

# IMF Working Paper

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## Economic Resilience with an Exchange Rate Peg: The Barbados Experience, 1985–2000

*DeLisle Worrell, Harold Codrington,  
Roland Craigwell, and Kevin Grenidge*

**IMF Working Paper**

Monetary and Financial Systems Department

**Economic Resilience with an Exchange Rate Peg: The Barbados Experience, 1985–2000**

Prepared by DeLisle Worrell, Harold Codrington, Roland Craigwell, and Kevin Greenidge<sup>1</sup>

Authorized for distribution by Mark Swinburne

August 2003

**Abstract**

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper discusses the institutional arrangements for exchange rate targeting in Barbados and the critical role they played in the policy response to its balance of payments crisis of 1991–92. The framework featured ongoing cooperation between the central bank and the Ministry of Finance, and the use of a forecast model which highlighted the size of fiscal adjustment needed to secure foreign reserves adequate to maintain the exchange rate peg.

JEL Classification Numbers: E63, F31, E52

Keywords: Stabilization policy, Exchange rate, Caribbean

Authors' E-Mail Addresses: [dworrell@imf.org](mailto:dworrell@imf.org), [hecodrington@centralbank.org.bb](mailto:hecodrington@centralbank.org.bb),  
[rcraigwell@centralbank.org.bb](mailto:rcraigwell@centralbank.org.bb), [kcgreenidge@centralbank.org.bb](mailto:kcgreenidge@centralbank.org.bb)

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<sup>1</sup> The authors acknowledge the helpful comments of Michael DaCosta, Pamela Madrid, Anthony Pellechio, Wendell Samuel, Mark Stone, and Mark Swinburne, while taking full responsibility for the contents of this article.

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## I. INTRODUCTION

Small, open economies face a dilemma with respect to exchange rate strategy: although an exchange rate peg to a stable, low-inflation currency may be desirable in order to contain inflation, exchange rate pegs are susceptible to speculative attack.<sup>2</sup> The design of institutions for policymaking is often seen as key to the resolution of this dilemma. Some countries (for example, Bulgaria and Estonia) have elected to fortify the exchange rate anchor by establishing currency board rules, which require the issue of domestic currency only in exchange for foreign currency; other countries have formed monetary unions, and two countries—Ecuador and El Salvador—have recently abolished their national currencies, in favor of the U.S. dollar. Many countries eschew an exchange rate anchor in favor of inflation or monetary targets. However, for countries where policymakers determine that the benefits of an exchange rate anchor outweigh the costs, it is possible to develop institutional arrangements that can help sustain the anchor. This paper discusses the Barbados experience, where arrangements for cooperation between the central bank and the Ministry of Finance (responsible for managing the government budget) were explicitly used to sustain the exchange rate peg.<sup>3</sup>

The period 1985–2000 was chosen in order to provide a context for discussing responses to the balance of payments crisis of 1991–92, which provided a test of the robustness of the policy framework.<sup>4</sup> The next section describes Barbados' balance of payments crisis of 1991–92, the most severe in the country's postwar history. We explore the factors leading up to the crisis, the policy response, and the mechanisms for deciding and implementing monetary and fiscal policy; and we trace the economic recovery after the adjustment period. The third section describes the institutional framework and the process of policy decision making and monitoring of economic performance, illustrating both how it was meant to work and how it functioned—rather imperfectly—in practice. A key component was the forecast model, which provided the mechanism for addressing inconsistencies between fiscal policies, monetary targets, and the exchange rate peg, far enough in advance to allow for timely fiscal adjustment. The fourth section discusses the model, its theoretical basis, how it evolved, its current structure, the behavioral relationships embodied in it, and its forecast performance. The last section assesses the strengths and weaknesses of the arrangement.

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<sup>2</sup> For a recent survey, see Flood and Marion, 1999.

<sup>3</sup> Other Caribbean economies that have maintained a peg to the U.S. dollar at an unchanged rate include Aruba, The Bahamas, Belize, the Cayman Islands, the Netherlands Antilles, and the members of the Eastern Caribbean Central Bank (Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines).

<sup>4</sup> The year 2000 appears to mark the end of the upswing following the 1991–92 crisis and adjustment; see below.

## II. THE 1991/92 CRISIS: CAUSES AND RESOLUTION

The Barbados economy was in difficulty at the outset of the 1980s, with output contracting, inflation in excess of 10 percent, and declining foreign exchange reserves. However, following an IMF-supported adjustment program in 1982-83, the economy recovered, inflation subsided, and external balance was restored.<sup>5</sup> For the remainder of the 1980s, steady growth was recorded in the range of 2-4 percent per year; inflation was about 5 percent per year; there was a surplus on the current account of the balance of payments (except for 1983 and 1987); and foreign exchange reserves increased steadily, to the equivalent of three months of imports by 1988 (see Figure 1). However, it was the nontradable sector which was responsible for the overall growth: exports of goods and services declined between 1985 and 1987; the nontradable sector grew more rapidly than the tradable sector, on the whole; and the price of nontradables rose relative to the price of tradables, indicating a deterioration of the competitiveness of the country's output. Moreover, the investment ratio declined from its 1980/81 peak, and the slight recovery in the second half of the 1980s was mainly in the area of building activity rather than finished capital goods. These tendencies are illustrated in Figure 2.

The current account of the balance of payments began to deteriorate toward the end of the decade. Earlier, the decline in exports had been somewhat offset by a decline in imports of raw materials used in the export industries. Also, the government borrowed large amounts on foreign financial markets to finance fiscal expansion, including capital expenditure, which rose steadily as a percentage of GDP from 1983 onward. These capital inflows, which were particularly heavy in 1983 and 1985-88, sustained the level of foreign exchange reserves, such that an overall surplus was recorded on the balance of payments (see Figure 3).

