TAX POLICY AND MACROECONOMIC ACTIVITY IN BARBADOS

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ABSTRACT

This paper examines the effects of tax policies on economic growth in Barbados. Rather than employing commonly used tax measures, which tend to yield more biased results, this study adds to the literature by developing an index of taxation for 1970 to 2007, based on documented policy changes. Using a standard growth regression and the unrestricted error correction model approach, the impact of changes in the overall level of taxation on economic growth is identified. The growth effects of changes in specific taxes are also investigated.

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1. Introduction

It is generally accepted that fiscal policy can be used to influence economic activity. It is thought that changes in government expenditure and in the level of taxation can stabilise the economy, promote growth and development, and make the distribution of income more equitable. Measurement of the desired economic impacts of fiscal policy is central in determining its effectiveness. Moreover, it would be useful to identify any of its “side effects”. This paper focuses specifically on tax policy, and investigates the effects of tax changes on economic growth in Barbados. An index of taxation is developed, based on policy changes documented in the Central Bank of Barbados’ Chronicle of Tax Policy (referred to as the “Tax Chronicle”). Then, using a standard growth regression and the unrestricted error correction model approach with a 1970-2007 data set, the relationship between taxation and economic growth is uncovered.

Since this study not only analyses the effects of changes in the overall level of taxation, but the effects of changes in specific taxes as well, its findings are expected to aid the Government of Barbados in its formulation of tax policy. Additionally, the use of an index of taxation, rather than the commonly used tax ratio, should yield more unbiased results than the latter measure, which tends to be correlated with variables such as output.

The remainder of the paper is structured as follows. The next section discusses the theoretical and empirical literature. Section 3 first identifies the existing measures of tax policy and then describes how our new measure is developed. Section 4 outlines the way in which the growth effects of taxation are modelled, while Section 5 presents estimation technique, along with the results and their policy implications. Section 6 concludes.

2. The Macroeconomic Effects of Tax Policy

2.1 Theoretical Perspectives

Based on the Keynesian view, fiscal instruments can be used to compensate for autonomous variations in investment and export demand, and in so doing, they can stabilise aggregate demand (Goode, 1984). A fiscal expansion can be used to stimulate aggregate demand and output, as it has a multiplier effect on these two variables; this effect is greater for an increase in expenditure than for a reduction in taxes (Hemming et al., 2002). The opposite is suggested for cases when there is excessive demand, which would, if left unchecked, lead to inflation and balance-of-payments imbalances (Goode, 1984). However, these fiscal actions can have distortionary effects on the economy (Blanchard and Fischer, 1989).

In the Keynesian model fiscal expansions have a crowding-out effect for several reasons, which makes fiscal multipliers smaller but they still remain positive, according to Hemming et al. (2002). In an open economy, there can be crowding out if the rise in aggregate demand results in import growth. A fiscal expansion can also crowd out investment, as higher government borrowing raises interest rates[1]. Moreover, as espoused by the Mundell-Fleming model, crowding out can occur via the exchange rate. When interest rates rise, as explained above, this attracts capital inflows, leading to an appreciation of the exchange rate and, as a result, there is a worsening of the external current account position[2]. It is also worthy to note that Neo Keynesian models take into account price flexibility, where, in a closed economy, fiscal expansion results in price increases, which, along with higher interest rates, limit the growth of aggregate demand (Hemming et al., 2002)[3].

In addressing the likely macroeconomic effects of taxation, the life-cycle model emphasises that the timing of taxes affects the behaviour of those alive today. If there is a tax cut, and therefore a decision to deficit finance, there will be an expansion in human wealth[4]. Consequently, there will be an increase in consumption and, by extension, in aggregate demand. Government may need to

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[1] However, the overall effect on output could still be large if there is a positive relationship between investment and income (Hemming et al., 2002).

[2] If the exchange rate is flexible and capital is perfectly mobile, there is complete crowding out, which renders fiscal policy ineffective. When the exchange rate is fixed, the rise in interest rates is smaller than in a closed economy, and if capital is perfectly mobile, then fiscal policy is very effective (Hemming et al., 2002).

[3] With an open economy and a flexible exchange rate, the appreciation mentioned above can lead to a reduction in prices, implying that there will be less crowding out by the appreciation than if prices were rigid. On the other hand, if the exchange rate were fixed, there would be more crowding out since the current account will worsen as a consequence of price increases resulting from an exchange rate appreciation (Hemming et al., 2002).

[4] As noted by Blanchard and Fischer (1989), government debt is a form of wealth to those who hold it.

raise taxes in the future to service this debt, but the longer this increase in taxes is deferred, the greater the probability of persons alive today not being alive later to pay it, and the larger the impact of the tax reduction on human wealth (Blanchard and Fischer, 1989).

As Hemming et al. (2002) point out, new classical models assume that prices clear markets. Therefore any fluctuations in output are caused by supply-side shocks and not variations in aggregate demand. According to Hemming et al. (2002), Lucas (1975) and Sargent and Wallace (1975) were the first to highlight that an implication of these models is that only unanticipated policies affect growth. Policies can be unanticipated if there are surprises by the government or if there is imperfect information.

The Ricardian Equivalence Theorem proposes that if persons are forward-looking and entirely aware of the government's intertemporal budget constraint, they will anticipate that a reduction in taxes, that is financed by borrowing, will later lead to an increase in taxes for their infinitely lived families. As a result, permanent income does not change, and if there are no liquidity constraints and perfect capital markets, consumption will not increase (Barro, 1974). This theory suggests that the current generation will leave a bequest for future generations so that they are able to meet their obligations when taxes are raised in the future. Therefore, a tax reduction will be followed by an accumulation of savings, rather than by an increase in spending (Blanchard and Fischer, 1989). If there is perfect Ricardian equivalence, then the decline in government saving caused by the tax reduction is completely offset by greater private saving, and there is no change in aggregate demand (Hemming et al., 2002).

Though some variants of the Keynesian model acknowledge the role of expectations, they usually consider adaptive expectations (Hemming et al., 2002). Under the assumption of rational expectations, individuals will consider the long-run effects of fiscal policy in the short run. Therefore, if a short-lived fiscal expansion has no long-term impacts it will not influence expectations. However, if the expansion is permanent there is additional crowding out and fiscal multipliers could become negative if households and firms anticipate that the initial rise in interest rates and the exchange rate appreciation will continue and possibly become larger (Goode, 1984; Krugman and Obstfeld, 1997).

The theoretical literature discusses other distortionory effects fiscal policy can have on the economy. For instance, the use of import duties to protect local industries may be detrimental to export growth, if it raises the cost of inputs to exporters and diverts the limited amount of factors of production to the protected sectors (Goode, 1984). In addition, income taxes act as a disincentive to the supply of labour, while capital taxes can also negatively impact saving and investment; in both cases there are growth implications (Hemming et al., 2002). Income taxes can also be discouraging to savings and, according to Goode (1984), it is possible, though theoretically inconclusive, that they are more discouraging than a consumption tax[5]. Heavy taxation of profits was identified as another disincentive to saving, as profit recipients tend to be high savers (Goode, 1984). In addition, it is noted by Goode (1984) that progressive taxation curbs savings and therefore capital formation, and also creates disincentives to work and invest. Therefore, many economists believe that there is a trade-off between equity and growth.

2.2. Empirical Evidence

Findings from empirical work on the macroeconomic effects of fiscal policy are mixed, particularly those regarding the relationship between fiscal policy and growth. This perhaps indicates that there are country-specific factors at work and that the effects of fiscal policy need to be assessed on a case-by-case basis. This variation in the results of previous studies makes them difficult to summarise. However, instead of concentrating on past results, here we focus on the various measures of the level of taxation employed in previous research.

Tax revenue, often expressed in real terms, has been used in some studies, such as that done by Hatemi-J (2002) to assess the sustainability of Sweden's fiscal policy. Hatemi-J (2002) also examines the effect of taxes on government expenditure[6], using causality analysis. The author concluded that the hypothesis of bi-directional causality could not be rejected, implying that in Sweden taxes and spending move simultaneously. In a later study for 19 OECD countries for the 1970-2002 period, Tagkalakis (2008) also used total tax revenue as a tax measure, inclusive of

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[5] This could be so because income tax is charged on income earned, as well as on the return of any portion of the person's income that has been saved, while with a consumption tax, there is no taxing of the returns on savings (Goode, 1984).

