



**XXVI ANNUAL CONFERENCE OF THE
REGIONAL PROGRAMME OF MONETARY STUDIES**

**A NEW FORECASTING MODEL
FOR BARBADOS**

**Dr. Roland Craigwell
Central Bank of Barbados**

JAMAICA CONFERENCE CENTRE

KINGSTON, JAMAICA, W.I.



November 23 - 26, 1994

**A NEW FORECASTING MODEL OF THE
BARBADIAN ECONOMY**

by

ROLAND C. CRAIGWELL
Chief Forecasting Analyst
Central Bank of Barbados

and

R. DELISLE WORRELL
Deputy Governor
Central Bank of Barbados

This paper is prepared for presentation at the
XXVI Annual Conference of the
Regional Programme of Monetary Studies to be held
in Jamaica, November 1994



*Correspondence Address: Dr. Roland Craigwell,
Research Department, Central Bank of Barbados,
P.O. Box 1016, Bridgetown, Barbados.
Tel. (809) + 436-6870; Fax (809) + 427-1431.*

NOVEMBER 1994

A NEW FORECASTING MODEL OF THE BARBADIAN ECONOMY

I. INTRODUCTION

Hitherto, forecasting and policy analysis of the Barbadian economy was undertaken solely on a judgmental basis. The proposed 'New Forecasting Model' (NFM) attempts to provide a formal econometric and statistical base for forecasting and policy analysis. Its broad objective is to identify and analyse causal relationships of macro-economic variables necessary for the understanding of the workings of the Barbadian economy. That is, it examines the causes of changes in output, balance of payment imbalances, fiscal deficits, inflation etc., focuses on those factors which are susceptible to domestic decisions, mainly government policy, projects domestic factors, assesses the impact of alternative policies and explores the implications of structural change. Thus it is envisaged that it will answer such short-term government policy questions as "what size of fiscal deficit may be allowed, if a certain foreign exchange target is to be achieved?"

The NFM is a culmination of fifteen years of modelling research in Barbados (see Craigwell and Walker (1993) for a useful survey). The first experimenters were McClean (1979, 1985); Worrell and Holder (1979, 1984); Boamah (1982); Boamah et al (1984). The main features of these models were their small size and the distinction they made between tradable and non-tradable sectors. Criticism can be lodged against the

tourism uses a two- step procedure. First, the demand for the Barbados tourism is estimated and projected. The determinant is real output in the visitors' home countries. Secondly, supply effects, non-price strategies and market specifics are introduced to modify the projection which is derived from step one. Specific account is taken of expansion in hotel capacity in Barbados, and the upgrade of hotels and facilities, increases or decreases in airline seat capacity, intensification of marketing expenditures, changes in productivity and improved service quality. Exhibit 1 shows the details of the estimates for Barbados. The total effects are applied to the baseline forecast for tourism.

The projections for manufacturing are also based on a two-step procedure. The forecast begins with a projection based on recent trends. This baseline projection is modified to take account of trade reform, the latter being largely judgmentally determined.

Barbados exports sugar under quota to the European Community; a restructuring programme is currently underway to increase the supply so as to fulfil the quota and the domestic market. The projections are based on data supplied by the sugar management company. For non-sugar agriculture and fishing, the forecasts are based on recent trends, adjusted by forecasts made by the officials of the various industries.

$$W = W(P_T, RQ, Q/N)$$

Estimates for import costs, sugar and export manufacturing and tourism are taken from the World Economic Outlook document of the World Bank.

Balance of Payments

From the output projections we may derive projections for the balance of payments, using the relationships that we have estimated. Export growth reflects recent trends. Imports are estimated from nominal GDP and adjustments for elasticity changes, e_p . That is,

$$m = m(Q, e_p)$$

where m is imports. Travel credits are based on tourism value added and inflation, while travel debits are on a historical ratio to domestic exports and travel credits. Investment income is based on trend as well as debt projections. Other services and transportation are forecasted on trend while all other services is projected using a 10-year relationship based on freight and insurance.

Fiscal Sector

Government revenues are projected according to economic growth and inflation, adjusted for the impact of tax reform and divestment. Current expenditures are

services from the forecast of the output of tradeables. Imports are forecast and we derive the required net capital inflows which would satisfy the foreign exchange reserve target.

We then forecast liabilities to the private sector and credit to the private sector, deriving the change in bank liquidity and its impact on the monetary base. The difference between the change in the monetary base and the central bank's net foreign assets (which are identical to the foreign exchange reserve target) give us the change in the net domestic assets of the monetary authority. We will allow that change to be in the form of credit to the government. It sets the limit of credit to government which may be allowed without causing the economy to fall short of the authorities' target for foreign exchange accumulation.