The balance of payments crisis broke in 1991, when international private finance for emerging market countries declined and Barbados was unable to roll over maturing loans. At the same time, the current account of the balance of payments had deteriorated substantially. In 1989 and 1990, foreign exchange reserves had declined sharply; and by 1991, it seemed that reserves would be exhausted by midyear. It was only at this stage, in October 1991, that an adjustment program was implemented. It focused on reducing aggregate expenditure by reducing the fiscal deficit, which fell from 8 percent of GDP in 1991 to less than 2 percent in 1992. The adjustment program included a 50 percent cut in government capital outlays, a 10 percent reduction in government employment, and an 8 percent cut in civil service wages across the board. The impact reduced demand for both imports and nontradables: the import ratio fell from 48 percent of GDP in 1991 to 40 percent in 1992, and the current account of the balance of payments turned around from a deficit to a surplus in excess of 10 percent of GDP. A supporting IMF Stand-by Arrangement was agreed in January 1992, complemented by a structural adjustment loan from the Inter-American Development Bank.

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<sup>5</sup> The principal feature of the adjustment was a reduction in the fiscal deficit, from 8.8 percent of GDP in 1982 to 6.5 percent in 1983 and 3.5 percent in 1984.

The program was anchored on the fixed exchange rate, and the adjustment strategy was designed to restore owned foreign reserves of the central bank to levels sufficient to ensure confidence in the maintenance of the parity. The recovery of foreign exchange reserves was remarkably swift, with not only large current account surpluses, mainly as a result of import contraction, but also a recovery in exports which began in 1993. The adjustment program included a tripartite accord on wages, prices, and productivity between government and representative organizations of workers and employers. In 1992 and 1993, price increases for tradable goods significantly exceeded those for nontradables, and growth in the tradable sector overtook that in nontradables in the 1994–96 period. Output per person in the tradable sector rose continuously after 1992, in contrast to the nontradable sectors, where increases in output per person have not been sustained. After three years of recession, real economic growth was restored in 1993 and was sustained at rates between 2.3 and 4.5 percent per annum to 2000. (Real output contracted 2.7 percent in 2001 and by a further 1.1 percent in the nine months to September 2002, compared with a similar period a year earlier.)

Monetary policy played only a small role in the adjustment process, but the Central Bank of Barbados was at the center of the design and management of the economic adjustment program. The only monetary measure which had notable effect was a temporary global credit standstill, imposed in December 1991 to contain expenditure while allowing time for fiscal measures to take full effect.<sup>6</sup> The ceilings were removed in May 1993. The central bank's main task in the adjustment process was to determine the magnitude of the adjustment that was needed, to negotiate the details of the agreement which the government signed with the IMF and the Inter-American Development Bank; and to oversee, jointly with the ministries of finance and economic affairs, the implementation of the program, including daily tracking of foreign reserves, weekly monitoring of most financial indicators, and a fortnightly high-level policy meeting. The central bank coordinated arrangements for making decisions on monetary policy, advising on fiscal policy and providing public information on the economic strategy, objectives, and performance. The policy-coordinating body, the Joint Economic Group (described in the next section), was informed by short-term forecasts of liquidity and foreign exchange, updated weekly; quarterly forecasts from an integrated macroeconomic model of the economy; and weekly updates of fiscal revenues and expenditures.

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<sup>6</sup> The credit standstill was fully complied with, as reflected in banks' balance sheets, which are monitored weekly by the central bank.

### III. INSTITUTIONAL ARRANGEMENTS

The Barbados adjustment program featured the use of fiscal policy to defend the exchange rate and contain inflation, through a temporary contraction of real output and expenditure. To achieve this outcome institutional arrangements were needed to reconcile a sharp reduction in the fiscal deficit with the continuing demand for government services and transfers. Fiscal adjustment involved real costs, and arrangements were put in place to achieve a public consensus on the distribution of the burden of adjustment. The elements of the institutional framework included (i) the economic forecasting system; (ii) a joint technical policy formulation committee of the central bank and the Ministry of Finance; (iii) the budget allocation, reconciliation and monitoring process; and (iv) a process of informed public consultation and debate, including a formal tripartite agreement between government and representatives of workers' and employers' organizations on guidelines for wage setting.

The process of implementing changes in fiscal policy is a lengthy one, and its effects therefore appear with a lag. In view of this, the decision process incorporated an economic forecast, on the basis of which the need for fiscal adjustment could be anticipated. The forecasting system consisted of a forecasting model with sufficient detail to reflect real output determinants, price formation, the balance of payments, fiscal policy and monetary outcomes. Forecasts derived from the model were evaluated and adjusted by the forecast team, based on market intelligence, their accumulated experience and a variety of quantitative studies at the sectoral level. At the time of the crisis, these included studies on the incidence of taxation (Babb, 1991; Mascoll, 1991; Worrell, 1989), external competitiveness (Clarke, Wood, and Worrell, 1986), and the interest sensitivity of deposits and credit (Howard and Wapensky, 1974; Worrell, 1974; Saunders and Worrell, 1981).<sup>7</sup>