[6] Hatemi-J (2002) identified four possible relationships between taxes and government spending and the rationale provided by the literature for each. For instance, Friedman (1971) put forward the notion that the amount of revenue a government generates determines how much it will spend.

social security contributions, in real per capita terms[7]. Tagkalakis (2008) found that fiscal policy has a greater effect on consumption during recessions than in booms, particularly for countries with less developed credit markets. This is likely to be the case since in a recession a greater proportion of firms and households are facing liquidity constraints.

Researchers have also used net taxes. Following the methodology proposed by Blanchard and Perotti (2002), de Castro and de Cos (2008) estimated the economic effects of Spain's fiscal policy within a VAR framework. The included tax measure was net taxes in real terms, calculated as government revenue minus transfers, deflated by the GDP deflator. Results showed that tax increases constrained economic activity and only temporarily improved the fiscal position. Net taxes were also divided into their direct and indirect components and, while indirect taxation seemed to have no impact on economic activity, direct taxation appeared to have a contractionary effect. The authors also found that increases in indirect taxes are inflationary, while direct taxes seemed to have no effect on prices. Using a similar approach for a study of Italian fiscal policy, Giordano et al. (2007) reported that net revenue had very negligible effects on real private GDP, inflation, employment and the long-term nominal interest rate.

A much more frequently used measure has been the tax ratio[8], particularly in the more dated studies. For instance, for 16 OECD countries over the 1968-1985 period, Van Hoa (1986) conducted the J-test on a simple IS-LM model of inflation, the variables of which were money supply, taxes (measured as taxes to GDP), government spending and unemployment. His findings indicated that taxes, but not expenditure, had a very strong effect on inflation.

Recently, however, it has been increasingly emphasized in the literature that the use of the tax ratio is not ideal for several reasons. For instance, according to Bretschger and Hettich (2002) and Devereux et al.(2004), this and other simple measures are not good proxies for the 'real' tax burden since they do not effectively account for the multifaceted nature of the tax system. Therefore, in addition to the tax ratio, Angelopoulos et al. (2007) employed other tax measures in estimating an endogenous growth model to examine the effects of "productive" and "non-

7 The deflator used by Tagkalakis (2008) was the GDP deflator.
8 The tax ratio is defined as tax revenue, as a ratio of GDP, where the tax revenue is usually in real terms. In some cases, this measure has been seasonally adjusted

productive” government expenditure, and the related tax burden, on economic growth for 23 OECD countries. These other measures, which yielded more robust results as it relates to expenditure, were the effective tax rates and statutory tax rates on capital and labour. The effective tax rate for a specific tax is calculated as revenue generated from that tax as a ratio to the tax base. The tax ratio, referred to as average tax rate, was found to be negatively related to growth. Results also indicated that effective labour income tax rates are negatively correlated with growth, while effective tax rates on capital income and corporate income were found to have positive growth effects.

Mendoza et al. (1997) also note the shortcomings of commonly used measures, including the fact that they do not allow for the distinction between the effects of direct and indirect taxation, and of specific direct taxes. Therefore, they employ the effective tax rates, on consumption, labour income and capital income, which were formulated by Mendoza et al. (1994) by comparing aggregate post and pre-tax incomes and prices. Mendoza et al. (1997) used these rates in their estimates of cross-country panel regressions for the G7 countries and 11 OECD countries, the results of which gave support to Harberger’s (1964) argument that, despite theory outlining how tax changes impact the long-run growth rate, in reality such changes have negligible effects on growth.

Forni et al (2009), in their study of the macroeconomic effects of fiscal policy in the Euro area, estimated a dynamic stochastic general equilibrium model using Bayesian techniques. Using government data that was only available in most instances at an annual frequency, they constructed quarterly effective tax rates[9] for three individual taxes, namely taxes on labour income, capital income and consumption, rather than for total taxes. Tax shocks were found to have a greater macroeconomic impact than expenditure shocks. Results indicated that cuts in tax rates on labour income and on consumption have significant positive impacts on consumption and output. Additionally, decreases in tax rates on capital income were found to encourage investment and output in the medium term.

9 These calculations were also based on the methodology of Mendoza, Razin and Tesar (1994).

Recognising the drawbacks of commonly used approaches, Romer and Romer (2007) developed a new measure of fiscal shocks for use in a study on the U.S., which found that tax increases are very contractionary, particularly due to the negative impact they have on investment. Romer and Romer (2007) made use of the narrative record, namely presidential speeches, the Economic Report of the President and Congressional reports, to distinguish between "endogenous[10]" and "exogenous" tax changes. The latter are tax changes such as those taken to reduce an inherited budget deficit or to encourage long-run growth. The narrative record is also used to identify the timing of tax changes, so as to construct a series of the changes in tax liabilities resulting from "exogenous" tax changes. Romer and Romer (2007) then regressed output growth on a constant term and the current value and twelve lags of their measure of exogenous tax changes". Other variations of this specification were also estimated, including those that added control variables such as lagged growth, monetary policy shocks and changes in government spending.

2.3. Summary of Evidence

According to the Keynesian model, a tax increase can cause a reduction in aggregate demand and output, while a tax reduction can lead to an expansion in these variables. Keynesian theory states that this expansion can be limited because of crowding-out effects. The life-cycle model also identifies a negative relationship between taxes and aggregate demand, but also proposes that a tax increase will usually follow a tax cut and the longer this tax increase is deferred, the greater the impact of a tax reduction on aggregate demand. However, the Ricardian Equivalence theorem hypothesises that, given no liquidity constraints, there will be no effect on aggregate demand because individuals have a bequest motive. Other theoretical models, such as the new classical ones, propose that tax changes have no effect on output. With respect to other variables, taxes can theoretically have negative effects on savings, investment and the supply of labour, and could also have inflationary consequences.

A review of the empirical literature shows mixed results regarding the relationship between taxes and growth and other macroeconomic variables. With respect to growth, some studies have

[10] This refers to changes occurring as a result of economic conditions that are likely to exist in the future, such as countercyclical action and changes to tax policy to accommodate changes in government expenditure. These are likely to yield biased estimates of the effects of tax changes on economic activity, since they are taken to return output growth to normal. Therefore in this study, Romer and Romer (2007) use the tax changes, which are motivated by more exogenous reasons.

found taxes to have Keynesian effects, while one of the papers reviewed found specific taxes to have positive growth effects. On the other hand, some studies discovered that taxes have no or very negligible impacts on output. While one study found taxes to have a very strong effect on inflation, another found that only indirect taxes are inflationary, while yet another found that taxes had insignificant inflationary consequences.

3. Measuring Tax Policies

3.1. *Possible Approaches to Measuring Tax Policies*

As exemplified by the review of the empirical literature, the majority of the measures used in tax studies such as this one can be classified as *de facto*, or outcome-based, since they measure the level of taxation by a variable that should represent the outcome of a change in tax policy. Perhaps for convenience these measures are heavily utilised. However, there are several drawbacks, some of which have been alluded to in the previous section. Romer and Romer (2007) also point out that a change observed in tax revenue may not be indicative of a tax policy change but could have been the result of a fluctuation in the tax base, which usually varies with the level of income, or with movements in stock prices, the price level, or a number of other factors. Romer and Romer (2007) also discuss the case where countercyclical tax changes are well timed and successful and therefore allow output to grow as normal. In such a situation, when one considers the series of tax changes and of changes in output, the effects of tax changes on output are very likely to be underestimated.

Given these shortcomings, an alternative approach is the use of *de jure*, or rule-based, measures, which are constructed based on information from the legal statutes and laws of the country being investigated. For these measures a number, either 0 or 1 or some continuous version thereof, is assigned to a data point to indicate the magnitude of the variable at that particular point in time. In light of the weaknesses of outcome-based measures, we follow Romer and Romer's (2007) approach and develop a new measure of taxation. This new measure is a rule-based one, as detailed in the following section.

3.2. A New Measure of Tax Policy

In this section, we describe how our measure of tax policy is developed. Romer and Romer's (2007) measure was one of fiscal shocks and was based on estimated changes in tax liabilities, as documented by official reports, when a policy change occurred. However, such information was not available for Barbados in all instances; therefore, we opt to code the tax changes, as detailed below, in order to construct an index of tax policy for 1969 to 2007.

As shown in Table 1 of the Appendix, several direct and indirect taxes exist or have existed in Barbados. For each individual tax in existence in 1969, a value of 1 is assigned at 1969 to represent the base year. For those taxes not in existence in 1969, a value of 0 is assigned to 1969 until they came into existence, at which point a value of 1 is assigned. Then, as indicated in the Tax Chronicle, each time a policy change occurred in each specific tax regime, the percentage change in the burden from each specific tax is estimated. The index is adjusted in accordance with these percentage changes, to give a series of an index for each individual tax.

