The Caribbean

From Vulnerability to Sustained Growth

Edited by Ratna Sahay, David O. Robinson, and Paul Cashin

INTERNATIONAL MONETARY FUND

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Foreword

After gaining their political independence from the United Kingdom in the 1960s and 1970s, the open island economies of the Caribbean prospered initially because of the preferential access given their traditional agricultural products to European markets, and later due to the growing importance of tourism. The national authorities, rightfully, put a strong emphasis on improving social conditions, and today living standards have reached levels that match upper-middle-income countries. In addition, many economies such as those that are members of the Eastern Caribbean Currency Union (ECCU), and which are the focus of several chapters in this book, have enjoyed a sustained period of price and exchange rate stability. However, during the last decade the island economies have been buffeted by a series of adverse shocks, including the erosion of trade preferences, decline in official foreign assistance, and frequent natural disasters. The relaxation of fiscal stances, in many instances reflecting accommodation to these shocks, has led to a rapid build-up of public debt in the region.

In response to the large macroeconomic challenges facing the Caribbean, the International Monetary Fund has stepped up its engagement in the region with the commencement of regional analysis and surveillance of the ECCU, intensified surveillance in Jamaica, more comprehensive Article IV consultations with individual countries, deeper technical assistance programs to help build local capacity, new IMF-supported programs in several countries (including Guyana, Grenada, and Dominica), and greater public outreach. The recent IMF-supported programs are developed by the authorities and embody a clear recognition of capacity constraints faced by many countries in implementing policies and undertaking reforms. In discussions with regional and national authorities, the IMF has emphasized that acceleration of the Caribbean's growth performance will require a multifaceted strategy designed to integrate the island economies with the global economy, facilitate the transformation of their economies from agriculture into tourism and related services, promote greater regional cooperation, particularly in the provision of collective govern-

ment services, and implement fiscal policies that preserve macroeconomic stability.

The papers in this book arose from the IMF's regional and bilateral surveillance work in the Caribbean and have benefited from discussions with key national and regional policymakers and feedback from regional conferences, seminars, and workshops. The papers set out many of the economic challenges facing the island economies of the Caribbean and present policy options designed to ameliorate external shocks and embark firmly on a sustained growth path. I hope that the contributions to this book will form the basis for deepening our policy dialogue in the region and help achieve the economic aspirations of the Caribbean people.

Anoop Singh
Director, Western Hemisphere Department
International Monetary Fund

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The views expressed in this book, as well as any errors of commission or omission, are the sole responsibility of the authors, and do not necessarily reflect the opinions of the Caribbean authorities, the Executive Directors of the IMF, or other members of IMF staff.

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Overview

Ratna Sahay, David O. Robinson, and Paul Cashin

The Caribbean islands have a distinct place in world history and culture that belies their small physical size. During the conquest of the Americas starting in the 17th century, the islands took center stage in the numerous naval campaigns between the European nations attempting to establish bases that would provide access to untold wealth in distant lands to the west. With the development of sugar and other tropical crops on the islands in the 18th and 19th centuries, the plantations themselves were treasured for the vast profits they generated.

Through time and driven by labor movements, the islands attained an increasing measure of autonomy, culminating in full independence for the larger islands by the 1970s. With the notable exception of Haiti, democratic traditions took strong root over time, and public policies today are actively debated and strongly influenced by the socioeconomic conditions of the populations. Unique local cultures have developed and flourish, as evidenced by Nobel prizewinners in economics and literature, as well as by the international success of pop music artists. The region has produced the West Indies cricket team, which dominated international competition for many years.

The last few decades have seen fundamental and lasting changes in the islands. Attaining independence, of course, is the key political change, which brought with it a need to define and implement national priorities. Economic structures have also changed—sugar and bananas, which were the backbones of the economies for centuries, have now been replaced as the dominant sector by tourism. Unfortunately, some things have not

changed—the islands remain among the most disaster-prone region in the world, hit regularly by major hurricanes, landslides, earthquakes, and even volcanic eruptions.

So how have the economies fared since independence? To answer this question, this book provides a broad perspective on the Caribbean islands, while focusing on the smallest ones—those in the Eastern Caribbean Currency Union (ECCU). The good news is that most countries have enjoyed a sustained period of price and exchange rate stability, while maintaining and improving living standards. The bad news is that, in more recent years, negative shocks have exacerbated the remaining problems of adjustment from declining sectors, growth has slowed, and a substantial public debt burden has been accumulated.

The Caribbean countries have been able to deliver on promises of strong social and economic outcomes. Most political parties in the region have their roots in organized labor and place great emphasis on sustaining high levels of employment, safe working conditions, and a strong social safety net with free access to health and education services. The region has among the strongest social indicators in the world; for example, life expectancy in the ECCU countries averages 74 years, well in excess of the average of 70 for middle-income countries, while literacy rates in the ECCU countries average 92 percent. Per capita incomes have also risen since independence; for example, the ECCU countries are now among the upper middle-income countries of the world (Table 1.1).

Traditional agriculture has fared poorly in recent decades. Both banana and sugar producers have been supported for many years by preferential access to markets in Europe that have enabled Caribbean producers to receive prices substantially above those on the free market—in the case of sugar, the price in Europe has often been two or even three times higher than the free market price. In response to increasing international pressure on restrictive European trade regimes, the erosion of preferential trade access by Europe's former colonies is now accelerating. Banana production in the Windward Islands has fallen sharply, and is now about one-third of the 1990 level (Figure 1.1). The fate of sugar is even more dramatic—St. Kitts and Nevis, the last remaining producer in the ECCU region, announced the closure of its industry in 2005.[1]

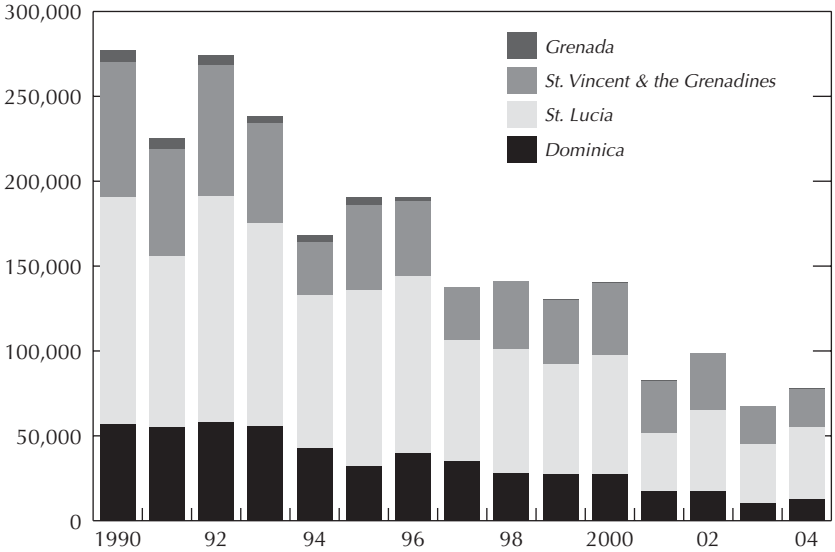
[1]The difficulties in the sugar industry are by no means new. As early as 1896, a Royal Commission headed by General Sir Henry Norman examined conditions in the sugar industry in the islands and concluded that the industry was in danger of extinction due to its inability to compete with more capital-intensive producers such as Brazil.

Table 1.1. Eastern Caribbean Currency Union (ECCU): Social and Demographic Indicators

	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines	ECCU
Population (thousands), 2003 (estimate)	79	71	104	47	161	106	567
Poverty headcount index, 2000[1]	12	33	32	31	25	38	29
Human Development Index rank (2004) among 177 countries	55	95	93	39	71	87	. . .
Life expectancy (years), 2003	75	77	73	72	74	73	74
Adult illiteracy rate (percent), 2001	13	4	6	2	10	11	8
Mortality rate, infant (per 1,000 live births), 2003	11	12	18	19	16	23	17
GDP at market prices, 2004 (millions of U.S. dollars)	815	282	437	404	762	404	3,105
Share in nominal GDP, 2004	26.3	9.1	14.1	13.0	24.6	13.0	100
GDP per capita (U.S. dollars), 2004 (estimate)	10,375	3,962	4,205	8,647	4,748	3,801	5,473

Sources: World Bank, World Development Indicators database; Eastern Caribbean Central Bank; and IMF staff estimates.
[1]Percentage of population living below each country's locally-defined poverty line in 2000.

Figure 1.1. Windward Islands Banana Exports
(In tons)

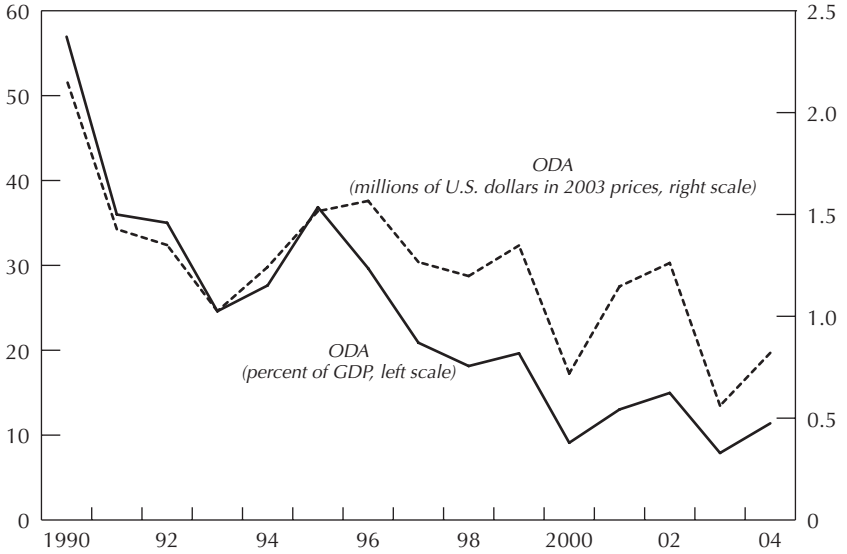


Source: Windward Islands Banana Development and Export Company.

How important are these traditional industries today? Measured in terms of value added or as a share of exports, the industries have long since ceased to constitute the dominant sector in the economy. Indeed, agriculture as a whole now accounts for just 6½ percent of GDP in the ECCU region, although there are notable exceptions in other Caribbean countries (in sugar-exporting Guyana, agriculture comprises about 30 percent of GDP). However, its social—and political—importance is much greater. These crops have been grown for centuries and form the foundation for rural livelihoods and the associated social support mechanisms. Closure of such industries—the sugar industry in St. Kitts and Nevis employed around 10 percent of the labor force when it was closed—creates significant social disruptions and economic challenges.

With independence and the rise in per capita incomes has also come a reduction in aid flows. Aid from member countries of the Organization for Economic Cooperation and Development (OECD)—largely to support the transition away from traditional crops and in response to natural disasters—has waxed and waned (Figure 1.2). While such flows have remained roughly constant in U.S. dollar terms since the mid-1970s, they

Figure 1.2. The Caribbean: Official Development Assistance (ODA)



Source: Organization for Economic Cooperation and Development.
Notes: The Caribbean includes the countries of the Eastern Caribbean Currency Union and The Bahamas, Barbados, Belize, Dominican Republic, Jamaica, Suriname, and Trinidad and Tobago.

have declined significantly in real terms and relative to GDP. For the ECCU countries as a whole, the reduction in aid flows is of the order of 5 percent of GDP a year, creating a substantial shortfall in government budgets and forcing either a scaling back in intended expenditure plans or the accumulation of debt. Going forward, the outlook is certainly no brighter in this regard for the Caribbean, as donor countries increase their relative aid flows to reducing poverty in the lowest-income countries, particularly in Africa.

Natural disasters have continued to hit the region with regularity (Table 1.2). The geographical location of the islands is a mixed blessing—beaches and climate that provide a natural basis for a tourism industry but also exposure to hurricanes. This is a critical area where the small size of the islands significantly constrains policy options. It is one thing for a state or a small corner of a large federation to be hit by a hurricane, and quite another matter when it devastates an entire country, as happened in Grenada in September 2004. St. Kitts and Nevis had to build and rebuild three cruise ship ports—vital infrastructure for a tourism dependent economy—in a three-year period in the late 1990s due to extensive damage

Table 1.2. Worldwide Incidence of Natural Disasters, 1970–2004

	All Recorded Disasters				
	Number of events	Number of events divided by land area		Number of events divided by population	
		Index	Rank	Index	Rank
All countries	7,116	100	75	100	75
Advanced economies	1,572	18	74	35	96
Caribbean	190	587	23	378	22
Eastern Caribbean Currency Union	48	1,173	5	747	5
Other Caribbean	142	196	35	133	34

Sources: EM-DAT Emergency Disasters Data Base (EM-DAT) (CRED, 2004) for natural disasters; World Bank, World Development Indicators database for land area; IMF, World Economic Outlook database for population.

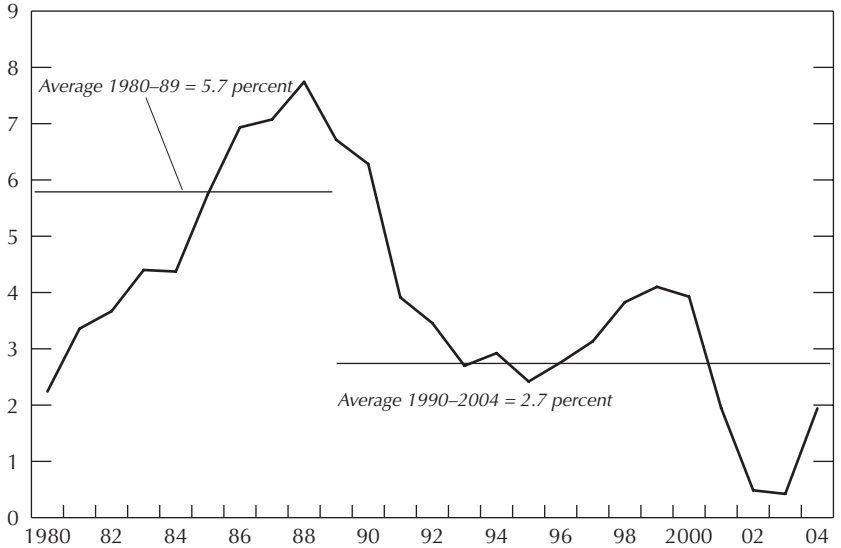
Notes: The sample contains 148 countries after omitting countries without at least one natural disaster associated with a cost estimate and/or missing information on GDP (24 advanced economies, 15 Caribbean countries, and 109 other developing countries). Simple unweighted averages are used for country groupings. Rankings are in descending order, with "1" indicating the most exposed to natural disaster.

from hurricanes. In the years to come, the rise in global warming augurs natural disasters with even greater frequency and severity.

The net effect of an erosion of trade preferences, declining aid flows, and a high frequency of natural disasters is that economic growth in the ECCU has been volatile and has slowed dramatically over the last decade (Figure 1.3). While the first two decades following independence saw strong growth reflecting the initial spurt to developing tourism, growth has halved since then as the contribution of tourism stabilized and the decline in traditional agriculture took its toll. Even countries such as Grenada that attempt to diversify away from traditional agriculture into new products are shortchanged by the long-lasting shocks caused by hurricanes that destroy crops such as nutmeg, which has a five- to seven-year gestation period.

The emergence of tourism as the dominant sector in the economies in the region has also created new vulnerabilities to global shocks, such as a sharp increase in petroleum-related products, which can disrupt international travel and intensely affect any number of tourism and tourism-related services and events. Indeed, the terrorist attacks of September 11, 2001 on the United States caused a sharp decline in Caribbean tourism and led to a dramatic contraction of output and employment in the region. The region's small economies are completely dependent on imports for their supply of petroleum products, and even a small shock to these

Figure 1.3. Eastern Caribbean Currency Union: Real GDP Growth
(Annual percent change, 3-year moving average)



Sources: Eastern Caribbean Central Bank; and IMF staff estimates.

prices can make a large difference to government finances and domestic production.

How should policymakers in these small and vulnerable economies respond to large, and sometimes sudden, shocks? The answer depends on the circumstances. To some extent, it is inevitable that public spending will rise following a natural disaster. When key infrastructure that is absolutely essential for a country to function is severely damaged by a hurricane, then it simply has to be rebuilt. This calls for greater savings during good times and access to well-functioning insurance mechanisms—both market as well as official (such as higher aid flows)—following disasters. Another way of looking at shocks is to ask if they are permanent or temporary. If shocks are temporary—as was the case of the September 11th attacks—then governments should attempt to smooth national consumption by borrowing in bad times and saving in good times. If shocks are permanent, however, there is a need to adjust to them steadily but surely, particularly if they are anticipated.

How have policymakers in the ECCU countries responded to these adverse developments in the external environment? The answer is that they have almost uniformly relaxed fiscal stances when the going became

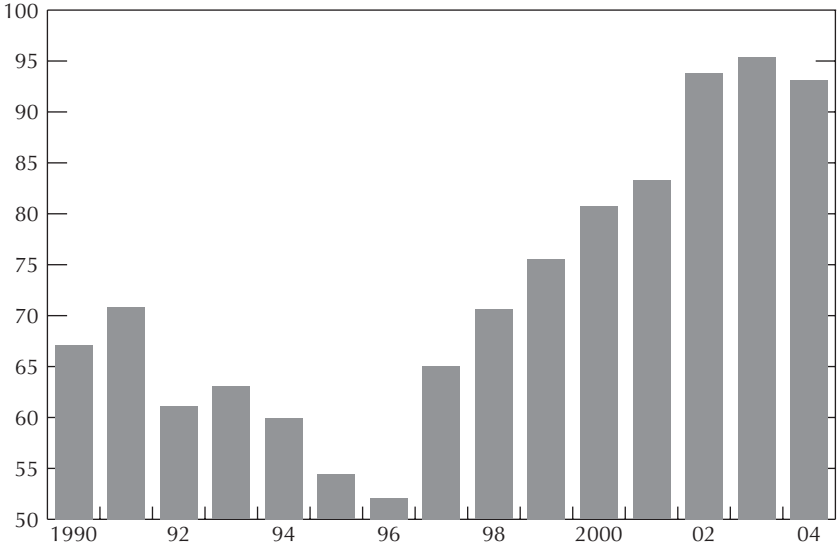
difficult. In the 1970s and 1980s, the small Caribbean economies grew rapidly, boosted by tourism. This growth helped generate fiscal savings that came in handy when natural disasters took their toll. However, since the slowdown in growth in the 1990s and the decline in trade preferences and aid flows, governments have begun to borrow heavily at home and abroad. The growth of domestic financial markets and cross-border capital flows, both natural consequences of economic development and globalization, facilitated this process. Hence, during a period when fiscal prudence was required to adjust to permanent negative shocks, government spending was increased to maintain and upgrade infrastructure and even create public employment. This last aspect is, perhaps, best illustrated in Antigua and Barbuda, where at end-2004, the central government alone employed 40 percent of the labor force, up from 30 percent a decade earlier. In addition, to spur private-sector-led growth, the Caribbean countries used all possible means available to attract new investment, including granting substantial tax exemptions or concessions that have served to erode the tax base and further widen fiscal deficits. As a result, since the mid-1990s public debt has grown rapidly to reach over 90 percent of GDP, and the economies in the region are now among the most heavily-indebted, emerging market countries in the world (Figure 1.4). One mitigating factor for the Caribbean people has been the substantial inflow of remittances resulting from the large-scale migration of skilled labor to industrial countries.

So what will the future hold for the region? Its economic challenges are formidable and complex, particularly for small sovereign states. The focus of this book is to document the many challenges facing the region and to explore policy options to address them. The book includes papers that were originally prepared to facilitate the IMF's regional and bilateral surveillance work in the Caribbean. They have benefited from discussions with prime ministers, central bank governors, senior government officials, and representatives from civil society and the private sector, as well as from presentations at many seminars and conferences in the region.

Part I of the book, "Fiscal Policy Challenges," examines the prime policy area of the growing fiscal imbalances in the Caribbean. It explores the reasons for larger fiscal imbalances in the ECCU countries—which share a common currency and a common central bank—compared to their neighbors.

Ratna Sahay reviews the economic performance of Caribbean countries since the 1990s, paying particular attention to their proclivity for growing fiscal imbalances. The rapid build-up of public debt is accounted for by a deterioration in fiscal balances, caused not by declining revenues but

Figure 1.4. The Caribbean: Total Public Debt
(In percent of GDP)



Source: IMF staff estimates.
Notes: The Caribbean includes the countries of the Eastern Caribbean Currency Union and The Bahamas, Barbados, Belize, Dominican Republic, Guyana, Haiti, Jamaica, Suriname, and Trinidad and Tobago. Simple average is used as the Caribbean average.

by a rise in expenditures, with the latter emanating from both domestic policy slippages (largely the deterioration in primary fiscal balances) and exogenous shocks (chiefly natural disasters and the erosion of trade preferences). Sahay concludes that the high public debt of Caribbean countries has heightened their vulnerability to economic shocks, and that a reduction in such debt stocks should be a priority macroeconomic goal. To be successful, debt reduction will need to be underpinned by a combination of fiscal consolidation, active debt management, asset sales, a lowering of domestic (financial sector) vulnerabilities to exogenous shocks, and the implementation of growth-enhancing reforms.

Rupa Duttagupta and Guillermo Tolosa examine the relationship between national fiscal policies and the ECCU's exchange rate arrangement. They draw on recent theoretical literature to assess the combined effect on national fiscal policies of a currency union with a fixed exchange rate arrangement. They find that fiscal stances under a currency union with a fixed peg tend to be associated with exacerbated free-riding opportunities that allow member countries to transfer the cost of fiscal slippages

(the inflation tax) across time (given the exchange rate peg) and across member countries (given the currency union). The chapter highlights the experience of 15 Caribbean countries since the early 1980s, finding evidence of greater fiscal free-riding in the ECCU countries compared with countries possessing other exchange rate regimes. The findings underscore the necessity to have appropriate mechanisms to ensure that the fiscal policies of members of a currency union are consistent with the maintenance of a regional fixed exchange rate arrangement.

Part II, "Macroeconomic Cycles and Volatility," documents the extent to which the Caribbean countries are similar in their economic characteristics and proclivity to shocks, the degree of comovement in their national economic activity, and the major determinants of volatility in the region. These factors are important to determining whether policy responses should be similar across countries.

In studying the pattern of economic fluctuations in Caribbean economic activity over the past four decades, Paul Cashin finds that periods of expansion in activity (real GDP) typically last much longer than periods of contraction. However, in keeping with the findings from previous analyses of developed countries, the length of periods of above-average and below-average rates of Caribbean economic growth is found to be much more symmetrical. There is also little support found for the notion that expansions and contractions in trend-adjusted Caribbean output have a fixed duration. However, comovement of output is common in the eastern Caribbean. Importantly, Cashin finds a strong association between movements in real GDP of ECCU countries, and a very strong association between movements in developed-country output and the output of individual ECCU countries.

Tobias Rasmussen and Guillermo Tolosa study the determinants of macroeconomic volatility in the countries of the eastern Caribbean. Given the Caribbean region's vulnerability to real external shocks—its openness to trade, dependence on tourism, and proclivity to natural disasters—it might be expected that the volatility of economic activity would be higher than that of other middle-income countries. Counterintuitively, the volatility of output in the ECCU is found to be markedly lower than that of countries at similar levels of development. Drawing on cross-country analyses, the authors find that this relative stability of incomes can be attributed to the region's above-average ability to borrow externally, and thereby smooth the path of national income. However, they caution that the ECCU's ability to borrow externally and engage in countercyclical fiscal policies may be weakening, given the region's rapid accumulation of high levels of public indebtedness.

Part III, "Financial Sector Issues," examines the health and role of the region's banking system in the face of expanding fiscal imbalances. Drawing on a comparison of the performance of the ECCU banking system with that of other Caribbean Community and Common Market (CARICOM) countries, Jingqing Chai finds the ECCU banking system to be well capitalized, reasonably profitable and liquid, yet with high levels of nonperforming loans, low provisioning for loan losses, and large exposure to the household (mortgage) sector. The author points out that there are growing vulnerabilities in the ECCU banking system. As public debt in the ECCU has accumulated since the 1990s, the banking system's exposure to the public sector has also increased, with the performance of state-owned local banks clearly inferior to that of foreign bank branches. Consequently, Chai sets out measures to ensure continued financial stability, including reforms to the system's institutional framework.

Part IV, "Economic Implications of Natural Disasters," outlines the effects of and national policy responses to economic losses caused by the region's proneness to natural disasters. Tobias Rasmussen points out the rising incidence of natural disasters in the eastern Caribbean during three decades since 1970, noting that a natural disaster occurred once every 4½ years in each of the six ECCU countries that are members of the IMF. In cataloging the macroeconomic effects of major natural disasters in the ECCU region, the author finds that there typically is a contemporaneous contraction of output and a deterioration of fiscal and external balances, ameliorated by an up tick in transfers from abroad (including development assistance), with a rise in public indebtedness over the medium term. Rasmussen suggests several means by which countries can mitigate the cost of natural disasters, including through recourse to insurance and capital markets, and outlines the role of international assistance in promoting disaster mitigation actions by national governments.

Paul Cashin and Pawel Dyczewski examine the role of public policy in the mitigation of the risk of natural disasters. An important policy question is how small island economies can respond to the economic vulnerability induced by natural disasters. Three main responses include risk identification and risk reduction, self-insurance, and utilization of risk transfer mechanisms. The chapter sets out the weaknesses of traditional insurance markets and capital-market-based risk transfer instruments in the Caribbean, as well as the difficulty of measuring the government risk from natural hazards in developing countries. The authors also highlight the moral hazard induced by postdisaster flows of external assistance from donors and international financial institutions, which dampen the incentive for disaster-prone countries to undertake predisaster mitigation

activities. The policy implications of these findings are that there needs to be a mix of financing options for postdisaster expenditure, arrayed as a graduated response to increasing levels of natural disaster risk in the Caribbean.

As the economies of the Caribbean are among the most open in the world, Part V, "Managing External Flows," takes up issues related to the influence of external flows—labor emigration and remittances, as well as the relationship between domestic tax incentives and foreign direct investment. Prachi Mishra quantifies the magnitude and nature of migration flows from the Caribbean, and estimates the costs and benefits to source countries of emigration. Mishra points out that Caribbean countries have lost 10 to 40 percent of their labor force due to emigration (largely to OECD countries) since 1970, with strikingly larger emigration rates among the highly educated. As a consequence, the Caribbean is the world's largest recipient of remittances (defined as the sum of worker remittances, compensation of employees, and migrant transfers), which in 2002 constituted about 13 percent of the region's GDP. However, the author cautions that the results of welfare calculations indicate that official remittance flows to the region are outweighed by the economic losses associated with high-skilled emigration, so that there does appear to be evidence of "brain drain" in the Caribbean.

Jingqing Chai and Rishi Goyal analyze the effectiveness of preferential tax treatment in promoting investment in the Caribbean. Tax concessions have been a longstanding and key component of the investment and development strategy of ECCU countries. The chapter outlines the major forms of tax concessions offered in the region—corporate income tax holidays, exemptions from import duties and taxes—and compares the cost of concessions (in terms of forgone revenue) against the benefits (attracting foreign direct investment). The authors find that reliance on tax concessions in ECCU countries has increased significantly over the past decade, resulting in forgone revenues ranging between 9½ and 16 percent of GDP annually, with only a modest effect in attracting additional investment. Consequently, the authors discuss several measures to reduce revenue losses and prevent excessive tax competition, including the adoption of a regional approach to harmonizing concessions.

Part VI, "Trade Integration and Tourism Developments," outlines developments in the tourism sector and the growth effects of the region's expanding integration with its trading partners. In recent decades the tourism sector has come to be the dominant driver of economic activity in Caribbean countries, and also exerts a strong influence on the evolution of both public finances and the balance of payments. Ruby Randall looks

at recent trends and the competitiveness of Caribbean tourism, with an emphasis on the experience of ECCU countries. The chapter highlights the sharp contraction in world and Caribbean tourism following the September 11, 2001 terrorist attacks, and the Caribbean's gradual recovery of its tourism market share. It then presents both price and nonprice measures of the competitiveness of Caribbean tourism, with the former partly gauged using indexes of tourism-customer-based and tourism-competitor-based real effective exchange rates. The author finds evidence that Caribbean countries have experienced an erosion of their price and nonprice competitiveness, and sets out a range of measures that could enhance the efficiency and cost-competitiveness of Caribbean tourism enterprises.

In the book's final chapter, Montfort Mlachila, Wendell Samuel, and Patrick Njoroge explore developments in, and the effects of, greater regional and multilateral integration of the trade (goods and services), labor and capital markets of ECCU countries. The chapter charts the historical experience of ECCU and CARICOM countries in achieving greater regional integration, and points out the incongruity that while Caribbean economies are among the most open in the world, these economies fall a long way short of being fully integrated with the global economy. The authors then model the contribution of greater integration to economic growth in the ECCU and the wider Caribbean, controlling for exogenous shocks and domestic policy changes. The estimation results indicate that while greater integration can positively affect the pace of growth in the Caribbean, such growth is strongly dependent on economic growth in industrial countries.