The body which came to be established to formulate policy, known as the Joint Economic Group (JEG), was chaired by the Governor of the Central Bank, and included the Director of the Ministries of Finance and Economic Affairs and senior central bank and ministry officials responsible for policy, forecasting, government budgeting and monetary operations. The structure and operations of the JEG were formalized in 1989, following a period of ad hoc and informal consultations between its eventual members. This was two years before the balance of payments crisis came to a head, although signs of disequilibrium were already apparent. The JEG met fortnightly to monitor economic developments on the basis of inputs on economic research and analysis, monetary operations, foreign exchange operations and government's cash flow. It made recommendations on budget limits at the outset of the budget planning cycle, and on fiscal and monetary adjustments whenever it was considered necessary thereafter. Once every quarter a

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<sup>7</sup> Subsequently, additional work has been done on competitiveness (Worrell, Boamah, and Campbell, 1996; Bynoe-Mayers, 1997), interest sensitivity (Greenidge, 1996), import propensities (Boamah and Craigwell, 1993), the determinants of inflation (Cumberbatch, 1997; Holder and Worrell, 1985), and factors influencing export structure and growth (McIntyre, 1995).

policy paper was prepared for the central bank's Board of Directors, and the JEG's government members kept the Minister of Finance up to date on the group's deliberations.

The JEG's recommendations to the Central Bank's Board of Directors on monetary policy, and to the Minister of Finance, on fiscal policy, were based on a common forecast. The Minister of Finance managed the budget allocation and reconciliation process, and the Chief Budget Analyst oversaw its implementation.

Although the JEG provided a mechanism for reconciling fiscal and monetary policy with economic projections consistent with the fixed peg, the existence of this mechanism did not always ensure that policies were in fact consistent. During an extended period from 1989 to 1991, government ran fiscal deficits that were excessive, in relation to the forecast levels of foreign reserves needed to maintain confidence in the exchange rate peg. The mechanism for ensuring policy consistency needed to be complemented by arrangements for making the implications of policy more transparent. The fiscal expansion was corrected when, as a result of public perception of the threat to the sustainability of the peg, public opinion shifted to favor strong fiscal adjustment. The JEG contributed indirectly to the public debate, as its economic forecasts were summarized in the quarterly press releases and economic reports of the central bank.

A process of public information and debate proved the ultimate sanction that produced the required fiscal adjustment, though only after the balance of payments deficit reached crisis proportions. As government finances and the balance of payments deteriorated from 1989 onwards, government's heavy borrowing program, large government borrowings from the central bank and the deterioration of the foreign exchange reserves were widely reported and discussed, in parliament and in the media. However, no fiscal action was taken until reserves were close to exhaustion, and government was faced with the prospect of a default on a foreign loan payment. An important element of the process of crisis resolution - centred around the fiscal adjustment - was the establishment of the tripartite accord on wages, prices and productivity. The accord, on which discussions began late in 1991, is acknowledged to have been a cornerstone of the adjustment, even though the formal Protocol for the Implementation of Prices and Incomes was signed only in August 1993 (see Downes and Alleyne, 1998).

In practice the system evolved over time, and never exactly matched the prototype. However, in principle it was meant to operate as follows. At the beginning of the budget preparation period the JEG would agree on a forecast scenario for an 18-month period, incorporating existing tax policies, spending commitments and capital projects. Based on detailed projections of output, exports, imports, capital flows, inflation and financial balances, the level of foreign exchange reserves was projected. If that level were thought to be unacceptably low, the JEG would recommend a reduction in the fiscal deficit.<sup>8</sup> On the basis of this recommendation the Ministry of

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<sup>8</sup> The foreign reserves target was based on the familiar rule of thumb, a target equivalent to the value of three months of imports. Performance criteria set under the standby involved a phased return to this level.



Finance would initiate budget discussions with spending ministries, based on an upper limit to expenditure, consistent with the target fiscal balance. In case of conflict with spending ministries, the Minister of Finance would make the final determination. At the conclusion of these discussions the Minister of Finance would decide on tax changes and changes in project and other expenditure. These changes would be incorporated into the forecast to produce a revised target for foreign exchange reserves. The Minister of Finance would announce the foreign reserves target – usually in terms of import cover, rather than a dollar amount – in the course of his general prognosis for the economy, incorporated into his budget speech. The Governor of the Central Bank would subsequently discuss the prospects for achieving the target at the central bank's quarterly press conference on the economy.

The central tool used in the process was the quarterly "Economic Outlook", the Central Bank's macroeconomic projection. This document, which dates from 1980 and includes tables on the monetary sector, real GDP, government operations, the balance of payments and international economic trends, was originally prepared on the basis of purely judgmental forecasts. In the late 1980s the forecasting model described later replaced the judgmental forecasts, although the model's forecasts were always modified in the light of expert judgment.

At its fortnightly meetings the JEG compared domestic and foreign exchange liquidity against targets described in the quarterly "Economic Outlook". Weekly forecasts of the Net International Reserves (NIR) were prepared for the meeting, with a table showing how foreign exchange cash flow determined trends in the NIR. It included a detailed statement on sources and uses of foreign exchange, incorporating data on short-term credit lines, transactions by the Central Bank and Government, and net sales or purchases by commercial banks. The latter reflected patterns of importation and foreign exchange earnings from tourism, sugar and other sources.

The NIR data were charted in such a way as to facilitate an assessment of prospects for achieving target levels. It is not possible to reproduce the 1989-92 charts because the data has not been stored, but the process is illustrated with data for a recent period in Figure 4. Seasonal patterns are readily apparent from previous years, allowing a judgmental forecast of current trends that may be compared with the target, shown as a solid line. A second table showed the Net Domestic Assets (NDA) of the Monetary Authorities, used to track Central Bank lending to Government, and to guide policy on the issue, redemption and trading in Government paper. If trends showed this variable to be seriously off target, an adjustment in government spending was indicated. These tables were supplemented by summaries of treasury bill issues and redemptions and commercial bank liquidity. The government's Chief Budget Analyst supplied comprehensive coverage of Government's revenue and expenditure, updated weekly, projected and compared with the quarterly forecasts contained in the "Economic Outlook". These tables provided a basis for deciding on the extent of fiscal adjustment needed if government's borrowing went off track.