The estimation of the percentage change in the tax burden is relatively simple for land tax (which is used as a proxy for overall property tax burden), corporate tax, stabilisation tax, stamp duties[11], VAT and hotel and restaurant taxes, since the main feature to consider was the tax rate[12]. Therefore, the percentage change in the tax rate was taken as the percentage change in tax burden. With respect to consumption taxes, the changes in the basic rate was assumed to indicate the changes in tax burden[13].

Changes to personal taxes and import duties are a bit a more challenging to code. With respect to personal taxes, changes were more frequent and made to allowances, the basic rate and to the marginal rate. To arrive at an estimate of the change in the personal tax burden, changes in allowances are coded separately from rate changes. Changes in the allowances are averaged across allowance categories to arrive at an average change for the period. A similar approach is

[11] Note that stamp duties refer only to those on imports; these were discontinued in 1997 when the VAT was introduced.

[12] In these instances, only the tax rate was used to estimate a change in tax burden. As one would appreciate, it would be difficult to quantify some changes to particular tax regimes, such as, exemptions granted to a small subset of taxpayers.

[13] There were changes in rates for specific goods over the time period; however, these were difficult to quantify, in terms of a change in tax burden, given no information on their importance to the consumers' basket of goods.

taken for rates. The two change series are then combined using principal component analysis, which is discussed below.

For import duties, use was made of a database[14] within the Central Bank of Barbados, which provided, for each year from 1994 to 2007, the dollar value of each good imported and the duty paid on the good. To calculate a weighted average import duty, each item was assigned a weight, which was the ratio of the dollar value of the good imported in 1994 to the total value of goods imported in 1994. These weights were held constant until 2007 and applied to the duty on respective goods. As the duties on particular items changed, the weighted average value also changed and these changes were used as estimates of the change in burden imposed by import duties. To obtain pre-1994 estimates, 1994 weights were also used, in conjunction with information from the Tax Chronicle on actual duties.

It would be preferable to include all the tax categories in the same model along with the various interaction terms but this may lead to problems of multicollinearity, especially between the interaction terms and the individual variables. Such an approach will also seriously infringe on the degrees of freedom during estimation, resulting in unreliable inferences. Similar observations are made in Demetriades and Luintel (1996a, 1997) in which the authors construct indices of financial repression. We follow their recommendation and construct a summary indicator using principal component analysis (other examples include Bandiera *et al.*, 2000; Abiad and Mody, 2005).

The method of principal component (Lawley and Maxwell, 1971; Theil, 1971) involves the linear and orthogonal transformation of our set of (possibly correlated) variables into uncorrelated variables referred to as principal components, which are ordered in terms of their variance. Besides the fact that the resulting variables are uncorrelated, the other advantage of this procedure is that we can choose to work with all or a sub-set of the components (depending on the amount of variance that each explains), effectively reducing dimensionality of the data and therefore overcoming the econometric problems mentioned. We choose to work with a weighted

[14] Although the data retrieved did not cover the all the goods imported, it was thought that it covered a sufficient number of items to produce an adequate weighted average import duty.

average of the number of sub-components sufficient to ensure that the summary index accounts for at least 99 percent of the total variation of each individual tax index.

Using the personal, corporate, property and stabilisation tax indices, an index of direct tax burden[15] is constructed using the method of principal component. This index for direct tax policy therefore is a combination of the variation of all direct tax categories. The same is done with consumption taxes, stamp and import duties, and hotel and restaurant taxes to arrive at a single index for indirect tax policy[16]. The approach is again applied to the indices of the direct and indirect tax policy to produce an overall index of overall tax policies, where an increase in the index represents a rise in the tax burden and a reduction indicates an easing of the tax burden.

The indices of individual direct tax policies are shown below, along with the index of overall direct tax burden. The fall in the direct tax burden in 1971 reflects the decline in the personal tax burden for that period, while the plateau from this point in time up to 1976 is commensurate with the absence of any major tax changes during the period. However, the direct tax burden rises in 1977, capturing the increase in both the personal and corporate tax burdens. While there is no significant change in corporate taxation for the next eight years, there are relatively large reductions in personal and property taxation that cause a decline in overall direct taxation. This decline continues, but at a slower pace, until 1984, mirroring a series of reductions in personal taxation. Then there is a noticeable drop in the direct tax burden in 1986, as personal, corporate and property taxation is reduced. From this point to 1990 there is very little movement in direct taxation, since there is slight variation in only the personal tax burden. In 1991, however, there is a spike in direct taxation, when stabilization taxes were imposed during the recession of the early 1990s. The direct tax burden fell in 1992, when stabilization taxes on companies were removed and fell back to the 1990 level in 1993 when stablisation taxes on individuals were eliminated. There were no other notable or quantifiable changes to direct taxes until 1999, when land tax rates were increased. Thereafter the direct tax burden fell gradually, reflecting declines in all direct tax categories.

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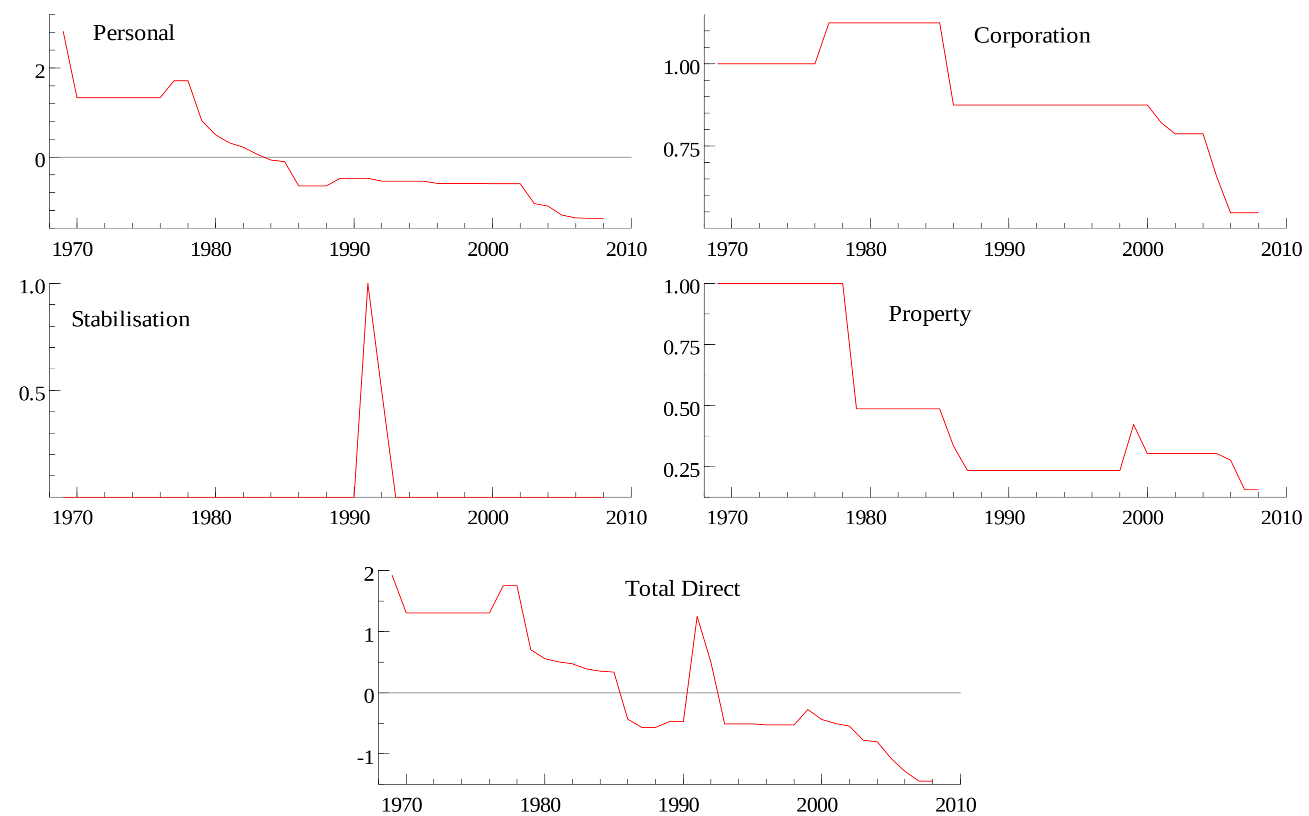
[15] Note that levies and “other” direct taxes are not included. Several levies have existed in the past but changes in these appear to have posed some difficulty in tracking, given the quality of information provided in the Tax Chronicle. The “other” direct tax category is relatively small and changes in this category were negligible.

