or equilibrium) correction term is highly negatively significant. The coefficients of the ECTs for the four government expenditure and revenue equations range narrowly between -0.36 and -0.38. These estimates suggest that the disequilibrium response rate in the equations is about 4 months.
Interestingly, in the short run, the tax price and national debt are the most critical variables in explaining the behaviour of government expenditure and revenue; the tax price variable is therefore replaced by the national income variable among the two most important in the long run. Fiscal stability still holds for Barbados in the short run, but there is inconclusive evidence of such stability for Jamaica based on the similarity in the absolute tax price coefficient of 0.50 and 0.52 for government expenditure and revenue, respectively.

**Table 5**

**Short-run Estimates of the ECM of the ARDL Equations for Barbados**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLRW</td>
<td>-0.311890</td>
<td>0.185026</td>
<td>-1.685656</td>
<td>0.1022</td>
</tr>
<tr>
<td>ΔLTP</td>
<td>-0.416197***</td>
<td>0.078509</td>
<td>-5.301299</td>
<td>0.0000</td>
</tr>
<tr>
<td>ΔLRY</td>
<td>0.749789***</td>
<td>0.205694</td>
<td>3.645174</td>
<td>0.0010</td>
</tr>
<tr>
<td>ΔLND</td>
<td>0.357935</td>
<td>0.111927</td>
<td>0.713660</td>
<td>0.4810</td>
</tr>
<tr>
<td>ΔLTP(-1)</td>
<td>0.357935***</td>
<td>0.086116</td>
<td>4.156434</td>
<td>0.0002</td>
</tr>
<tr>
<td>C</td>
<td>-3.036817***</td>
<td>0.538652</td>
<td>-5.637813</td>
<td>0.0000</td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.369021***</td>
<td>0.065058</td>
<td>-5.672170</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Note, ***, ** and * mean significant at the 1, 5 and 10 percent levels, respectively.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLTP</td>
<td>0.647487***</td>
<td>0.057448</td>
<td>11.270806</td>
<td>0.0000</td>
</tr>
<tr>
<td>ΔLRY</td>
<td>0.478379***</td>
<td>0.156183</td>
<td>3.062946</td>
<td>0.0047</td>
</tr>
<tr>
<td>ΔLND</td>
<td>0.301531***</td>
<td>0.077348</td>
<td>3.898393</td>
<td>0.0005</td>
</tr>
<tr>
<td>C</td>
<td>-2.491346</td>
<td>0.428621</td>
<td>-5.812463</td>
<td>0.0000</td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.367167***</td>
<td>0.062762</td>
<td>-5.850138</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

$R^2 = 0.824 \quad \hat{\sigma} = 0.032 \quad AIC = -3.845 \quad SIC = -3.497 \quad \chi^2_{sc}(2) = 1.034[0.5961] \quad \chi^2_H(7) = 6.445[0.488] \quad \chi^2_{FP}(1) = 0.109[0.913] \quad JB = 1.262[0.531]$

Notes: the regression is based on the conditional ECM using an ARDL(1,1,1,1) specification with the dependent variable, ΔLGR estimated over the period 1973 to 2010. $R^2$ is the adjusted multiple correlation coefficient, $\sigma$ is the standard error of the regression, AIC and SIC are Akaike’s and Schwarz’s Bayesian Information Criteria, $\chi^2_{sc}(2)$, $\chi^2_H(7)$, and JB are chi-square, statistics to tests for no-residual correlation (Breusch-Godfrey test), no heteroscedasticity, no misspecification, normal errors (Jarque-Bera), respectively, with p-values in [.].
### Table 6
**Short-run Estimates of the ECM of the ARDL Equations for Jamaica**

<table>
<thead>
<tr>
<th>Government Expenditure Equation for Jamaica: ARDL(1,0,0,0,0,0)</th>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆LRW</td>
<td>-0.162228</td>
<td>0.096660</td>
<td>-1.678346</td>
<td>0.1037</td>
<td></td>
</tr>
<tr>
<td>∆LTP</td>
<td>-0.503541***</td>
<td>0.086281</td>
<td>-5.836076</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>∆LRY</td>
<td>0.482563</td>
<td>0.374259</td>
<td>1.289381</td>
<td>0.2071</td>
<td></td>
</tr>
<tr>
<td>∆LND</td>
<td>0.230995***</td>
<td>0.071518</td>
<td>3.229904</td>
<td>0.0030</td>
<td></td>
</tr>
<tr>
<td>∆LTP(-1)</td>
<td>0.632587***</td>
<td>0.106943</td>
<td>5.915197</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-4.745663</td>
<td>0.657458</td>
<td>-7.218201</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.375208***</td>
<td>0.050976</td>
<td>-7.360554</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

Note, *** and * mean significant at the 1, 5 and 10 percent levels, respectively.