The chapters in this book provide an assessment of economic developments in the Caribbean and a perspective on the key issues facing the region's policymakers. A common theme is the openness of the region's island economies, and the important influence of external shocks on their economic performance. Major shocks to these economies—the steady erosion of trade preferences and the decline in aid flows—are more permanent in nature and, to a large extent, anticipated. This calls for strategic planning by policymakers to adjust to the new global economic environment, while seeking new opportunities to ensure a steady increase in the living standards of the peoples of the Caribbean.

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I

Fiscal Policy Challenges

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2

Stabilization, Debt, and Fiscal Policy in the Caribbean

RATNA SAHAY

This chapter examines the macroeconomic performance of the Caribbean countries since the 1990s, with a special emphasis on their public debt accumulation. Most Caribbean countries have a high level of public debt. The rapid buildup of this debt can in large part be attributed to a deterioration in fiscal balances owing principally to a rise in expenditures rather than a fall in revenues. The rise in expenditures reflects both policy slippages and exogenous shocks. The main policy message is that there is a critical need for fiscal consolidation and a reinvigoration of growth in Caribbean countries, so that their debt might be brought down to more sustainable levels.

The Caribbean countries rank high on the Human Development Index, relative to other developing and emerging market economies (UNDP, 2005). Average illiteracy rates are very low, and life expectancy at birth is high at nearly 70 years. In contrast, average poverty levels (based on national surveys) are high, with nearly 30 percent of the population below the poverty line. Income inequality, while not as severe as in Latin America, is significant. Per capita incomes range from US$460 in Haiti to nearly US$16,700 in The Bahamas, as indicated in Table 2.1. Although virtually all Caribbean countries are endowed with natural beauty and a warm climate that attracts tourists, only two countries—Trinidad and Tobago and Suriname—have abundant natural mineral resources—petroleum and bauxite, respectively.

The record of the Caribbean region on the political front is relatively favorable. Caribbean countries score well, for example, on a "voice and accountability" measure that gauges the strength of political rights and civil liberties, scoring nearly 70 on a scale of 0 to 100 (Table 2.1). A

Table 2.1. The Caribbean: Selected Socioeconomic Indicators[1]

	Population[2] (in thousands, 2003)	Nominal GDP Per Capita (in U.S. dollars, 2003)	Distance from United States[3] (in miles)	Poverty (percent of population below poverty line, most recent year survey)	Income Inequality GINI Coefficient[4] (most recent year of survey)	Human Development Index Ranking[5] (out of 175 countries, 2002)	Illiteracy (percent of population aged 15 years and over, 2002)	Life Expectancy at Birth (in years, average 2000–05)[6]	Voice and Accountability[7] (percentile ranking 2002)	Government Effectiveness[8] (percentile ranking 2002)
Antigua & Barbuda	73	11,124	1,337	12	50	55	14	74	55	70
Bahamas, The	314	16,691	112			51	5	67	87	88
Barbados	270	9,651	1,611	14	39	29	0	77	91	87
Belize	256	3,891	767			99	23	71	72	55
Dominica	79	3,554	1,414	33	30	95	24	73	81	66
Dominican Republic	8,745	1,825	1,286	21	47	98	16	67	57	42
Grenada	80	4,103	1,567	32	20	93	6	65	70	67
Guyana	765	911	1,622	35	43	104	4	63	69	47
Haiti	8,132	460	713	66		153	48	50	15	2
Jamaica	2,651	2,962	524	19	38	79	12	76	65	55
St. Kitts & Nevis	42	7,641	1,275	31	10	39	2	70	78	57
St. Lucia	149	4,048	1,496	19	43	71	5	73	80	57
St. Vincent & the Grenadines	120	3,329	1,337	33	60	87	17	74	79	57
Suriname	436	2,470	1,360			67	6	71	59	53
Trinidad & Tobago	1,303	7,836	1,622	21	40	54	2	71	66	68
Caribbean[9]	**1,561**	**5,366**	**1,203**	**28**	**38**	**78**	**12**	**69**	**68**	**58**

Sources: American Airlines website (www.aa.com); UNDP (2002, 2003, and 2004); World Bank, World Development Indicators database; Economic Commission for Latin America and the Caribbean (2004); Kaufman, Kraay, and Mastruzzi (2003); World Bank governance index: http://info.worldbank.org/governance/kkz/; and country authorities.

[1]Data for some countries are not available.

[2]The population for Haiti is that of 2001.

[3]The distance is measured as that from Miami to a major city in the destination country.

[4]A larger value indicates greater income inequality.

[5]A larger value indicates a lower development ranking.

[6]Projected figures.

[7]Includes a number of indicators measuring various aspects of the political process, civil liberties, and political rights; the extent to which citizens of a country are able to participate in the selection of governments. A larger value indicates greater voice and accountability (scale: 0 – 100).

[8]Combines responses on the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. A larger value indicates greater government effectiveness (scale: 0 – 100).

[9]The figures for the Caribbean are simple averages.

"government effectiveness" measure that attempts to capture the quality of public service provision, the quality of bureaucracy, the competence of civil servants, the independence of the civil service with respect to political pressures, and the credibility of the government's commitment to policies, receives a lower score of 58.

Inflation has been stabilized in the overwhelming majority of Caribbean countries. The newly independent countries (most of which gained independence in the 1960s and 1970s) tended to peg their exchange rates to those of their former colonial powers as a means of ensuring confidence in the local currency. Over time, some of the countries introduced a greater degree of flexibility in their exchange rate regimes, while others chose to peg their currencies to the U.S. dollar. Whatever the exchange rate regime, inflation in most countries has been kept under control—where control over inflation has been lost, credible efforts have been made to rein it in (Table 2.2).

Since the late 1990s, the Caribbean countries' access to international capital markets has increased at the same time that their domestic financial markets were being developed. To pursue their economic goals and finance their development processes, governments began to develop their financial markets and borrow at home and abroad. Given relatively low and stable inflation, the relative political stability of democratic regimes, and the development of local and regional financial markets, governments for the most part have had easy access to financial resources.

Since the mid-1990s, average national public debt in the region has virtually doubled, rising to exceptionally high levels in many countries. At the same time, fiscal performance has deteriorated sharply. With the notable exceptions of Antigua and Barbuda, Guyana, and Jamaica, public debt was not a major economic problem until the mid-1990s.

The remainder of this chapter provides an overview of macroeconomic developments in 15 Caribbean countries; examines the factors that contributed to public debt accumulation in the very highly indebted countries in the region; documents the revenue and expenditure developments in these very highly indebted countries; and offers conclusions and policy implications.

Macroeconomic Performance

GDP growth in the Caribbean region relative to other developing countries during 1980–2004 was low (Figure 2.1).[1] As shown in the top

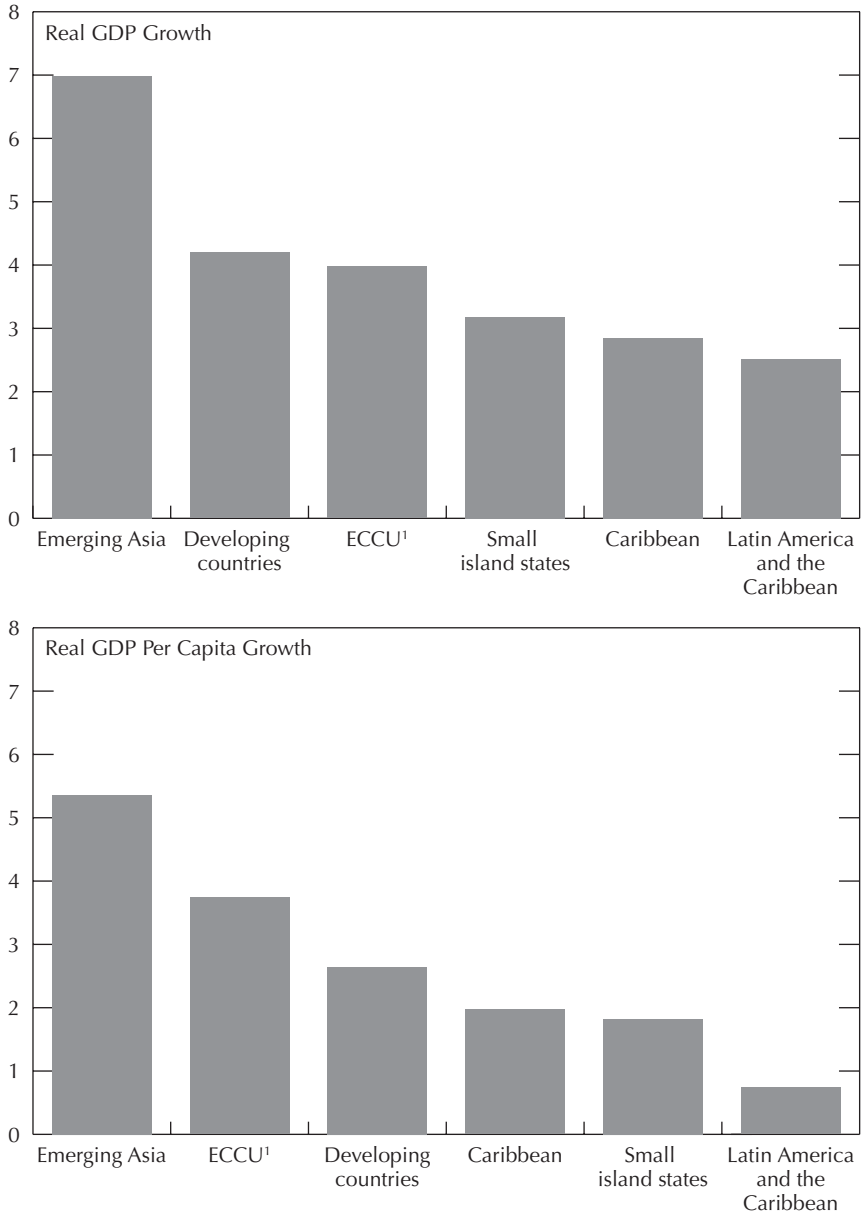
[1]Countries included in each regional grouping in Figure 2.1 are listed in Appendix 2.1. The average numbers presented in Figure 2.1 are simple arithmetic means, so as to give equal weight to each country, irrespective of the population or size of the GDP.

Table 2.2. The Caribbean: Macroeconomic Indicators, 1990–2004
(In percent)

Countries	Exchange Rate Regime	Total Public Debt[1] 1997	Total Public Debt[1] 2004	Overall Balance[1,3] 1990–1997	Overall Balance[1,3] 1998–2004	Primary Balances[1,2] 1990–1997	Primary Balances[1,2] 1998–2004	CPI Inflation[4] 1990–1997	CPI Inflation[4] 1998–2004	GDP Growth[4] 1990–1997	GDP Growth[4] 1998–2004
Antigua & Barbuda	Currency board	102	99	–3.2	–6.9	0.3	–2.8	3.7	0.7	3.0	3.8
Bahamas, The	Fixed peg	47	46	–2.5	–2.1	–0.2	–0.2	3.2	1.8	0.9	2.8
Barbados	Fixed peg	67	86	–2.2	–4.2	2.1	0.7	3.7	1.2	—	1.8
Belize	Fixed peg	43	102	–3.9	–8.0	–2.2	–4.2	2.9	1.1	5.7	6.9
Dominica	Currency board	62	115	–3.4	–6.4	–1.1	–1.8	2.6	1.2	2.7	0.1
Dominican Republic	Independently floating[5]	23	53	–2.5	–3.3	–1.4	–1.7	17.7	16.0	3.9	4.4
Grenada	Currency board	41	129	–3.9	–6.4	–1.3	–2.9	2.6	1.6	2.8	3.1
Guyana	Managed floating[5]	211	166	–9.2	–6.2	8.0	1.3	30.1	5.3	5.9	0.6
Haiti	Managed floating[5]	33	40	–3.9	–2.1	n.a.	–1.3	23.2	16.8	–0.4	0.1
Jamaica	Managed floating[5]	103	139	0.2	–8.4	8.7	9.1	32.6	8.9	1.0	1.2
St. Kitts & Nevis	Currency board	86	179	–1.7	–11.8	1.0	–6.1	3.5	2.5	4.5	2.5
St. Lucia	Currency board	35	70	–0.1	–2.8	0.7	–0.6	3.1	2.0	2.3	1.4
St. Vincent & the Grenadines	Currency board	48	79	–1.5	–3.1	–0.2	–0.6	3.6	1.2	3.3	3.2
Suriname	Fixed peg	26	49	–3.9	–5.3	–1.8	–3.6	105.7	37.7	0.8	2.6
Trinidad & Tobago	Managed floating[5]	52	45	0.2	–0.5	6.7	4.8	6.6	4.3	2.0	7.1
Caribbean[6]		**65**	**93**	**–2.8**	**–5.2**	**1.4**	**–0.7**	**16.3**	**6.8**	**2.6**	**2.8**

Sources: IMF, World Economic Outlook database; country authorities; and IMF staff estimates.
[1]In percent of GDP.
[2]Primary fiscal balance is overall fiscal balance plus interest payments.
[3]Overall fiscal balance is government revenues and grants minus government expenditures.
[4]Annual percentage change. CPI denotes consumer price index.
[5]Dominican Republic had a fixed exchange rate regime until early 2003, Guyana until 1989, Haiti until 1991, Jamaica until 1990, and Trinidad and Tobago until 1993.
[6]Figures for the Caribbean are simple averages.

Figure 2.1. Real GDP Growth by Region
(Average annual growth rate, 1980–2004)



Sources: IMF, World Economic Outlook database; country authorities; and IMF staff estimates.
[1]Eastern Caribbean Currency Union.

panel of Figure 2.1, average Caribbean GDP grew at about 3 percent a year during 1980–2004. Compared with other developing countries, this growth rate was only marginally higher than that of Latin America. Even the average rate of growth of all "small island states" in the world was higher than that of the Caribbean. At the other extreme, emerging Asian countries grew at nearly two and a half times the pace observed in the Caribbean.[2] The bottom panel in Figure 2.1 provides a similar comparison on a per capita basis. The performance of the Caribbean improves marginally; it is higher than the average of the small island states, in addition to Latin America, but lower than the other regional groupings. (For details about the regional groupings, see Appendix 2.1).

While inflation rates are low and have fallen in recent years, public debt levels have risen to very high levels in most Caribbean countries (Table 2.2). The period since 1990 is divided into two subperiods: 1990–97 and 1998–2004, based on the sharp increase in public debt levels observed in several countries in the second subperiod. Since 1998, average ratios of public debt to GDP in the region grew rapidly, from 65 percent in 1997 to over 90 percent by 2004, while the GDP growth rate marginally improved in the second subperiod relative to the first. However, the inflation performance improved significantly in the second subperiod: annual average inflation rates came down from over 16 percent over 1990–97 to less than 7 percent over 1998–2004.

Reflecting the debt buildup, fiscal accounts worsened sharply during 1998–2004 in the Caribbean. The average overall fiscal balance declined in every country (apart from The Bahamas, Guyana, and Haiti) during 1998–2004, compared with 1990–97 (Table 2.2). As public debt grew, interest costs also rose. Hence, part of the explanation for the deterioration in the overall fiscal balance is the rise in interest-related expenditures. However, looking at the overall balance excluding interest costs (defined as the primary fiscal balance), the performance is also worse in the second subperiod for *every* country except The Bahamas, where the primary balances in the two subperiods were about the same, and Jamaica, where the primary surplus increased in the second subperiod.

[2]Within the Caribbean, the countries in the Eastern Caribbean Currency Union (ECCU) grew at a much higher rate of 4 percent, comparable to the average of all developing countries. However, this relatively high number reflects the high growth rates in the 1980s; since the 1990s, growth has decelerated sharply.

Table 2.3. The Caribbean: Economic Performance Under Fixed and Flexible Exchange Regimes
(In percent)

	Fixed Exchange Rate Regime[1]	Flexible Exchange Rate Regime[2]
Annual Inflation		
1990–97	13.5	22.0
1998–2004	5.1	10.2
Period 1998–2004 minus period 1990–97	–8.3	–11.8
Annual GDP Growth		
1990–97	2.6	2.5
1998–2004	2.8	2.7
Period 1998–2004 minus period 1990–97	0.2	0.2
Overall Fiscal Balance (percent of GDP)		
1990–97	–2.6	–3.0
1998–2004	–5.7	–4.1
Period 1998–2004 minus period 1990–97	–3.1	–1.1
Public Debt (percent of GDP)		
1990–97	55.5	84.4
1998–2004	95.5	88.4
Period 1998–2004 minus period 1990–97	40.0	4.0

Sources: IMF, *Annual Report of Exchange Arrangements and Exchange Restrictions, 2003;* and IMF staff estimates.

[1]Countries included are Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Suriname. The Dominican Republic had a fixed exchange rate regime until early 2003.

[2]Countries included are Guyana, Haiti, Jamaica, and Trinidad and Tobago.

Does the Exchange Rate Regime Matter?

Until 2004, 10 of the 15 Caribbean countries maintained fixed exchange rate regimes (currency boards or a fixed peg to a major currency) throughout the sample period under consideration—Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Suriname, while the Dominican Republic moved from a fixed peg regime to a float in mid-2003. The remaining four countries—Guyana, Haiti, Jamaica, and Trinidad and Tobago—had more flexible regimes (managed or independent floating) for most of the period.[3]

Confirming the experience of other developing countries, inflation outcomes under fixed exchange rate regimes in the Caribbean countries were generally better than those under floating regimes (Table 2.3).[4] A common

[3]Suriname has multiple exchange rates.

[4]See Ghosh and others (2003) for similar evidence in other developing countries.

feature across the two sets of countries is that the average rate of inflation declined in both groups over 1998–2004 compared with 1990–97, reaching single-digit levels in the second subperiod. Under fixed exchange rate regimes, annual inflation declined from nearly 13½ percent over 1990–97 to 5 percent over 1998–2004, while under the more flexible exchange rate regime, inflation fell from 22 percent during 1990–97 to 10 percent during 1998–2004. The rapid decline in inflation rates in countries with flexible exchange rates in the second subperiod is impressive.

Countries with fixed exchange rate regimes grew faster in both subperiods. However, the difference across the two subperiods for each group of countries is not high: the average GDP growth in countries with fixed exchange rate regimes rose from 2.6 percent a year during 1990–97 to 2.8 percent during 1998–2004, while in countries with flexible exchange rate regimes, it increased from 2.5 to 2.7 percent a year.

Contrary to expectations, average fiscal outcomes in countries with fixed exchange rate regimes were worse than those with flexible regimes. Fixed exchange rate regimes should instill greater macroeconomic discipline than flexible regimes, since discretionary monetary policy is more constrained;[5] however, this appears not to be the case in the region. The average overall fiscal deficit in the 11 countries with fixed exchange rate regimes was higher than in countries with flexible exchange rate regimes and has more than doubled in recent years—from 2.6 percent of GDP during 1990–97 to 5.7 percent during 1998–2004. In the four countries with more flexible regimes, the average overall deficit was somewhat lower at 3 and 4.1 percent of GDP, respectively, for the same subperiods.

The most alarming development is in countries with fixed rate regimes, where public debt has risen very rapidly—from just over 55 percent of GDP in the 1990–97 period to nearly 96 percent during 1998–2004. Apart from the fact that these developments reflected a weaker fiscal performance in countries with fixed exchange rate regimes, they also indicate that countries with fixed regimes and a stable inflation environment were able to access the global financial markets more easily when global interest rates were falling. Average public debt levels were much higher in the floating exchange rate regimes in both subperiods (at more than 80 percent of GDP), driven by Jamaica and Guyana.

[5]However, Tornell and Velasco (2000) show that, contrary to conventional wisdom, fixed exchange rate regimes may not foster greater fiscal discipline, owing to the scope for postponing costs of fiscal overspending to the future under fixed exchange rates, which is not possible under flexible regimes. See Chapter 3 of this volume for an empirical assessment of this argument for Caribbean countries.

In sum, countries with fixed exchange rate regimes had lower inflation rates and marginally higher GDP growth rates; on the other hand, they had higher fiscal imbalances and built up public debt faster. In fact, the large historical buildup of debt and fiscal imbalances under fixed exchange rate regimes in Guyana and Jamaica during the 1980s and the consequent pressures on the exchange rate peg and foreign external reserves, led to their abandoning their fixed exchange rate regimes.

How Have the Caribbean Countries Performed Relative to Each Other?

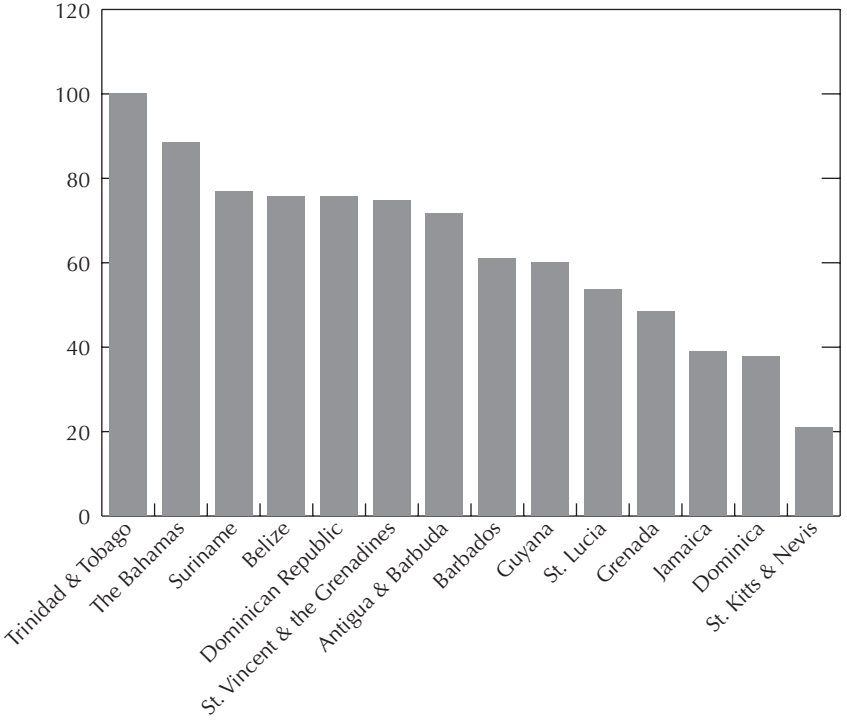
The average performance of the Caribbean countries presented in Table 2.2 masks significant diversity of experience. To compare how each country performed relative to the other countries in the region, an index of macroeconomic performance, ranging from 0 to 100, with 100 representing the best relative performance, was constructed.[6] Figure 2.2 presents the relative ranking based on macroeconomic performance. Note that a low score on the macroeconomic performance index reflects both the effects of negative exogenous shocks as well as policy performance (for example, St. Kitts and Nevis, the country with the lowest score, most likely suffered the highest costs due to natural disasters during the period under consideration).[7]

Ranked relative to each other, Trinidad and Tobago and The Bahamas had the best macroeconomic performance, while St. Kitts and Nevis, Dominica, and Jamaica received the lowest scores. Both Trinidad and Tobago and Suriname (which is ranked third), countries with natural resources, are among the better performers. Of course, the existence of natural resources does not guarantee good macroeconomic performance—in fact, there is suf-

[6]The ranking was based on the ratio of total public debt to GDP in 2004, the absolute change in the public debt ratio from 1990–97 to 1998–2004, average overall fiscal balance (as a share of GDP) over 1998–2004, absolute change in overall fiscal balance (as a share of GDP) from 1990–97 to 1998–2004, average consumer price index (CPI) inflation during 1998–2004, absolute change in CPI inflation from 1990–97 to 1998–2004, average real GDP growth in 1998–2004, and absolute change in real GDP growth from 1990–97 to 1998–2004. Countries are ranked from 1 to 15 in each category, with the best performer receiving the highest score. The scores are then aggregated for each country, with the same weight given to each indicator of macroeconomic performance. Finally, the aggregate scores are normalized so that the scores for all countries range from 1 to 100.

[7]Haiti is excluded from this comparison because data on public debt in the initial subperiod are not available.

Figure 2.2. The Caribbean: Relative Ranking on Macroeconomic Performance[1]
(Average performance during 1998–2004 compared with 1990–97)

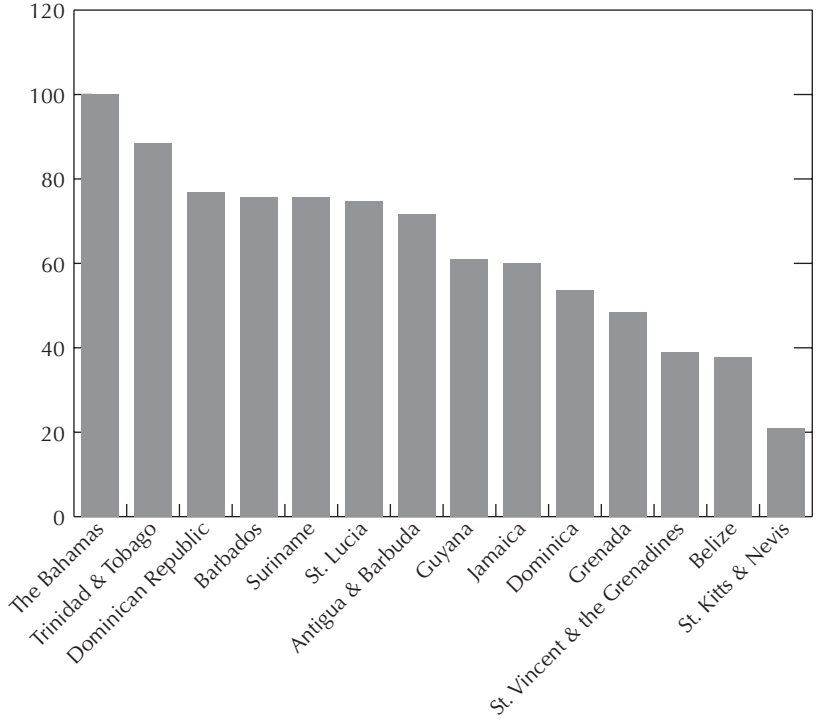


Source: Author's calculations.
[1]The ranking is based on total public debt in 2004, absolute change in public debt from 1990–97 to 1998–2004, average overall fiscal balance from 1998 to 2004, absolute change in overall fiscal balance from 1990–97 to 1998–2004, average CPI inflation from 1998–2004, absolute change in CPI inflation from 1990–97 to 1998–2004, average real GDP growth from 1998 to 2004, and absolute change in real GDP growth from 1990–97 to 1998–2004. Countries are ranked from 1 to 14 in each category, with the best performer receiving the highest scores. The scores are then summed for each country, with equal weight to each category of macroeconomic performance. Finally, the summed-up scores are normalized so that the scores for all countries range from 1 to 100. Haiti is excluded from the comparison because the data on primary balance in period 1990–97 are not available.

ficient literature that provides arguments and evidence for a lower than average performance in resource-rich developing countries (Sachs and Warner, 1995). The Dominican Republic ranks fifth from the top because of its relatively good performance until the banking crisis in 2003.

Figure 2.3 refines the ranking in two ways—inflation performance is dropped and the primary fiscal balance (overall fiscal balance excluding

Figure 2.3. The Caribbean: Relative Ranking on Fiscal and Debt Performance[1]
(Average performance during 1998–2004 compared with 1990–97)



Source: Author's calculations.
[1]The ranking is based on total public debt in 2004, absolute change in public debt from 1990–97 to 1998–2004, average overall fiscal balance from 1998 to 2004, absolute change in overall fiscal balance from 1990–97 to 1998–2004, average primary fiscal balance from 1998–2004, absolute change in primary fiscal balance from 1990–97 to 1998–2004, average real GDP growth from 1998 to 2004, and absolute change in real GDP growth from 1990–97 to 1998–2004. Countries are ranked from 1 to 14 in each category, with the best performer receiving the highest scores. The scores are then summed for each country, with equal weight to each category of macroeconomic performance. Finally, the summed-up scores are normalized so that the scores for all countries range from 1 to 100. Haiti is excluded from the comparison because the data on primary balance in period 1990–97 are not available.

interest payments) is added. The figure focuses on debt, fiscal, and growth performance. By this measure, The Bahamas is the best performer, while St. Kitts and Nevis continues to receive the lowest score. The striking change in rankings are in Belize, which moves from the fourth-best to the second-lowest performer, while St. Lucia improves its ranking from tenth to sixth place.

Table 2.4. Caribbean Countries' Public Debt and Primary Fiscal Balances
(In percent of GDP)

	Total Public Debt		
	Low to medium debt (0 to 50)	High debt (50 to 90)	Very high debt (Higher than 90)
2004			
Primary fiscal balance[1]			
Higher than 5	Trinidad & Tobago		Jamaica
0 to 5	*Suriname*	Barbados	*Dominica,* Grenada
Less than 0	The Bahamas	*Dominican Republic,* St. Lucia, St. Vincent & the Grenadines	Antigua & Barbuda, Belize, Guyana, St. Kitts & Nevis
2001–04			
Primary fiscal balance[2]			
Higher than 5			Jamaica
0 to 5		*Suriname,* Trinidad & Tobago	*Dominica*
Less than 0	The Bahamas, *Dominican Republic*	Barbados, St. Lucia, St. Vincent & the Grenadines	Antigua & Barbuda, Belize, Grenada, Guyana, St. Kitts & Nevis

Sources: IMF staff calculations based on data from country authorities; and IMF, World Economic Outlook database.