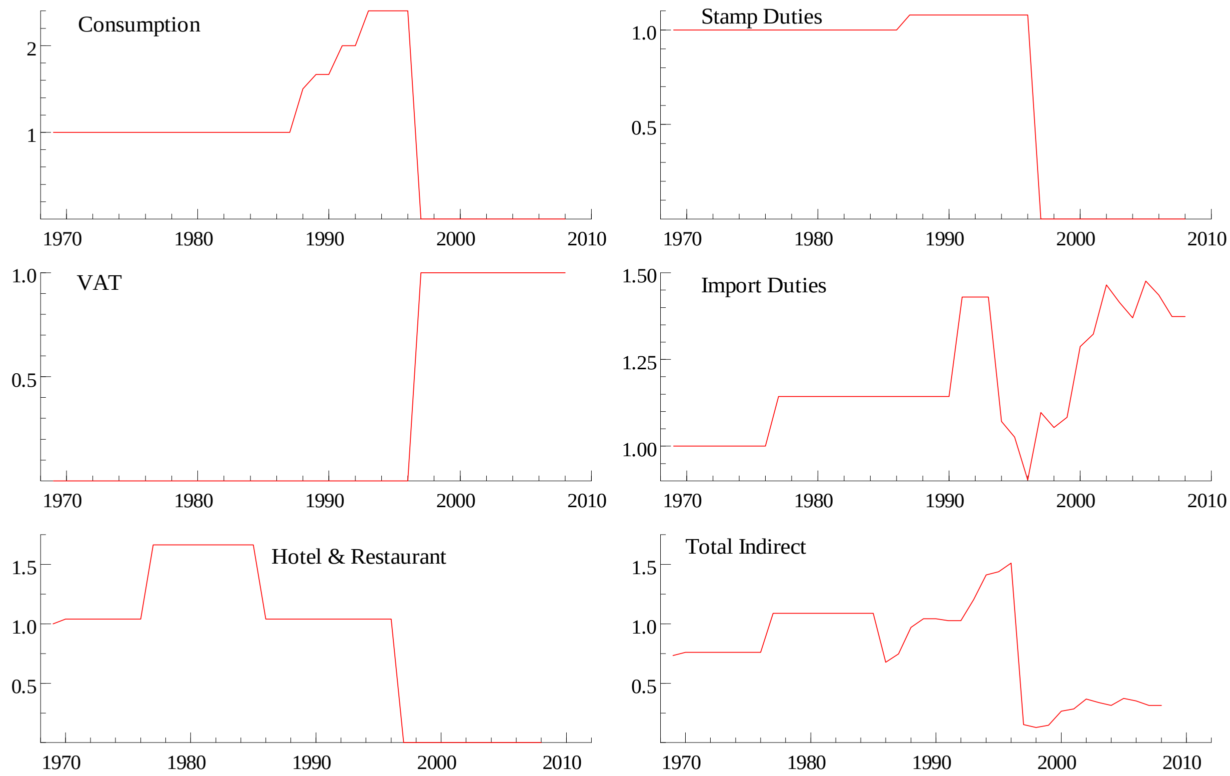
[16] Note that excises and “other” indirect taxes are not included.

Figure1: Graphs of Indices of Specific Direct Taxation and Overall Direct Taxation



The indices for specific indirect taxes, and for the index of overall indirect taxation are given below. With the exception of hotel and restaurant taxes, from 1970 to 1976, there were no significant, or quantifiable, modifications to any indirect tax regimes; therefore the overall indirect tax burden remained stable. However, with an increase in the burdens of import duties and hotel and restaurant taxes in 1977, there is a rise in indirect taxation, which is followed by another period of stability. Then, with a decline in the hotel and restaurant tax rate in 1986, the indirect tax burden declined but increased again in 1987, when stamp duties on imports were raised. Thereafter, the indirect tax burden rose periodically as the basic consumption tax rate increased. The sudden decline in indirect taxation in 1997 reflects the elimination of stamp duties on imports, consumption taxes, and hotel and restaurant taxes, when the VAT was introduced. Since no significant changes were made to the VAT regime, the changes in the indirect tax burden thereafter reflect those in import duties.

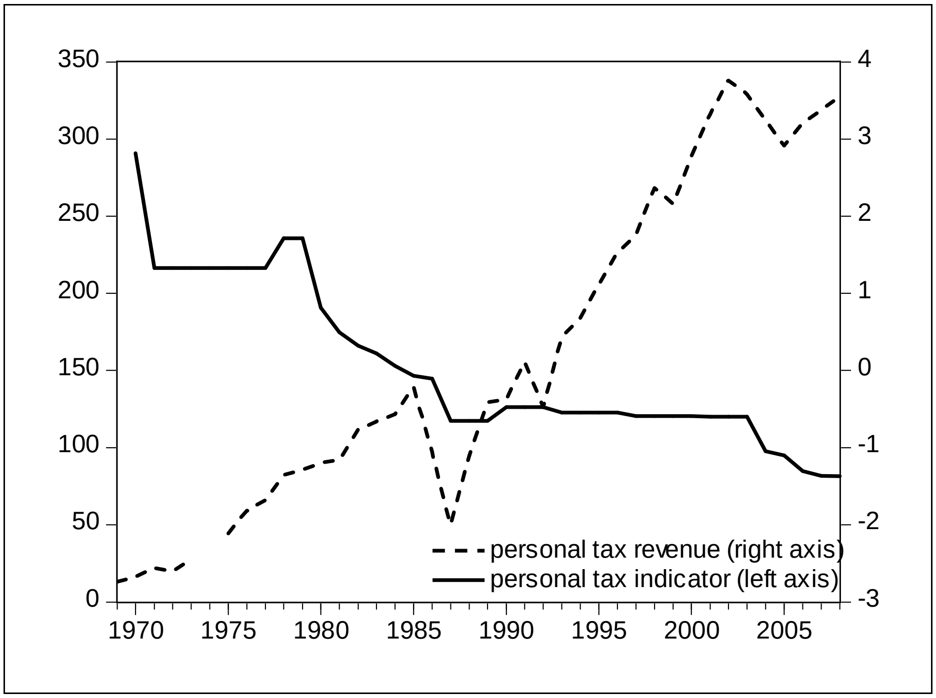
Figure 2: Graphs of Indices of Specific Indirect Taxation and Overall Indirect Taxation



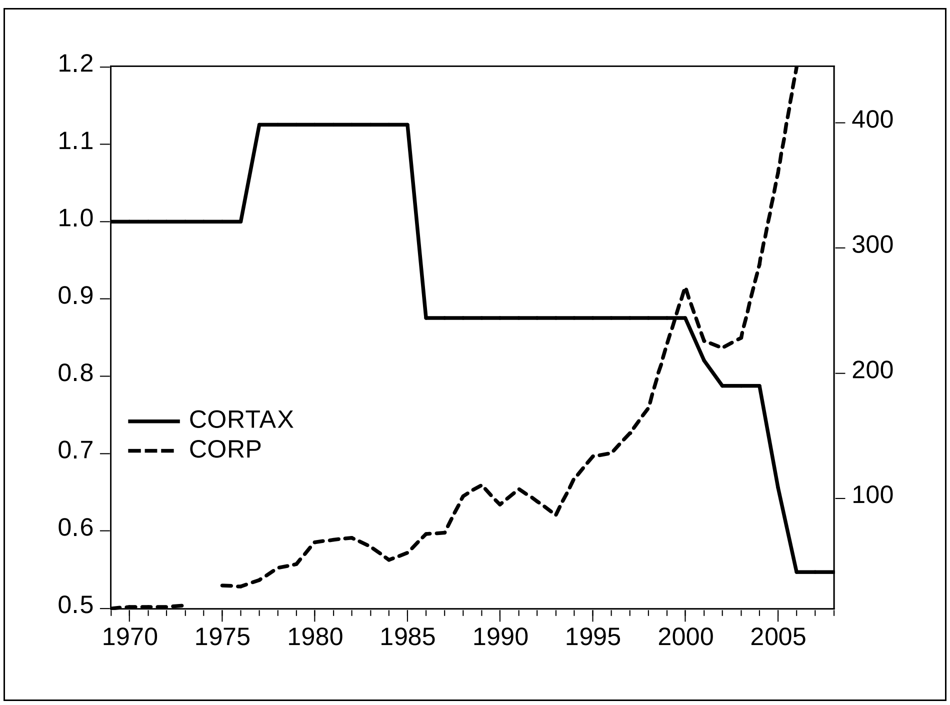
The plot of the index of overall taxation is given in Figure 1 of the Appendices, which again shows the graphs of the indices of direct and indirect taxation.

