



Working Paper

A Forecasting Model for Economic Policy in Barbados

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November 2017

Abstract

The forecasts in my paper *The Barbados Economy: The Road to Prosperity* are based on an empirical model of an export-driven economy, where the source of growth is increased productivity and competitiveness in tourism, other traded services and exports. Foreign exchange inflows and incoming investment generate multiplier effects on domestic production and incomes, which in turn increase the demand for imports, paid for out of the foreign exchange earnings and capital inflows. To avert balance of payments crises, government must avoid creating money to fuel domestic spending and imports for which there is no additional foreign finance. To grow the economy there must be investment in productivity increases to strengthen international competitiveness. This note provides the model, structured along these lines, on which the forecasts are based.

Keywords: Barbados, economic policy, fiscal policy, monetary policy, small open economy, productivity and growth, competitiveness.

JEL codes: E5, E6, F4

Introduction

The model is structured around the unique characteristics of the small open financially integrated economy (SOFIE). These economies are defined as "small" because their human and material resources are sufficient to produce only a handful of products at competitive international prices. This compares with the great variety of products need for modern lifestyles and to fuel domestic production. The possibilities of domestic/foreign substitution in production and consumption are therefore negligible (Worrell, Moore and Beckles, 2017, Page 9).

Also built into the model is financial integration into the global financial market, which is now a universal feature of modern economies, irrespective of the exchange regime. SOFIEs lack a capacity for independent monetary policy, except when it is used as a market-smoothing mechanism (Worrell, 2012, Page 5). The sources of money supply increases are overall balance of payments surpluses, reflected an accumulation of foreign reserves by the central bank, balanced by the issue of an equivalent value of local currency liabilities; and government borrowing from the central bank. Financial integration ensures that domestic interest rates follow the international trends, once country risk premiums are factored in, and excess or deficient liquidity demand flows over the border.

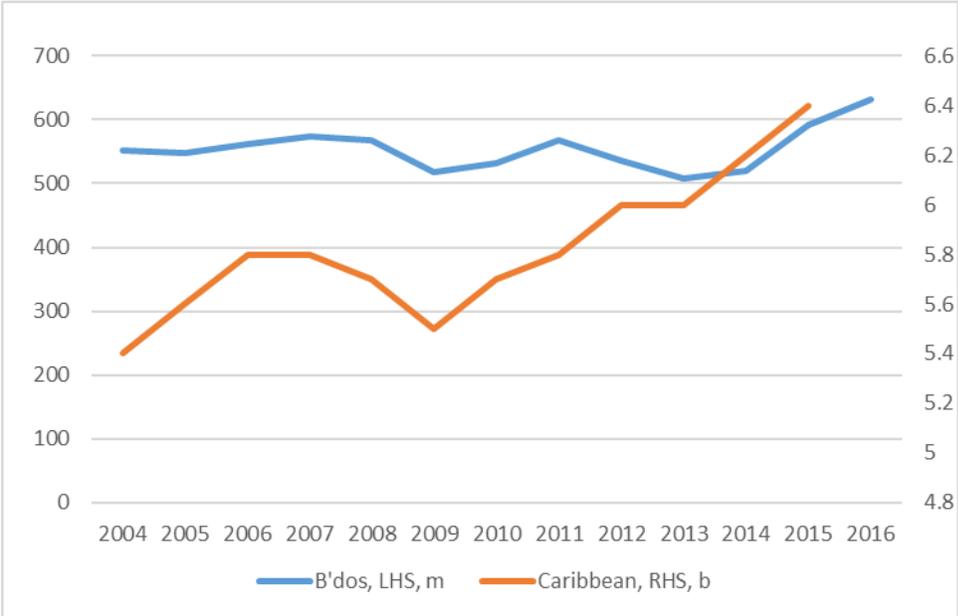
Output in the SOFIE is fully determined on the demand side, and there is no need to model consumption, investment or domestic savings. Because of small size, the demand for any tradable good that is competitively produced is infinite, and international financial markets provide an infinite supply of investment for tradables, once the country premium is accounted for. Aggregate spending is determined by the multiplier effects of foreign currency inflows, and spending grows only as fast as import propensities allow. Domestic savings, ex post, are the difference between investment (determined by international interest rates and the profitability of investment) and the imports required for the new investment projects, which must be fully financed with foreign money.

The model consists of modules on output and prices; government expenditure, revenue and financing; the balance of payments; and Central Bank and commercial bank balance sheets. This paper describes the model and provides the estimates on which the analysis in my paper *The Barbados Economy: The Road to Prosperity* is based.