The process may be illustrated with reference to Figure 4 and Table 1. The table shows the variables which link the balance of payments to the fiscal deficit, via the financial sector balances. The target is to contain government's borrowing from the central bank, to be consistent with the foreign reserve target for December 2001, given the projected sources and uses of finance by the private sector. The forecasts were derived from the model described in Section IV. The quarterly targets for the net international reserves and for central bank credit to government

are included in Figure 4, where, by comparing weekly trends with recent historical patterns, policy makers may anticipate the need for fiscal adjustment. Figure 4 portrays the situation as it would have appeared in mid-2001.

#### IV. THE MEDIUM-TERM FORECAST MODEL

##### A. Models for Developing Countries

The forecasting model on which policy discussions are centered has evolved continuously over many years, from the efforts of economists at the Central bank of Barbados to incorporate the structural features of the Barbadian economy. The model shares much in common with empirical macroeconomic models for developing economies summarized in Agénor and Montiel (1999) (see Table 2). In its financial programming, the IMF uses a model popularized by Polak, based on the nominal income identity, and a priori assumptions about the real growth rate and the balance of payments. Inflation and the nominal growth rate depend on the money supply, which is driven by domestic credit and the accumulation or decumulation of foreign reserves. The World Bank's standard RMSM model is used to determine the shift in the savings function necessary to generate investment for a target growth rate. The model establishes a link between growth and investment, which depends on the supply of savings and hence on the propensity to save. The model has been extended to identify fiscal and foreign exchange gaps.

There is a class of structural macroeconomic models for open economies, containing equations for output, domestic prices, wages, consumption and investment, shown in the final panel of Table 2. They feature a production function which includes imported intermediate goods as well as labor and capital. In addition to wages and import prices, domestic prices depend on the extent of capacity utilization. Wages are determined by an expectations-augmented Phillips curve: its arguments are a foreign price index, the available labor force and the expected rate of inflation. Consumption depends on disposable income, the rate of interest and a wealth variable. The investment equation includes as arguments real output, the cost of capital and the pre-existing capital stock. Most, though not all, models developed for Caribbean countries fall within this genre. Twenty eight models for the English-speaking Caribbean are summarized in Craigwell et al. (1996), Table 1.

Agénor and Montiel point out that this model has only one output, so that the factors influencing the production of tradables and nontradables cannot be distinguished, and important terms of trade effects are lost.<sup>9</sup> The impact of monetary, fiscal, exchange rate and commercial policies may differ between tradables and nontradables, because the former are constrained by world price changes (apart from transport and information costs), whereas the latter are not. For this reason, external shocks and productivity changes may also have disparate effects. Recent studies which illustrate these effects include Kumhof (2001), Furman and Stiglitz (1998), Habermeier

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<sup>9</sup>For a model of the Barbados economy which incorporates terms of trade effects, see McClean (1997).

and Mesquita (1999) and McKay and Milner (1997). Agénor and Montiel suggest a minimum of three outputs are needed—exportables, importables and nontradables.

### **B. Models for the Caribbean**

In modelling Caribbean countries, two additional factors, small size and geographic location must be considered, because of their significant effects on the outcome of any policy. Because of small size, resource-based activities are few, in relation to the wide diversity of consumption needs. All Caribbean countries therefore have very high ratios of external transactions to GDP, and openness is a structural feature, which cannot be changed to any significant degree by trade policy.<sup>10</sup> Furthermore, small size results in export concentration because the achievement of efficient scale in just one or two industries exhausts the supply of skilled and qualified labour. Exporters from small countries face disproportionately high costs of diversification of product and market, areas where economies of scale and scope are considerable and where information costs may be prohibitive. Possibilities for agglomeration economies are limited; only in the main export activity will there be a sufficient number of firms to attract firms specializing in the same field.<sup>11</sup>

Arguably, the critical growth constraint for small countries is neither savings nor foreign exchange but capacity in the tradable sector. In much the same way that trade policies have little effect on trade structures, monetary and exchange policies have little effect on foreign investment inflows and outflows in countries where there is no parallel market for foreign exchange.<sup>12</sup> The savings gap is closed by foreign investment, available in amounts that for a small credit-worthy economy may be considered infinitely large, for profitable investment. Foreign investment will close the foreign exchange gap as well, provided that investment takes place in the tradable sector. In contrast, investment in nontradables will not supply an earnings stream in foreign exchange to service foreign debt. For this reason, growth models for small developing economies need to specify a growth constraint based on investment in tradables.

It follows from their structural openness that small economies' inflation is very strongly influenced by foreign inflation and exchange rate changes. Domestic inflation may be driven above foreign inflation by expansionary policies affecting the price of nontradables, though, should this trend persist strongly, devaluation is probable. The only way to keep domestic inflation below foreign inflation is to achieve rapid increases in total factor productivity in

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<sup>10</sup>Carter (1997) provides evidence on size and openness for four Caribbean countries, in comparison with other countries, small and large.

<sup>11</sup> Krugman (1991) discusses the pervasiveness of agglomeration economies in determining the patterns of world trade.