<table>
<thead>
<tr>
<th>Government Revenue Equation for Jamaica: ARDL(1,1,1,1)</th>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆LTP</td>
<td>0.522603***</td>
<td>0.112767</td>
<td>4.634368</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>∆LRY</td>
<td>0.254239</td>
<td>0.441170</td>
<td>0.576283</td>
<td>0.5689</td>
<td></td>
</tr>
<tr>
<td>∆LND</td>
<td>0.408981***</td>
<td>0.088101</td>
<td>4.642199</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-3.536855***</td>
<td>0.626679</td>
<td>-5.643804</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.380837***</td>
<td>0.066164</td>
<td>-5.755934</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

\[
R^2 = 0.652 \quad \hat{\sigma} = 0.073 \quad \text{AIC} = -2.186 \quad \text{SIC} = -1.838 \quad \chi^2_{sc}(2) = 3.529[0.1713] \quad \chi^2_H(7) = 9.212[0.237] \quad JB = 0.912[0.633] \quad F_{stat}(2, 27) = 2.750[0.0818]
\]

Notes: the regression is based on the conditional ECM using an ARDL(1,1,1,1) specification with the dependent variable, ∆LGR estimated over the period 1973 to 2010. \( \bar{R}^2 \) is the adjusted multiple correlation coefficient, \( \sigma \) is the standard error of the regression, AIC and SIC are Akaike’s and Schwarz’s Bayesian Information Criteria, respectively, \( \chi^2_{sc}(2) \), \( \chi^2_H(7) \), and JB are chi-square, statistics to tests for no-residual correlation (Breusch-Godfrey test), no heteroscedasticity, normal errors (Jarque-Bera), respectively, with p-values in [.]. EC stands for error correcting term.

In the short run, a rise in the national debt leads to an increase in government expenditure and revenue in both Barbados and Jamaica. A 1% increase in the debt gives rise to a similar 0.3% increase in both expenditure and revenue for Barbados. In the case of Jamaica, a 1% rise in the debt causes revenue to increase (0.4%) at almost double the rate of expenditure (0.23%).
Apart from all of the critical regressions being checked for serial correlation, heteroscedasticity, functional form, normal errors, the CUSUM and CUSUM squares tests were used to check for stability in the coefficients over the sample period. The results reveal stable coefficients.

5. Conclusion

The paper introduces a new fiscal system to the literature via an augmented Baumol-Spann model that permits a way to directly measure fiscal stability in the realm of the cobweb theorem. The system addresses previous shortcomings in the literature by: (1) specifying from the same theory both an upward sloping government revenue/demand function and a downward sloping government expenditure/supply function and (2) treating government behaviour in an endogenous rather than exogenous way, resulting from (1).

The use of the bounds testing approach to cointegration allows for the empirical testing of the concept of fiscal stability developed in the paper. The results suggest that fiscal stability holds for Barbados in both the long and short run. While for Jamaica, fiscal stability does not hold in the long run and is inconclusive in the short run. For Barbados, in the short run, the tax price and real income variables are dominant, whilst for Jamaica, the two dominant variables are the tax price and national debt. In both countries, income and debt are the two most important variables explaining government expenditure and revenue in the long run.

Understanding the concept of fiscal stability is important in the context of managing small open economies with productivity issues in the public sector. Perhaps the empirical results are suggestive of a wider unbalanced productivity gap between the public and private sectors in Jamaica relative to Barbados. In both countries, the relative inefficiencies contribute to the high and persistent fiscal deficits, which when financed by credit creation at the central bank causes
depletion in the foreign reserves. As the latter relationship is well known in the literature as the critical cog in the monetary approach to the balance of payments, it is imperative that the predetermined fiscal condition is understood, estimated and forecast.

From a policy perspective, the best way to achieve fiscal stability in the long run is to reduce the productivity gap between the public and private sectors. This would lower the relative price of public sector goods and services vis-à-vis the private sector. On the historical evidence, economic growth in the two countries encourages more government spending than it increases government revenue. Therefore, the governments would have to make a greater effort at containing the rate at which expenditure grows relative to revenue in the future. However, once the economy is growing, the relative size of the government sector would decline but not necessarily the absolute size.

In the face of the theoretical and empirical findings in this paper, there is scope for research to test fiscal systems empirically as separate equations; a reduced-form equation; a disequilibrium system or as part of a larger structural model. Furthermore, an analysis of fiscal stability can be conducted on just the current account of the government. This would lend to disaggregation of the data along economic classification lines that is better for policy formulation.

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