The maximum allowable fiscal deficit is the total of this non-inflationary credit from the central bank and prudent levels of foreign borrowing - determined by the government's external debt service profile. The projection of fiscal revenues is based on inflation and real GDP, adjusted for the impact of any tax reform. The maximum allowable government expenditure is the total of the deficit and revenue.

The system offers a forecast of real output and employment based on sectoral plans, problems and strategies. It provides a guide for monetary and fiscal policies that will serve to attain balance of payments targets, conditional on the prospects for growth.

The details are being worked out via institutions for private/public collaboration such as ministries of tourism, tourism associations and trade unions. Some aspects of the strategy are in place, others are still matters of contention. Some plans are well-devised and have been consistently implemented, others are of questionable efficacy. It is the forecaster's job to make the best judgement about the implementation, effectiveness and probable impact of each item.

The country has also taken measures to reduce gradually the extent of export concentration in the tourism sector, though acknowledging that tourism will remain the principal foreign exchange earner. More vigorous promotion and additional incentives are being targeted to other traded services. Niche markets are being sought in fisheries, agriculture and manufacturing and these sectors are to be developed further as complements to tourism, to provide inputs and to produce goods and services that may be sold to tourists. There is substantial international financial services activity. A fledgling information services industry has grown up in Barbados in the decade of the 1980s. There has been considerable development of artistic services in association with the tourism industry, especially music and festival arts. A few firms in manufacturing have developed niches in pharmaceuticals, electronic assembly and a number of other areas. In all of these activities demand is infinitely large on the international market.

Beyond a certain level of the money supply imports absorb so much of the foreign exchange receipts that the foreign exchange target cannot be achieved. Therefore, by superimposing the balance of payments constraint on the fiscal constraint the allowable level of credit to the central bank and therefore of increase in money supply is uniquely determined.

V. ECONOMIC PROSPECTS FOR BARBADOS

The point of departure is the forecast of tourism growth. Based on output in the visitors' home countries, the projected growth rate for tourism in the next six years is between 5% and 6%. If the exchange rates are kept fixed and inflation is contained as well as it has been in the recent past, cost competitiveness should improve by about 4% per year relative to other Caribbean destinations. It is unlikely that Jamaica and the Dominican Republic - the competitors suffering from high inflation - will be able to reduce inflation to rates comparable to those for Barbados for the time being.

Manufacturing accounts for 9% of GDP in Barbados. Growth is expected in food processing and the other manufacturing based on recent trends. However, Barbados is undertaking a major trade reform which is likely to slow the growth of manufacturing. The growth rate for manufacturing is projected at 1%. Output in fisheries and non-sugar agriculture are both projected to grow at the same rate of about 5%. Efforts to expand production of non-sugar agriculture have had little success.

policies and the expected impact of competitive strategies. Because so much of what goes into the forecast of tradeables is judgmental we cannot determine margins of error ex ante. Nevertheless, the forecasts are useful if they are carefully compared with performance as it evolves as a guide to the modification of strategies and policies.

GDP ESTIMATES

Estimates of Real GDP (1974 Prices)
(% changes)

	1995	1996	1997	1998	1999	2000
	-----	-----	-----	-----	-----	-----
TRADED SECTOR	0.6	5.7	3.8	4.8	2.5	2.5
Sugar	(30.6)	46.7	11.7	12.5	0.0	0.0
Non - Sugar Agriculture & Fishing	0.3	6.6	6.4	5.5	4.2	3.4
Manufacturing	(0.8)	(0.7)	(0.9)	2.7	0.0	0.7
Tourism	6.7	4.3	4.4	4.3	3.7	3.6
NON-TRADED SECTOR	3.0	2.6	2.6	2.7	2.3	1.8
Mining & Quarrying	0.6	3.6	7.0	2.7	2.8	2.3
Electricity, Gas & Water	3.3	(1.3)	3.0	4.2	3.5	2.9
Construction	1.8	2.6	4.5	2.2	2.7	3.0
Wholesale & Retail	4.5	2.9	0.3	2.6	3.0	3.6
Government	0.0	5.3	4.5	2.7	2.5	2.6
Transportation, Storage & Communications	4.2	0.3	2.9	3.3	3.1	3.1
Business & Other Service	3.5	2.2	2.5	3.1	2.8	3.1
Total	2.2	3.5	3.0	3.3	2.4	2.0