Note: Dominica, the Dominican Republic, and Suriname are italicized to indicate that their relative positions have changed over time.

[1]End of 2004.

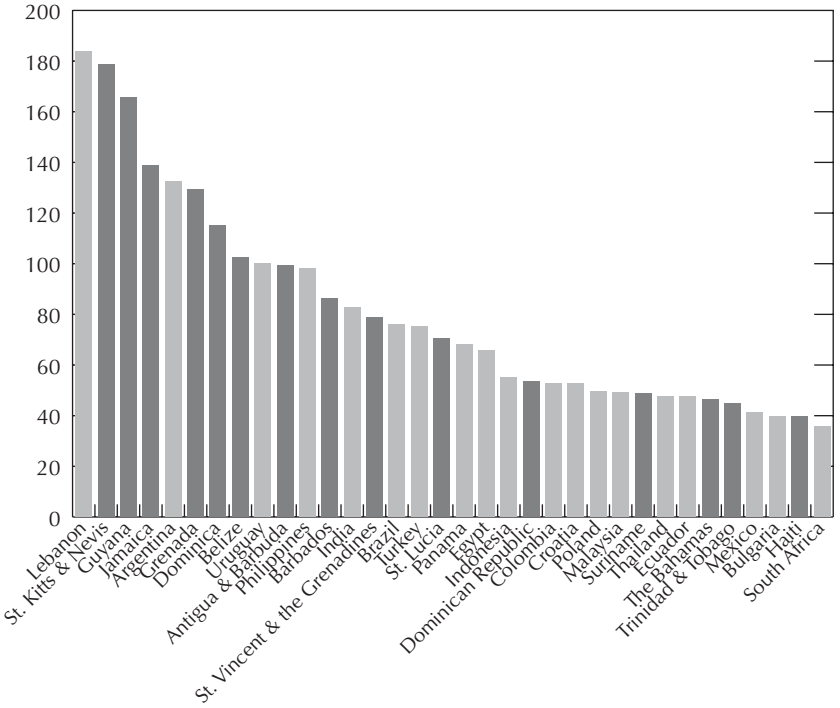
[2]Average for the period 2001–04.

Fiscal Performance and Debt Accumulation

We now focus on two main economic concerns, highlighted in the previous section, that afflict the region: the rise in public debt and fiscal expansion. Table 2.4 presents information on public debt and primary fiscal balances in the Caribbean countries. The reason for the focus on the primary fiscal balance, rather than the overall fiscal balance (recall that the latter includes interest payments, while the former does not) is because the primary balance corresponds more closely to the government's efforts to generate surpluses, and is therefore an indicator of the government's policy stance. Unless circumstances are dire, governments do not choose the level of interest payments, which depends on the level of debt accumulated from previous years.[8]

[8]However, active debt management can reduce debt service or interest costs—for example, by lengthening the maturity and contracting new debt at lower interest rates.

Figure 2.4. Public Sector Debt in Highly Indebted Emerging Market Countries[1]
(Public debt in percent of GDP, end-2004)



Sources: IMF, World Economic Outlook database; country authorities; and IMF staff estimates.
Note: Caribbean countries are shaded in dark.
[1]Guyana and Haiti are, strictly speaking, not emerging market economies because they do not have access to private capital markets. However, they are included in this figure to show their debt levels relative to other countries in the region.

The Caribbean countries are among the most indebted emerging market countries in the world. As shown in Figure 2.4, 14 Caribbean countries are in the top 30 most-indebted countries, while seven are among the top 10.[9] Table 2.4 (upper panel) lists the countries according to their primary fiscal balance and public-debt-to-GDP ratio in 2004. In general, public-debt-to-GDP ratios over 50 to 60 percent are considered high. By that measure, only three countries have low debt—The Bahamas, Suriname,

[9]Strictly speaking, we should exclude Guyana and Haiti from this list because these two countries do not have access to private capital markets and would not be considered emerging market countries.

and Trinidad and Tobago.[10] Four countries—Barbados, the Dominican Republic, St. Lucia, and St. Vincent and the Grenadines—have debt in the range of 50 to 90 percent.[11] The remaining seven countries—Antigua and Barbuda, Belize, Dominica, Grenada, Guyana, Jamaica, and St. Kitts and Nevis—have debt beyond 90 percent.

Table 2.4 indicates that countries are generating much lower primary fiscal surpluses than is needed to bring debt down—in fact, eight of the 14 countries have primary fiscal deficits. Assessing the fiscal effort in these countries from Table 2.4 shows that only Jamaica and Trinidad and Tobago generated primary surpluses of more than 5 percent of GDP in 2004. Four other countries—Babados, Dominica, Grenada, and Suriname—had primary surpluses that were positive but less than 5 percent of GDP. The remaining eight countries registered primary deficits. Deficits on the primary balance are sufficient evidence to infer that debt levels will rise in those countries. In fact, when debt levels are high, large primary surpluses must be run to prevent a further increase in the debt stock. The magnitude of the primary surpluses needed increases with interest rates and the size of the debt stock, but is reduced by real exchange rate appreciation and real GDP growth. Thus, for example, even though Jamaica has generated primary surpluses in the range of 8 to 13 percent of GDP for many years, public debt has continued to rise because of high interest costs and low growth.

Table 2.4 (lower panel) confirms that the average performance on primary fiscal balance and public debt during 2001–04 is similar to that reported in Table 2.4 (upper panel) for 2004. The pattern and cell entries in both tables are identical, with the exceptions of Barbados, the Dominican Republic, Grenada, Suriname, and Trinidad and Tobago.[12] Fiscal performance improved in 2004 in Barbados, Grenada, Suriname, and Trinidad and Tobago. In fact, in the latter two countries, the recent primary surpluses helped reduce the public debt levels to under 50 percent of GDP. Public debt in the Dominican Republic increased sharply following the banking crisis in 2003 and the subsequent large exchange rate depreciation.

[10]Since data on primary balances in Haiti are not available, it is excluded from Table 2.4.

[11]The Dominican Republic's painful experience, involving a more than doubling of public sector debt following the government bailout of the banking sector in August 2003, indicates that ensuring low public debt alone is not sufficient to avoid crises—weaknesses in the banking sector need to be independently addressed.

[12]Dominica, the Dominican Republic, and Suriname are italicized in Table 2.4 to indicate that their relative positions have changed over time.

What Accounts for the Rise in Public Debt in the Average Caribbean Country?

To shed light on this question we focus our analysis on the six very highly indebted countries—those with public-debt-to-GDP ratios that exceeded 90 percent at end-2004. These countries are Antigua and Barbuda, Belize, Dominica, Grenada, Jamaica, and St. Kitts and Nevis—henceforth called the Caribbean-6.[13] A debt accounting exercise is employed to decompose the sources of the public debt buildup in these countries.[14]

Equation (2) in Appendix 2.2. can be used to analyze the public debt accumulation process of the Caribbean-6.[15] The analysis is divided into two subperiods, 1991–97 and 1998–2004, to mark the timing when debt began to rise sharply in most countries. Table 2.5 presents the results obtained from estimating equation (2) for the average debt accumulation in the six countries.

During the 1991–97 period, the average public-debt-to-GDP ratio in the Caribbean-6 did not grow, while during 1998–2003 it rose rapidly—by 7.8 percent of GDP a year. Almost 40 percent of the 7.8 percent growth of public debt—amounting to 3 percent of GDP—is attributable to the deterioration of fiscal primary balances (excluding grants), and 2.9 percent of GDP to the combined effect of interest payments and output growth. The price effect (due both to inflation and appreciation of the real exchange rate) and grants together helped reduce the debt ratio by 4 percent of GDP. "Events" (such as the assumption by the government of private sector debt) and measurement error explain about 6 percent of GDP a year. Given that the measurement errors are positive, this indicates that the fiscal accounts consistently understated the accumulation of debt.

There are several notable changes from the 1991–97 to the 1998–2003 subperiods: (1) the significant worsening of the primary balance and its relative contribution to debt accumulation; (2) the rise in interest costs relative to GDP growth; and (3) measurement error, indicating a possible underestimation in recording the magnitude of the fiscal deficits in the second subperiod or the realization of government guaranteed debt in the first subperiod.

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[13]Even though the public-debt-to-GDP ratio is very high in Guyana, it is a special case because Guyana is receiving debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative. Barbados, although not included, has a high debt level of 86 percent of GDP.

[14]A more extensive discussion of the economic issues in the Eastern Caribbean Currency Union countries is available in IMF (2004 and 2005).

[15]See Helbling, Mody, and Sahay (2004) for a detailed discussion on the debt accounting exercise.

Table 2.5. Very Highly Indebted Caribbean Countries: Total Public Sector Debt Accumulation by Component[1]
(In percent of GDP)

Year	Total Public-Debt-to-GDP (in percent, end of period)	Public Debt Accumulation	Contribution to Increase in Debt-to-GDP Ratio: Primary fiscal balance (excluding grants)	Grants	Primary balance (includes grants)	Interest payments	Interest-output difference effect[2]	Price effect	Events and measurement errors[3]
1990	72.7	. . .	0.6	–1.9	–1.4	. . .	. . .	. . .	. . .
1991	81.7	9.0	1.0	–2.0	–1.0	–2.5	–4.6	15.9	–1.3
1992	67.8	–13.9	–0.2	–1.3	–1.5	3.2	1.6	–13.7	–0.3
1993	70.7	2.9	1.2	–2.9	–1.7	2.7	0.8	–2.5	6.2
1994	68.1	–2.6	1.2	–1.9	–0.7	3.0	0.9	–3.4	0.6
1995	67.7	–0.4	0.5	–2.4	–1.9	3.0	3.1	–3.0	1.5
1996	66.6	–1.1	1.5	–2.2	–0.7	4.1	2.0	–4.2	1.8
1997	72.7	6.0	2.7	–1.8	0.9	3.4	1.3	–1.6	5.5
1998	84.1	11.5	2.6	–2.9	–0.3	4.8	2.9	–2.4	11.2
1999	90.1	6.0	1.8	–1.7	0.1	4.5	1.4	–0.2	4.6
2000	99.8	9.7	2.8	–2.6	0.2	4.6	1.0	0.1	8.4
2001	106.1	6.3	4.8	–1.7	3.0	4.7	4.4	–2.7	1.6
2002	128.2	22.1	6.9	–2.0	4.9	4.6	3.8	0.7	12.7
2003	130.6	2.4	2.3	–3.5	–1.2	6.8	2.8	–3.2	4.0
2004	127.2	–3.4	—	–2.5	–2.6	7.6	4.0	–3.7	–1.1
1991–97	70.8	—	1.1	–2.1	–0.9	2.4	0.7	–1.8	2.0
1998–2004	109.4	7.8	3.0	–2.4	0.6	5.4	2.9	–1.6	5.9
Change	38.7	7.8	1.9	–0.4	1.5	3.0	2.2	0.2	3.9

Source: IMF staff calculations based on data from country authorities.

Note: A positive value means that the component contributed to an increase in the public-debt-to-GDP ratio, while a negative sign means that it contributed to a decline in the public-debt-to-GDP ratio.

[1]Very highly indebted countries are defined as countries that have a public-debt-to-GDP ratio greater than 90 percent.

[2]The interest rate component includes the change in the real value of the domestic-currency-denominated debt that occurs with changes in the nominal exchange rate. This is only relevant for Jamaica, since the other countries had invariant exchange rates.

[3]Events include those that do not appear in the fiscal accounts but modify the public debt.

What Do the Individual Country Data Show?

St. Kitts and Nevis had the highest public-debt-to-GDP ratio, at almost 180 percent at end-2004, but this ratio rose most rapidly in Grenada between 1997 and 2004 (growing by 14.6 percent of GDP a year). Table 2.6 compares the performance across the six countries. Jamaica stands out as the only country that generated primary fiscal surpluses in both subperiods, averaging nearly 9 percent of GDP a year during the entire 1991–2004 period. All other countries registered primary fiscal deficits in both subperiods.

In the case of Jamaica, the sharp increase in the interest payments component was the most important factor for rapid public debt accumulation between 1997 and 2004. In fact, interest payments rose by 9.1 percent a year between the two subperiods, surpassing the annual rise in the debt-to-GDP ratio.[16] This rise in interest payments occurred during a period when global interest rates were falling, indicating the importance of country-specific factors in affecting interest costs. In all other countries, interest payments also increased, contributing positively to debt accumulation.[17]

In summary, the single most important factor contributing to the rise in the ratio of public debt to GDP in all cases except Jamaica is the deterioration in the primary balance (including and excluding grants). In the case of Jamaica, the sharp rise in interest costs exceeded the increase in the public-debt-to-GDP ratio. In virtually all countries, output growth helped reduce the debt in both subperiods. However, there was substantial variation across countries in the quantitative contribution of GDP growth in reducing debt-to-GDP ratios.

Fiscal Expansion: Policy Slippages versus Exogenous Shocks

As noted in the previous sections, the rapid buildup of public debt since 1997 in the region's very highly indebted countries—the Caribbean-6— is in large part due to a deterioration in fiscal balances. This section explores

[16]The increase in the interest payments component has to do both with an increase in interest rates and with a higher public-debt-to-GDP ratio. The latter is partly related to a major bailout of domestic financial institutions in 1996–97, which generated substantial fiscal costs in subsequent years. The low value of the interest payments component in the first subperiod is the result of the substantial decline in the U.S. dollar value of domestic currency debt in 1991 as a consequence of the large depreciation of the Jamaican currency that occurred that year.

[17]Antigua and Barbuda's debt was, in part, restructured and reduced, while arrears have been incurred on most public sector debt.

Table 2.6. Very Highly Indebted Caribbean Countries: Total Public Sector Debt Accumulation by Component[1]
(In percent of GDP)

			Contribution to Increase in Debt-to-GDP Ratio							
Year	Total Public-Debt-to-GDP (in percent, end of period)	Public Debt Accumulation	Primary fiscal balance (excluding grants)	Grants	Primary balance (includes grants)	Interest payments	Output growth	Interest-output difference effect[2]	Price effect	Events and measurement errors[3]
Highly Indebted Caribbean Countries										
1991–97	70.8	—	1.1	–2.1	–0.9	2.4	–1.7	0.7	–1.8	2.0
1998–2004	109.4	7.8	3.0	–2.4	0.6	5.4	–2.5	2.9	–1.6	5.9
Change	38.7	7.8	1.9	–0.4	1.5	3.0	–0.8	2.2	0.2	3.9
Antigua & Barbuda										
1991–97	108.7	–1.7	0.9	–0.6	0.2	3.4	–3.1	0.3	–2.8	0.5
1998–2004	122.5	–0.4	3.5	–0.5	3.0	4.1	–4.5	–0.4	–1.6	–1.6
Change	13.7	1.3	2.6	0.1	2.8	0.7	–1.4	–0.7	1.2	–2.0
Belize										
1991–97	36.2	2.5	4.1	–1.3	2.8	1.6	–1.3	0.3	–0.6	—
1998–2004	77.6	8.5	5.3	–1.2	4.2	3.6	–4.2	–0.6	0.1	4.8
Change	41.4	6.0	1.2	0.1	1.4	2.0	–2.9	–0.9	0.7	4.8
Dominica										
1991–97	68.5	–1.1	4.8	–4.1	0.7	2.3	–1.5	0.9	–2.2	–0.4
1998–2004	98.5	7.7	7.4	–5.4	1.9	4.9	0.1	5.0	–1.4	2.1
Change	29.9	8.8	2.6	–1.4	1.2	2.5	1.6	4.1	0.8	2.5

Grenada										
1991–97	43.5	–2.1	3.5	–2.9	0.6	2.4	–1.0	1.4	–1.3	–2.8
1998–2004	82.6	12.6	7.1	–4.3	2.9	3.6	–1.5	2.0	–1.2	8.8
Change	39.1	14.6	3.7	–1.4	2.2	1.2	–0.5	0.6	0.2	11.6
Jamaica										
1991–97	107.6	–2.2	–8.6	—	–8.6	2.6	–0.7	1.9	–2.1	6.5
1998–2004	134.5	5.1	–9.3	—	–9.3	11.8	–1.7	10.1	–2.1	6.4
Change	26.9	7.3	–0.7	—	–0.7	9.1	–1.0	8.2	—	–0.2
St. Kitts & Nevis										
1991–97	60.0	4.5	2.1	–3.5	–1.5	2.0	–2.4	–0.4	–1.8	8.2
1998–2004	141.1	13.3	4.1	–3.1	1.0	4.3	–2.9	1.4	–3.6	14.4
Change	81.1	8.8	2.0	0.4	2.4	2.3	–0.5	1.9	–1.9	6.2

Source: IMF staff calculations based on data from country authorities.

Note: A positive value means that the component contributed to an increase in the public-debt-to-GDP ratio, while a negative sign means that it contributed to a decline in the public-debt-to-GDP ratio.

[1]Very highly indebted Caribbean countries are defined as countries that have a public-debt-to-GDP ratio greater than 90 percent.

[2]The interest rate component includes the change in the real value of the domestic-currency-denominated debt that occurs with changes in the nominal exchange rate. This is only relevant for Jamaica, since the other countries had invariant exchange rates during the period under study.

[3]Events include those that do not appear in the fiscal accounts but modify the public debt.

whether the deterioration stemmed from revenue declines or expenditure increases. Also, to what extent was the fiscal deterioration due to unanticipated shocks rather than fiscal policy slippages?

Did Government Revenues Fall, or Did Expenditures Rise?

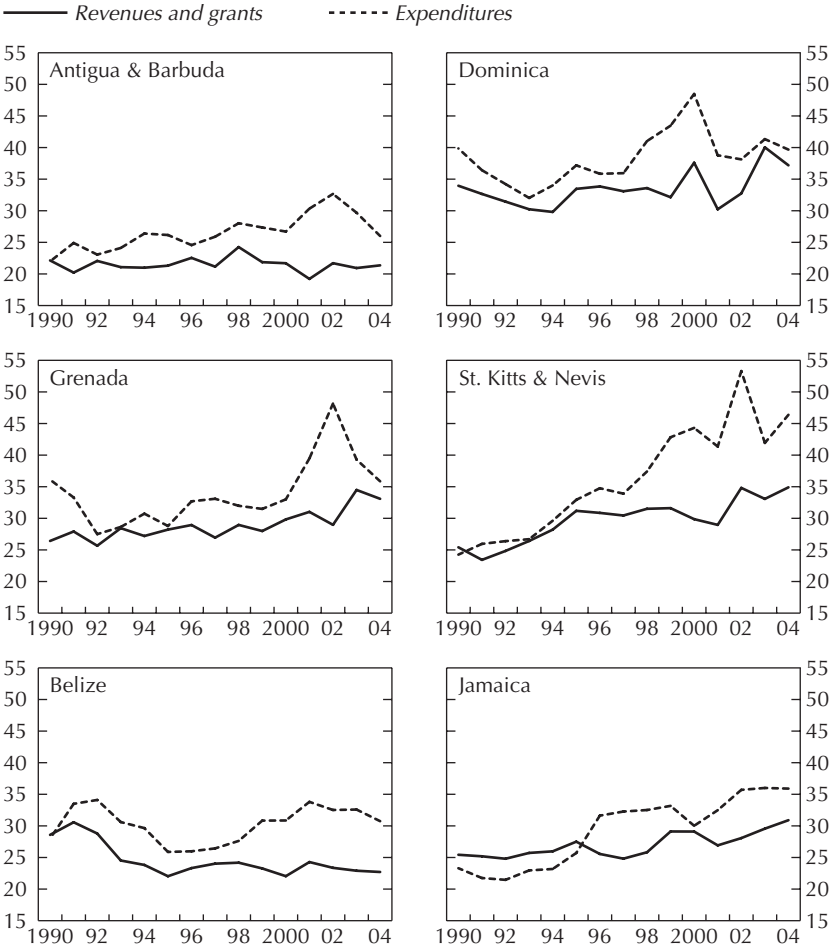
Over 1998–2004, the overall fiscal balance deteriorated in each of the Caribbean-6 cases, mostly on account of a rise in expenditures. Figures 2.5 to 2.7 and Table 2.7 summarize developments in overall fiscal balances and central government revenues and expenditures in the six countries. Except in Belize, fiscal revenue as a share of GDP increased in the second subperiod in all countries. On the other hand, there is clear evidence that expenditures rose quite sharply in virtually all countries. Total current expenditures increased in all cases except Grenada, while capital expenditures also rose in all countries except Jamaica. Within current expenditures, interest expenditures rose in all six countries, while the noninterest component rose in four countries (exceptions were Belize and Grenada). In summary, the fiscal deterioration occurred in spite of an improvement in revenue performance, and was caused by a combination of rising interest costs, higher public investments, and larger noninterest current expenditures.

Did Exogenous Shocks Contribute to Expansionary Fiscal Policy?

Quantifying the full effects of exogenous shocks on fiscal performance is difficult. There are multiple sources of shocks and many of them are not easily observable (such as productivity shocks). Moreover, the authorities do not categorize expenditures separately for the shocks. Finally, second-round indirect effects of shocks that can be observed cannot be easily accounted for. Hence, the attempt in this subsection is simply to provide a qualitative analysis to the extent possible, given the information at hand.

Many types of unanticipated shocks can affect fiscal management in Caribbean countries. First, global interest rates can increase, raising interest payments unexpectedly. Second, oil price hikes are a major supply shock that can slow economic growth and reduce government revenues when increases in international oil prices are not fully passed through to domestic prices. Third, a slowdown in global economic growth can adversely affect small open economies that depend heavily on external demand for their products, such as tourism. Fourth, terms of trade shocks—such as secular declines in the price of bananas, sugar, and cotton—can also

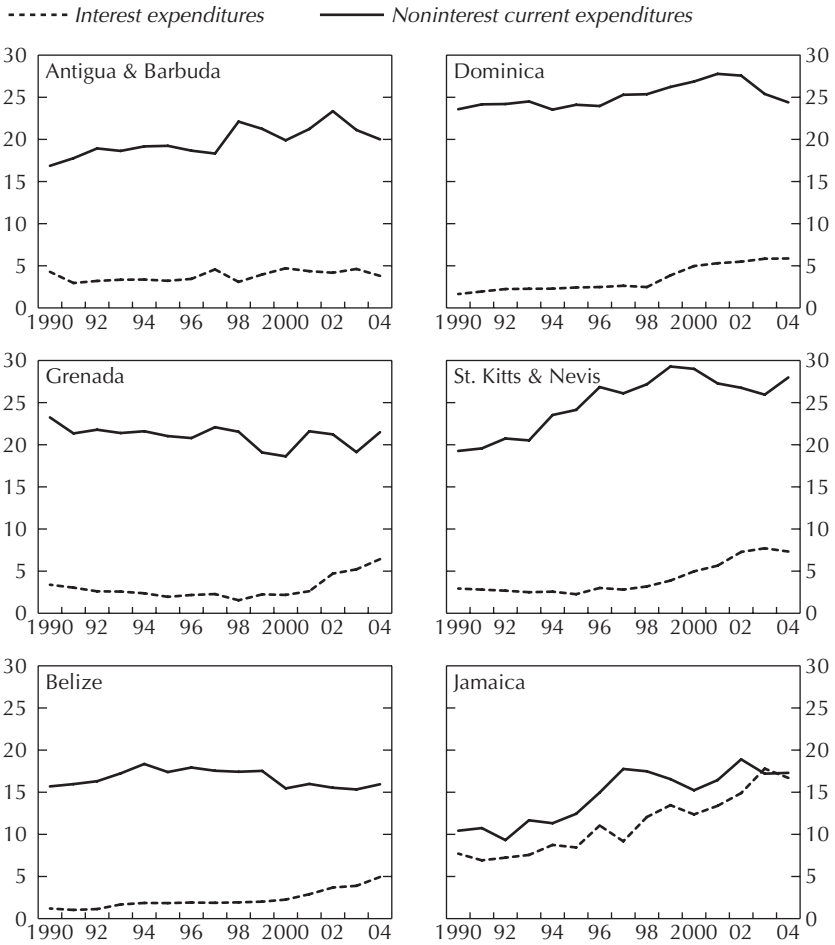
Figure 2.5. Very Highly Indebted Caribbean Countries: Central Government Revenue and Expenditures[1]
(In percent of GDP)



Sources: Country authorities; and IMF staff estimates.
[1]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

decrease the growth potential and a permanent source of revenues. Finally, natural disasters to which many Caribbean countries are prone can have devastating effects on economies. Each of these factors will be examined in turn by asking whether there was a perceptible change in their nature

Figure 2.6. Very Highly Indebted Caribbean Countries: Current Expenditures of the Central Government: Interest versus Noninterest[1]
(In percent of GDP)

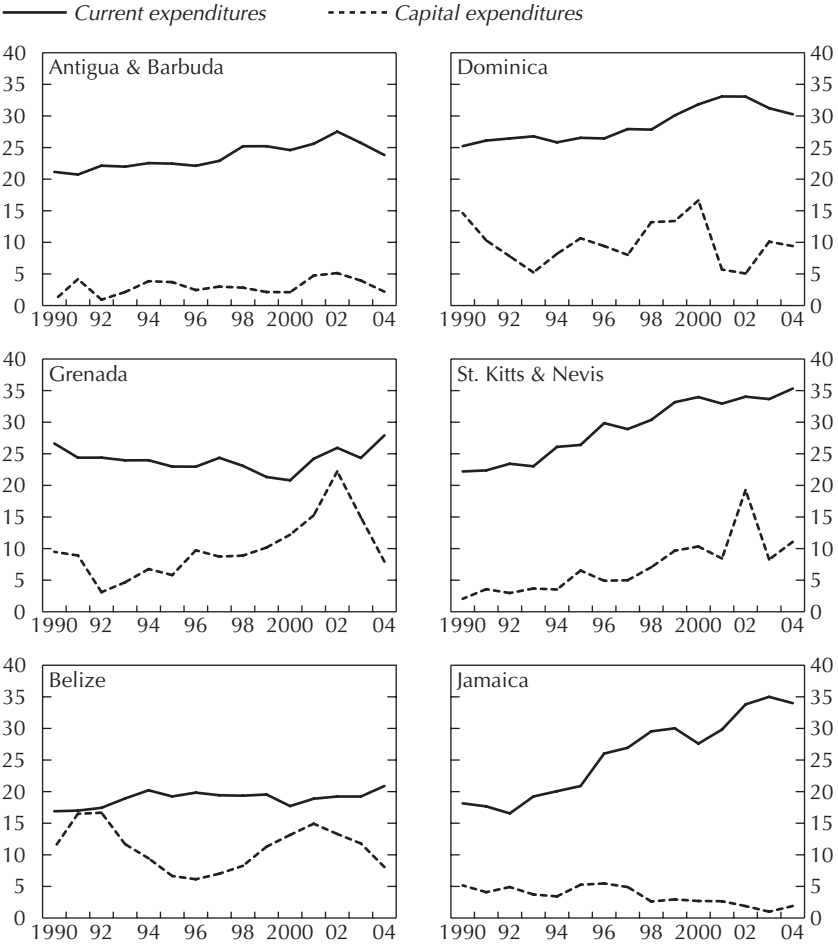


Sources: Country authorities; and IMF staff estimates.
[1]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

or frequency during 1998–2004 compared with 1991–97 that caused fiscal imbalances to rise in the second subperiod.

Figure 2.8a shows developments in the average Caribbean growth rates (for all 15 countries)—and world real interest rates as measured

Figure 2.7. Very Highly Indebted Caribbean Countries: Composition of Central Government Expenditures, Capital versus Current Expenditure[1]
(In percent of GDP)



Sources: Country authorities; and IMF staff estimates.
[1]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

by the 6-month LIBOR (the London interbank offer rate divided by the industrial countries' inflation rate). Figure 2.8b focuses on the Caribbean-6 from 1990, and also shows developments in interest-related current expenditures. There was an increase in interest payments during

Table 2.7. Very Highly Indebted Caribbean Countries: Changes in Central Government Revenues and Expenditure[1]
(In percent of GDP)

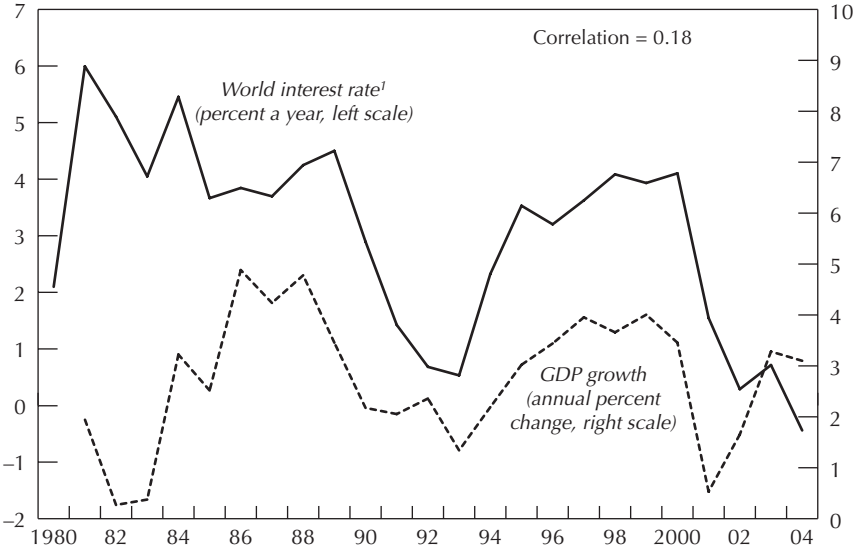
	Overall Fiscal Balance	Revenues	Central Government: Noninterest current expenditures	Interest expenditures	Capital expenditures	Current expenditures
Antigua & Barbuda						
1990–97	–3.2	21.4	18.4	3.5	2.6	22.0
1998–2004	–7.1	21.6	21.3	4.1	3.3	25.4
Change	↓	↑	↑	↑	↑	↑
Belize						
1990–97	–3.6	25.7	17.1	1.6	10.6	18.6
1998–2004	–8.0	23.2	16.2	3.1	11.5	19.3
Change	↓	↓	↓	↑	↑	↑
Dominica						
1990–97	–3.4	32.3	24.2	2.2	9.3	26.4
1998–2004	–6.8	34.8	26.2	4.8	10.5	31.1
Change	↓	↑	↑	↑	↑	↑
Grenada						
1990–97	–3.9	27.5	21.7	2.5	7.1	24.2
1998–2004	–6.4	30.6	20.4	3.6	13.1	23.9
Change	↓	↑	↓	↑	↑	↓
Jamaica						
1990–97	0.3	25.6	12.3	8.4	4.6	20.7
1998–2004	–5.2	28.5	17.0	14.4	2.2	31.4
Change	↓	↑	↑	↑	↓	↑
St. Kitts & Nevis						
1990–97	–1.7	27.6	22.6	2.7	4.0	25.3
1998–2004	–11.8	32.1	27.6	5.7	10.6	33.3
Change	↓	↑	↑	↑	↑	↑

Source: IMF staff estimates from country authorities' data.
[1]Very highly indebted Caribbean countries are defined as countries that have a public-debt-to-GDP ratio averaging greater than 90 percent.