The graphs below perfectly exemplify the drawback of outcome-based tax measures and the importance of rule-based ones such the one developed in this study. The first graph displays personal tax revenue and our personal tax index. As can be seen, even though the personal tax burden has been falling, personal tax revenues have been increasing, as there are other factors at work, such as higher employment levels or wage increases.

Graph of Personal Tax Revenue and Personal Tax Index



Graph of VAT Revenue and VAT Index



The use of personal tax revenue is therefore not a pure measure of the tax burden and its use will clearly yield misleading results. Similarly, receipts from corporate tax have been expanding, despite the clear declining trend in the corporate tax burden.

4. Modelling the Growth Effects of Taxation

Most empirical studies on taxation and growth begin with the standard growth regression, often referred to as the Barro regression following the pioneering work of Barro and Sala-i-Martin (1995), and add to this baseline model a tax burden indicator (*t*) and perhaps a number of interaction terms depending on what is being investigated (see Equation 1). The idea is to estimate the effects of taxes on growth, controlling for other possible growth determinants. Note that this workhorse regression model of the growth literature, the Barro regression, is really that first proposed in the seminal work of Mankiw et al. (1992), *MRW*, but with additional explanatory variables.

$$\underbrace{\overbrace{y_{i,t} = \gamma X_{i,t} + \varepsilon_{i,t}}^{\text{Original model of Mankiw et al (1992)}} + \pi Z_{i,t}}_{\text{Barro regression}} + \varphi t_{i,t} \qquad (1)$$

Here, y is growth in real GDP per capita and, as noted by Durlauf et al. (2004), X can be seen as representing those growth determinants suggested by the Solow growth model, while Z captures those determinants that lie outside the original Solow theory. In addition, whereas the X variables are quite common in empirical studies, the Z variables vary considerably across studies and also by country (Kenny and Williams, 2001). Moreover, there is an extensive list of such Z variables. The Durlauf et al. (2004) survey identifies 145 different regressors, the vast majority of which have been found to be statistically significant in at least one study using conventional standards. They note that one of the main reasons why so many alternative growth variables have been identified is due to questions of measurement, and attribute the high percentage of statistically significant growth variables to publication bias and data mining.

Remaining with the empirical literature and accepting Equation (1) as an appropriate framework for examining the growth effects of taxes, the question is how to choose among the vast number of possible growth determinants. This is far from an easy task as Durlauf et al. (2004) pointed out when they argued that the absence of consensus is one of the fundamental problems of the empirical growth literature.

The common approach to variable selection in the literature is to choose from among the *X* variables those that have been found to be robust across different studies, and to choose from *Z* those additional controls that the researcher wants to account for in relation to the issue being investigated. In this regard, note that Levine and Renelt (1992) and Kalaitzidakis et al. (2000) concluded that the only robust growth determinants among *X* are initial income and the share of investment in GDP. In surveying the literature on growth and financial liberalisation, the variables commonly used in *X* and *Z* are presented in the table below (with citations).

A Selection of Commonly Utilised Variables in Growth Regressions

X	*Z*
Core Macroeconomic	**Institutional and Other macroeconomic**
• log initial (real) per capita GDP *(MRW, fb, KO, BH, P)*	• Political risk indicator *(fb)*
• investment/GDP *(MRW, C, D, A, KO, P,G)*	• Financial crisis dummy *(fb)*
• human capital: education *(MRW, C, D, fb, BH, P,G)*	• Inflation, (*fb, Ac, RC, BH, P,G)*
• pop. growth *(MRW, fb, BH, P)*	• Private cons./GDP *(fb)*
• gov't consumption/GDP *(D, fb, BH, P,G)*	• Private invest/GDP *(fb, Ac)*
	• Growth rate of real exports *(D,G)*
	• Financial Development *(C, D, KO, P,G)*
	• Current Account/GDP *(fb)*
	• Trade Balance/ openness *(fb, Ac, KO)*
	• Total or external debt/GDP *(fb ,Ac, G)*
	• Short-term debt/GDP *(fb)*
	• Terms of Trade ,*(D, Ac, BH)*
	• Real exchange rate overvaluation,*(Ac)*
	• Employment per capita *(C)*
	• Private credit (*BH,G)*
	• Quality of Institutions (*BH)*
	• Law and Order (*BH)*
	• Human capital: health (*P)*
	• Life expectancy (*KO, BH)*

Notes: *MRW* = Mankiw, Romer and Weil, (1992), *KO* = Klein and Olivei (1999), *fb* = Fratzscher and Bussiere (2004), *A*c = Achy (2005), *BH* = Bekaert et al. (2005), *LC* = Lewis and Craigwell (1998), *D*= Downes (2003), P = Peters (2001), G=Greenidge (2006).

With respect to the *X* variables, initial GDP is only included in panel estimation and is thus excluded from our model, while the other *X* variables will form the core regressors used in this paper. In terms of the *Z* variables, the selection is further narrowed by utilising any growth research specific to the Caribbean region. Additionally, a general-to-specific modelling procedure is employed, allowing for a more robust method of selecting the variables.

A Caribbean Country Growth Model

As discussed above, a wide range of variables have been used in growth empirics; however, a number of these, such as ethno-linguistic fractionalisation (from Easterly and Levine, 1997; Sala-i-Martin, 1997a; Sala-i-Martin, 1997b) and assassinations (as in Dollar, 1992; Dollar and Kraay, 2001), are not applicable to the Caribbean. The choice of variables is arrived at by a survey of the literature as it relates to developing countries, in particular work done on the Caribbean region[8]. The following variables are revealed from the survey: human capital, fiscal policy, openness to international trade, financial development, inflation, physical capital and the population growth rate.

In the absence of continuous and consistent data on school enrolment and qualifications used to proxy *human capital*, the World Bank (1994) procedure on interpolating and extrapolating the Barro and Lee (2000) measures of educational attainment is followed. In this regard, the percentage of the population that has successfully completed only the secondary school level and the percentage that has successfully completed a tertiary level are utilised to form an overall measure of human capital based on principal component analysis. This overall measure of human capital accounts for 99 percent of the individual components. *Fiscal policy* is measured by the ratio of government consumption to gross domestic product (GDP) and this is obtained from the World Development Indicators (WDI) CD ROM 2008. In terms of o*penness to international trade*, the share of exports in GDP is used to capture the effect of a more outward-looking trade regime. However, given that it is normally imports that are most affected under a trade restrictive regime and usually stand to benefit most from greater openness to international trade, the share of imports to GDP is also employed as an alternative proxy. Additionally, the trade volume

[8] Specifically, works by Williams and Daniel (1991), the World Bank (1994), Boamah (1997), Lewis and Craigwell (1998), Peters (2001), Downes (2003), Greenidge (2006) and Craigwell et al. (2008). Note that a wider review of the literature on these variables is also contained in Greenidge (2006).

(merchandise exports plus imports) to GDP ratio is experimented with for comparison purposes. These data also came from the WDI 2008.

Financial development is measured by the ratio of broad money (M2) to GDP, and the inflation rate by the twelve-month moving average of changes in the consumer price index. However, since it is recognised in the literature that even in low inflation environments high inflation volatility can impede growth by generating uncertainty concerning future prices, this study experiments with the conditional standard deviation of the inflation rate as a measure of uncertainty (also employed as a determinant by Barro, 1997; Barro and Martin, 1999; Barro and Sala-i-Martin, 2004; Levine and Renelt, 1992; Sala-i-Martin, 1997a). This is obtained by estimating a generalised autoregressive conditional heteroscedasticity (GARCH) model of the inflation rate[9]. Finally, physical capital accumulation is given by the gross domestic investment.

When the tax indicator is added to these standard growth variables, its impact on economic growth is expected to be negative.