<sup>12</sup>They may have a large impact on financial flows of a speculative nature, however.

nontradable production, with no increase in real wages.<sup>13</sup> Empirical studies for the Caribbean all confirm the foreign price effect on inflation (see Cumberbatch (1997) for a survey).

A second distinguishing characteristic of Caribbean economies is their geographical proximity to the US. In conjunction with their small size, this makes them extensions of the US currency area (Farrell and Worrell, 1994) and circumscribes the possibility of exchange rate policy. Financial flows quickly neutralise the real balance effects and the pass-through of prices means that relative price effects soon disappear. As a result, changes in real exchange rates bear no relationship to nominal exchange rate changes (Bynoe-Mayers, 1997 provides evidence for Barbados; for a capsule of the theory of optimal currency areas, see Aizenman and Flood, 1992).

Among the earliest models developed by the Central Bank of Barbados to incorporate some of these peculiarities was Holder and Worrell (1985), a structural model used to explore sources of inflation. The domestic source of inflation in that model is the balance between the demand and supply of nontradables. Demand is driven by monetary and fiscal policy and by the balance of payments, while the supply curve shifts with changes in local and imported costs. Boamah et al. (1985) added equations to determine wages and employment. The wage is the result of a bargain between employers and workers, where employers' offers are conditioned by output prices and wage demands are based on lagged wages and expected inflation.

A structural model with linkages to the financial sector appears in Worrell (1987), Appendix B (with Holder). Worrell (1992) introduced an output capacity limit based on investment, and in Worrell (1997) this limit is made to depend on investment in the tradable sector by making investment in nontradables endogenous. The determinants of investment in tradables are retained earnings,<sup>14</sup> the expected rate of return, the perceived risk associated with that rate of return, the opportunity cost of investment (a US interest rate), the rate of previous investment in tradables, a time variable as a proxy for technical change, and government investment as a proxy for infrastructure. The expected rate of return is derived from the probability distribution of expected profits based on market projections, modified by the rate and structure of corporate taxation (see King and Fullerton, 1984, and Worrell, 1989).

The forecast model has been modified from time to time to incorporate the results of these sectoral studies, as empirical tests produce stable parameter estimates. There is no comprehensive description of the model in the form that it would have been used at the time of the 1991—92 crisis. However, the essential structure of the model in its current form was by then fully established. At end-2002 the model featured a disaggregated tradable sector: tourism output was forecast based on assumptions about growth of demand in major markets and capacity utilization, and other tradables were forecast based on supply considerations. Output of

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<sup>13</sup>Capital flows equilibrate profit rates at home and abroad with allowance for information cost and risk.

<sup>14</sup>Available evidence is that well over 50 percent of private investment is financed by private firms (Worrell, 1985).

nontradables was estimated from a reduced form of demand and supply equations, with a lagged capacity adjustment. Demand included fiscal stimulus and derived demand from incomes earned in the tradable sector. The balance of payments forecast was the result of the tradables forecast, a conventional import demand function, debt service projections provided by an independent (of the forecast system) debt monitoring system at the central bank, and capital movements based on the public sector investment program and a survey of major enterprises' investment intentions. Prices were a weighted average of international prices (for tradables) and prices of nontradables, derived from the market clearing solution for nontradables. Forecasts of financial balances were based on nominal income (the product of prices and output), interest rates (determined by international arbitrage), inflation, and public sector credit. Fiscal projections were derived from growth projections, on the basis of unchanged tax and spending policies, and the public sector investment program.

The model is far from ideal, as may be seen from the size of in-sample forecast errors, shown in Table 3. It consistently underestimates foreign exchange reserves and overestimates all other macroeconomic aggregates, by considerable margins. In general the third quarter forecast is slightly better than that for the first quarter, but the improvement is rather small. From a policy point of view, the fact that an underestimate of foreign reserves is associated with an overestimate of the fiscal deficit imparts a useful conservative bias to the forecast.

## V. CONCLUSIONS

Fiscal discipline in Barbados was obtained via a transparent link between the fiscal deficit—and its financing—and the level of foreign exchange reserves, in much the same way that monetary policy is linked to inflation in the inflation-targeting framework. The authorities were induced to take decisive action to correct deviations from the forecast target by the fear of social sanction from an informed public. The time-inconsistency problem, reflected in the lag between the decision to take corrective fiscal action and the implementation of measures, was dealt with by using a forecast target. Fiscal policy seems a very blunt instrument for economic adjustment, compared with monetary policy; tinkering with the tax system causes inefficiency, and frequent changes in spending programs are disruptive to the provision of public services. In an open economy like Barbados, however, there is no alternative to fiscal adjustment, if the peg is to be sustained.

Just as in the inflation-targeting framework, ensuring and preserving the reputation of the central bank proves to be vital in a system which focuses on the maintenance of adequate foreign exchange reserves. Security of tenure for the governor and the bank's decision-making board, administrative autonomy for the bank, and regular reporting requirements are important elements in establishing a reputation for professional, dispassionate judgement. As is now widely recognized, it is also vital that the central bank have staff of high technical caliber and spokespersons of the highest professional standing. Moreover, it is equally important that the ministry of finance be authoritative and highly regarded for the technical quality of its output, since its role is so much more influential than that of the monetary authority.

The Barbados policy framework incorporated features which might be attractive to other small, open economies: a readily visible anchor, a commitment mechanism which involved a fiscal reaction mechanism (reflecting the importance of fiscal adjustment in the open economy), forward-looking decision mechanisms and forecast tools, and arrangements which promoted national debate and agreement on the sharing of the burden of adjustment. The robustness of the arrangement depended on its implementation, however, and although the Barbados exchange rate anchor held, adjustments were not always applied in timely fashion. The features listed should be considered the minimum necessary for successful macroeconomic management in small, open economies, but they may be institutionalized differently in different countries, and committed policy implementation is necessary for their success.