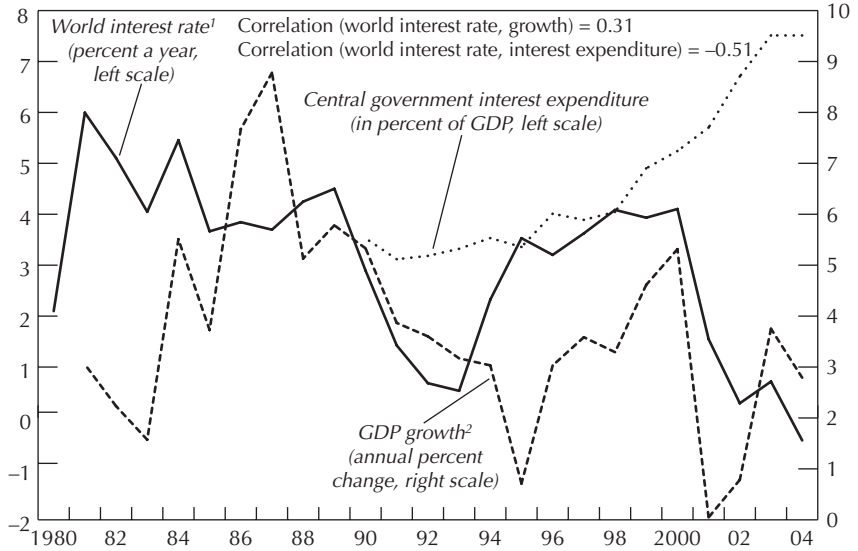
1998–2004 in the Caribbean-6 countries, even though global interest rates were declining during that subperiod. Interest payments rose during 1998–2004, primarily because the Caribbean countries were able to place greater volumes of debt in international markets as global investors appear to have been rebalancing their portfolios in the aftermath of the financial crises in Asia in 1997, Russia in 1998, and Argentina in 2001. Domestic borrowings also increased as local financial markets deepened. Counterintuitively, there appears to be a positive relationship between the Caribbean growth rates (both the Caribbean-15 and Caribbean-6) and world interest rates. This can happen if growth is influenced by

Figure 2.8. Caribbean GDP and World Interest Rate

a. Caribbean Region: GDP Growth and World Interest Rate



b. Very Highly Indebted Caribbean Countries: GDP Growth, Central Government Interest Expenditure, and World Interest Rate[2]



Sources: IMF, World Economic Outlook database; country authorities; and IMF staff estimates.
[1]World interest rate is the six–month London interbank offer rate.
[2]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

policy, such as public sector expansion or structural reforms that benefit private sector investments, or due to lower access to concessional financing, as was indeed the case.[18]

Figure 2.9a shows developments in oil prices since 1980 and GDP growth in the 15 Caribbean countries, while Figure 2.9b focuses on the Caribbean-6 since 1990. While there is a negative relationship between oil prices and GDP growth rates in the wider Caribbean, this relationship is weaker for the Caribbean-6, reflecting in part the fact that increases in international oil prices were not fully passed through to domestic prices in the highly indebted countries.

The comovement between industrial countries' GDP growth rates and those of both the wider Caribbean and the Caribbean-6 is striking (Figure 2.10). In most countries, the key source of growth is the tourism sector. Figure 2.11 shows how the stay-over tourist arrivals evolved in the Caribbean-6 countries. The sharp dip in tourism performance in Grenada in 2004 reflects the impact of Hurricane Ivan, while the sharp increase in St. Kitts and Nevis mainly reflects the doubling of capacity for stay-over tourists through the opening of the Marriott Hotel. In Antigua and Barbuda and Belize, tourism performance appears to have been much more sluggish than in other countries.

Of the Caribbean-6 highly indebted countries, Dominica (bananas), Belize (bananas and sugar), and St. Kitts and Nevis (sugar) have been affected by the erosion of preferential trade agreements through the 1990s.[19] Figure 2.12 illustrates price movements for bananas and sugar—in the case of sugar, the key concern is the decrease in the volume that can be exported to the protected (higher price) markets in Europe. While these shocks are permanent in nature, they have been anticipated for some time and prices have been declining slowly. They have affected both the production and profits of the agricultural sector as well as government revenues from this sector. The impact on the economies is hard to assess, but limited evidence indicates that the shocks have generated significant fiscal losses. In St. Kitts and Nevis, for example, the state-owned sugar industry has suffered losses of 3 to 4 percent of GDP a year over the past several years.

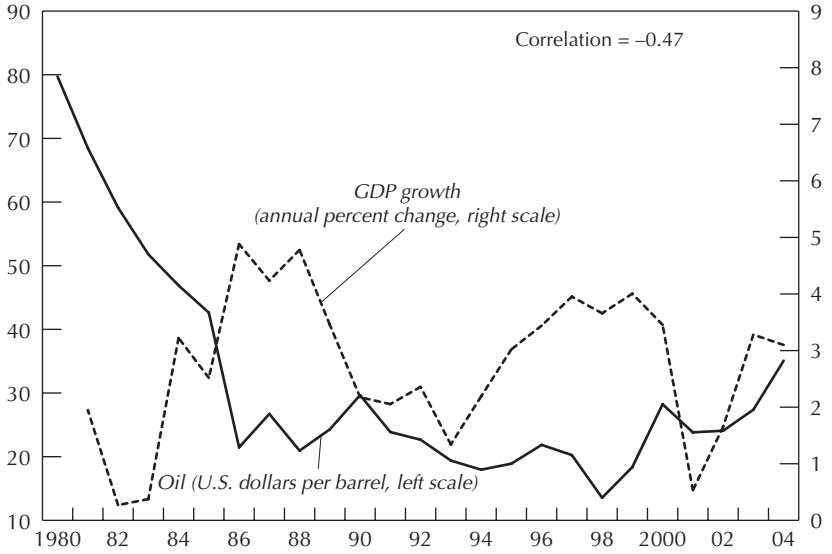
Finally, natural disasters have frequently affected the Caribbean countries, triggering disaster management and reconstruction expenditures.

[18]Alternatively, an improvement in global economic conditions would positively impact both world interest rates and Caribbean growth rates.

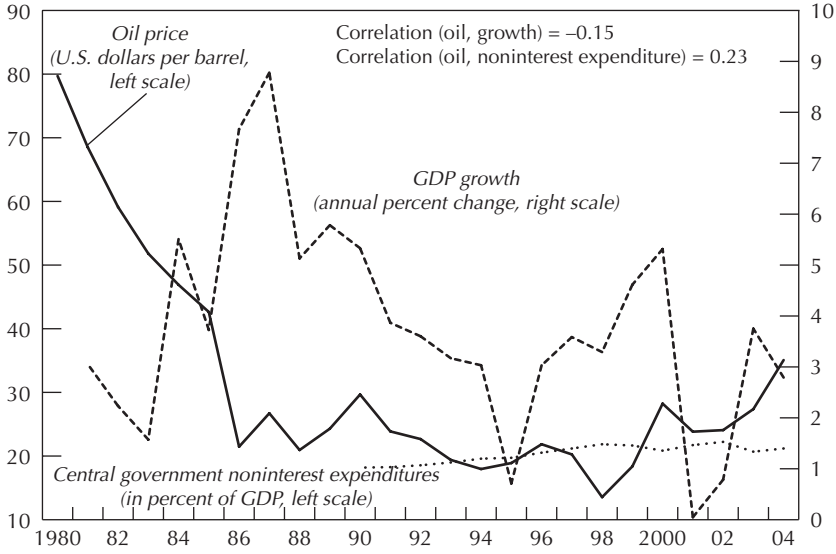
[19]Grenada is also a banana producer, although over time it has successfully diversified away from this activity.

Figure 2.9. Caribbean GDP Growth and Oil Prices

a. The Caribbean: GDP Growth and Oil Price



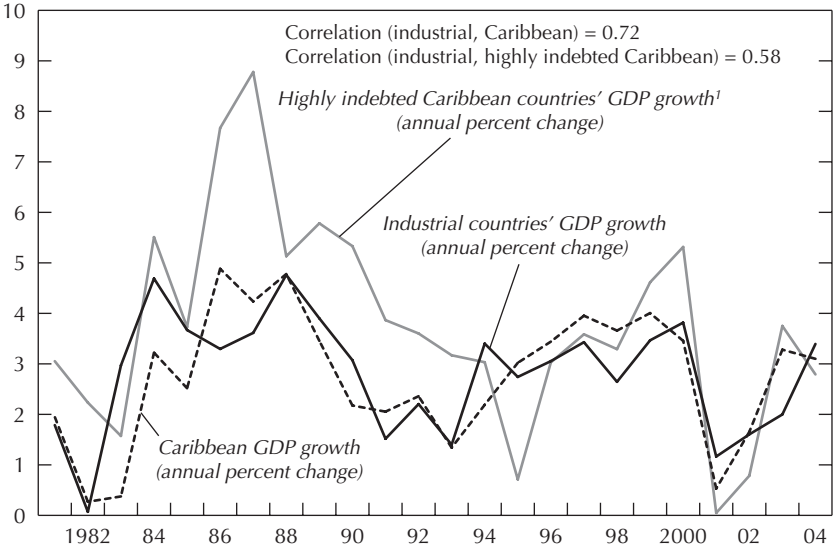
b. Very Highly Indebted Caribbean Countries: GDP Growth, Oil Price, and Central Government Noninterest Expenditure[1]



Sources: IMF, World Economic Outlook and Commodity Price System databases; country authorities; and IMF staff estimates.

[1]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

Figure 2.10. GDP Growth of Caribbean and Industrial Countries

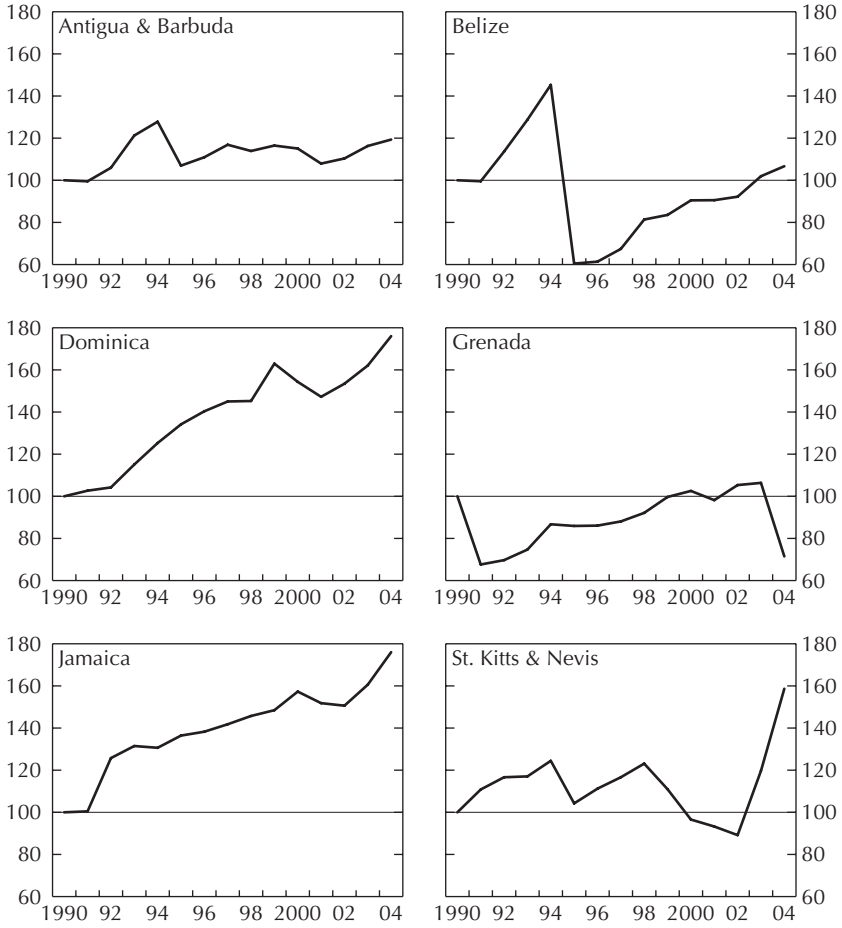


Sources: IMF, World Economic Outlook database; country authorities; and IMF staff estimates.
[1]Highly indebted Caribbean countries include Antigua and Barbuda, Belize, Dominica, Grenada, Jamaica, and St. Kitts and Nevis.

Figure 2.13 provides evidence that the frequency of natural disasters was higher in the second half of the 1990s than in the first half, with the exception of Jamaica. However, there is not sufficient information to infer whether the severity of the natural disasters and the associated fiscal costs were higher in the second subperiod.

Table 2.8 provides a summary picture of exogenous shocks in the Caribbean-6. The two shocks that did affect fiscal balances more negatively in the second subperiod are natural disasters and the decline in preferential agreements. On the other hand, higher oil prices in the second subperiod do not appear to have caused the slowdown in growth or an increase in current expenditures. The rise in interest expenditures during the second subperiod was also not caused by a rise in global interest rates (since interest rates actually declined during that subperiod), but rather by the increase in the stock of debt and a decline in concessional financing. Given the high correlation between growth in the Caribbean and the industrial countries, the Caribbean should have grown faster, as GDP growth in industrial countries was somewhat higher in the second subperiod. However, the September 11th shock to tourism economies directly reduced growth in 2001–02.

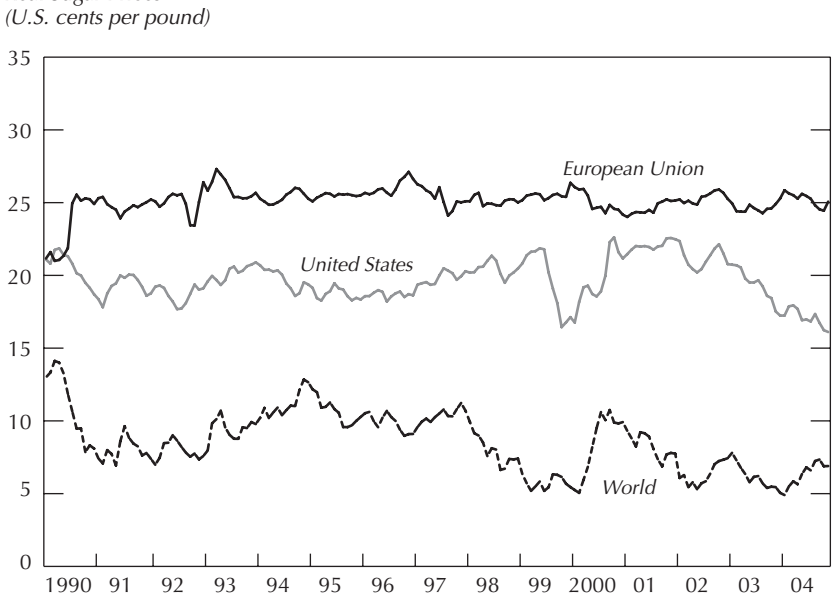
Figure 2.11. Very Highly Indebted Caribbean Countries: Tourism Developments[1]
(Stayover arrivals, in thousands; 1990 = 100)



Sources: National Tourism and Statistical Offices; and IMF staff estimates.
[1]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

The conclusion is that the rapid increase in fiscal imbalances in recent years appears to be related to policy slippages, insufficient fiscal planning for anticipated adverse shocks, and, to some extent, unanticipated shocks. The decline in preferential access was an anticipated adverse shock. In fact, some countries began to adjust their production structures

Figure 2.12. The Caribbean: Real Sugar and Banana Prices
(January 1990–December 2004)



in anticipation of this shock in the 1980s. Given the high frequency of natural disasters, countries should have saved in good times to be able to cover, at least in part, expenditures related to natural disasters. In contrast, the September 11th attack on the United States was an unanticipated shock that slowed growth significantly for 18 months or so in the tourism-dominated economies.

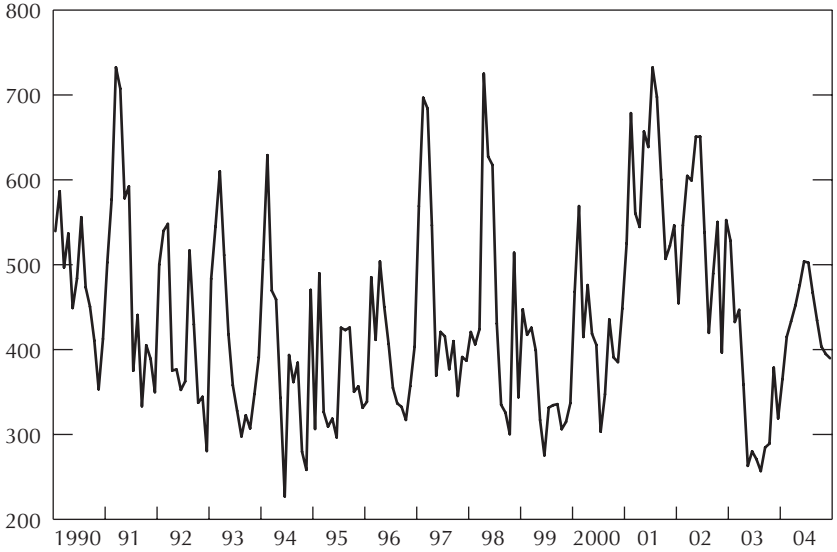
Debt Sustainability in the Very Highly Indebted Countries

Going forward, the implications for sustaining public debt at such high levels in the Caribbean-6 are grave. Table 2.9 presents an analysis of public debt sustainability in the Caribbean-6 countries based around three questions: (1) What is the primary fiscal surplus needed to reduce the public-debt-to-GDP ratio to 60 percent in five years?[20] (2) What

[20]While the target debt ratio could be higher or lower than 60 percent of GDP and acceptable levels do depend on the specific circumstances of each country (Reinhart, Rogoff, and Savastano, 2003), the ECCU countries set this goal in 1998 for themselves, as did the European Union countries in the context of setting their convergence criteria.

Figure 2.12 ***(concluded)***
(January 1990–December 2004)

Real Banana Price
(U.S. dollars per metric ton)

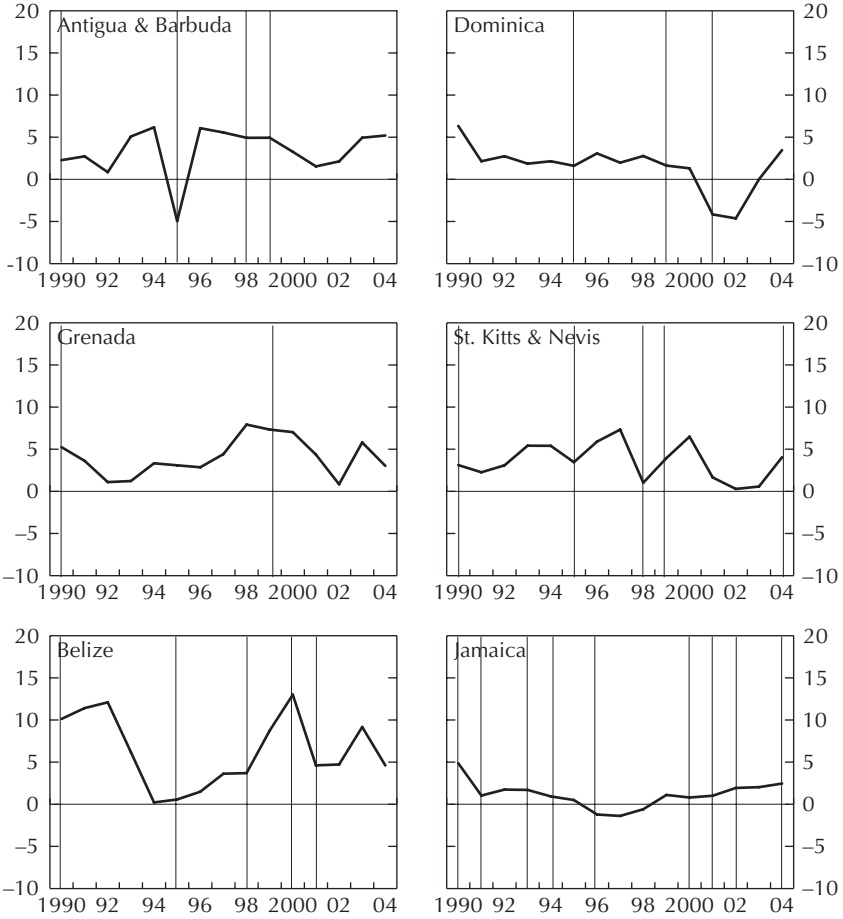


Source: IMF, Commodity Price System database.
Notes: Sugar (U.S.) is the U.S. import price, CSCE nearest futures, c.i.f. New York; sugar (EU) is the European Union negotiated import price for raw unpackaged sugar from the African, Caribbean, and Pacific countries, c.i.f. European ports; sugar (world) is the free market price, CSCE nearest futures, c.i.f. New York. All nominal price series were deflated using the IMF's manufacturers' unit value index. Banana (Central American and Ecuador) is the U.S. importer's price, f.o.b. U.S. ports, U.S. dollars per metric ton (Chiquita, Dole, and Del Monte). The nominal price series was deflated using the IMF's manufacturers' unit value index.

is the primary surplus needed to prevent debt from rising and simply stabilize it at the current (very high) levels? and (3), If current policies are pursued, what would be the level of debt by 2010? The current situation in the primary balance and public sector debt is presented in Table 2.9.

As shown in Table 2.10, to reduce debt to 60 percent of GDP over the next five years, the primary surpluses needed are exceptionally large, requiring a substantial turnaround in all six countries. Jamaica would need to generate the highest primary fiscal surpluses—23 percent of GDP in each of the next five years, followed closely by St. Kitts and Nevis at 19 percent, Grenada (17.6 percent), Antigua and Barbuda (6.3 per-

Figure 2.13. Very Highly Indebted Caribbean Countries: Real GDP Growth and Natural Disasters[1,2]
(In percent of GDP)



Sources: Emergency Disasters Database (EM-DAT) (CRED, 2005); country authorities; and IMF staff estimates.

[1]Very highly indebted Caribbean countries are defined as countries that have a ratio of public debt to GDP greater than 90 percent.

[2]The natural disasters include: For Antigua and Barbuda, Hurricane Gustav (1990), Hurricane Luis (1995), Hurricane Georges (1998), Hurricane Jose (1999), and Hurricane Lenny (1999). For Dominica, Hurricane Luis (1995), Hurricane Lenny (1999), and Hurricane Iris (2001). For Grenada, Hurricane Arthur (1990), Hurricane Lenny (1999), and Hurricane Ivan (2004). For St. Kitts and Nevis, Hurricane Gustav (1990), Hurricane Luis (1995), Hurricane Georges (1998), and Hurricane Lenny (1999). For Belize, cold wave (1990), flood (1990), flood (1995), Hurricane Mitch (1998), Hurricane Keith (2000), Hurricane Iris (2001), and Hurricane Chantal (2001). For Jamaica, disease (1990), flood (1991), flood (1993), Tropical Storm Gordon (1994), Tropical Storm Marco (1996), drought (2000), Hurricane Michelle (2001), flood (2002), Hurricane Lili (2002), Hurricane Isidore (2002), and Hurricane Ivan (2004).

Table 2.8. Caribbean-6: Exogenous Shocks and Economic Policies and Outcomes

	Global Shocks			Country-Specific Shocks		Policies/Outcomes		
	LIBOR (in percent)	Oil prices (U.S. dollars per barrel)	World GDP growth (per year, in percent)	Decline in preferential agreements	Natural disasters (number of events)	GDP growth (per year, in percent)	Central government noninterest expenditures (percent of GDP)	Central government interest expenditures (percent of GDP)
Antigua & Barbuda				No				
1991–1997	2.3	21.8	3.1		2	3.0	18.4	3.5
1998–2004	1.8	24.4	3.7		3	3.8	21.3	4.1
Change	–0.4	2.5	0.5		1	0.9	2.8	0.6
Belize				Yes (Sugar, bananas)				
1991–1997	2.3	21.8	3.1		1	5.7	17.1	1.6
1998–2004	1.8	24.4	3.7		4	6.9	16.2	3.1
Change	–0.4	2.5	0.5		3	1.2	–0.9	1.5
Dominica				Yes (Bananas)				
1991–1997	2.3	21.8	3.1		1	2.7	24.2	2.2
1998–2004	1.8	24.4	3.7		2	0.1	26.2	4.8
Change	–0.4	2.5	0.5		1	–2.7	2.1	2.6
Grenada				No				
1991–1997	2.3	21.8	3.1		0	2.8	21.7	2.5
1998–2004	1.8	24.4	3.7		2	3.1	20.4	3.6
Change	–0.4	2.5	0.5		2	0.3	–1.3	1.0
Jamaica				No				
1991–1997	2.3	21.8	3.1		4	1.0	12.3	8.4
1998–2004	1.8	24.4	3.7		5	1.2	17.0	14.4
Change	–0.4	2.5	0.5		1	0.2	4.7	6.0
St. Kitts & Nevis				Yes (Sugar)				
1991–1997	2.3	21.8	3.1		1	4.5	22.6	2.7
1998–2004	1.8	24.4	3.7		2	2.5	27.6	5.7
Change	–0.4	2.5	0.5		1	–2.0	5.0	3.0

Sources: IMF staff estimates from country authorities' data; and IMF, World Economic Outlook database.

Table 2.9. Very Highly Indebted Caribbean Countries: Public Debt Sustainability Assumptions[1]
(In percent of GDP)

	Current Situation[2]	
	Public debt	Primary balance
St. Kitts & Nevis	178.7	–4.1
Jamaica	142.0	10.4
Grenada	129.4	3.7
Dominica	115.0	3.4
Antigua & Barbuda	99.4	–0.8
Belize	93.2	–7.9

Sources: Country authorities and IMF staff estimates.
[1]Very highly indebted Caribbean countries are defined as countries that have a public-debt-to-GDP ratio greater than 90 percent.
[2]For Belize and Jamaica, the current debt level corresponds to that of 2003, while for others this corresponds to 2004.

cent), Dominica (4.1 percent), and Belize (4 percent). These are extremely demanding fiscal efforts by any standards. Compared with the current levels of primary fiscal balances, these would require a substantial increase or turnaround (over 10 percent of GDP) in primary balances in all countries except Antigua and Barbuda and Dominica.

To stabilize public debt at the current level, three countries would still need to increase primary fiscal balances beyond their current levels. Supposing that the countries were less ambitious and aimed merely to prevent debt from rising further. The second column in Table 2.10 indicates how much primary surplus would need to be generated to stabilize debt at current levels. Three countries—St. Kitts and Nevis, Antigua and Barbuda, and Belize—would still have to increase their primary balances beyond their current levels, although by more modest amounts than if they were planning to reduce the public-debt-to-GDP ratios substantially. While this may be an interesting hypothetical question, it is certainly not advisable to have such a modest goal. The main reason is that countries with such high debt levels are extremely vulnerable to even otherwise small shocks and to financial crises.

If policies followed in the last five years were to continue in the medium term, public debt would rise to extreme levels and endanger macroeconomic stability (Table 2.10). If current policies are measured by their current primary fiscal balance, debt in all countries except Dominica would remain in the triple-digit range, rising significantly in three of the six countries over the next five years.