5. Methodology and Results

5.1 Methodology

Our data set spans the period 1960 to 2008, giving us 49 data points and, as such, we opt for a single-equation estimation approach to co-integration analysis. At the same time we are mindful of issues of endogeneity in choosing our estimation procedure, since in the presence of simultaneity cointegration regressions may be biased in small samples even though they are consistent estimators Stock and Watson (1993). Therefore, we opted to use the Unrestricted Error Correction Model (UECM) approach proposed by Pesaran et al. (2001), where short- and long-run effects are estimated jointly from a general autoregressive distributed-lag (ARDL) model. Pesaran et al. (2001) refers to this as the ARDL approach to cointegration modelling. This technique has two main advantages over the other common procedures to cointegration

[9] The GARCH model, developed by Bollerslev (1986), is the most popular tool for modelling volatility as it permits precise time dependence estimates of the second moment of the variable in question (Serven, 1998; Bo and Sterken, 1999). A GARCH (1,1) model of the form $\pi_t = a_0 + a_1\pi_{t-1} + \varepsilon_t$ where $\sigma_t^2 = \beta_0 + \beta_1\varepsilon_{t-1}^2 + \sigma_{t-1}^2$ is used, where π is the inflation rate, σ_t^2 is the conditional variance of ε_t and the σ_t is taken as the measure of uncertainty.

analysis, mainly the Engle and Granger two-step approach and the Johansen maximum likelihood framework. The first advantage stems from the fact that the other methods focused on the estimation of long-run relationships among I(1) variables, which inevitably involves a certain degree of pre-testing and thus introduces a further degree of uncertainty into the analysis of relationships between levels (Cavanagh et al., 1995; Pesaran et al., 1996; Pesaran et al., 2001). Moreover, their widespread use has led to the common misconception that long-run relationships exist only in the context of cointegration among integrated variables (Greenidge, 2006; Loayza and Ranciere, 2006). With the UECM, cointegration analysis can be conducted irrespective of whether the explanatory variables are I(0), I(1) or a mixture of both. The second advantage is that this technique improves upon the other methods since it is better at handling small sample and dynamic sources of bias. Pesaran and Shin (1998), Pesaran et al. (2001) and Haug (2002) show that the OLS estimators of the short-run parameters in the UECM are $\sqrt{T}$ -consistent and the long-run coefficients are super consistent in small sizes.

The UECM is specified:

$$\Delta y_t = \phi_0 + \sum_{i=1}^{p-1} \gamma_i \Delta y_{t-i} + \sum_{i=0}^{q-1} \delta_i \Delta X_{t-i} + \alpha y_{t-1} + \beta_i X_{t-1} + \varepsilon_t \qquad (2)$$

where X represents the set of growth determinants identified above, ϕ and γ are the short-run coefficients related to growth and its determinants, α and β are the level effects and thus the long-run coefficients are computed as $-(\beta_i/\alpha)$, α also represents the speed of adjustment to the long-run relationship, ε_t is a disturbance term with the classical assumptions.

A long-run relationship is said to exist between economic growth and its determinants if the coefficients on the lagged level variables are jointly significant. This is a standard F-statistic test, however its asymptotic distribution is non-standard. As such, Pesaran et al. (2001) provide two sets of asymptotic critical values; one set assuming that all the regressors are I(1); and another set assuming that they are all I(0). These two sets of critical values refer to two polar cases but actually provide a band covering all possible classifications of the regressors into I(0), I(1) or even fractionally integrated. If the calculated F-statistic lies above the upper level of the band, the null is rejected, indicating cointegration. If it falls below the lower level of the band, the null cannot be rejected, indicating the lack of cointegration. If the calculated F-statistic falls within the band, a conclusive inference cannot be made.

5.2 Results

The results are presented in Table 2. The first column shows the variables, the second column gives the final estimates for the standard growth model without the tax indicator, and each column thereafter displays the estimates with some measure of the tax indicator included. The diagnostics for each model are given in the lower panel of the respective column. In this regard, each model passes various diagnostic tests, including that for serial correlation of the residuals, functional form misspecification, non-normal residuals and heteroscedastic disturbances. Moreover, based on the coefficient of variation, each model is capable of explaining over 90 percent of the variability in economic growth over the period and thus can be taken as an adequate representation of the growth process in Barbados. In what follows, we first discuss the standard growth model and its determinants and then proceed to analyse the findings when the tax indicator is included.

In the standard model, the presence of a long-run equilibrium relationship between growth and its determinants is confirmed based on the result of the ‘bounds’ test. The computed F-statistic on the exclusion test of the level variables is 31.39, which exceeds the asymptotic critical upper ‘bounds’ value of -3.99 in Pesaran et al. (2001, Table CII(iii)) for the existence of a cointegrating relationship, thus rejecting the null of no cointegration relationship at 5% level. This implies that growth in Barbados and its determinants are cointegrated or co-moving. Moreover, the coefficient on the lagged real GDP term, representing the implicit speed of adjustment towards equilibrium, is negative and highly significant, and implies that shocks to the economy will eventually dissipate and output will gravitate towards this equilibrium position. Moreover, the size of the coefficient indicates that approximately 16 percent of any deviation from the long-run equilibrium output level is corrected each year. There is relatively little change in these results for the models that include a tax indicator, although in some cases the speed of adjustment towards equilibrium increases.

The results in the standard model suggest that investment, financial development, the stock of human capital, government consumption expenditure, trade openness and inflation are significant determinants of growth.

As shown in the Appendix, estimation of the standard growth model (without a tax index) revealed significant explanatory variables as investment, financial development, government consumption, trade openness, human capital, real GDP and inflation.

The positive effect of human capital on steady-state output is one of the fundamental predictions of the endogenous growth models and is of no surprise here given Barbados' impressive education track record. The coefficient on this combined of educational attainment suggests that a 1 percentage point increase in the percentage of the adult population entering the work force having successfully completed education training at the secondary level or higher, leads to approximately one-fifth (computed as -0.0349/-0.1566) of a percentage expansion in economic growth. This finding augers well for the significant amount of investment and attention that successive governments have placed on developing the stock of human capital in Barbados. For example, in 1960/61, the government's current expenditure on education was Bds$4 million or 18.3 percent of total expenditure and this has risen over the years to reach Bds$446.3 million or 21.9 percent in 2006/07. Indeed, it is at the tertiary level that much of the investment has taken place with the three largest tertiary institutions on the island opening within the sample period of this study: the Cave Hill Campus of the University of the West Indies in 1962; the Barbados community College in 1969; and, the Samuel Jackman Prescod Polytechnic in 1970. Furthermore, this investment has also been accompanied by policies to ensure that each member of the population gets access to at least a basic level of education. Such policies included the abolition of fees at secondary schools and a compulsory school-leaving age of 16 years. The figures on educational attainment indicate that the percentage of the population whose highest level of education is at the secondary or tertiary levels have risen significantly over the sample period. Thus, the quality of its human capital has been increasing over time and as such there is no surprise of the finding of a positive and significant effect on growth.

In addition, the positive coefficient on changes in the human capital variable indicates that improvements in the stock of human capital have a short-run contributory effect to growth. Here, the evidence suggests that a 10 percent rise in the percentage of the adult population attaining some form of training at the secondary level or further will lead to roughly a 0.2 percentage rise in economic growth.

The positive coefficient on the lagged openness variable can be taken as suggesting that greater openness to international trade has allowed the economy to raise its output levels over the years. Admittedly, this is an outcome indicator and as such may be capturing other policy actions that encourage trade but that are unrelated to openness. More so, since exports of services is mainly tourism and have little to do with actual openness to trade in the traditional sense. It is possible to have trade controls in place but invest heavily in tourism product development and marketing. It is more likely that the proxy is capturing such effects. Openness also has a positive short-run impact on growth, as indicated by the combined effects of lags 1 and 2 changes in openness.

The finding of a positive impact of financial development on growth is consistent with the growth literature and suggests that the financial system has developed in a manner which has facilitated growth. Moreover, it is supported by the demand-following of the relationship between financial development and growth, which views the former as a consequence of the demand for financial services (see for example, Robinson, 1952; and Lucas, 1988). Specifically, it would suggest in the development process, as the Barbadian economy evolved from traditional agricultural production to a more complex, and monetised economy, certain demands were generated for the services of financial institutions. Such demands were created by the growing needs of firms for external finance, as their retained profits fall short of their investment expansion needs. The financial system development was in accordance to meeting such demands.

The evidence also indicates that government consumption expenditure has reduced growth in short-run and also lowered the long-run level of output. Lewis and Craigwell (1998) suggest that it is likely that government spending occurred at the expense of private investment and to the extent that this spending is not productive, fiscal policy will have a negative impact on growth. It does not necessarily mean that all categories of government spending reduce output but that in the aggregate it does.