Table 1. Monetary Variables, Actual (2000) and Projected (2001), at December 2000.  
(Barbados dollars, millions)

	Mar. 2000	Jun. 2000	Sep. 2000	Dec. 2000	Mar. 2001	Jun. 2001	Sep. 2001	Dec. 2001
Net International Reserves	749.7	1,038.8	1,020.2	969.0	1,096.7	1,158.5	1,069.1	969.0
Net Domestic Assets	-224.2	-416.3	-449.8	-406.1	-507.9	-498.3	-415.0	-335.5
Net Claims on Public Sector	-337.5	-550.2	-504.5	-455.6	-605.7	-596.2	-512.9	-433.4
Monetary Base	525.4	622.5	570.5	562.9	588.8	660.1	654.1	633.5
Import Cover (Weeks)	17.3	24.7	23.8	21.9	25.5	26.8	24.3	21.7
Overall Fiscal Balance	0.9	10.2	-80.8	-7.4	-4.8	-44.3	-79.4	-22.9
Total Financing	-0.9	-10.2	80.8	7.4	4.8	44.3	79.4	22.9
Domestic Financing	-5.6	-205.4	61.9	-7.4	8.4	32.1	75.8	9.0
Central Bank	-138.7	-213.3	44.6	49.8	-147.6	9.6	83.3	79.5
Foreign Financing (Net)	4.7	195.2	18.9	14.8	-3.6	12.2	3.6	13.9

Source: Central Bank of Barbados.

Table 2. Models for Developing Countries

**IMF (Polak) Model**

Nominal income  $Y = Y_1 (MO) = Y_2 (CR, FXR)$

**World Bank (RMSM)**

Real Income  $y = I/ICOR$

Investment  $i = s = s(y)$

**Representative Macroeconometric Model**

Output  $y = y (l, j, k)$

Price of home good  $p = p (w, p_j, \tilde{y})$

Wages  $w = w[l(y, k, p^f)/l, E(infl)]$

Consumption  $c = c (y_d, \Delta, a)$

Investment  $i = i(y, q, k_{-1})$

Symbols:

*a* Absorption

*c* Consumption (real)

*CR* Domestic credit

*E(infl)* Expected inflation

*FXR* Foreign exchange reserves

*i* Investment (real)

*I* Investment (nominal)

*ICOR* Incremental capital output ratio

*j* Imported input (real)

*k* Capital (real)

*l* Employed labour

*p* Price index

*p<sup>f</sup>* Foreign price index

*p<sub>j</sub>* Price of imported input

*w* Wage index

*y* Output (real)

*y<sub>d</sub>* Disposable income (real)

*ŷ* Output capacity (real)

Source: Agenor and Montiel (1999, Chapter 13).