Table 2.10. Very Highly Indebted Caribbean Countries: Policy Questions on Public Debt Sustainability[1,2]

(In percent of GDP)

Primary Balance Needed to Reduce Public-Debt-to-GDP Ratio to 60 Percent in Five Years[3,4]	Primary Balance Needed to Stabilize Public Debt-to-GDP Ratio at Current Level[3]	Public Debt in 2010 under Current Policies[4]
Jamaica (23.1)	Jamaica (8.6)	St. Kitts & Nevis (231.1)
St. Kitts & Nevis (19.0)	Dominica (1.3)	Grenada (147.5)
Grenada (17.6)	Antigua & Barbuda (–0.3)	Jamaica (131.8)
Antigua & Barbuda (6.3)	Grenada (–0.7)	Belize (115.4)
Dominica (4.1)	St. Kitts & Nevis (–2.0)	Antigua & Barbuda (101.3)
Belize (4.0)	Belize (–3.1)	Dominica (66.0)

Sources: Country authorities; and IMF staff estimates.

[1]Very highly indebted Caribbean countries are defined as countries that have a public-debt-to-GDP ratio greater than 90 percent.

[2]Debt sustainability analysis is based on average growth rate and interest rate over 1998–2004.

[3]For Belize and Jamaica, the current debt level corresponds to that of 2003, while for others this corresponds to 2004.

[4]For Belize and Jamaica, the debt level in five years corresponds to that in 2008.

Taking Stock: Conclusions and Policy Implications

Most Caribbean countries have a high level of public debt, and today, 14 of the 15 Caribbean countries are among the 30 most indebted emerging market countries in the world. Given the large vulnerabilities emanating from exogenous shocks in the region and high debt, the probability of financial crises has risen. The potential problems faced by governments could be compounded, since social security funds or public commercial banks have typically financed the fiscal deficits in several countries.

Reducing public debt should be a key macroeconomic goal going forward. There are five key elements of efforts to successfully reduce publicdebt to more sustainable levels and help countries achieve their growth potential: fiscal consolidation, prudent debt management strategies, asset sales/privatization, reducing vulnerabilities to exogenous shocks, and growth-enhancing structural reforms. Given the exceptionally high levels of debt in many countries, a combination of these elements is needed.

One of the most important messages derived from this chapter is the need for fiscal consolidation—the average fiscal deficit of more than 5 percent of GDP at the end of 2004 is very high by any standard. Several developments have been noted: average fiscal performance in every country, except Jamaica, deteriorated in 1998–2004, compared with 1991–97;

a rise in expenditures, rather than a fall in revenues, was the main cause of the worsening of the fiscal accounts; and, notably, interest payments steadily rose during the latter period, when global interest rates were on a downward trend. Going forward, the scope for sustaining such expansionary fiscal policies is limited because not only have public debts risen rapidly, but also the global financial environment has been turning unfavorable. Moreover, cross-country studies have shown that fiscal consolidation can help raise growth rates by increasing the credibility of economic reform programs, thereby attracting foreign investors and creating room for the private sector to flourish (Gupta and others, 2002; and Baqir, Ramcharan, and Sahay, 2004).

Given the Caribbean region's high human development indexes and natural tourist attractions, its economic growth potential clearly has not been fully exploited. Some of the key ways in which reforms can help its countries achieve their growth potential or even expand it are to increase labor market flexibility; achieve greater regional cooperation in the economic spheres; create an enabling environment for the private sector—especially the local private sector; and reduce the role of the public sector, including the high levels of employment in the government sector.

Active debt management can help lengthen maturities of debt and reduce the overall cost of servicing the debt. Many countries are already involved in active debt management. Dominica, Dominican Republic, and Grenada have embarked on a debt restructuring strategy that involves both official and private sectors, while a few others have approached their creditors for debt relief. Guyana's official debt was cancelled recently. Debt restructuring and debt forgiveness are, however, typically one-time events that follow a series of large exogenous shocks or recurrent policy slippages. Many other countries (such as St. Kitts and Nevis and St. Lucia) are lengthening the maturities and reducing the average interest costs of their debts by replacing high-interest-bearing and short-term debt with lower-interest-bearing and long-term debt. The room for such active debt management, however, will remain limited, especially as global interest rates rise.

The scope for raising revenues and retiring debt stock through asset sales and privatization varies widely across countries, but these steps cannot be relied upon to produce large reductions in debt. There are three lessons from previous asset sales/privatization experiences of other developing, market-based economies. First, privatization receipts in general have been disappointingly low, rarely exceeding 5 percent of GDP in a year. Second, to maximize revenues, privatization schemes need

to be carefully planned and distress sales should be avoided. Third, the privatization process should be transparent to ensure that the process is conducted fairly.

The Caribbean region is highly vulnerable to adverse exogenous shocks. Natural disasters are common—hurricanes, floods, and crop disease have been known to disrupt lives and fiscal planning only too often. Indeed, the huge losses inflicted by Hurricane Ivan in Grenada in September 2004 pushed the authorities to approach their creditors in October 2004 for debt relief. Disaster mitigation and management capacities are still relatively weak and need to be strengthened (see also Chapters 7 and 8).

In addition, the Caribbean region is highly susceptible to the external global environment, such as the threat of terrorist attacks, global slowdowns in growth, rising interest rates, and petroleum price hikes. Countries also need to adjust to the anticipated and continuing shock of the erosion of the preferential access of their traditional agricultural commodities to industrial countries.

Vulnerability to external shocks is compounded by existing domestic vulnerabilities, which include weaknesses in financial systems, very high debt, large fiscal deficits, and the combination of a fixed exchange rate regime and high debt. Financial sector weaknesses include large holdings of government paper by public pension systems and domestic banks, poor-quality loan portfolios, and weak financial sector regulation and supervision. The recent crisis in the Dominican Republic revealed only too painfully how a relatively well-performing country can face a crisis because of weaknesses in its financial sector. The earlier banking crisis in Jamaica had a similarly disruptive effect on the economic reform strategy. The Asian crises of the 1990s and the crises in Jamaica and Argentina showed that countries with fixed exchange rate regimes, large fiscal deficits, and very high debts are particularly vulnerable to currency attacks. There are at least two lessons to be learned from other countries' experiences with financial crises. First, addressing domestic vulnerabilities ex ante will go a long way toward preventing crises and avoiding the devastating effects of financial crises. Second, financial crisis-management capacity should be built up so the country can respond effectively in the event a crisis cannot be avoided.

In conclusion, the Caribbean region has the natural and human resources to grow more rapidly and to further raise its already high standard of living. Given the existing economic weaknesses in most countries, decisive policy actions on several fronts are needed now if the Caribbean is to achieve its economic potential.

Appendix 2.1. Regional Groupings

Eastern Caribbean Currency Union

Antigua and Barbuda
Dominica
Grenada
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines

Caribbean

Antigua and Barbuda
Bahamas, The
Barbados
Belize
Dominica
Dominican Republic
Grenada
Guyana
Jamaica
Haiti
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Suriname
Trinidad and Tobago

Latin America and the Caribbean

Antigua and Barbuda
Argentina
Bahamas, The
Barbados
Belize
Bolivia
Brazil
Chile
Colombia
Costa Rica
Dominica
Dominican Republic
Ecuador
El Salvador
Grenada
Guatemala
Guyana
Haiti
Honduras
Jamaica
Mexico
Netherlands Antilles
Nicaragua
Panama
Paraguay
Peru
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Suriname
Trinidad and Tobago
Uruguay
Venezuela

Small Island States

Antigua and Barbuda
Bahamas, The
Barbados
Belize
Cape Verde
Comoros
Cyprus
Dominica
Dominican Republic
Fiji
Grenada
Guinea-Bissau
Guyana
Haiti
Jamaica
Kiribati
Maldives
Malta
Mauritius
Papua New Guinea
Samoa
São Tomé and Príncipe
Seychelles
Solomon Islands
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Suriname
Tonga
Trinidad and Tobago
Vanuatu

Emerging Asia

Bangladesh	Lao PDR	Samoa
Bhutan	Malaysia	Solomon Islands
Cambodia	Maldives	Sri Lanka
China	Myanmar	Thailand
Fiji	Nepal	Tonga
India	Pakistan	Vanuatu
Indonesia	Papua New Guinea	Vietnam
Kiribati	Philippines	

Appendix 2.2. Accounting For Public Sector Debt

Equation (1) describes the accumulation of public sector debt, with variables measured in foreign currency. (For the calculations, the U.S. dollar is used as the foreign currency. Below we use foreign currency and U.S. dollar interchangeably.) F_t and D_t are, respectively, foreign and domestic public debt at the beginning of period t, with the latter denominated in domestic currency. S_{t+1} is the nominal exchange rate at the beginning of period $t + 1$ measured in units of foreign currency per unit of domestic currency. $GBAL_t$ is the government's primary fiscal balance during period t, while $GRANTS_t$ represents the grant component of government revenue, which can be used to finance deficits without creating new debt. The interest rate on domestic-currency-denominated debt is denoted by i_t, while r_t denotes the interest rate on foreign-currency-denominated debt. Finally, EVT_t (event) represents any event that does not appear in the fiscal accounts but modifies the public debt at time t:[21]

$$S_{t+1}D_{t+1} + F_{t+1} = (1 + i_t)\, S_{t+1}D_t + (1 + r_t)F_t - GBAL_t - GRANTS_t + EVT_t \qquad (1)$$

In equation (2), this study expresses variables in equation (1) as shares of GDP. Let Z_t denote the country's GDP in U.S. dollars. Thus, $Z_t = Y_t * P_t$,

[21]Several such events can be identified. Antigua and Barbuda reduced its debt by more than 13 percent of GDP in 1998 by negotiating with its creditors on reducing its arrears. In Belize, previously unaccounted debt became publicly guaranteed during privatization of the electricity and water companies (1999–2002). The government in Grenada borrowed more than 10 percent of GDP in 2002 to terminate lease arrangements that had not been previously included as debt. In Jamaica, public contingent liabilities were recognized over time, and public enterprises in St. Kitts and Nevis increased their debt by nearly 9 percent of GDP in 1997.

where Y_t is the real GDP and P_t is the U.S. dollar price index. Dividing both sides of equation (1) by Z_t and rearranging terms, we obtain equation (2), where

$$b_{t+1} \equiv \frac{B_{t+1}}{Z_t} \equiv \frac{S_{t+1} D_{t+1} + F_t}{Z_t}$$

is the public-debt-to-GDP ratio at the beginning of period $t + 1$, and $gbal_t$, $grants_t$, and evt_t are, respectively, the primary balance (excluding grants), grants, and value of "events" as shares of GDP. $\hat{Y}_t$ and $\hat{P}_t$ denote, respectively, the percent change of real output and of U.S. dollar-denominated prices.[22] Finally, $\bar{r}_t \equiv (1 - \alpha_t)i_t + \alpha_t r_t + (1 - \alpha_t)(1 + i_t)s_t$ is the U.S. dollar interest rate, with α denoting the share of foreign-currency debt in the total of public debt. Notice that the last term of the formula captures the change in the value of domestic currency debt due to changes in the nominal exchange rate—the "price effect:"

$$b_{t+1} - b_t = -gbal_t - grants_t + \frac{\bar{r}_t - \hat{Y}_t}{(1 + \hat{Y}_t)(1 + \hat{P}_t)} b_t - \frac{\hat{P}_t}{(1 + \hat{P}_t)} b_t + evt_t \qquad (2)$$

Two features of equation (2) are worth noting. First, in this study, we have chosen to work with a U.S. dollar interest rate instead of a real interest rate. This was done to facilitate a comparison across countries, given that changes in real exchange rates tend to produce large swings in ex-post real interest rates, and this complicates the accounting. This does not affect the analysis, since U.S. dollar inflation was low and stable during the period under analysis. Second, we separate the grants component of the primary balance (which is not a policy variable) from the nongrants component (which is a policy variable).

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[22]Changes in domestic prices when measured in U.S. dollars can occur either because domestic prices change relative to foreign prices (i.e., changes in the real exchange rate) or due to inflation of U.S. dollar-denominated prices (in this case both foreign and domestic prices change at the same rate). The second effect is usually larger in absolute value than the first effect, but it is also more stable. On the other hand, the first effect, although in general small in absolute value, may have large swings, especially in periods of crisis due to the changes real exchange rates exhibit during those times.

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3

Fiscal Policy: Is the Eastern Caribbean Currency Union a Free-Riding Paradise?

RUPA DUTTAGUPTA AND GUILLERMO TOLOSA

Currency unions with fixed exchange rates can induce mutually conflicting fiscal incentives. On the one hand, fiscal overspending by one country can trigger a costly abandonment of the peg for the entire union, thereby requiring utmost fiscal discipline by union members. Conversely, under some conditions, member governments can defer the costs of fiscal slippages to the future or share them with other members, which induces moral hazard behavior.

The existing theoretical literature has analyzed both of the above aspects in the relationship between fiscal incentives and exchange rate regimes. Earlier studies supported the traditional view that a fixed exchange rate is an effective policy for fiscal discipline, since fiscal profligacy is deterred by the risk of losses in foreign reserves or buildup of public debt resulting ultimately in a costly abandonment of the peg (Frenkel, Goldstein, and Masson, 1991; Giavazzi and Pagano, 1988). However, country experiences with the realignment or collapse of fixed exchange rates caused in part by fiscal deterioration (for example, the CFA franc zone in January 1994 and Argentina in December 2001) have questioned the conventional wisdom.[1]

[1]Besides the Eastern Caribbean Currency Union, the only other currently-operating currency union with a fixed exchange rate regime is the CFA franc zone, which comprises the West African Economic and Monetary Union (WAEMU) and the Central African Economic and Monetary Union (CEMAC). The euro area, while also representing a currency union, is different from the ECCU and the CFA zone in that the common currency in the union freely floats against all other major international currencies.

In this regard, recent studies have shown that the conventional view can be overturned by explicit consideration of fiscal incentives induced by the exchange rate regime (Tornell and Velasco, 2000; Chari and Kehoe, 2004).

This chapter explores in detail the factors underlying fiscal policies in the Caribbean in general and the Eastern Caribbean Currency Union (ECCU) in particular. First, it draws on the recent theoretical literature and assesses the combined effect of a fixed exchange rate in a currency union on fiscal policies. Next, using annual data from 1983 to 2004, it estimates the factors influencing fiscal policies in 15 Caribbean countries, including the ECCU-6, by recognizing explicitly the scope for free riding under the Eastern Caribbean quasi-currency board arrangement (CBA).[2]

The main results of the chapter provide evidence in support of the presence of greater free-riding behavior in the ECCU relative to countries with other exchange rate regimes. In particular, under some conditions fiscal stances under a regional CBA can be associated with exacerbated free-riding opportunities arising from the ability of governments to transfer the inflation costs of fiscal slippages to the future, given the fixed exchange rate, and dilute it across space to other member governments, given the currency union. This opportunity does not arise under a flexible exchange rate regime owing to the immediate inflationary impact of fiscal overspending. Stylized observations on the fiscal stances of the countries in the sample show that the primary balances of the ECCU countries were the worst during 1990–2004, followed by countries with fixed pegs, while countries with flexible regimes were the best fiscal performers. Finally, empirical results confirm that fiscal policies of all pegged regimes during 1983–2004 were characterized by free-riding behavior, and particularly so in the ECCU countries.

Fixed Exchange Rates, Currency Unions, and Fiscal Discipline

Tornell and Velasco (2000) show that fiscal discipline is not always maintained under a fixed exchange rate. The authors assume that a government can finance fiscal deficits by issuing debt for a temporary period,

[2]The sample includes the ECCU-6—Antigua and Barbuda, Dominica, Grenada, St. Lucia, St. Kitts and Nevis, and St. Vincent and Grenadines—and nine other Caribbean countries: The Bahamas, Barbados, Belize, Dominican Republic, Guyana, Haiti, Jamaica, Suriname, and Trinidad and Tobago.

but eventually has to rely on the inflation tax (in the spirit of Krugman, 1979). Thus, different exchange rate regimes influence fiscal incentives differently, depending on when observable costs start to bite. Under a fixed exchange rate, observable costs will not materialize until inflation takes place at some time in the future. Conversely, under a flexible regime, inflation is observed in the present owing to the consequence of anticipated future inflation (in the spirit of Sargent and Wallace, 1981). If governments are shortsighted and dislike inflation, they spend more under fixed exchange rates, as they can postpone the costs of higher spending.

In a similar vein, Beetsma and Bovenberg (1999) and Chari and Kehoe (2004) show that fiscal discipline is not unambiguously upheld under a currency-union arrangement. In their model, the supranational central bank faces a trade-off between the benefits of greater debt deflation and the output costs of higher inflation, and reneges on its commitment of low inflation when the benefits exceed the costs. Consequently, a government has the incentive to overspend, given that the benefits of spending accrue solely to its own country while the inflation cost of higher fiscal deficits can be shared with other members of the union.

Thus, the *combination* of two monetary arrangements—a fixed exchange rate within a currency union—can indeed give rise to perverse fiscal incentives. Under the traditional setup, fixed rates and currency unions reinforce each other, making the monetary arrangement an ideal environment for fiscal discipline. However, considering also the elements of the alternative view, the scope for free riding could be strengthened. Following Tornell and Velasco (2000) and Sun (2003), we assume that (1) there are no enforceable rules for fiscal deficits and no policy coordination between member governments; (2) governments eventually rely on inflationary financing of fiscal deficits; and (3) governments are biased toward spending and are shortsighted, i.e., they discount the future more heavily than the present. Given this set-up, fiscal policies under a regional currency board can induce greater free-riding opportunities by allowing a member government to transmit costs of fiscal slippages to the future and to other member governments.[3]

The critical assumption supporting the above result is that persistent fiscal deficits eventually need to be financed by the inflation tax, possibly in the form of a currency or banking crisis.[4] This assumption can be substantiated from both a theoretical and an empirical standpoint.

[3]See Duttagupta and Tolosa (2006) for the detailed algebraic analysis.

[4]Abstracting from relative prices, inflation and devaluation are equivalent. In addition, a jump in the price level is also considered inflation for the purposes at hand.

Table 3.1. Allocation of the Inflation Tax under Alternative Exchange Rate Regimes

	Individual Country	Currency Union
Flexible exchange rate regime	*Case I. "No free riding"* Inflation tax borne by the country in the present	*Case II. "Regional free riding"* Inflation tax borne by all countries in the union in the present
Fixed exchange rate regime	*Case III. "Intertemporal free riding"* Inflation tax borne by the country in the future	*Case IV. "Intertemporal and regional free riding"* Inflation tax borne by all countries in the union in the future

Theoretically, inflation is viewed as the outcome of a trade-off for the common central bank between the benefits to fiscal accounts versus the costs of output decline. The benefits of inflation rise with increases in public debt until a threshold when it is optimal to inflate.[5] Empirically, country experiences have proven that a currency crisis can take place even when the central bank had apparently neither the incentive nor the legal capacity to devalue (for example, in Argentina).[6] Fears of fiscal insolvency usually spur self-fulfilling mechanisms, resulting in a widespread sudden plunge in the demand for government liabilities, including the currency.

Table 3.1 illustrates how fixed exchange rate regimes and currency unions can spread the burden of the inflation tax across time and space, thereby inducing fiscal incentives that are at odds with the conventional wisdom. Four cases are highlighted:

- *Case I*, represented by the upper left panel of Table 3.1, shows the situation when a country has a flexible exchange rate regime. Fiscal overspending would be translated into depreciation of the exchange rate and inflation in the same period as demand for money decreases in anticipation of future inflation. This is the benchmark case with no free riding in fiscal policy.[7]
- Under *Case II*, a country is a member of a currency union that operates a flexible exchange rate. While fiscal overspending would gener-

[5]The beneficial effects of inflation on public accounts are twofold. Tornell and Velasco (2000) stress the seignorage deriving from devaluation, while Chari and Kehoe (2004) stress the deflation of debt in domestic currency.

[6]Reinhart (2002) finds that 85 percent of all debt crises are accompanied by currency crises.

[7]Note that the only type of free-riding behavior under consideration is with respect to the burden of the inflation tax. Other forms of free riding, e.g., higher future taxes or lower future social expenditure, are not considered here.

ate costly present inflation, this is now shared with all union members. This case is labeled as "regional free riding," since the costs of spending are diluted for the country undertaking fiscal expansion.

- Under *Case III*, a country has a fixed exchange rate. In this case, future inflation does not lead to present inflation, as the current exchange rate is fixed. Deferring the costs of the inflation tax amounts to free riding on future governments by spending today, a phenomenon that can be called "intertemporal free riding."
- Finally, under *Case IV*, the common currency of the union—adopted by all union members—is fixed vis-à-vis a major international currency. The outcome in this case follows naturally from the other three cases. Actual inflation or even the probability of higher inflation in the future has no consequences for money demand or inflation today, given the fixed exchange rate. Inflation is expected to take place in the future and the cost to be shared by future member governments, given the currency union. Thus, the inflationary costs of fiscal expansion are minimal at present—future governments end up bearing them and all member governments end up sharing them. Consequently, incentives for fiscal slippages at present are the highest.

The scope for regional free riding can intensify under certain conditions. The incentive to free ride would rise with increases in the bail out capacity of the central bank—for example, proxied by the level of foreign reserves at the currency board—as perceived by member governments and/or their creditors. Even if governments do not expect to be directly bailed out by the central bank, the latter's commitment to bail out the financial system from systemic crises reduces the urgency for governments to prepare for potential liquidity shortages in the banking system, and also benefits governments that have significant ownership in the banking system.

The incentive to free ride intertemporally is related to internal political competition and turnover. The higher the competition for political leadership, the smaller the probability that the same political party will have control in the next term and the higher the incentive to delay the cost of fiscal expansion, in particular when elections are close.[8]

The operation of both moral hazard channels depends on the structure of capital markets as well. In well-developed markets, high debt would be discouraged by rising interest rates (Bayoumi, Goldstein, and Wolgrom, 1995). Conversely, countries face tight borrowing constraints in poorly-

[8]Intertemporal free riding is also linked with the cost of realignment of the peg—the higher the cost, the lower the probability of free riding intertemporally (Sun, 2003).

developed markets owing to the structural scarcity of funds. Thus, the scope for fiscal overspending increases under some degree of capital market development, i.e., where capital is available and limited information leads to underestimation of sovereign risk.

Fiscal Policies in the Eastern Caribbean Currency Union

Institutional Setup

The Eastern Caribbean Currency Bank (ECCB) operates like a currency board arrangement at the regional level. It has full central bank functions such as issuing the common currency, managing a common pool of foreign exchange reserves for member countries, and maintaining monetary conditions conducive to growth, economic development, and financial system stability. The reserve pooling agreement implies that no individual country reserves are allocated, and although reserves are imputed to individual members, these are not a measure of the foreign reserves at a country's disposal. At the same time, each member has unrestricted access to the common pool of reserves as long as it has the domestic currency to make it effective (Williams, Polius, and Hazel, 2005).

The ECCB regulations allow some departures from traditional CBAs, and as a result it is actually considered a quasi-CBA.[9] The ECCB is required to maintain foreign exchange reserves to cover 60 percent of its demand liabilities, unlike most other currently existing CBAs that require full foreign exchange backing of the domestic currency (e.g., Hong Kong, Djibouti, and Lithuania). The ECCB can support the national fiscal authorities in several ways: by providing temporary advances (up to 5 percent of the government's average annual revenue during the preceding three financial years); holding treasury bills (up to 10 percent of the government's estimated revenue of that year); holding other securities (with varying limits according to the security); and servicing governments' special deposit loans to financial institutions (Hendrickson and others, 2002; van Beek and others, 2000). The ECCB also has autonomy in determining discount and rediscount rates, reserve requirements, and interest rate controls, such as the floor on the savings interest rate.

The CBA has been very stable so far, reflecting prudent policies by the ECCB. Despite its autonomy, the ECCB has rarely used the monetary

[9]Henceforth, the quasi-currency-board arrangement will be referred to as the CBA for the sake of simplicity.

policy tools at its disposal. Also, despite a lower requirement, the reserve backing of the CBA has been close to 95 percent, which has helped bolster the fixed exchange rate while giving the ECCB some scope to serve as a lender of last resort—at its discretion—for the banking system.

However, national fiscal policies in the ECCU have not been conducive to strengthening the CBA. Actual fiscal outcomes have increasingly deviated from the fiscal guidelines established by the ECCB's Monetary Council in 1998, reflecting the fact that national fiscal policy decisions have been made independently of the CBA (Figure 3.1).[10] Moreover, the rising foreign reserve coverage at the ECCB, combined with the discretion of the ECCB to provide liquidity support, could raise the perception of a stronger bail out capability of the ECCB and induce further fiscal overspending by member governments and continued financing by their creditors. Thus, the scope for free riding is clear, although whether this actually influences fiscal policies in the ECCU is an empirical question.

Stylized Facts

The fiscal positions of the six ECCU countries were the worst among the 15 Caribbean countries in our sample. The ECCU countries had the largest average primary deficits during 1990–2004 (a sufficiently long period over which short-run determinants of fiscal policy can be expected to net out), followed by countries with pegged regimes (Figure 3.2). The countries with various forms of relatively more flexible regimes—including floats—were the best fiscal performers in the sample.[11]

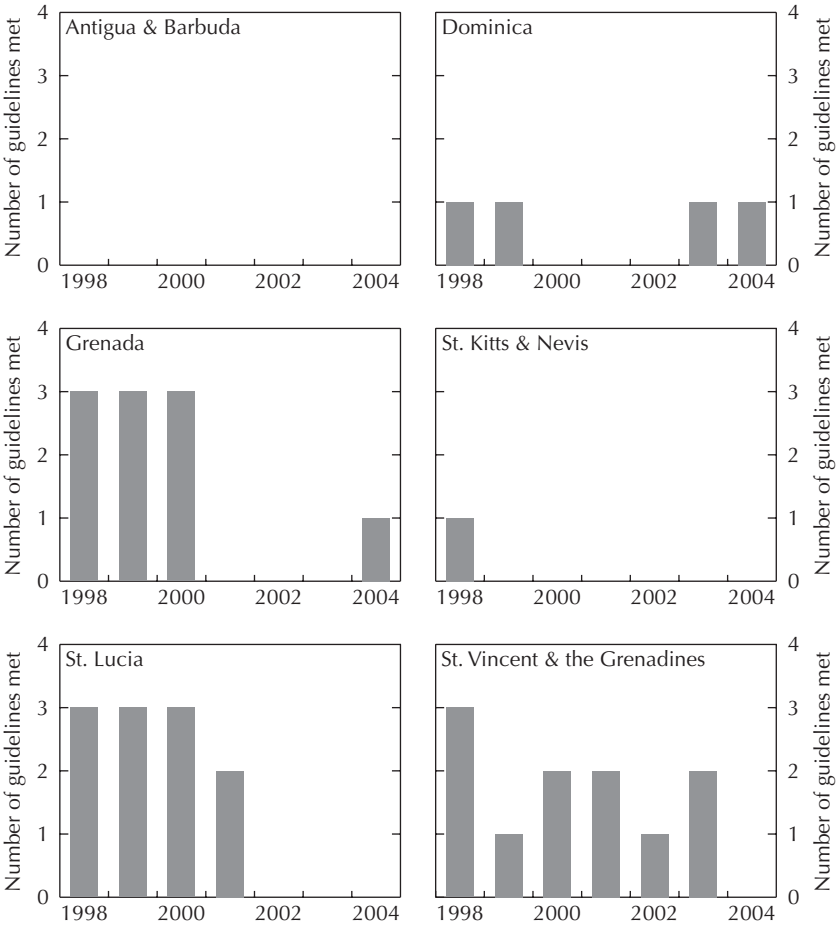
The deterioration of primary balances in the ECCU was mainly due to a worsening in government expenditures, which increased sharply during the 1990s (Figure 3.3, panel a).[12] Fiscal expenditure growth generally surpassed GDP growth irrespective of the nature of the business cycle (panel

[10]However, the existence of fiscal rules as such may not be enough to induce fiscal discipline (as confirmed by the recent experience in the euro area).

[11]The ECCU countries maintained a regional CBA, while The Bahamas, Barbados, Belize, and Suriname maintained conventional fixed peg regimes throughout the sample period. The Dominican Republic maintained a crawling peg until 2002, while Guyana (until 1989), Haiti (until 1991), Jamaica (until 1990), and Trinidad and Tobago (until 1993) maintained fixed peg regimes. These countries abandoned their pegged regimes in favor of a variety of more flexible exchange rate regimes, including floats.

[12]Sahay (2005) analyzes the public debt dynamics of a sample of 15 Caribbean countries and finds that the ECCU countries are among the highest for emerging market economies. In addition, most of the increase in public debt is accounted for by a deterioration in primary balances. See also Chapter 2 of this volume.