Real output and prices

Economic growth over the 2017-2021 period is expected to be driven by tourism. Arrivals increased in 2015 and 2016 more rapidly than for the Caribbean as a whole (Figure 1), and that momentum is assumed to continue for 2017 and 2018. However, expansion of tourism accommodation has suffered major administrative delays. The model assumes that tourism ceases to grow in 2019 because of the delay in expanding capacity.

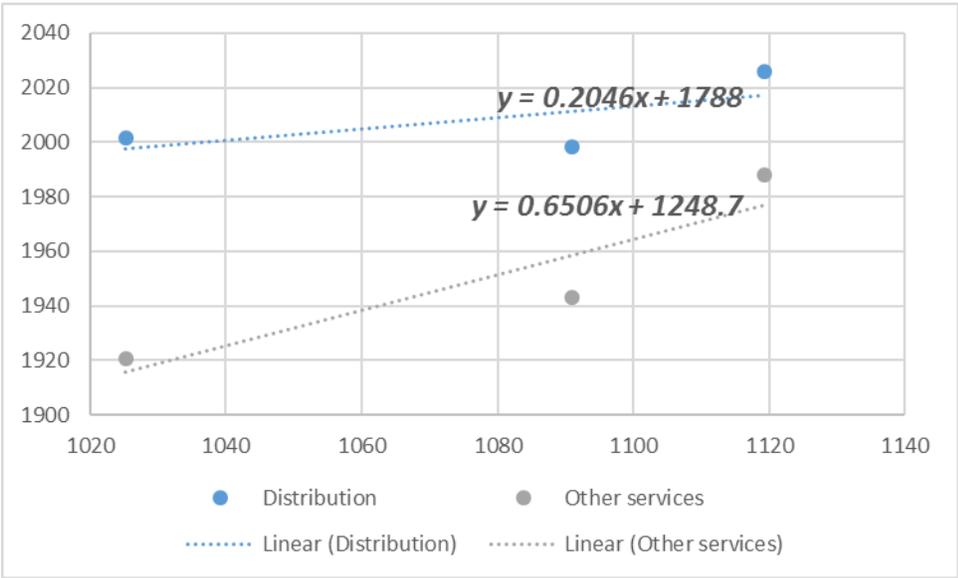
Figure 1. Tourist arrivals, excluding cruise – Barbados (million) and the Caribbean (billion)



The other foreign exchange sectors are unlikely to make a significant impact on output growth in the near term. Although "other services" and manufacturing together account for about 1/3 of foreign earnings, those earnings have not been growing in either sector in the past three years.

The wholesale/retail and business and personal sectors will benefit from spinoffs from the growth of tourism. The extent of these spinoffs is estimated based on the pattern observed in the last three years (Figure 2). It appears that the relationship between tourism and ancilliary activities has changed over the last decade, perhaps because of recession and the impact of new technologies. As a result, spinoffs from tourism are not apparent before 2014. Transportation, telecommunications and public utilities are expected to increase on recent trends, modestly in the case of public utilities, more robustly for telecommunications. Value added in Government services is frozen during the forecast period. Construction activity, which has been in decline, is expected to bottom out and remain unchanged.

Figure 2. Distribution (y) and other services (y) benefit from the growth of tourism (x)



An initial run based on these assumptions produces slow growth in 2017 and 2018, and stagnation thereafter.

The price deflator used to convert to nominal GDP is based on projected US inflation from IMF sources for 2017 and 2018, and thereafter it is kept constant at the 2018 rate until 2021. This relationship needs to be further explored. Experiments with oil prices and the US inflation rate as explanatory variables yielded an unrealistically low deflator, based on relationships over the past 12 years.

Government revenue, expenditure and financing

Revenues from the personal, corporation, property and value added taxes are forecast based on the projection of nominal income, using relationships estimated for the 2004-2016 period. Import taxes are forecast based on projected imports, using a relationship estimated over the same period.