Finally, gross domestic investment is found to be a significant determinant of economic growth only in the short-run. Its coefficient indicates that a 10 percent rise in physical capital accumulation leads to approximately 1.1 percentage point increase in output. However, this effect dissipates over time.

When the index of overall taxation is included in the growth model, it is found to have a contractionary effect in the short-run but no long-run impact. The same short-run result holds for indirect taxation. However, it direct taxation also has negative growth effects in the long-run.

While personal taxation and economic growth are not related in the long-term (perhaps indicative of individuals' ability to adjust to increases in personal taxation), they are positively related in the short-run. This short-run relationship, which can be interpreted as a fall in the personal tax burden resulting in lower economic growth, perhaps highlights the need for the breakdown of personal taxation into the various income categories. It is possible that although the aggregate personal tax burden has been declining, the burden on the higher-income group has been rising. As noted by Goode (1984), progressive taxation curbs savings and therefore capital formation, and also creates disincentives to work and invest.

Similar to personal taxation, corporate and property taxation are unexpectedly positively related to growth in the short-run. On the other hand, in the long run, these forms of taxation are both found to have a negative effect on growth. In other words, increasing (reducing) the burden in these categories of taxes reduces (increases) growth over time. Since the plots in Figure 1 show these categories falling over the sample period, it means that tax polices in these areas have served to raise the rate of economic growth. One inference that can be drawn is that these categories of taxation increased the amount funds firms and property-holders have at their disposal for investment and consumption purposes, which have positive growth implications. With regards to the stabilisation tax policies of the early 1990s, these are found to have been growth-reducing. Therefore, although these taxes may have been effective in buffering government revenue during the economic downturn of that period, they are likely to have also further suppressed economic activity.

The majority of the categories of indirect taxation policies have had no long-run impact on economic growth; only import duties were found to have negatively impact growth in the long-run, most likely by raising the cost of inputs and thereby discouraging production. While there is no short-run relationship between import duties and economic growth, an increase in the burdens from consumption taxes, stamp duties and hotel and restaurant taxes have constrained economic growth, in the short run, as expected. Finally, it appears that the introduction of the VAT, which at the time replaced eleven other taxes, spurred economic growth in the short-run but that effect has since dissipated.

Table 1: Description of Direct and Indirect Taxes in Barbados

Tax	**Description**
Direct	
i) Personal taxes	These are taxes charged on the taxable income (gross income minus personal, spouse, home and child allowances) of individuals. Barbados has a Pay As You Earn system and employers are required to withhold taxes from their workers' wages and salaries. Income tax is charged at a basic rate on an individual's taxable income up to and including $24,200. Taxable income in excess of $24,200 is then taxed at the marginal rate. Deductions are also allowed for contributions to a savings or retirement plan, purchase of shares and for other investments.
ii) Corporate taxes	These are taxes levied on profits of all companies operating in Barbados. International business companies face a significantly lower rate. Corporations also benefit from allowances, such as depreciation, export, and research and development allowances. Deductions, such as that for the cost of listing shares on the stock exchange, are also allowed.
iii) Levies	These comprise employment, environmental, health, transport, betterment and training levies. None of these currently exist.
iv) Stabilisation taxes	These were instituted in the early 1990s, as part of the structural adjustment programme to boost Government revenue. The rate was initially 1.5% of an individual's total income and on the profits of corporations but was increased periodically, depending on Government's need for revenue. Stabilisation taxes are no longer in existence.
v) Property taxes	This category mainly comprises land tax and property transfer tax, but also includes estate duties, rent registration, land development duties, and taxes on intellectual properties and corporate affairs. From 2006, also include in this category were taxes on income earned from rental of home accommodation. While land tax is paid annually, property transfer tax is payable by the seller a property is sold.
vi) Other direct taxes	This category includes withholding taxes on interest earned on savings and securities, as well as taxes charged on dividends.
Indirect	
i) Consumption taxes	These are taxes levied on spending on goods and services. However, they have been replaced by the value added tax (VAT).
ii) Stamp duties	In this study, these only refer to those stamp duties placed on imports. These have also been replaced by the VAT.

Tax	Description
iii) VAT	The VAT was introduced in 1997 and, so as to simplify the tax system, it replaced stamp duties, hotel and restaurant taxes and consumption taxes. The VAT (at a rate of 15%) is imposed on a wide range of goods and services supplied in, or imported into, the country; some goods and services, particularly essential ones, are however exempted or zero-rated. In addition, a lower rate of 7.5% is charged on the supply of tourist accommodation.
iv) Excises	These were initially levied on only rum products. However, after the introduction of the VAT, they were charged on tobacco, spirits, petroleum products and motor vehicles.
v) Import duties	This category comprises custom duties, levied on a large variety of imported goods at various rates, with luxury goods being taxed at higher rates. This category also includes a cess, which was introduced in September 2005 for an eighteen-month period and imposed on extra-regional imports (certain items, particularly essential ones, were exempted).
vi)Hotel and Restaurant taxes	These were taxes levied on the revenue of hotels and restaurants, but they have been replaced by the VAT.
vii) Other indirect taxes	This category encompasses an environmental levy and highway revenue. The environmental levy covers the cost of disposal of waste generated from the use of imported goods. There is a general rate of 1% of the CIF value of imports but some commodities, such as vehicles and refrigerators, are taxed at a specific nominal value per unit.