Figure 3.1. Eastern Caribbean Currency Union Countries: Compliance with Fiscal Guidelines[1]

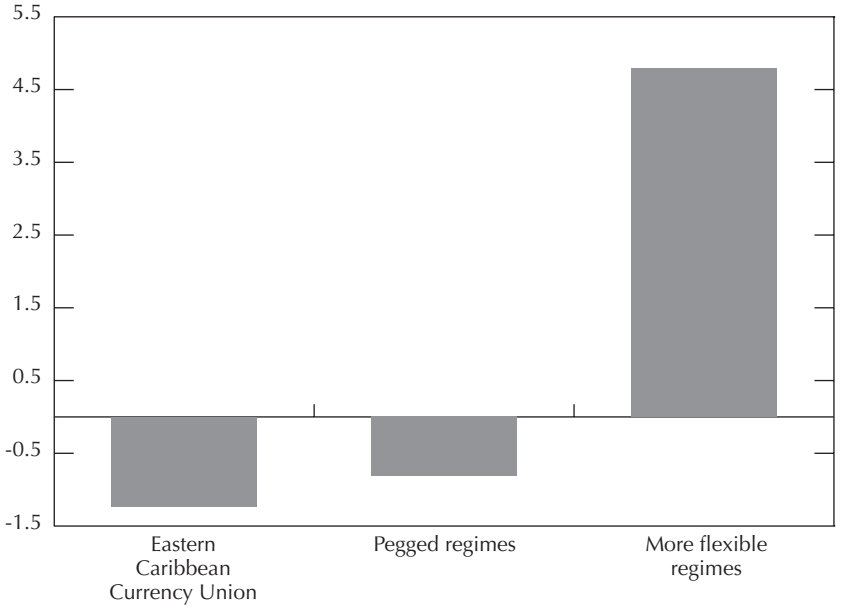


Sources: ECCU member country authorities; and IMF staff estimates.

[1]The four fiscal guidelines are current balance (4 to 6 percent of GPD); overall balance (greater than 3 percent of GDP); total public sector debt (less than or equal to 60 percent of GDP); and debt-service payments (less than 15 percent of current revenue).

b), suggesting that fiscal stances were influenced by other factors besides the growth slowdown. The rise in primary expenditure over time characterized every ECCU country, and in each case, exceeded the increase in fiscal revenue during the same period (panel c). Also, the composition of primary spending did not change in a major way, implying that fiscal

Figure 3.2. Fiscal Primary Balance under Alternative Exchange Rate Regimes, Average over 1990–2004[1]
(In percent of GDP)



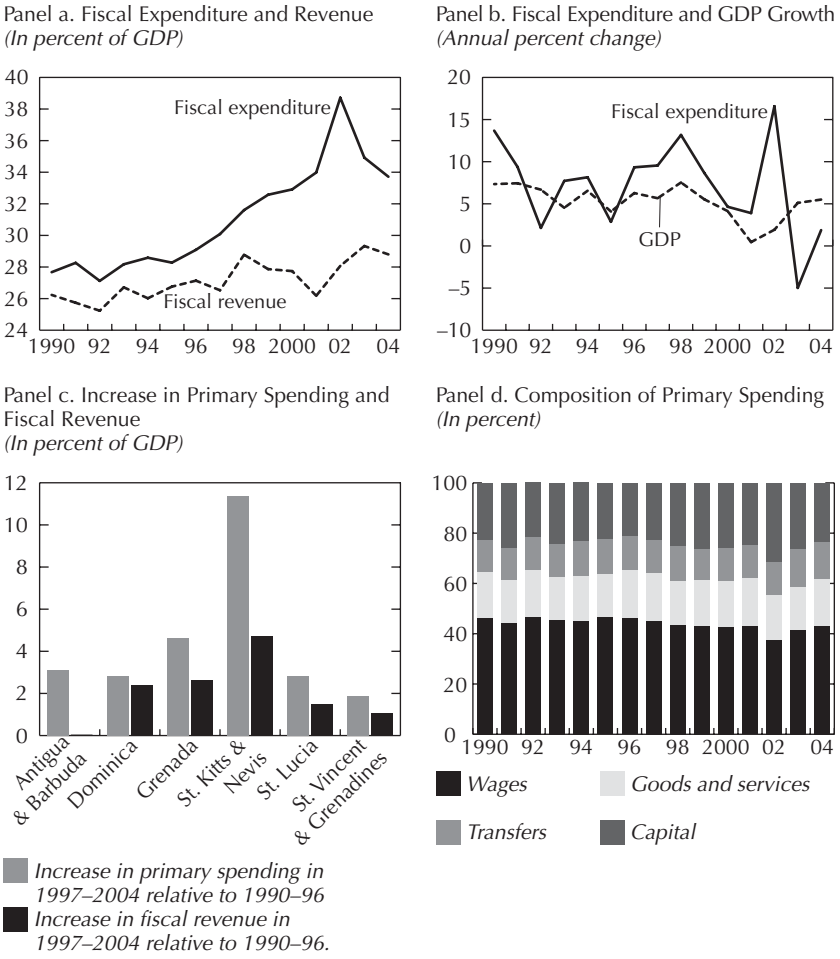
Sources: Country authorities; and authors' calculations.
[1]Excludes observations for which data on primary balance were not available.

policies were not driven by a sharp rise in government preference toward a particular item (panel d).

The ECCU governments had access to foreign financing even when other emerging market countries faced a turnaround of net capital inflows (Figure 3.4). Also, unlike other developing countries, where capital flows are usually procyclical, non-FDI capital inflows continued to the ECCU countries even during periods of low economic activity.[13] Possible reasons for their ability to borrow externally could be their good repayment record, relatively low GDP volatility, the perception that the ECCB would serve as a lender of last resort in the event of potential liquidity shortages faced

[13]See Kaminsky, Reinhart, and Végh (2004) and Rasmussen and Tolosa (2005). The higher influx of net capital inflows since the mid-1990s has been unrelated to changes in capital account policies, as the region had eliminated most capital controls in the early 1980s (see IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*, various years). See also Chapter 5 of this volume.

Figure 3.3. Eastern Caribbean Currency Union (ECCU): Nature of Fiscal Stance



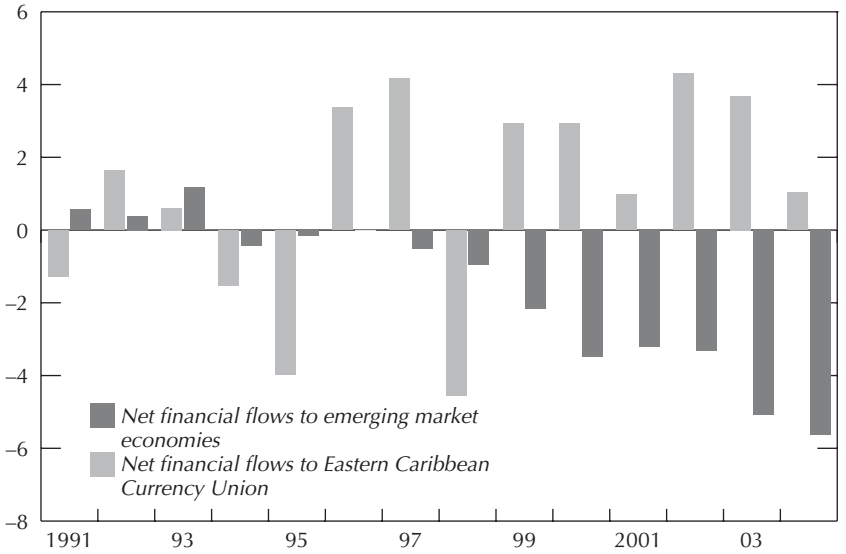
Sources: Eastern Caribbean Central Bank; ECCU member country authorities; and IMF staff estimates.

by member governments, and the gradual elimination of transaction costs with financial innovation in capital markets over time.[14]

In sum, stylized facts underscore the need for a deeper analysis of the factors influencing fiscal policies in the ECCU. Average fiscal bal-

[14]Reinhart, Rogoff, and Savastano (2003) find evidence that borrowing capacity is significantly related to default histories and the nature of macroeconomic volatilities.

Figure 3.4. Private Net Capital Inflows (less foreign direct investment)
(In percent of GDP)



Sources: Country authorities; IMF, World Economic Outlook database; and authors' calculations.

ances in the ECCU since the 1990s were much lower than in other Caribbean countries with more flexible exchange rate regimes. The fiscal deterioration was characterized by expenditure expansion across all member countries, with revenue remaining relatively stable. The large fiscal deficits were financed in part by borrowing from abroad during good and bad times, and even when financial flows into other emerging markets were shrinking. These peculiarities highlight the importance of studying the nature of fiscal policies in the ECCU, and assessing in particular any evidence of moral hazard behavior under the regional CBA.

Empirical Analysis

The estimation model used to examine the presence of free riding in fiscal stances of the Caribbean countries during 1983–2004 represents a marked improvement over previous cross-sectional studies on the same issue. Past studies have generally used cross-section regression techniques to estimate the relationship between fiscal stance and exchange rate regimes, a key weakness of which is the inability to take into account

unobserved heterogeneity.[15] This chapter uses a panel fixed-effects estimation technique to control for country-specific unobservable heterogeneity.[16] Moreover, rather than use a binary variable to account for fiscal overspending or free riding under specific exchange rate regimes—as done in previous empirical studies—specific channels through which different regimes can influence fiscal incentives are identified in this chapter.

The estimated equation has the following form:

$$y_{it} = \alpha + \beta x_{it} + \gamma z_{it} + \nu_{it}$$

where y_{it} is a measure of fiscal stance of country i at time t, expressed as the primary fiscal balance as a percent of nominal GDP (and since the primary balance is unaffected by interest payments, it serves as an appropriate indicator of fiscal policy stance); x_{it} comprises a number of control variables for country i at time t, the description of which (and their expected signs in the regression) is given in Box 3.1; ν_t is the error term in the regression; and z_{it} is a group of three indicators that are used as proxies for moral hazard behavior reflecting regional and intertemporal free-riding behavior. These proxies are described in detail below.[17]

Intertemporal free riding is proxied by the closeness to election under alternative exchange rate regimes. Shortly before elections are held, governments' shortsightedness could increase; that is, the closer the elections, the more governments could spend to improve their chances of winning. A fixed exchange rate regime would conveniently defer the costs of higher fiscal expenditure to the future, while under flexible exchange rates the costs would have to be paid up front.[18] Table 3.2 shows a more pronounced negative correlation between primary balances and closeness to election

[15]See, for instance, Fatas and Rose (2001) and Tornell and Velasco (2000).

[16]The country-specific, time-invariant factors also help proxy for "institutions," for which data are very poor in the Caribbean (e.g., fiscal transparency, characteristics of the budget process, independence of the ministry of finance over the cabinet, and the degree of expenditure control by the budget authority). See von Hagen and Harden (1996).

[17]The data sources of all the indicators are documented in Appendix 3.1.

[18]Three variables are used to fully explore the impact of all exchange rate regimes on intertemporal free riding: (1) the product of the time remaining to the next election and a dummy for all ECCU countries to capture the effect under the ECCU; (2) the product of the time remaining to the next election and a dummy for countries that maintained fixed peg regimes to capture the effect under these exchange rate regimes; and (3) the time remaining to the next election in years for all other regimes to assess the effect under flexible regimes. In the presence of intertemporal free riding, there would be a negative relationship between fiscal stance and proximity to election for all countries with fixed exchange rates, including the ECCU, and no such relationship for countries with flexible regimes.

Table 3.2. Simple Correlation between Proximity to Elections and Primary Balances

Group	Observations	Correlation
Regional currency board	90	–0.23
Of which:		
Antigua & Barbuda	15	–0.18
Dominica	15	–0.28
Grenada	15	–0.24
St. Kitts & Nevis	15	–0.41
St. Lucia	15	–0.11
St. Vincent & the Grenadines	15	–0.23
Other pegged regimes	74	–0.19
Other more flexible regimes	47	–0.18

Source: Authors' calculations based on data from 1990–2004.

for the regional CBA relative to the other regimes, although a more formal analysis is needed to establish any causal relationship reflected in the correlations.

Regional free riding is proxied by the level of official foreign reserves relative to base money under different exchange rate regimes. While countries not belonging to the ECCU only have access to external reserves at their central banks, each ECCU country has access to the entire pool of foreign reserves at the ECCB. In the presence of regional free riding, the increase in foreign reserves at the ECCB would induce fiscal slippages, resulting in a worsening of fiscal balances in ECCU countries. In the non-ECCU countries, foreign reserves are not expected to have a negative bearing on fiscal stances.[19]

The relative size of a ECCU member country, reflecting its systemic importance in the union, is used as an alternative proxy for regional free riding. The relationship between this proxy and fiscal stance is ambiguous, however. On the one hand, the more systemically important a country becomes, the greater could be the perceived prospects of being bailed out by the ECCB to maintain the stability of the CBA.[20] One the other, the expectation of being bailed out could be seen to be higher if a country is small, since the associated costs are relatively small.

[19]Two variables are used in the regression to explore the impact of all exchange rate regimes on regional free riding: (1) the product of a dummy for all ECCU countries and the level of foreign reserves at the ECCB (as a percent of reserve money) that captures the effect under the CBA; and (2) the level of foreign reserves under all other exchange rate regimes.

[20]See Wildasin (1997) for a similar argument. For instance, the countries that violated the Stability and Growth Pact in Europe were its largest members, France and Germany.

Box 3.1. Control Variables Used in the Regression

(1) Economic performance measured by the annual real GDP growth rate. A counter- (pro-) cyclical fiscal policy would imply an increase (decrease) in fiscal deficits during economic slumps and a corresponding decrease (increase) during an economic boom.

(2) Trade openness expressed as the sum of exports and imports of goods and services as a percentage of GDP, as a proxy for trade policies.

(3) Terms of trade measured by the ratio of export price to import price, in dollars. Improvement in the terms of trade would improve fiscal revenues, reduce the need for expansionary fiscal policy, and help improve the primary balance.

(4) A dummy for an IMF program controls for the effect of existing IMF programs on the fiscal stance.

(5) Time dummies to control for time specific events and also account for innovations in the financial markets over time that ease borrowing constraints for member governments.

Results

Estimation results indicate that fiscal policies in the ECCU and other pegged regimes are significantly influenced by intertemporal free riding, unlike countries with flexible regimes (Table 3.3).[21] For all pegged regimes, including the ECCU countries, fiscal stances worsen with closeness to the election period, reflecting that the cost of fiscal expansion is deferred to the future. This behavior is not observed for flexible exchange rate regimes, reflecting that the immediate inflationary consequences of fiscal expansion under flexible exchange rate regimes deters free riding.

Fiscal policies under the ECCU are also affected by regional free riding. Fiscal stances of the ECCU countries worsen with an increase in foreign reserves at the ECCB, consistent with the expectation of being bailed out rising with an increase in the reserve coverage at the ECCB. This effect is not observed for other countries in the sample that do not belong to the currency union. Fiscal stances in the ECCU also worsen as the relative size of a member country in the union rises, confirming that countries'

[21]To avoid endogeneity between some of the right-hand side explanatory variables (real GDP growth, trade openness, foreign reserves) with the primary balance, one-year lagged values of the explanatory variables are used.

Table 3.3. Determinants of Fiscal Policy in the Caribbean, 1983–2004

Fixed-Effect Regression (Dependent Variable: Primary Fiscal Balance, Ratio to GDP)	Coefficients[1]
Explanatory Variables	
(1) Proximity to election (number of years to election) for flexible regimes	0.03 (0.92)
(2) Intertemporal free riding in the ECCU: proximity to election for countries in the ECCU	–0.60 (0.01)**
(3) Intertemporal free riding under fixed pegs: proximity to election for fixed peg regimes	–0.36 (0.10)*
(4) Official foreign reserves (relative to reserve money) for non-ECCU countries	0.00 (0.71)
(5) Regional free riding: official foreign reserves (relative to reserve money) for ECCU countries	–0.13 (0.01)**
(6) Regional free riding: dummy for ECCU capitalization* relative to country size in ECCU	–0.79 (0.02)**
(7) Real GDP growth	0.00 (0.98)
(8) Terms of trade	0.00 (0.83)
(9) Trade openness	0.02 (0.05)**
(10) Dummy for IMF program	1.34 (0.10)*
(11) Time dummies[2]	
Year 1985	–4.37 (0.02)**
Year 1988	–3.52 (0.04)**
Year 1989	–3.04 (0.06)*
Year 1990	–2.89 (0.06)*
Year 1991	–3.73 (0.03)**
Year 1992	–2.73 (0.10)*
Year 1998	–2.82 (0.10)*
Year 1999	–3.07 (0.07)*
Year 2000	–3.85 (0.02)**
Year 2001	–3.57 (0.03)**
Year 2002	–5.83 (0.00)**

Table 3.3 ***(concluded)***

Fixed-Effect Regression (Dependent Variable: Primary Fiscal Balance, Ratio to GDP)	Coefficients[1]
Number of observations	256
Number of countries	15
R-squared	0.34
Significance of the regression: F(30, 211)	3.69**
Significance of country-specific effects: F(14, 211)	12.05**
Hypothesis test: significance of years after 1998 in having a negative influence on fiscal policy F(1, 211)	4.48**

Source: Authors' calculations.
Note: ECCU denotes Eastern Caribbean Currency Union.
[1]Each coefficient represents the impact of a change in a given explanatory variable on the fiscal stance. The parentheses contain probability values. Results that are statistically significant at 5 percent and 10 percent are marked by ** and *, respectively.
[2]Coefficients only for the statistically significant time dummies are presented.

expectation of being bailed out rises with the increase in their systemic importance within the union.

A positive relationship is observed between primary balance and the prevalence of an IMF program, implying that countries that adopted fiscal reforms under IMF-supported economic programs were able to improve their fiscal stances.

Finally, the results confirm that fiscal policies in the Caribbean countries have deteriorated significantly since the late 1990s. Four of the time dummies from 1998–2004 are individually significant in worsening the fiscal balances of the Caribbean countries. Also, the hypothesis test at the bottom panel of Table 3.3 confirms the joint significance of the years after 1998 in adversely affecting fiscal stances. A possible explanation could be that with innovations in financial markets, Caribbean countries had better access to external financing, which exacerbated their fiscal imbalances.

To uncover the specific components of the fiscal balances in the ECCU that are more responsive to free-riding indicators, the regressions are re-estimated for just the ECCU countries. Table 3.4 reports the regression results using primary fiscal balance, primary spending and fiscal revenue (in percent of GDP) as alternative proxies for fiscal stance. The results supporting intertemporal and regional free riding continue to hold for the ECCU countries with primary balance as the indicator of fiscal stance. Table 3.4 also confirms that fiscal primary spending in the ECCU increases with proximity to the election year (intertemporal free riding)

Table 3.4. Determinants of Fiscal Policy in the Eastern Caribbean Currency Union (ECCU), 1983–2004

	Dependent Variable		
Fixed-Effect Regression	(I) Primary balance (ratio to GDP)	(II) Primary expenditure (ratio to GDP)	(III) Fiscal revenue (ratio to GDP)
Explanatory variables			
(1) Intertemporal free-riding in the ECCU: Dummy for ECCU* proximity to election	–0.66 (0.00)**	0.51 (0.08)*	–0.15 (0.59)
(2) Regional free riding: official foreign reserves (relative to reserve money) at the Eastern Caribbean Currency Bank	–0.19 (0.01)**	–0.12 (0.20)	–0.32 (0.00)**
(3) Relative country size in ECCU	–0.75 (0.07)*	3.06 (0.00)**	2.3 (0.00)**
(4) Real GDP growth	0.10 (0.34)	–0.60 (0.01)**	–0.26 (0.05)**
(5) Terms of trade	0.01 (0.74)	–0.06 (0.04)**	–0.05 (0.06)*
(6) Trade openness	0.02 (0.34)	0.05 (0.13)	0.07 (0.02)**
(7) Natural disaster dummies[1]			
Antigua & Barbuda, 1995	–8.13 (0.04)**	15.37 (0.00)**	
St. Kitts & Nevis, 1987	9.55 (0.01)**		
St. Lucia, 1987	7.64 (0.03)**		10.17 (0.02)**
St. Lucia, 1988	9.61 (0.01)**		
St. Vincent & the Grenadines, 1986	6.37 (0.05)**		
St. Vincent & the Grenadines, 1987	6.55 (0.05)**		8.71 (0.03)**
St. Vincent & the Grenadines, 1992	–6.36 (0.05)**	6.74 (0.09)*	
Number of observations	124	124	124
Number of countries	6	6	6
R-squared	0.65	0.59	0.53
Significance of the regression	F(33,85)=4.89**	F(33,85)=3.67**	F(33,85)=2.92**
Significance of country-specific effects	F(5,85)=4.11**	F(5,85)=14.91**	F(5,85)=9.58**

Source: Authors' calculations.
[1]Coefficients only for the statistically significant natural disaster dummies are presented.

and increases in relative size of the country in the ECCU (regional free riding). Fiscal spending in the ECCU also increases with decline in real GDP growth and deterioration in terms of trade, and is positively related to the natural disaster shocks in 1992 and 1995, confirming the pres-

ence of countercyclical behavior in primary spending.[22] However, primary spending is not significantly affected by the increase in reserve coverage at the ECCB. Fiscal revenues fall with the increase in reserve coverage at the ECCB, implying that greater reserve coverage at the currency union induces regional free riding through greater laxity by governments in generating fiscal revenues. Fiscal revenue is also negatively related to real GDP growth, possibly reflecting the fact that governments' efforts to increase fiscal revenues suffer a setback during good growth years.[23]

Robustness

Robustness tests carried out by including additional explanatory variables in the regressions confirm the existence of regional and intertemporal free riding. These tests looked at (1) total private sector capital flows from industrial countries to emerging market economies (to assess whether the evolution of fiscal stances was a mere reflection of greater availability of external financing); (2) world oil prices (to analyze the impact of oil price shocks on the fiscal stance); (3) world interest rates (proxied by the three-month U.S. treasury bill rate (to see whether world monetary conditions affected capital flows to the region); and (4) real GDP per capita (to proxy for the level of institutional development). These variables did not have any systematic or significant influence on fiscal policy, and were eventually dropped from the regression.

Finally, the estimation results were also tested for structural breaks and none were found. A Chow (1960) test was performed to identify structural breaks in fiscal policy stance in 1997–98 and was rejected at the 5 percent level of significance. This result supports the view that moral hazard behavior was always present in the fiscal stances of ECCU countries, and was not a result of any major structural change in fiscal policies in the last decade.

[22]The data for natural disasters were taken from Rasmussen (2004). To save degrees of freedom, each dummy was added individually to the regression (in column II), and accepted only if its coefficient was significant at the 10 percent level. Note that some of the natural disaster dummies had a positive effect on fiscal balance, possibly reflecting an increase in fiscal revenues owing to grants, or no significant increase in primary spending. The regressions with primary spending and fiscal revenue provide some support for this argument.

[23]This result also supports the perception that the sectors responsible for high growth in the region (e.g., tourism) are undertaxed, resulting in sluggish fiscal revenue growth even in times of robust economic recovery.

Conclusions

Fiscal policies in ECCU countries have become more expansionary over time and in comparison with other Caribbean countries. Primary balances in ECCU countries have been persistently deteriorating since the early 1990s—reflecting rapid expenditure growth and sluggish revenues—and actual fiscal outcomes have progressively diverged from the fiscal guidelines established by the ECCB's Monetary Council in 1998. In a sample of 15 Caribbean countries during 1990–2004, the fiscal imbalances of ECCU countries were the highest, followed by countries with other pegged regimes. Countries with more flexible regimes were the best fiscal performers.

This chapter found evidence in support of the presence of free-riding fiscal behavior in pegged regimes and more so in the ECCU member countries. Contrary to the expectation that the regional CBA would restrain fiscal slippages of union members, fiscal discipline appears to have weakened, given the scope for free riding on member countries and over time. Specifically, the costs of fiscal overspending are spread across time (intertemporally), given the fixity of the exchange rate regime, and across space (regionally) to member countries, given the currency union. Expansionary fiscal policies are also reflected in a negative relationship between fiscal revenues-to-GDP and real GDP growth (indicating insufficient efforts to generate revenue in periods of high growth), although fiscal spending is countercyclical.

These findings underscore the need to ensure the consistency of fiscal policies with the regional CBA. Further analysis is needed to find effective incentive mechanisms that discipline individual country behavior and would support the stability of the CBA. Possible options include improving the effectiveness of the Monetary Council's fiscal guidelines by enforcing them at national levels. Regional free riding could be discouraged by clearly demonstrating that the ECCB will not bail out members—either directly by financing fiscal deficits, or indirectly by bailing out banking systems in individual countries. In this regard, the current practice by the ECCB of not bailing out governments facing intermittent debt servicing problems (as in Antigua and Barbuda over several recent years and Dominica in 2002) has helped establish the credibility of the ECCB. Finally, consideration should also be given to whether more fiscal policy coordination at the regional level—for example, by adopting a common approach toward eliminating costly fiscal incentives to investors (see Chapter 6), or by allowing greater transmission of world oil price changes to domestic prices—would help attain greater fiscal discipline in the currency union.

Appendix 3.1. Data Sources

Fiscal stance proxies. (1) *Primary balance divided by nominal GDP*: For the ECCU countries, data for primary balance and GDP during 1983–1990 was obtained from the Eastern Caribbean Central Bank (ECCB), while data after 1990 was obtained from the IMF Western Hemisphere Department. For the non-ECCU countries (except The Bahamas) data was obtained from the IMF Western Hemisphere Department. The data for The Bahamas was obtained from the IMF World Economic Outlook database (series GCBXI for primary balance, and series NGDP for nominal GDP); (2) *Primary expenditure, divided by nominal GDP*: For the ECCU countries, the primary expenditure series before 1990 was obtained from the ECCB, while that after 1990 was from the IMF Western Hemisphere Department.

De facto exchange rate regime. The Reinhart and Rogoff (2002) classification of exchange rate regimes; the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*, various issues; and the IMF Western Hemisphere Department.

Gross domestic product. For ECCU countries from the IMF Western Hemisphere Department; for the rest of the Caribbean countries from the IMF World Economic Outlook database (series W_NGDP_R).

Election dates. From the World Bank Database of Political Institutions.

ECCB foreign reserves coverage was measured by the ratio of foreign assets at the ECCB in terms of reserve money (lines 1L. DZF and 14...ZF in the IMF's International Financial Statistics, IFS). The nominal exchange rate between Eastern Caribbean dollars and U.S. dollars (series AE.ZF in IFS) was used to convert foreign assets of the ECCB in U.S. dollars to that in Eastern Caribbean dollars.

Terms of trade. World Economic Outlook database (series W_TT).

Openness. Defined as the sum of exports and imports of goods and services, divided by nominal GDP. For ECCU countries, these series were obtained from the IFS, series codes 90C..ZF... (exports), 98C..ZF... (imports) and 99B..ZF... (nominal GDP). For the rest of the Caribbean, the series were obtained from the IMF's World Economic Outlook database: WEO W_NX (exports), W_NM (imports), and W_NGDP (nominal GDP).

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II

Macroeconomic Cycles and Volatility

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4

Key Features of Caribbean Business Cycles

PAUL CASHIN

The study of business cycles or the pattern of fluctuations in economic activity has a long history in economics. Since the seminal work of Burns and Mitchell (1946) and their colleagues at the National Bureau of Economic Research (NBER), work on cyclical instability has traditionally been concerned with analyzing the attributes of expansions and contractions in the level of economic activity, or the so-called "classical cycle." In more recent decades, spurred by the contribution of Lucas (1977) and the emerging practice of using a measure of the output gap to influence the setting of monetary policy, fluctuations in real output relative to its long-term trend (or the "growth cycle") have attracted considerable attention.

While a large literature has developed analyzing the features of developed country business cycles (such as Backus and Kehoe, 1992), there have been few studies of the regularities of macroeconomic fluctuations in developing countries. Two notable exceptions have been Agénor, McDermott, and Prasad (2000) and Rand and Tarp (2002). Nonetheless, several key questions remain unresolved. Do the characteristics of macroeconomic fluctuations in developing countries differ from those of developed countries? Are the features of macroeconomic fluctuations broadly similar across developing countries? From a policy perspective these issues are also of great importance, as use of potentially inappropriate conclusions regarding the stylized facts of macroeconomic fluctuations in developing countries can adversely affect the efficacy of stabilization policy advice. Economic policy is often contingent on whether a country

is experiencing a cyclical contraction or expansion, and so it is vital that appropriate tools be used to extract the country-specific business cycle from the data.

This chapter will focus on several questions in attempting to identify and describe some of the key features of Caribbean business cycles during 1963–2003.[1] What are the key stylized facts of Caribbean business cycles? Do expansions and contractions in the level of real output have similar features, and how do they compare with the business cycle defined as alternating periods of above- and below-average rates of economic growth relative to trend? Is there any relationship between the duration and amplitude of Caribbean business cycles? Is there any support for the notion that expansions and contractions in trend-adjusted output have a fixed duration? Is there a relationship between movements in real output among Caribbean countries and between the Caribbean and developed countries? Is there a relationship between movements in trend-adjusted output among Caribbean countries and between the Caribbean and developed countries?

An economic time series is composed of periodic components that lie in a specific band of frequencies. In measuring growth (or deviation from trend) cycles, the aim is to isolate the cyclical component of an economic time series. As such, we are seeking a business cycle filter that will eliminate the slowly-evolving ("trend") component and the rapidly-varying ("irregular") component of real GDP, leaving behind the intermediate ("business-cycle") components of real GDP (Baxter and King, 1999).