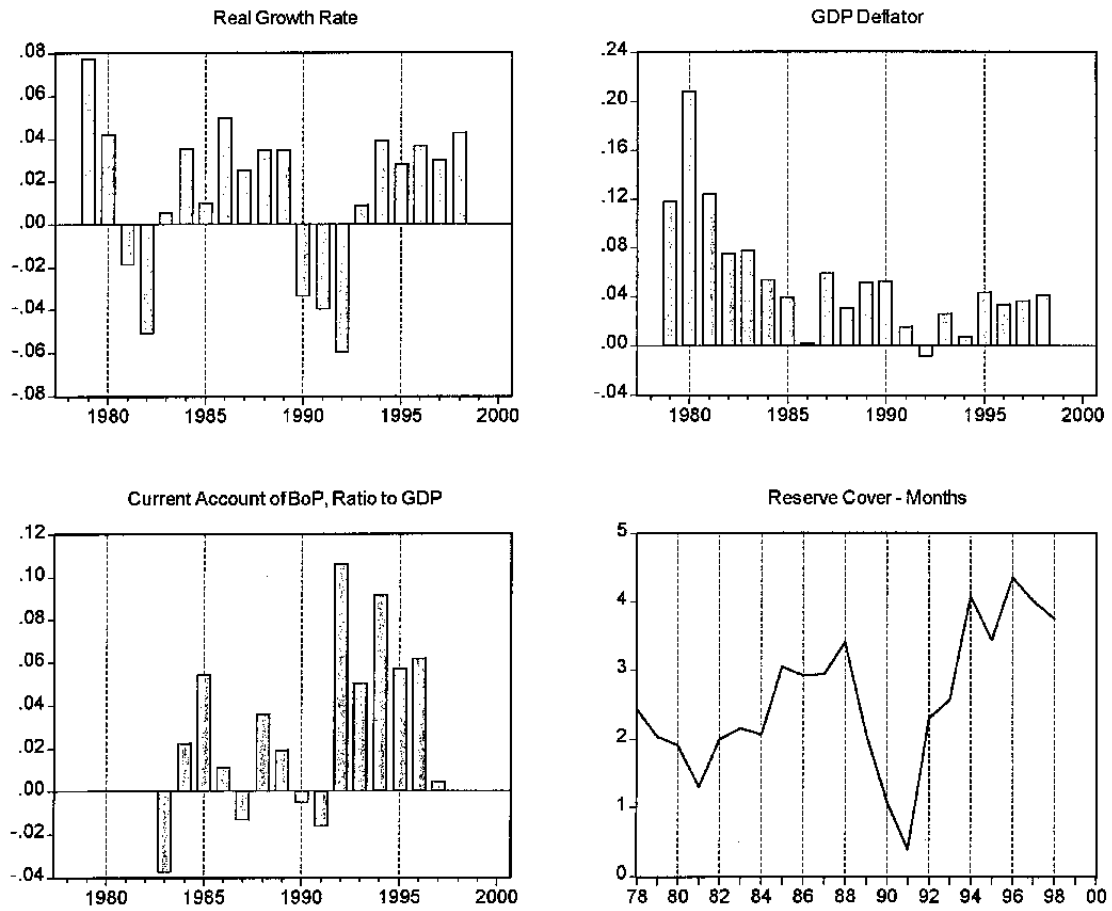


Table 3. Forecast Errors of the Economic Outlook Model

Root Mean Square Errors	1980-85		1986-90		1991-95		1995-99		1980-99	
Millions of Barbados Dollars	Proj.@ Q1	Proj. @ Q3	Proj. @ Q1	Proj. @ Q3	Proj. @ Q1	Proj. @ Q3	Proj. @ Q1	Proj. @ Q3	Proj. @ Q1	Proj. @ Q3
Real GDP Growth (percent)	1.69	1.11	2.44	1.36	3.34	1.10	1.58	1.08	2.37	1.17
Fiscal Balance	47.02	22.73	107.2	69.28	123.7	99.14	99.52	79.14	96.67	71.17
Credit to Private Sector - (changes)	59.71	23.86	23.06	28.90	68.69	74.00	95.25	87.79	64.78	57.36
Liabilities to Private Sector- (changes)	87.22	23.61	89.44	32.69	59.68	31.35	119.0	95.78	89.50	50.15
Reserves (-incr./+decr.)	140.0	173.6	82.47	57.16	165.2	81.84	96.89	80.76	127.6	113.3

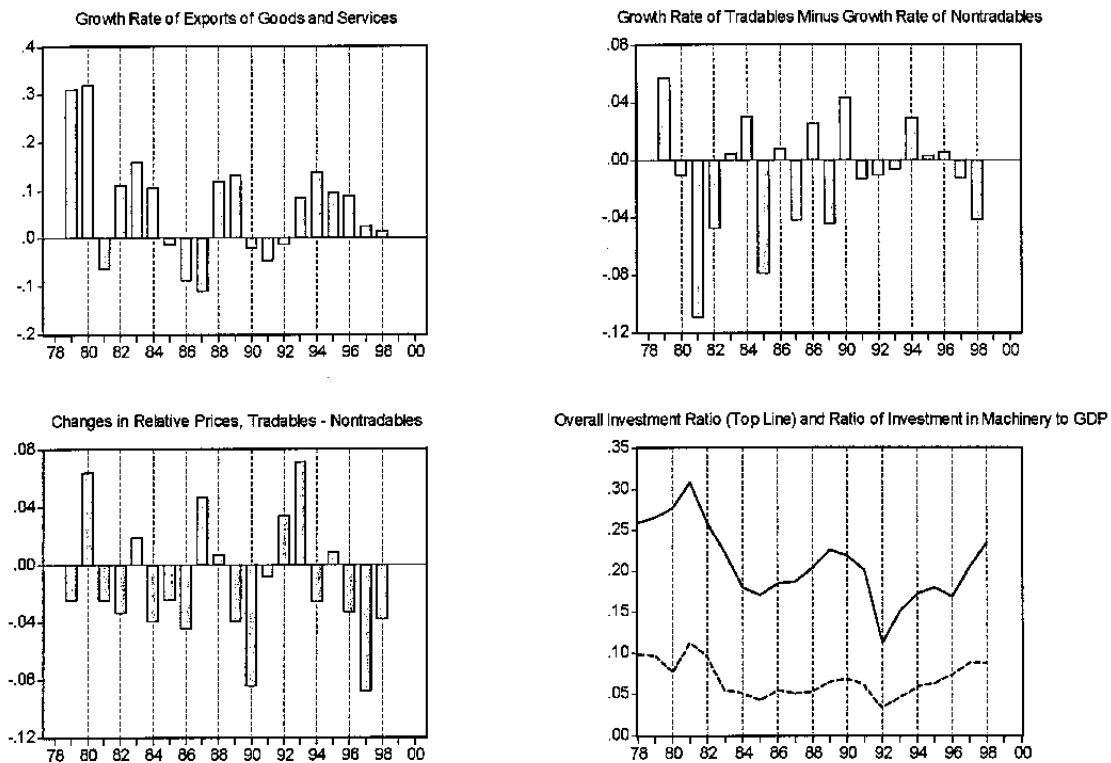
Source: Central Bank of Barbados.