Figure 1: Graphs of Indices of the Direct, Indirect and Overall Taxation

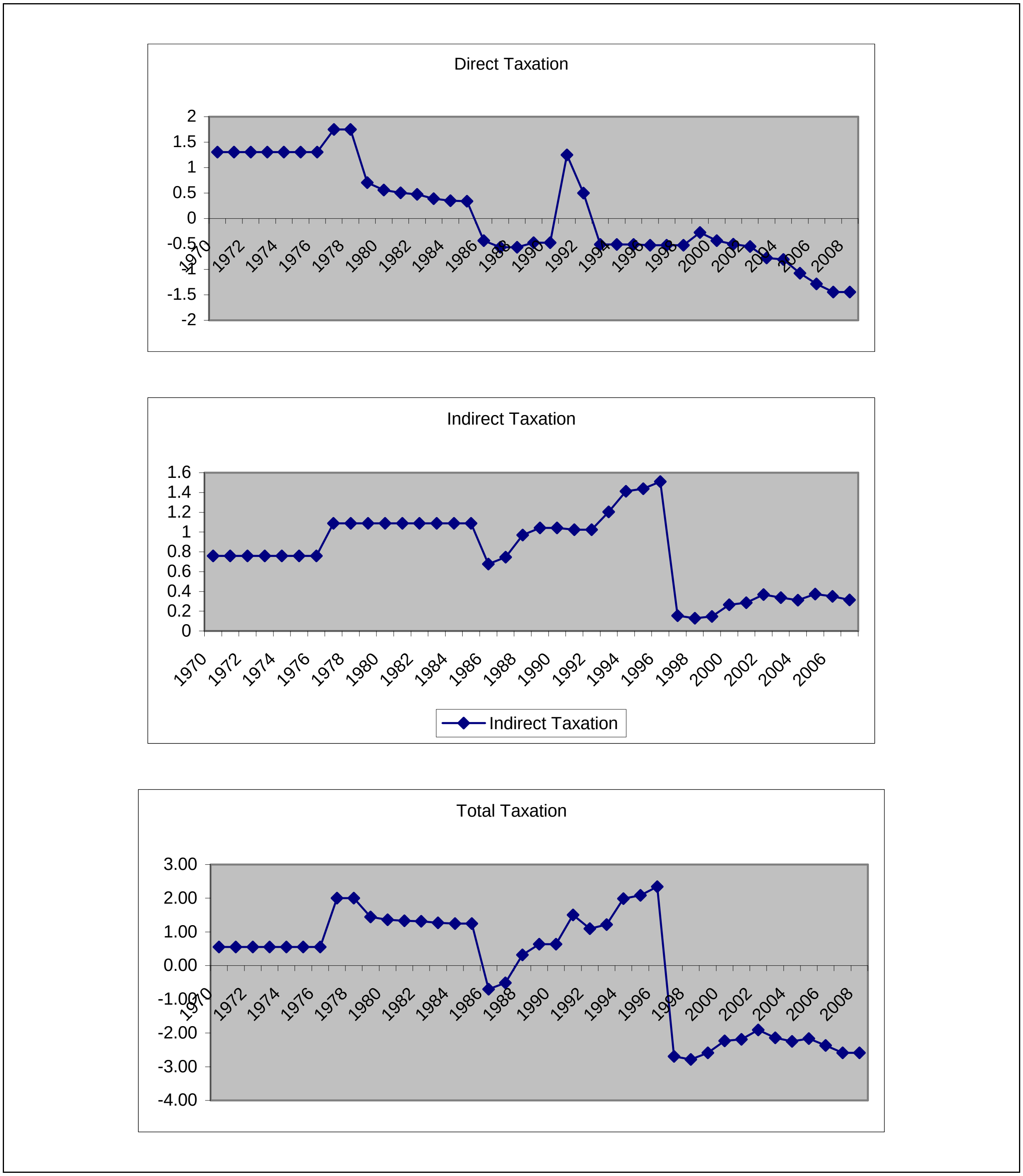


Table 2: Results of For Taxation and Growth

Variable	Basic Model	with Total Tax	with Direct Tax	with Indirect Tax
ΔL(Physical Capital)	0.114***	0.108	0.114	0.111
ΔL(Physical Capital)$_{t-2}$	-0.025***	-0.024	-0.025	-0.026
ΔL(Financial Dev.)	0.090***	0.111	0.078	0.112
ΔL(Fiscal Policy)	-0.289***	-0.287	-0.258	-0.286
ΔL(Fiscal Policy)$_{t-1}$	0.087***	0.091	0.076	0.089
ΔL(Openness)$_{t-1}$	0.051**	0.070	0.038	0.066
ΔL(Openness)$_{t-2}$	-0.077**	-0.087	-0.081	-0.089
ΔL(Human Capital)	0.020**	0.024	-0.199	0.022
L(Real GDP)$_{t-1}$	-0.157***	-0.168	0.165	-0.173
L(Financial Dev.)$_{t-1}$	0.186***	0.196	-0.403	0.198
L(Fiscal Policy)$_{t-1}$	-0.461***	-0.481	0.148	-0.478
L(Openness)$_{t-1}$	0.144***	0.127	-0.238	0.130
ΔL(Inflation)	-0.274***	-0.227	0.427	-0.225
ΔL(Inflation)$_{t-1}$	0.441***	0.419	-0.720	0.428
L(Inflation)$_{t-1}$	-0.792***	-0.755	0.029	-0.753
L(Human Capital)$_{t-1}$	0.035***	0.036	-0.014	0.035
Δ(Total Tax)		-0.003		
Δ(Total Tax)$_{t-1}$		-0.003		
Δ(Direct Tax)			-0.006	
Δ(Direct Tax)$_{t-1}$			0.011	
Δ(Indirect Tax)				-0.012
Δ(Indirect Tax)$_{t-1}$				-0.012
R^2	0.965	0.977	0.972	0.976
F-statistic	31.39**	37.24**	30.85**	36.57**
DW	1.81	2.28	1.96	2.27
AR	0.372[0.695]	1.831[0.197]	0.658[0.533]	1.853[0.193]
RESET	0.036[0.852]	2.015[0.176]	2.463[0.137]	1.7693[0.203]
Norm	1.306[0.521]	0.506[0.776]	0.128[0.938]	1.030[0.598]
ARCH	0.426[0.523]	0.012[0.915]	0.490[0.495]	0.121[0.7329]

	Personal Tax	Corporate Tax	Stabilisation Tax	Property Tax
ΔL(Physical Capital)	0.115	0.112	0.123	0.112
ΔL(Physical Capital)$_{t-2}$	-0.032	-0.028	-0.028	-0.027
ΔL(Financial Dev.)	0.053	0.074	0.085	0.101
ΔL(Fiscal Policy)	-0.255	-0.252	-0.300	-0.293
ΔL(Fiscal Policy)$_{t-1}$	0.036	0.051	0.106	0.099
ΔL(Openness)$_{t-1}$			0.059	
ΔL(Openness)$_{t-2}$	-0.084	-0.114	-0.058	-0.096
ΔL(Human Capital)			0.025	
L(Real GDP)$_{t-1}$	-0.142	-0.175	-0.173	-0.190
L(Financial Dev.)$_{t-1}$	0.172	0.134	0.195	0.195
L(Fiscal Policy)$_{t-1}$	-0.396	-0.375	-0.478	-0.490
L(Openness)$_{t-1}$	0.160	0.206	0.125	0.194
ΔL(Inflation)	-0.229	-0.262	-0.288	-0.237
ΔL(Inflation)$_{t-1}$	0.417	0.443	0.439	0.490
L(Inflation)$_{t-1}$	-0.741	-0.810	-0.783	-0.805
L(Human Capital)$_{t-1}$	0.026	0.024	0.035	0.041
Δ(Personal Tax)$_{t-1}$	0.233			
(Corporate Tax)$_{t-1}$		-0.106		
Δ(Corporate Tax)$_{t-1}$		0.090		
(Stabilisation Tax)$_{t-1}$			-0.018	
Δ(Stabilisation Tax)			-0.014	
Δ(Stabilisation Tax)$_{t-1}$			0.020	
(Property Tax)$_{t-1}$				-0.054
Δ(Property Tax)$_{t-1}$				0.040
R^2	0.965	0.967	0.971	0.969
F-statistic	35.39**	33.34**	27.00**	35.34**
DW	1.88	2.06	1.88	2.09
AR	0.215[0.809]	0.730[0.497]	0.416[0.668]	0.973[0.399]
RESET	0.121[0.732]	0.241[0.630]	2.102[0.169]	0.277[0.606]
Norm	0.488[0.783]	1.218[0.544]	1.355[0.508]	1.929 [0.310]
ARCH	0.702[0.414]	0.065[0.802]	0.108[0.748]	0.032[0.859]

	Consumption Tax	Stamp Duty	with VAT	with Import Duty	Hotel and Restaurant Tax
ΔL(Physical Capital)	0.111	0.115	0.114	0.102	0.107
ΔL(Physical Capital)$_{t-2}$	-0.028	-0.026	-0.026	-0.037	-0.022
ΔL(Financial Dev.)	0.107	0.108	0.108	0.101	0.113
ΔL(Fiscal Policy)	-0.285	-0.288	-0.287	-0.254	-0.287
ΔL(Fiscal Policy)$_{t-1}$	0.085	0.085	0.084	0.086	0.099
ΔL(Openness)$_{t-1}$	0.059	0.049	0.051		0.064
ΔL(Openness)$_{t-2}$	-0.092	-0.079	-0.079	-0.093	-0.080
ΔL(Human Capital)	0.022	0.023	0.022		0.021
L(Real GDP)$_{t-1}$	-0.1634	-0.173	-0.172	-0.190	-0.179
L(Financial Dev.)$_{t-1}$	0.192	0.199	0.197	0.218	0.204
L(Fiscal Policy)$_{t-1}$	-0.469	-0.477	-0.474	-0.421	-0.488
L(Openness)$_{t-1}$	0.133	0.138	0.138	0.133	0.131
ΔL(Inflation)	-0.228	-0.219	-0.221	-0.225	-0.234
ΔL(Inflation)$_{t-1}$	0.428	0.426	0.424	0.441	0.424
L(Inflation)$_{t-1}$	-0.750	-0.760	0.759	-0.696	-0.756
L(Human Capital)$_{t-1}$	0.034	0.034	0.035	0.026	0.036
Δ(Consumption Tax)	-0.007				
Δ(Consumption Tax)$_{t-1}$	-0.006				
Δ(Stamp Duties)$_{t-1}$		-0.017			
Δ(VAT)$_{t-1}$			0.018		
(Import Duties)$_{t-1}$				-0.045	
Δ(Hotel & Rest Tax)					-0.013
Δ(Hotel & Rest Tax)$_{t-1}$					-0.014
R^2	0.977	0.971	0.971	0.968	0.974
F-statistic	37.17**	33.14**	33.13**	38.49**	33.37**
DW	2.35	2.26	2.27	2.19	2.22
AR	3.683[0.052]	0.925[0.418]	1.104[0.386]	1.946[0.173]	1.466[0.264]
RESET	0.317[0.582]	0.115[0.739]	0.115[0.739]	2.606	1.833[0.196]
Norm	0.984[0.611]	1.774[0.412]	1.895[0.388]	1.278[0.528]	0.817[0.665]
ARCH	0.085[0.775]	0.087[0.773]	0.101[0.755]	0.914[0.352]	0.016[0.900]

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