As the growth cycle is defined in terms of deviations from some long-term trend, it is important to be clear about the type of detrending that is carried out on the output series analyzed in this chapter. Existing studies of the Caribbean growth cycle are predicated on the view that it is necessary to start from a stationary series.[2] Applied researchers consequently use stationary-inducing transformations, which are known to yield dis-

[1]In describing turning points in Caribbean business cycles, we follow the taxonomy of Mintz (1972). For the classical cycle, turning points in the *level* of real GDP are described as either "peaks" or "troughs," with the periods between peaks and troughs (troughs and peaks) denoted as contraction (expansion) phases. For the growth cycle, turning points in *filtered* real GDP are called "downturns" and "upturns," with periods between downturns and upturns (upturns and downturns) described as low-rate (high-rate) growth phases.

[2]Earlier studies of aspects of Caribbean growth cycles have included Mamingi (1999), Borda, Manioc, and Montauban (2000), and Craigwell and Maurin (2002), among others. See also De Masi (1997) for a summary of approaches taken by the International Monetary Fund in estimating growth cycles, and Cashin and Wang (2005) for an examination of comovement of Caribbean output and key macreoconomic variables.

torted estimates of the growth cycle (Baxter and King, 1999; and Canova, 1998). Specific examples of such growth-cycle distorting transformations include removal of polynomial functions of time, first differencing, and the Hodrick-Prescott filter, among many others.

In a recent paper, Corbae and Ouliaris (2006) propose a new approach to estimating the growth cycle that starts from the level of a time series. Using frequency domain techniques and recent developments in spectral regression for nonstationary time series, they propose an approximate "ideal" band pass filter for estimating deviations from trend (which need not be linear). Using Monte Carlo simulations, they demonstrate that the new filter has superior statistical properties to the popular Baxter and King (1999) and Hodrick-Prescott (1980) filters. In particular, they show that their filter, in contrast to the other two filters, is statistically consistent in the sense that the filtered series asymptotically converges to the true growth cycle.

In this chapter, the Corbae and Ouliaris (2006) filter is used to calibrate the Caribbean growth cycle. Baxter and King (1999) define the "growth cycle" of the United States as movements in real GDP over the "classic" business cycle frequencies, namely cycles in GDP between six and 32 quarters or two to eight years.[3] However, business cycles in Caribbean countries are likely to be quite different from those existing in developed countries, and so it would be inappropriate to apply such a rule in determining Caribbean growth cycles. Instead, the duration of typical classical business cycles of each of the Caribbean countries is calculated, and is then used as the measure of the country-specific "classic" business cycle frequencies. The peaks and troughs identified in the Caribbean growth cycle by the Corbae-Ouliaris frequency domain (FD) filter are then compared with turning points of the Caribbean classical cycle.

It is widely recognized that macroeconomic fluctuations are related across countries, and research on the international transmission of business cycles has found evidence of positive comovement of real output across developed countries (Backus and Kehoe, 1992). However, there has been little work examining the synchronization of output among developing countries. This chapter will examine the extent to which Caribbean output comoves with output in developed countries, and whether there is synchronization of business cycles across Caribbean countries.

[3]Using high frequency data, NBER researchers specified that business cycles were cyclical components of no less than six quarters in duration, and which typically last fewer than 32 quarters (Burns and Mitchell, 1946).

Extracting Business Cycles from Nonstationary Data

If one accepts the Burns and Mitchell (1946) definition of the business cycle as fluctuations in the level of a series within a specified range of periodicities, then the ideal filter is simply a band-pass filter that extracts components of the time series with periodic fluctuations between six and 32 quarters or two to eight years (Baxter and King, 1999). It can be shown that the exact band-pass filter is a double-sided moving average of infinite order, and with known weights. It follows that if we want to estimate the filter starting from the time domain, an approximation to the correct result is needed.[4]

Many approximations have been suggested in the literature, with perhaps the Hodrick-Prescott (1980) and Baxter-King (1999) filters being the most popular. This section outlines an alternative *frequency domain* procedure for approximating the ideal band-pass filter, originally suggested in Corbae and Ouliaris (2006), that overcomes some of the shortcomings of the Hodrick-Prescott and Baxter-King time-domain based filters.

Assume that x_t (t = 1, ..., n) is an observable time series generated by:

$$x_t = \Pi_2' z_t + \tilde{x}_t, \tag{1}$$

where z_t is a p + 1-dimensional deterministic sequence and $\tilde{x}_t$ is a zero mean time series. The series x_t therefore has both a deterministic component involving the sequence z_t and a stochastic (latent) component $\tilde{x}_t$. In developing their approach to estimating ideal band-pass filters, Corbae and Ouliaris (2006) make the following assumptions about z_t and $\tilde{x}_t$.

Assumption 1

$z_t = (1, t, \ldots, t^p)'$ is a pth order polynomial in time.

Assumption 2

$\tilde{x}_t$ is an integrated process of order one (I(1) process) satisfying $\Delta\tilde{x}_t = \nu_t$, initialized at t = 0 by any $O_p(1)$ random variable. Assume that ν_t has a

[4]For data measured at annual frequency, Baxter and King (1999) note that using their band-pass filter on developed country data, researchers should isolate cycles with periodicities of eight years and higher. They point out that since the shortest detectable cycle in a time series using annual data is one that lasts two years, the annual business cycle filter passes components with cycle length between two and eight years. In this case, the band-pass filter is equivalent to a high-pass filter, which removes low frequency (or long cycle) components of greater than eight years, and allows high frequency (or short cycle) components to pass through. That is, the band-pass filter removes the trend components of the data, leaving behind the cycle (or filtered data).

Wold representation $\nu_t = \sum_{j=0}^{\infty} c_j \xi_{t-j}$ where $\xi_t = iid\ (0, \sigma^2)$ with finite fourth moments and coefficients c_j satisfying $\sum_{j=0}^{\infty} j^{1/2} |c_j| < \infty$. The spectral density of ν_t is $f_{\nu\nu}(\lambda) > 0, \forall\lambda$.

Assumption 2 suffices for partial sums of v_t to satisfy the functional law $n^{-1/2} \sum_{t=1}^{[nr]} \nu_t \xrightarrow{d} B(r) = BM(\sigma^2)$, a univariate Brownian motion with variance $\sigma^2 = 2\pi f_{\nu\nu}(0)$ (e.g., Phillips and Solo, 1992, theorem 3.4), and where $\xrightarrow{d}$ is used to denote weak convergence of the associated probability measures as the sample size $n \to \infty$. The result that motivates the new filtering procedure is as follows.

Lemma B (Corbae, Ouliaris, and Phillips, 2002): Let $\tilde{x}_t$ be an I(1) process satisfying Assumption 2. Then, the discrete Fourier transform *of* $\tilde{x}_t$ for $\lambda_s \neq 0$ is given by:

$$w_{\tilde{x}}(\lambda_s) = \frac{1}{1 - e^{i\lambda_s}} w_v(\lambda_s) - \frac{e^{i\lambda_s}}{1 - e^{i\lambda_s}} \frac{[\tilde{x}_n - \tilde{x}_0]}{n^{1/2}} \tag{2}$$

where the discrete Fourier transform *(dft)* of $\{a_t\ ;\ t = 1, \ldots, n\}$ is written $w_a(\lambda) = 1/\sqrt{n} \sum_{t=1}^{n} a_t e^{i\lambda_t}$, and $\{\lambda_s = 2\pi s/n,\ s = 0,1,\ldots, n-1\}$are the fundamental frequencies.

Equation (2) shows that the discrete Fourier transforms of an I(1) process are not asymptotically independent across fundamental frequencies. They are actually frequency-wise dependent by virtue of the component $n^{-1/2}\tilde{x}_n$, which produces a common leakage into all frequencies $\lambda_s \neq 0$, even in the limit as $n \to \infty$. Corbae, Ouliaris, and Phillips (2002) also show that the leakage is still manifest when the data are first detrended in the time domain. These results on leakage show that in the presence of I(1) variables, any frequency domain estimate of the "cyclical" component of a time series (e.g., real GDP) will be badly distorted.

Corbae and Ouliaris (2006) suggest a simple "frequency domain fix" to this problem, which is derived from equation (2). Note that the second expression in equation (2) can be rewritten using

$$w_{(t/n)}(\lambda_s) = \frac{-1}{\sqrt{n}} \left(\frac{e^{i\lambda_s}}{1 - e^{i\lambda_s}} \right)$$

by Lemma B of Corbae, Ouliaris, and Phillips (2002). Thus, even for the case where there is no deterministic trend in equation (1), it is clear from the second term in equation (2), which is a deterministic trend in the frequency domain with a random coefficient $[\tilde{x}_n - \tilde{x}_0]$, that the leakage from the low frequency can be removed by simply detrending in the frequency domain, leaving an asymptotically unbiased estimate of the first term

$$\frac{1}{1-e^{i\lambda_s}} w_v(\lambda_s)$$

over the nonzero frequencies. It is recommend that this detrending be done *before* the relevant business cycle frequencies are identified, as this will maximize the number of frequency domain terms available to estimate $[\tilde{x}_n - \tilde{x}_0]$.[5] An indicator function can then be applied to the unbiased estimate of

$$\frac{1}{1-e^{i\lambda_s}} w_v(\lambda_s)$$

to annihilate (or zero out) the nonbusiness cycle frequencies. For example, for the Burns and Mitchell (1946) definition of the United States business cycle, all frequencies outside the [6, 32] quarter (or [2, 8] year) range would be set to zero, while those within the range would be kept at their original values.[6] The filtered series is then obtained by applying the inverse Fourier transform to the result. It can be shown that the filtered series will be a $\sqrt{n}$ consistent estimate of the true business cycle over the included frequencies (Corbae and Ouliaris, 2006).

Data, Summary Statistics, and Cycle Definition

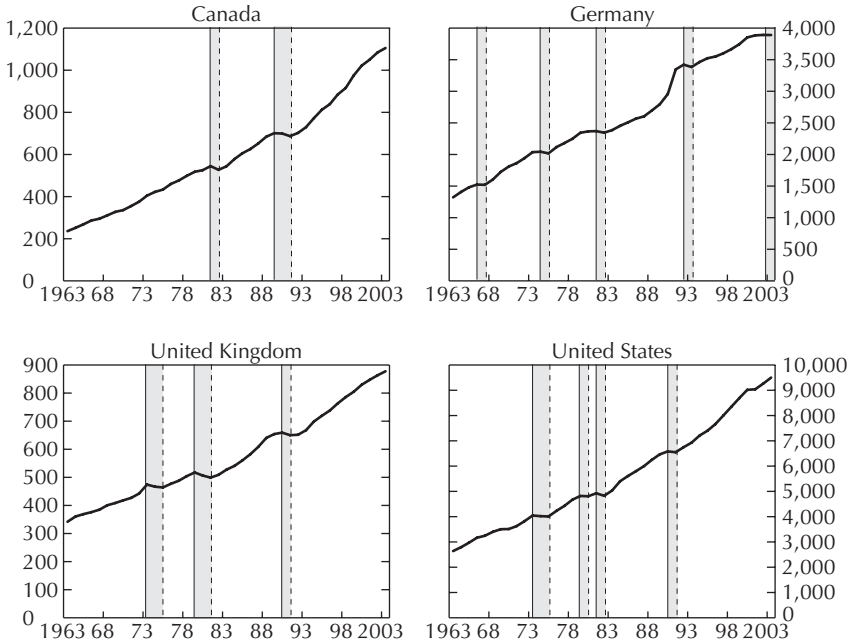
The Caribbean countries analyzed in this chapter are the six IMF members of the Eastern Caribbean Currency Union (ECCU): Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. To enable a comparison of Caribbean business cycles with those of key trading partners, business cycles are also examined in Canada, Germany, the United Kingdom, and the United States. To measure real output in each country, we use the logarithm of annual real GDP (in millions of local currency, base year typically 1990), which is available for the period from 1963 to 2003.[7] Real GDP for each of the 10 countries during this period is shown in Figure 4.1.

[5]This recommendation follows from the fact the true coefficient $[\tilde{x}_n - \tilde{x}_0]$ in equation (2) does not vary with frequency.

[6]The indicator function would have a value of unity for each frequency that needed to be included in the filter, and zero for each frequency that needed to be excluded from the filter. For example, for the classical business cycle ranging between six and 32 quarters, the indicator function would have a value of unity for all fundamental frequencies that fall in the range $[\pi/16, \pi/3]$.

[7]The annual national accounts GDP data are taken from the IMF's International Financial Statistics and World Economic Outlook databases.

Figure 4.1. Chronology of Developed-Country Classical Cycles
(Real GDP in billions of 1995 local currency)



Sources: IMF, International Financial Statistics and World Economic Outlook databases; author's calculations.

Notes: Peaks in real GDP are denoted by solid lines; troughs are denoted by dashed lines. Contractions (periods of peak to trough movement) are denoted by shading; expansions (periods of trough to peak movement) are denoted by no shading.

A key issue relates to the nature of business cycle fluctuations in Caribbean countries. In particular, are aggregate fluctuations in these economies characterized by basic time series properties—such as volatility and persistence—that are similar to those observed for developed economies? To answer this question we examine the summary statistics for the stationary components of real output. The properties of real output growth rates (first differences of logarithms of real output) for each of the 10 countries in the sample are reported in Table 4.1. The mean rate of growth ranges from a low of 2.36 percent for the United Kingdom to a high of 4.91 percent for St. Kitts and Nevis. The volatility of growth rates has typically been higher for the Caribbean countries than the developed countries, reflecting the well-known tendency for greater output variability among developing countries due to the greater incidence of exogenous

Table 4.1. Properties of Output Growth Rates, 1963–2003

	Mean (Percent)	Standard Deviation (Percent)	Coefficient of Variation	Autocorrelation Coefficient (1 year)	Autocorrelation Coefficient (2 years)
Canada	3.86	2.21	0.57	0.32	0.1
Germany	2.7	2.6	0.96	0.33	–0.13
United Kingdom	2.36	1.9	0.81	0.29	–0.19
United States	3.2	2.1	0.66	0.22	–0.19
Antigua & Barbuda	4.7	2.79	0.59	0.23	0.01
Dominica	3.54	5.11	1.44	–0.11	0.07
Grenada	4.38	2.88	0.66	0.43	0.08
St. Kitts & Nevis	4.91	2.42	0.49	0.12	0.15
St. Lucia	4.41	4.21	0.95	0.38	0.32
St. Vincent & the Grenadines	4.25	3.14	0.74	–0.14	0.23

Source: Author's calculations.

Notes: Sample moments were computed from log-differences of real output. Coefficient of variation is the ratio of the standard deviation to the arithmetic mean. Autocorrelations of one and two years are the first- and second-order autocorrelation coefficients, respectively.

shocks affecting output (Mendoza, 1995; Agénor, McDermott, and Prasad, 2000). Output in Caribbean countries averages about 1.6 times as variable as output of the United States; output of the developed countries is only about 1.05 times as variable as output of the United States. To examine the persistence of output fluctuations, Table 4.1 also reports the first two autocorrelations of the output growth series. The autocorrelations for the Caribbean countries are typically positive, indicating that output tends to revert to its mean at a reasonably slow rate.

Chronology of the Caribbean Classical Cycle

Identifying specific cycles in economic time series requires precise definitions of an expansion and a contraction. For annual time series, an expansion phase is naturally defined as a period when the growth rate is positive; a contraction phase is obviously when the growth rate is negative. For future reference, we introduce the following definitions:

Definition 1: For annual data, an *expansion* is defined as a sequence of increases in the level of output (classical expansion) and a *contraction* is defined as a sequence of decreases in the level of output (classical contraction).

Definition 2: A *cycle* includes one expansion and one contraction.

In addition, and following Cashin and McDermott (2002), to avoid spurious turning points we want to rule out any mild interruptions in expansions or contractions. Accordingly, any potential change of phase

that moves the cycle by less than one-half of 1 percent a year is ruled out as being a turning point.

The duration of phases of the Caribbean classical cycle can be determined with the assistance of these definitions. Accordingly, here we use these rules to determine when real GDP is in an expansionary or a contractionary phase. We also adapt the rules to determine when real GDP is in a relatively high or relatively low phase of economic growth.[8] When the peaks and troughs in each of the time series have been dated, key features of these cycles can be measured. In particular, the duration and amplitude of expansions and contractions in Caribbean output can be measured.

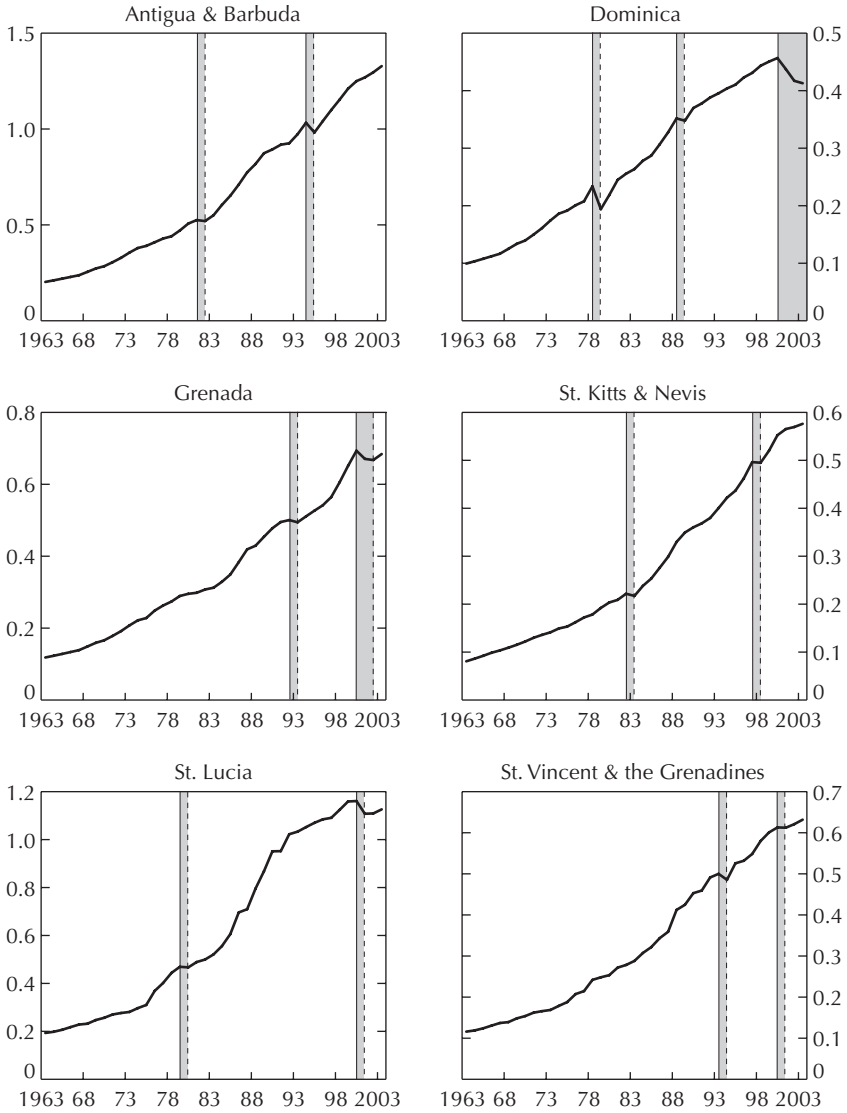
Importantly, the duration of classical business cycles in Caribbean countries can be used to determine the cyclical component of the real output data. In determining the cyclical component of output series for each country, we follow the Burns-Mitchell rule that the minimum cycle length is two years, while the upper bound to the cycle length is the average cycle length (that is, the mean duration of expansions and contractions). As a consequence, the duration of classical business cycles is allowed to vary across countries. For Caribbean cycles, this implies that the business cycle frequency is typically wider than that of developed countries.

Contractions (expansions) are then described as periods of absolute decline (rise) in the real GDP series, not as a period of below-trend (above-trend) growth in the series (Watson, 1994). Figures 4.1 and 4.2 present the peak and trough dates for developed country and Caribbean real GDP. The dashed lines represent the trough dates and the solid lines the peaks, with contractions (peak to trough movements) denoted by shading and expansions (trough to peak movements) denoted by no shading. Compared with expansions, it is clear that contractions (absolute declines) in Caribbean real GDP are relatively rare, and short-lived, events.

Given our definition of the business cycle, we follow the cycle-dating rule set out above in analyzing Caribbean output data. For example, using this rule we determine that the classical business cycle for Caribbean countries ranges between Antigua and Barbuda (2 and 13 years); Dominica (2 and 11 years); Grenada (2 and 9 years); St. Kitts and Nevis (2 and

[8]The duration of phases of growth cycles (using high frequency data) can also be determined with the assistance of an algorithm traditionally used to date turning points in classical cycles—the Bry and Boschan (1971) algorithm. The rules embodied in the Bry-Boschan algorithm have evolved from the NBER's dating of cycles in U.S. economic activity. Adaptations of this algorithm have been used previously to automate the dating of business cycles (see King and Plosser, 1994; Watson, 1994; and Harding and Pagan, 2002a). Pagan (1999) has also applied the algorithm to date bull and bear markets in equity prices, as have Cashin, McDermott, and Scott (2002) in dating commodity-price cycles.

Figure 4.2. Chronology of Caribbean Classical Cycles
(Real GDP in billions of 1990 Eastern Caribbean dollars)



Sources: IMF, International Financial Statistics and World Economic Outlook databases; author's calculations.

Notes: Peaks in Caribbean real GDP are denoted by solid lines; troughs are denoted by dashed lines. Contractions (periods of peak to trough movement) are denoted by shading; expansions (periods of trough to peak movement) are denoted by no shading.

Table 4.2. Summary Statistics for Filtered Output, 1963–2003

	HP Standard Deviation	HP Skewness	HP Kurtosis	FD Standard Deviation	FD Skewness	FD Kurtosis	FD Business Cycle Frequency (years)
Canada	2.18	–0.53	–0.06	2.14	–0.42	–0.55	(2, 9)
Germany	2.58	0.71	0.91	2.13	0.47	0.49	(2, 9)
United Kingdom	2.03	0.42	0.64	1.38	0.91	2.22	(2, 8)
United States	2.04	–0.42	–0.22	1.16	0.22	0.54	(2, 6)
Antigua & Barbuda	2.81	–0.45	0.47	2.88	–0.55	0.04	(2, 13)
Dominica	3.66	–1.2	4.9	3.75	–1.22	4.82	(2, 11)
Grenada	3.28	0.15	–0.65	2.64	0.55	0.62	(2, 9)
St. Kitts & Nevis	2.26	–0.4	2.5	3.34	–0.76	0.75	(2, 15)
St. Lucia	3.99	–0.04	–0.11	5.14	–0.18	–0.46	(2, 20)
St. Vincent & the Grenadines	2.55	0.3	–0.4	1.53	–0.25	0.08	(2, 7)

Source: Author's calculations.

Notes: HP denotes the Hodrick-Prescott (1980) filtered output (with smoothing parameter $\lambda = 100$); FD denotes the Corbae-Ouliaris (2006) filtered output. The business-cycle frequencies used to derive FD-filtered output are given in the last column of the table, and were determined using the rule set out in the second section of the chapter-for annual data, minimum cycle length is two years while the upper bound on cycle length is the average duration of each country's classical business cycle. The skewness measure is $\mu_3/(\mu_2)^{1.5}$ and the kurtosis measure is $\mu_4/(\mu_2)^2 - 3$, where μ_r is the rth (central) moment. The skewness of a symmetrical distribution, such as the normal, is zero; similarly, the kurtosis (as previously defined) of the normal distribution is zero.

15 years); St. Lucia (2 and 20 years); and St. Vincent and the Grenadines (2 and 7 years). In comparison, the classical business cycle for the developed countries ranges between Canada (2 and 9 years); Germany (2 and 9 years); United Kingdom (2 and 8 years); and the United States (2 and 6 years) (see Table 4.2).[9]

Chronology of the Caribbean Growth Cycle

The variant of the rule used here to date the Caribbean growth cycle essentially follows the classical cycle-dating rule outlined above. The rule is formally defined as follows:

Definition 3: For annual data, a growth-cycle expansion (or *high-rate phase*) is defined as a sequence of increases in the positive deviation of output from trend,

[9]It should be noted that following the Burns-Mitchell rule using annual real output data yields a business cycle for the United States (two to six years) that is slightly shorter in duration than that which is generally accepted (two to eight years). A reason for the difference could be that the latter cycle duration is typically derived using data observed at high frequency.

and a growth-cycle contraction (or *low-rate phase*) is defined as a sequence of increases in the negative deviation of output from trend.

Definition 4: A completed growth cycle includes one high-rate phase and one low-rate phase.

Again, to avoid spurious turning points we want to rule out mild interruptions in growth-cycle phases. Accordingly, any potential change of phase that moves the growth cycle by less than one-half of 1 percent is ruled out as being a turning point. Low-rate (high-rate) phases are then described as periods of below-trend (above-trend) growth in real GDP, and so this rule dates "growth cycles," as described by Mintz (1972).

Turning now to examine output volatility through the prism of business cycles, following Baxter and King (1999), as stated above, our definition of the growth cycle is all variations in the level of real GDP at classic business-cycle frequencies, which may vary across countries. For example, it is generally accepted that for the United States the classic business-cycle frequencies lie between six and 32 quarters. Note that this corresponds to the frequency domain interval of $[\pi/16, \pi/3]$ and thus excludes the zero frequency or long-run component of the data. It follows that the FD filter measures movements in real GDP relative to an unspecified (possibly nonlinear) trend, which is often equated to potential output. We also compare the FD filter with the Hodrick-Prescott (HP) filter, so as to provide a comparison with existing approaches in the literature.[10]

The quality of a given filter can be assessed in terms of its ability to approximate the ideal band-pass filter over a predefined interval. For example, in the case of the HP filter with annual data and a cyclical component of (2, 8) years, a smoothing parameter of $\lambda=100$ can be shown to produce a reasonable (though not statistically consistent) approximation to the ideal band-pass filter (Backus and Kehoe, 1992).

To derive the growth cycle, we apply the FD filter to each country's real output series, allowing the FD filter to "pass through" each country's business cycle frequencies. For example, in calculating the growth cycle of Dominica using annual data, the FD filter is akin to a high-pass filter that

[10]Filters such as Hodrick-Prescott, Baxter-King, and frequency domain extract the permanent component of a series that is nonstationary (for example, follows a unit root process), leaving behind the stationary (or cyclical) component of a series. The frequency domain filter aims to eliminate both the high-frequency irregular components and the zero- to low-frequency components of the data. The filter thereby allows to "pass through" business cycle frequencies, in the traditional range of six to 32 quarters (two to eight years) for the United States.

removes low frequency components of the data (with periodicity greater than 11 years).

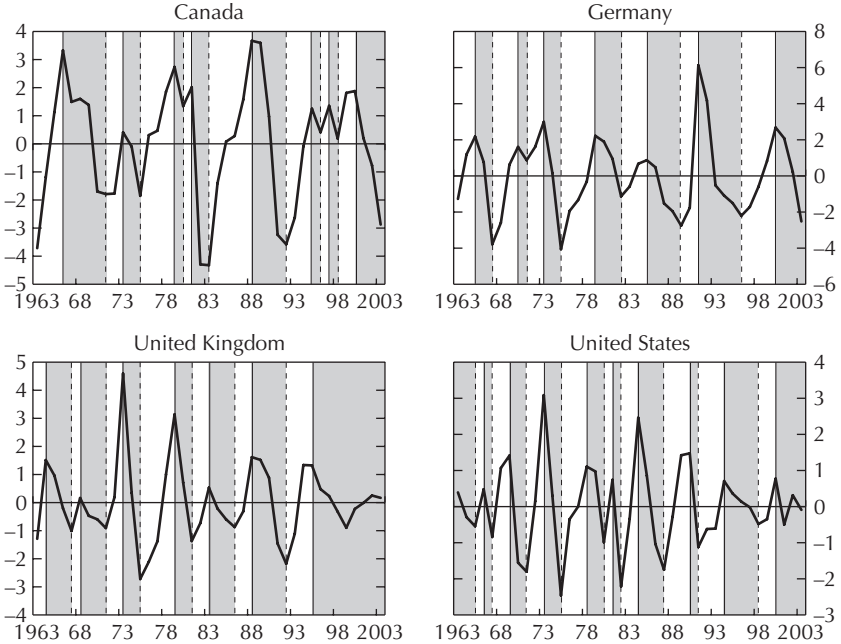
Our approach to detrending the real output series using the FD filter differs from the standard practice of using the HP filter and imposing a common value of the smoothing parameter (typically $\lambda = 100$) on annual data from all countries. Translating the FD approach into a HP setting, the FD approach implicitly allows for the choosing of an optimal value of λ for each output series. A virtue of the FD approach is that a priori assumptions about the smoothing parameter are not required, and the parameter does not have to be held constant across all series. Simulations seeking to approximate the FD-filtered output by applying the HP filter indicate that for Caribbean countries, the optimal value of the smoothing parameter typically exceeds 100. Such high values of the smoothing parameter would also be consistent with allowing to pass through components of the data with cycles greater than eight years—this is consistent with the typical duration of Caribbean classical business cycles as measured in this chapter. For the developed countries, the value of the smoothing parameter was much closer to the "traditional" value. Marcet and Ravn (2001) analyze the issue of cross-country comparisons of HP-filtered output data. Both Canova (1999) and Agénor, McDermott, and Prasad (2000) undertake analyses of the differing deviation-from-trend cycles that are implied by the application of various filters used to decompose macroeconomic series into nonstationary (trend) and stationary (cyclical) components.