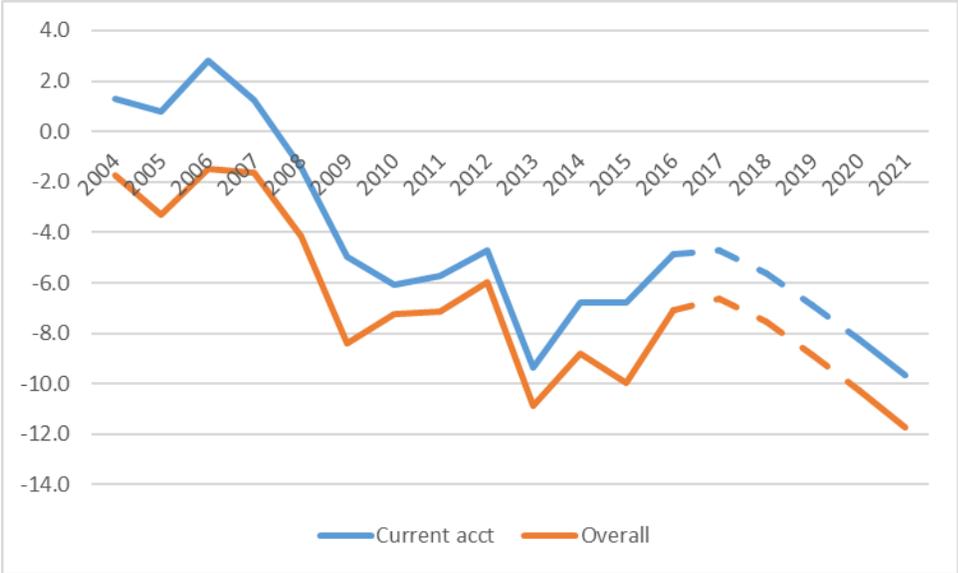
Government's wages bill for the fiscal year ending March 2018 reflects an increase agreed by the Parliament of Barbados in the *Estimates of Expenditure* approved in March this year. Thereafter the wages bill rises with inflation each year. Government purchases, subsidies to state corporations and grants to individuals are all projected to rise at the same pace as inflation.

In order to forecast interest costs, the starting point was an estimate of the overall fiscal deficit. This deficit amount was added to the total of Government debt at March 2017, making the simplifying assumption that debt is accumulated in equal monthly amounts over the course of the fiscal year. The interest cost is calculated on the debt level at the mid-point of the fiscal year, at an average interest rate which is unchanged, by assumption. This generates a larger deficit, somewhat higher debt and a slightly higher interest cost. The process is repeated, until the interest cost converges to a single amount.

Capital expenditure for the fiscal year ending March 2018 is put at the annual average over the previous 5 years. Thereafter capital expenditure rises at the rate of inflation.

The outcome of this forecast is a fiscal deficit which rises from 6.6 percent of GDP in the current fiscal year, to 11.7 percent in the 2021/22 Fiscal Year (Figure 3).

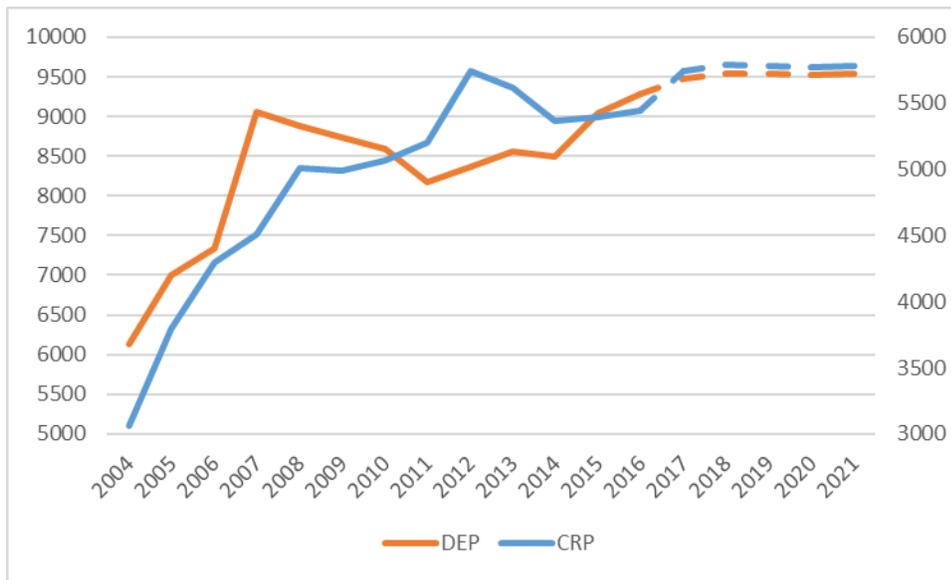
Figure 3. Fiscal balances, no adjustment (% of GDP)



The financial sector

In order to explore how fiscal deficits might be financed we go to the financial sector. With its rock-bottom credit rating Government effectively has no access to funding from international financial markets. We forecast the growth of bank deposits and credit, based on their relationship to nominal GDP over the past 12 years, and deduce that there is unlikely to be an increase in excess liquidity in the coming 5 years (Figure 4). Assuming that the contribution to Government finance from non-bank private sources remains at the \$150 million recorded in 2016 leaves the great burden of Government financing on the shoulders of the Central Bank.