Figure 1. Growth, Inflation, the Current Account, and Reserves



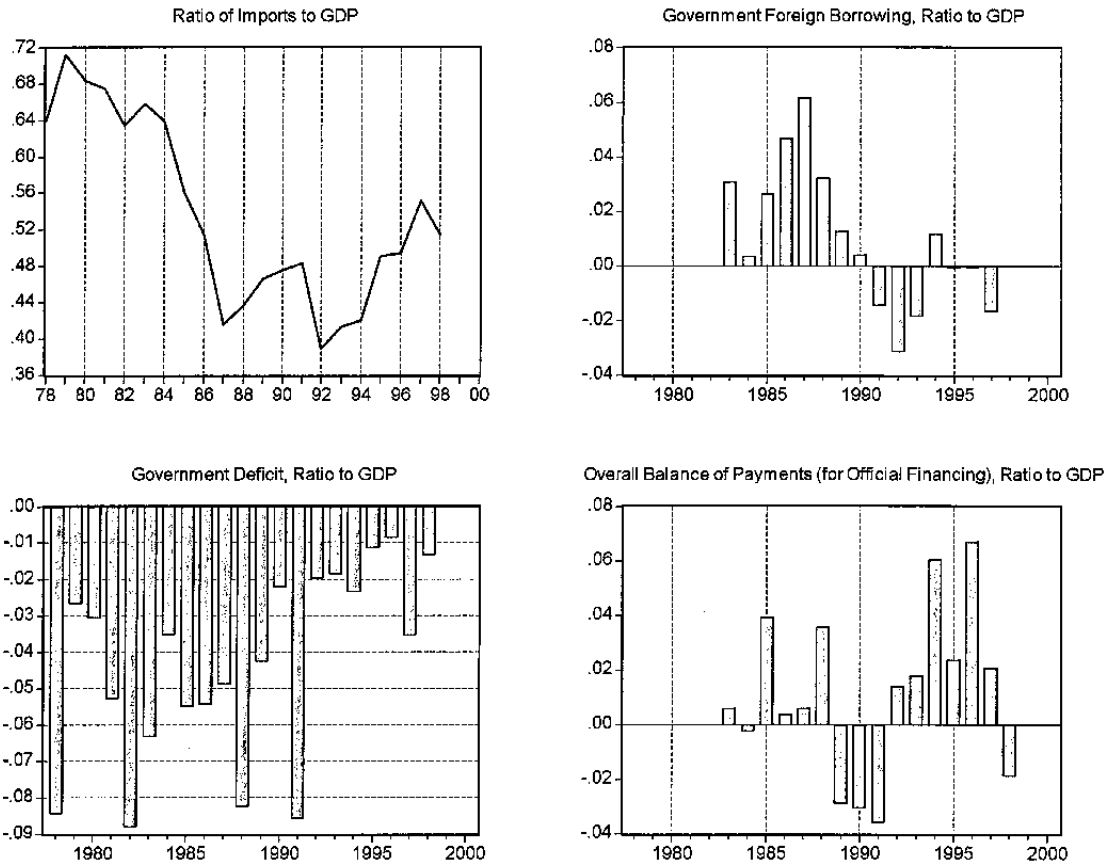
Source: IMF, *International Financial Statistics*.

Figure 2. Exports, Tradables vs. Nontradables, and Investment



Source: IMF, *International Financial Statistics*.

Figure 3. Imports, Government Foreign Borrowing, the Fiscal Deficit, and the Balance of Payments



Source: IMF, *International Financial Statistics*.

Figure 4. Net International Reserves and Net Credit to the Public Sector

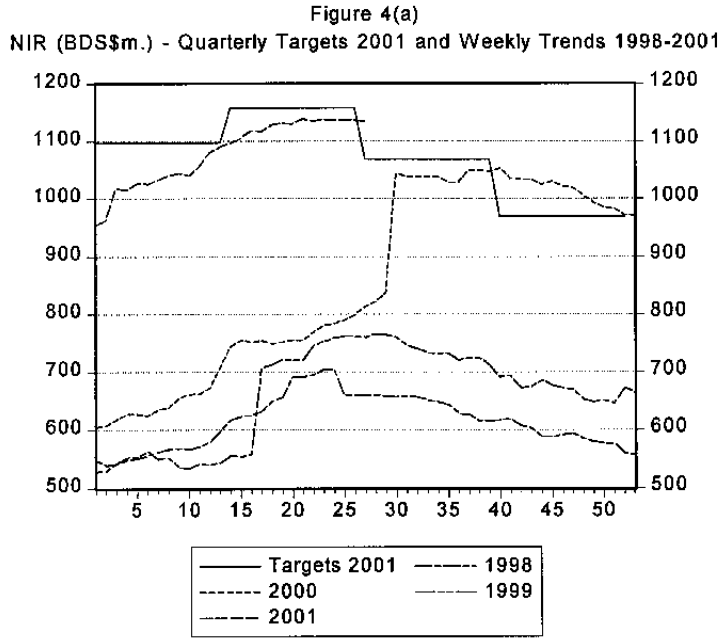
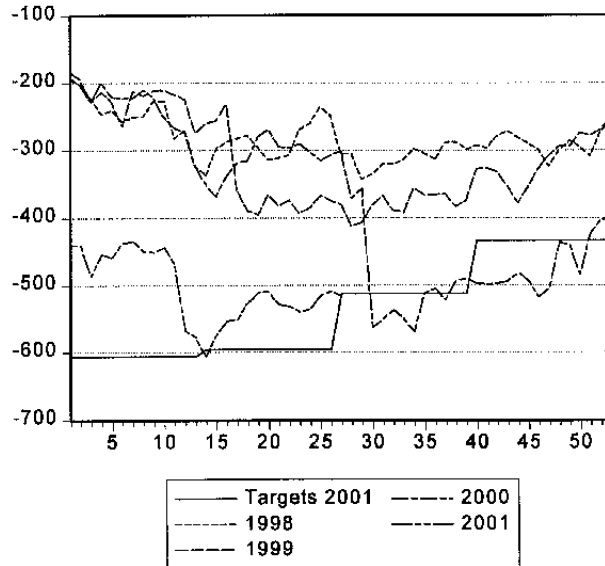


Figure 4 (b)  
Net Credit to the Public Sector (BDS\$m) - Quarterly Targets 2001 and Weekly Trends 1998-2001



Source: Central Bank of Barbados.

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