Figure 4. Bank deposits and credit, \$million



The balance of payments

Tourist receipts are projected to increase at the same rate as arrivals; by assumption, average spending per visitor remains unchanged. Foreign receipts from other services, other exports and income from abroad are all projected to grow on trend.

Fuel imports are estimated as a function of real GDP and international oil prices and projected forward. All other imports are projected as a function of nominal income.

The current account would be close to balance in the forecast period, but for the fact that large injections of new money are projected. Private capital inflows are projected on trend, leading to overall surpluses averaging about \$150 million a year, before we take account of the impact of money creation.

In the absence of money creation foreign exchange reserves would recover to \$1 billion by 2018. However, in view of the size of fiscal deficits forecast and the extent of money creation necessary to finance them, foreign reserves are forecast to fall below \$600 million by the end of 2016. The loss of reserves due to money creation is estimated from an import equation which contains both nominal GDP and money creation as explanatory variables.

The impact of the May Budget

Government's estimate of the total impact of the Budgetary measures was about 4.6 percent of our projected nominal GDP, which would severely depress real output in the private sector, without any commensurate increase in the real output of the public sector. However, the government estimate appears unrealistically high, because rising prices as a result of the tax will shrink the tax base, and therefore the amount of revenue collected.

Various scenarios were tried, with differing assumptions about the impact of the combination of the NSRL and the foreign exchange fee. Our estimates suggest that the maximum yield from these taxes would be about \$330 million, after factoring in the impact of price increases on disposable income. However, a tax yield of this magnitude would have a severe contractionary impact on the economy, converting GDP growth projected at 0.8 percent before NSRL and the FX fee, to a contraction in the real economy of 3.4 percent. Alternatively, our estimates suggest that if the economy avoids recession, the yield from the NSRL and FX fee will not exceed \$200 million.

A strategy for closing the fiscal current account and increasing public sector productivity

The elements of the strategy are:

- Sale of BNTCL and Hilton hotel, and long term leases of Harrison Cave, GAIA and Bridgetown Port, which could yield \$700-800 million over the next 3 years;
- Reduction in staff complement of 1,500 persons per year over 3 years;
- 10 percent reduction in subsidies to state-owned corporations, each year for 3 years;
- Clearing proposed investments where approvals are outstanding for 3 months or more, which could open the way for investment of \$600-700 million over three years;
- Completing the project proposals to seek funding for major infrastructure such as sewerage, roads and telecommunications updates, which could be as much as \$1,500 million over 5 years.

These measures would have the following effects:

- They would increase Government revenue and cut government spending sufficiently to eliminate the fiscal current account deficit;
- As a result Government would no longer have a chronic cash shortage, and Central Bank could intervene to bring the Barbados Treasury bill rate back to the historical relationship to the comparable US rate, and reduce interest costs for all maturities of Government borrowings;
- They would provide a growth spurt to the economy immediately through hotel and other construction, and in the medium term by adding new hotel capacity and sustaining infrastructure, which remains a source of competitive strength for Barbados;
- The accelerated private sector growth, coinciding with retrenchment in the public sector, yields an additional 0.8 percent growth each year, thanks to the higher productivity of labour in the private sector;
- Significantly higher rates of GDP growth would help to restore growth in tax revenues, helping to achieve fiscal objectives more quickly.

Appendix 1. Equations of the model

Real output

Sugar production = $148 - 8.6(\text{time})$

Other agriculture = $256 + 4.3(\text{time})$

Manufacturing = $542 - 16.1(\text{time})$

Public utilities = $329 + 2.5(\text{time})$

Distribution = $1788 + 0.9(\text{tourism})$

Transport, communications = $823 + 13.9(\text{time})$

Business, other services = $1249 + 0.65(\text{tourism})$

Government revenue

Personal tax = $63 + 0.035(\text{nominal GDP})$

Corporation tax = $-232 + 0.05(\text{nominal GDP})$

Property tax = $58 + 0.009(\text{nominal GDP})$

VAT = $-219 + 0.117(\text{nominal GDP})$

Import duties = $167 + 0.01(\text{imports})$

Banks

Deposits = $-3609 + 0.98(\text{nominal GDP})$

Credit to private sector = $-3780 + 1.39(\text{nominal GDP})$

Balance of payments

Fuel imports = $2450 - 0.25(\text{real GDP}) + 7.78(\text{oil price})$

Other imports = $1937 + 0.07(\text{nominal GDP})$