The standard deviation, skewness, and kurtosis of each of the HP and FD filters applied to real GDP are given in Table 4.2.[11] Irrespective of the filtering method used, for the six Caribbean countries there is typically evidence of negative skewness in the real GDP growth cycle, indicating larger downward spikes in real GDP growth than upward spikes. For the Caribbean countries, the FD filter typically displays positive kurtosis, implying an empirical distribution that has tails thinner than the normal distribution (leptokurtic). That is, large movements in Caribbean (filtered) output are relatively common.

Figures 4.3 and 4.4 present for each of the 10 countries the filtered (or detrended) real GDP derived from the FD filter. Given that we are measuring the real GDP series in logs, the figure reflects smoothed deviations

[11]These are the same moments considered by Canova (1998). Difference filters assume that the underlying trend of a series follows a random walk. Such a filter is also a poor match to conventional preconceptions of what constitute business-cycle frequencies—the difference filter emphasizes (the less persistent) high frequencies and downplays the (more persistent) low and business-cycle frequencies.

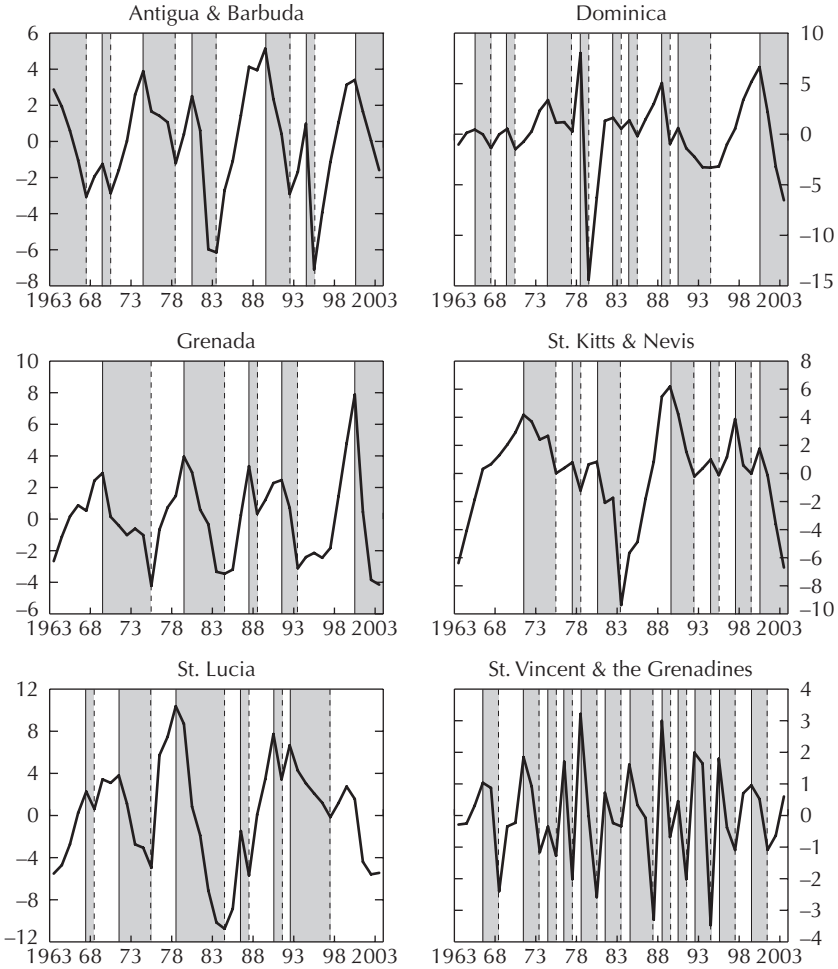
Figure 4.3. Chronology of Developed-Country Growth Cycles, FD-Filtered Output
(Percentage deviation from trend)



Source: Author's calculations.
Notes: FD denotes Corbae-Ouliaris (2006) filtered real GDP. Turning points in filtered real GDP are described as downturns (denoted by solid lines) and upturns (denoted by dashed lines). Low-rate growth phases (periods of downturn to upturn movement) are denoted by shading; high-rate growth phases (periods of upturn to downturn movement) are denoted by no shading.

of actual GDP from potential output or trend, expressed in percentage terms. For each country there are several downswings and upswings in this series, with the period between these turning points being described as the low-rate and high-rate phases of each country's growth cycle. Clearly, for many countries there are several phases which are rather short-lived, and it is unlikely that an upturn in economic growth, for example, would be declared on the basis of only one or two years of above-trend growth (and likewise for a downturn). In order to formally identify the duration of low-rate and high-rate phases of the developed country and Caribbean growth cycles, we use the cycle-dating rules set out above to identifying turning points in annual growth cycle data (as measured by the FD filter). The dashed lines represent the upturn dates and the solid lines the downturns, with low-rate phases (periods of downturn to upturn movement) denoted

Figure 4.4. Chronology of Caribbean Growth Cycles, FD-Filtered Output
(Percentage deviation from trend)



Source: Author's calculations.

Notes: FD denotes Corbae-Ouliaris (2006) filtered real GDP. Turning points in filtered Caribbean real GDP are described as downturns (denoted by solid lines) and upturns (denoted by dashed lines). Low-rate growth phases (periods of downturn to upturn movement) are denoted by shading; high-rate growth phases (periods of upturn to downturn movement) are denoted by no shading.

by shading and high-rate phases (periods of upturn to downturn movement) denoted by no shading. In contrast to the classical cycle, low-rate phases are relatively frequent, and often long-lived, events.

Comparison of Classical and Growth Cycles

In a growing economy, high-rate phases must coincide with expansion phases in the classical cycle, yet low-rate phases may be associated with either phase of the classical cycle. However, classical contraction phases must be associated with low-rate phases in the growth cycle. While growth-cycle downturns tend to lead classical-cycle peaks, growth-cycle upturns tend to coincide with or lag classical-cycle troughs. Accordingly, we should expect that high-rate phases will tend to be shorter-lived than expansion phases, and that low-rate phases will tend to be longer-lived than contraction phases.

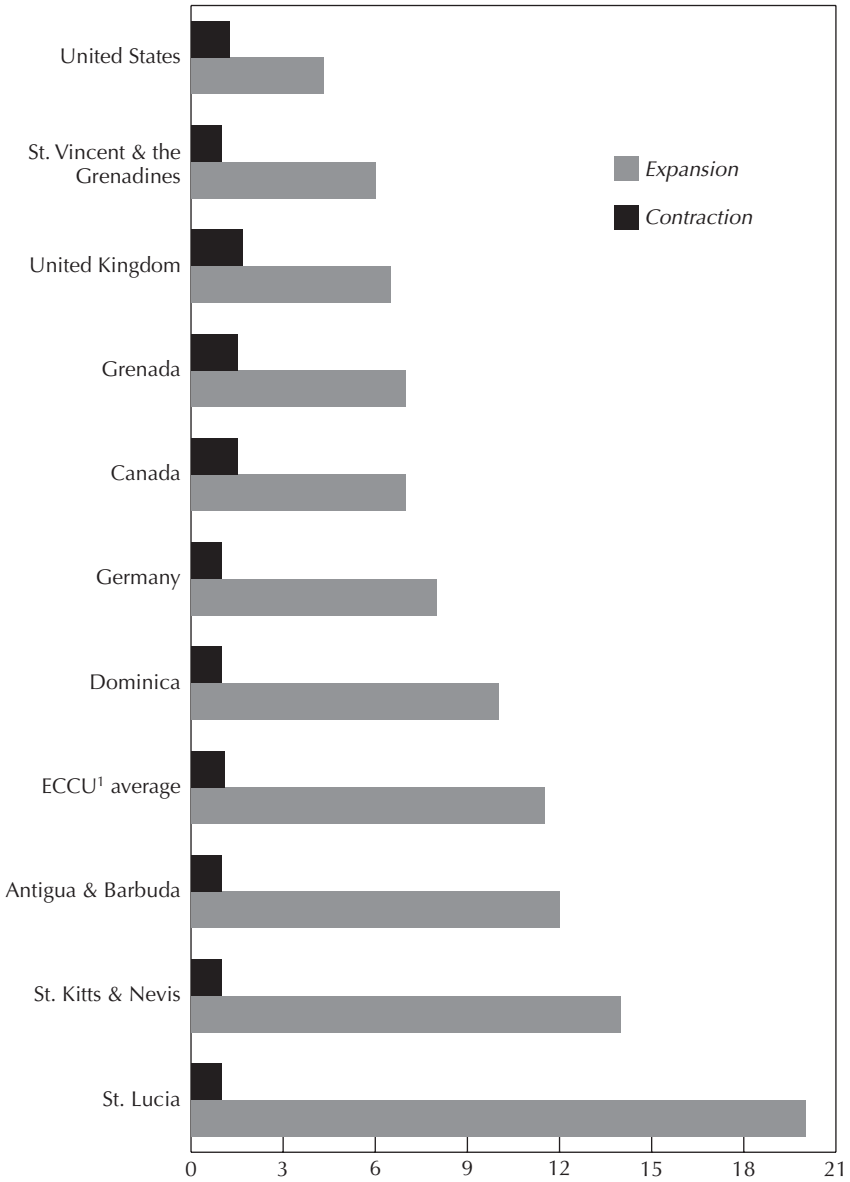
There are clearly more turning points in the Caribbean growth cycle than in the Caribbean classical cycle. For example, St. Lucia has only one completed (peak-to-peak) classical cycle and five completed (downturn-to-downturn) growth cycles over the sample period. Since 1963, St. Lucia has had two contractionary phases of the classical cycle, with many more (six) periods of low-rate (below-trend) phases of the growth cycle. On four occasions, low-rate phases of the growth cycle interrupted classical expansions, but did not terminate them. As shown in Figures 4.2 and 4.4, downturns in the growth cycle tend to lead peaks in the classical cycle, while upturns in the growth cycle tend to coincide with (or slightly lag) troughs in the classical cycle. Interestingly, while real GDP for St. Lucia was in a contractionary phase only about 5 percent of the time between 1963–2003, its real GDP growth was below trend about 44 percent of the time during the same period.[12]

In addition to information on the attributes of real GDP and GDP growth cycles, Figures 4.5 to 4.8 also report on the salient features of movements in real GDP and real GDP growth between these turning points. For each of the two series, data is split into two phases: expansion and contraction phases (for the classical cycle) and high-rate and low-rate phases (for the growth cycle). For each phase, we present results for the average duration of the phase measured in years and the average amplitude of the aggregate phase movement in output (in percent change)—a measure of the deepness of the phase movement.

The results in Figure 4.5 imply that an important stylized fact of classical cycles is that they are asymmetric: contractions in real GDP are considerably shorter in duration than real GDP expansions. For Antigua and Barbuda, the typical length of contractions (about one year) is about

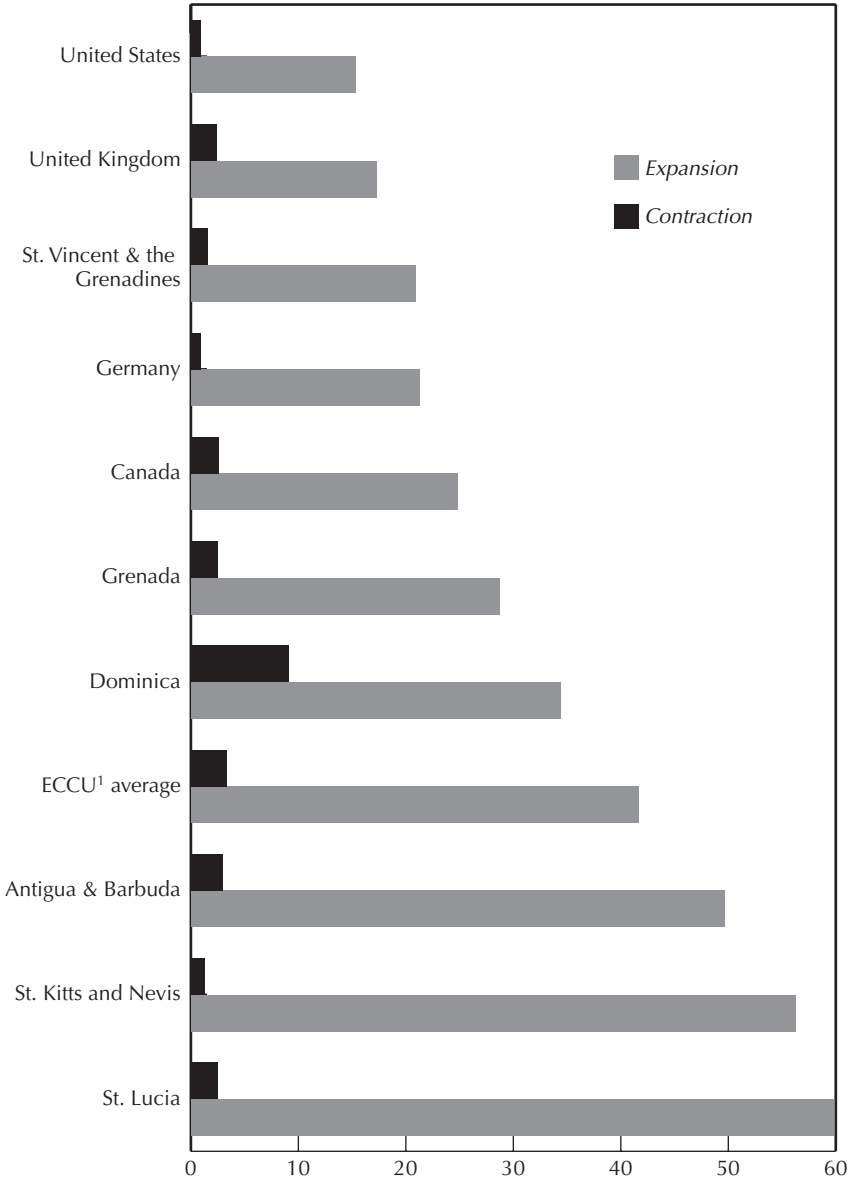
[12]See Cashin (2004) for additional detail on the chronology for completed cycles in Caribbean real GDP.

Figure 4.5. Average Duration of Expansions and Contractions in Real GDP, 1963–2003
(In years)



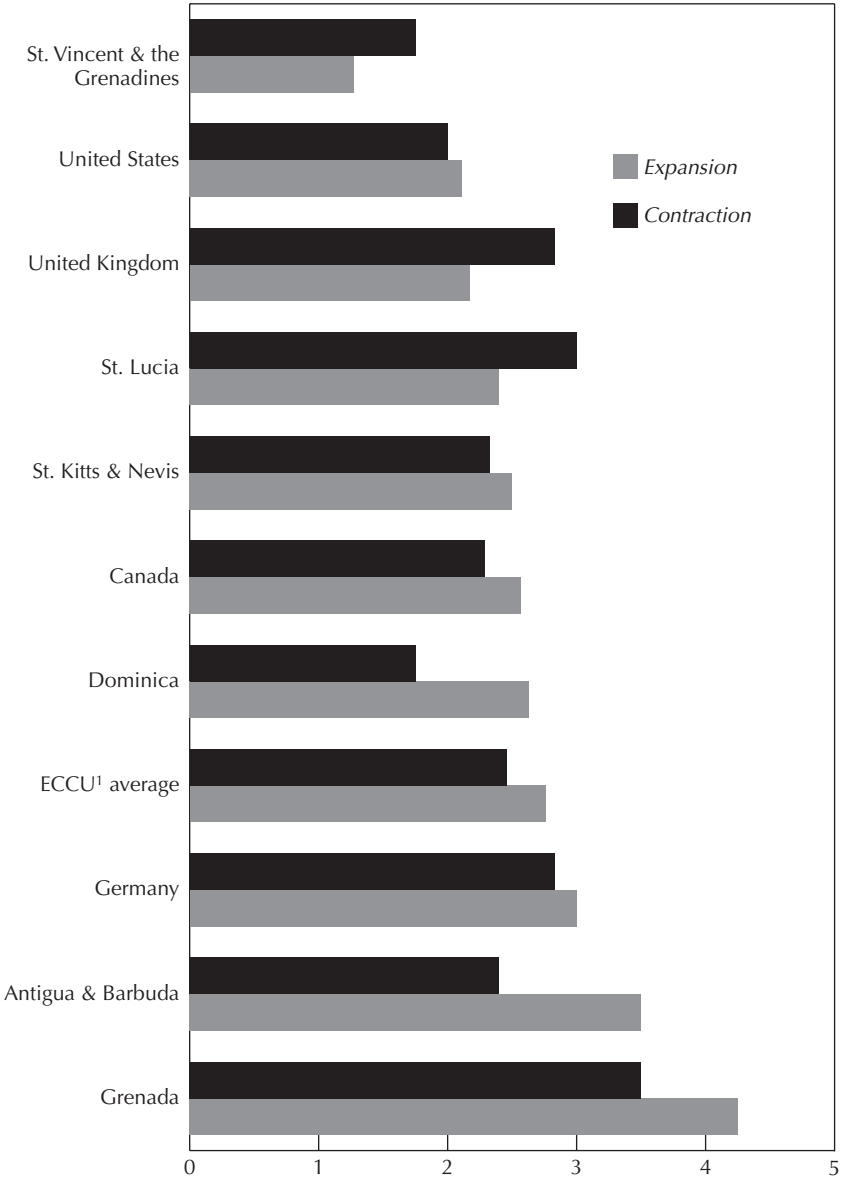
Source: Author's calculations.
[1]Eastern Caribbean Currency Union.

Figure 4.6. Average Amplitude of Expansions and Contractions in Real GDP, 1963–2003
(Percent change)



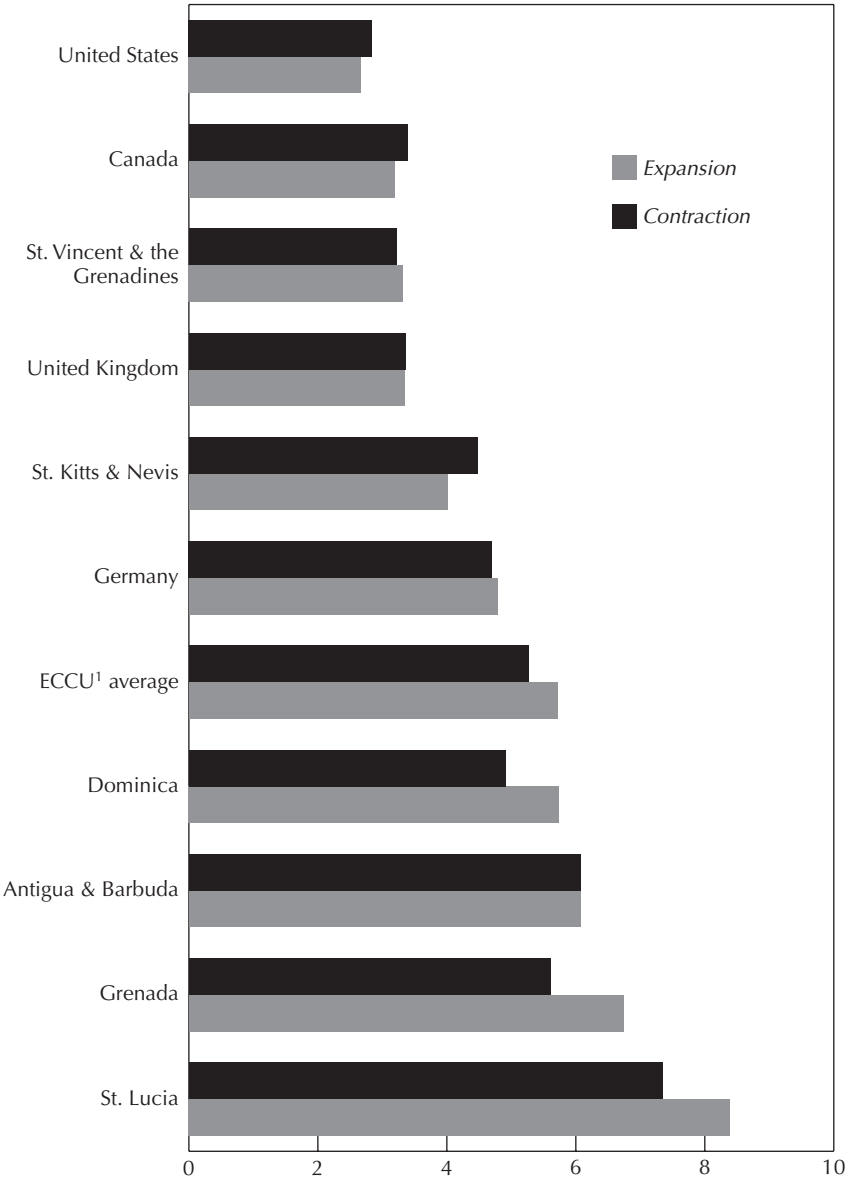
Source: Author's calculations.
[1]Eastern Caribbean Currency Union.

Figure 4.7. Average Duration of Expansions and Contractions in Real GDP Growth, 1963–2003
(In years)



Source: Author's calculations.
[1]Eastern Caribbean Currency Union.

Figure 4.8. Average Amplitude of Expansions and Contractions in Real GDP Growth, 1963–2003
(Percent change)



Source: Author's calculations.
[1]Eastern Caribbean Currency Union.

one-twelfth as long as the typical length of expansions, giving an average cycle (peak-trough-peak movement) of about 13 years. The amplitude (percent change) measure (Figure 4.6) shows that the average decline in real GDP during contractions (about 3 percent) is considerably smaller than the average rise during expansions (about 50 percent). This differing relative amplitude obviously results in an overall upward trend in Antigua and Barbuda's real GDP.

In comparing phases of classical and growth cycles, the average Caribbean classical cycle is about 2½ times longer in duration than the average Caribbean growth cycle (Figures 4.5 and 4.7). High-rate phases (of the Caribbean growth cycle) tend to be considerably shorter-lived than classical expansion phases, and low-rate phases tend to be longer-lived than classical contraction phases. For most Caribbean countries, the duration of classical contraction phases has also varied more about its mean than has the duration of low-rate phases of the growth cycle.

This asymmetry in duration can be more clearly seen in Figure 4.5, which orders the 10 countries by the (increasing) duration of output expansions. The duration of the phases varies quite dramatically across the countries, ranging from an average expansion of 20 years for St. Lucia to an average expansion of just over four years for the United States. The ECCU average duration of expansions (contractions) is about 12 years. Similarly, the amplitude (percent change) measure shows that the average ECCU output decline during contractions is in most cases considerably smaller than the average ECCU output rise during expansions. This differing amplitude can be seen in Figure 4.6, which orders the countries by the (increasing) amplitude of expansions. The average output decline across all six Caribbean countries is about 3 percent during contractions, while the average output rise across all six Caribbean countries is about 42 percent during expansions. This differing relative amplitude results in a large overall upward trend in real output, and indicates that existing trends are caused by the differing relative amplitude of expansions and contractions.

The results in Figure 4.7 also imply that Caribbean growth cycles share an important stylized fact with developed country growth cycles in that they are rather symmetric—positive deviations from trend output are of similar duration to negative deviations from trend output. Figures 4.7 and 4.8 present the duration and amplitude of high-rate and low-rate phases, again ordered by the increasing duration and amplitude of high-rate phases, respectively. For the six Caribbean countries, the average duration of rises in trend-adjusted output in high-rate phases of growth cycles (about 2¾ years) is slightly longer than the average duration of declines in

trend-adjusted output in low-rate phases (about 2½ years). Similarly, the average rise in trend-adjusted output in high-rate phases of growth cycles (about 5¾ percent) is slightly larger than the average fall in trend-adjusted output in low-rate phases (about 5¼ percent).

The results for classical and growth cycles in Caribbean output can be compared with those in the existing literature on developed country and developing country business cycles. While the length of the Caribbean classical cycle is longer than that reported from earlier findings on the duration of business cycles in developed countries (Baxter and King, 1999), the duration of Caribbean classical cycles is typically much longer than previously measured for developing country business cycles. The mean duration of Caribbean classical cycles measured here (at between 2 and 12½ years) is longer than those derived by Rand and Tarp (2002) using the Bry-Boschan (1971) cycle-dating algorithm and quarterly output data for a range of middle-income developing countries. Rand and Tarp (2002) conclude that developing country business cycles range in length between about two and five years; this contrasts with the accepted business-cycle duration for the U.S. economy of between two and eight years (Burns and Mitchell, 1946). An implication of these results is that classical business cycles in Caribbean countries are much longer-lived than those of other (middle-income) developing countries, and generally slightly longer in duration than those of developed countries.[13]

According to the standard deviations of FD-filtered output, volatility in Caribbean countries is considerably higher than that of developed countries (Table 4.3). Caribbean output volatility ranges from St. Vincent and the Grenadines' low of 30 percent greater than the United States, to St. Lucia's high of over four times greater volatility than the United States. On average, Caribbean output volatility is about 2.8 times greater than that of the United States. Using the largest of the ECCU economies (Antigua and Barbuda) as the base, Caribbean output volatility ranges from about half as variable (St. Vincent and the Grenadines) to close to twice as variable (St. Lucia). In addition, the percentage of the sample period spent in a low-rate phase ranges from a low of 41 percent

[13]Canova (1999) finds that among many commonly used filters, frequency domain filters of the type used in this chapter applied to U.S. real GDP are best able to replicate the properties of NBER growth cycles. He argues that such filters, due to their ability to extract both deterministic and stochastic trends from the data, are consistent with Pagan's (1997) finding that a random walk with drift (without drift) is the best representation of the data-generating process that yields the typical duration and symmetry properties of the phases of classical (growth) cycles.

Table 4.3. Features of Growth Cycles, FD-Filtered Real GDP, 1963–2003

	Canada	Germany	United Kingdom	United States	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines
Number of downturns	7	6	6	8	5	8	4	6	6	12
Number of upturns	7	6	6	9	6	8	4	6	5	11
Time spent in low-rate phase (percent)	46	49	63	54	49	41	41	41	44	51
Average duration of high-rate phase (years)	2.57	3.0	2.17	2.11	3.5	2.63	4.25	2.5	2.4	1.27
Average duration of low-rate phase (years)	2.29	2.83	2.83	2.0	2.4	1.75	3.5	2.33	3.0	1.75
Average amplitude of high-rate phase (percent change)	3.19	4.78	3.34	2.67	6.07	5.74	6.74	4.01	8.39	3.32
Average amplitude of low-rate phase (percent change)	–3.39	–4.7	–3.36	–2.84	–6.07	–4.91	–5.61	–4.48	–7.34	–3.22
Volatility (standard deviation of growth cycle)	2.14	2.13	1.38	1.62	2.88	3.75	2.64	3.34	5.14	1.53
Ratio of volatility to U.S. volatility	1.84	1.84	1.19	1.0	2.48	3.23	2.27	2.87	4.42	1.32
Ratio of volatility to Antigua & Barbuda volatility	0.74	0.74	0.48	0.4	1.0	1.3	0.92	1.16	1.79	0.53

Source: Author's calculations.
Note: FD denotes the Corbae-Ouliaris (2006) filtered GDP series.

(Dominica, Grenada, and St. Kitts and Nevis) to a high of 63 percent (United Kingdom).[14]

Nonparametric Tests of Features of Caribbean Business Cycles

Formal nonparametric tests are used here to provide additional information on the nature of the high-rate and low-rate phases in real GDP growth relative to trend. In particular, we use the Spearman rank correlation test, the Brain-Shapiro (1983) test of duration dependence, and Harding and Pagan's (2002a) concordance statistic to examine whether there are similarities in the phases of Caribbean business cycles.[15]

Rank Correlation and Duration Dependence

Do Caribbean growth cycles have a similar "shape?" The Spearman rank correlation statistic provides a measure of whether there is a significant relationship between the severity (absolute amplitude) of high-rate and low-rate phases and their respective durations. The null hypothesis of the Spearman rank correlation test is that there is no rank correlation between the amplitude of a high-rate phase (low-rate phase) and the duration of that high-rate phase (low-rate phase). Following Harding and Pagan (2002a), if we consider the duration and amplitude of a phase as two sides of a right-angled triangle, where the height of the triangle is the amplitude and the base of the triangle is the duration, then we can view this as a test of whether the phases of the growth cycle consistently have the same "shape" (that is, the same angle of the hypotenuse).

We also examine whether there is any tendency for high-rate and low-rate phases of deviation-from-trend growth in real GDP to maintain a fixed duration. If true, this would imply duration dependence—the longer any high-rate or low-rate phase continues, the more likely it is to switch to the other phase. Accordingly, we follow Diebold and Rudebusch (1992) and calculate the Brain-Shapiro statistic for duration dependence, which tests

[14]In contrast, the percentage of time Caribbean countries spent in the contraction phase of the classical cycle was much smaller (Dominica at 12 percent, Grenada at 7 percent, and Antigua and Barbuda, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines at 5 percent.

[15]Unfortunately, the limited number of completed classical cycles for Caribbean countries and several developed countries precluded use of the rank correlation and Brain-Shapiro statistics.

Table 4.4. Nonparametric Tests on the Nature of Contractions/Expansions in Real GDP Growth, 1963–2003

	Low-Rate Phase		High-Rate Phase		Number of Phases	
	Brain-Shapiro	Spearman	Brain-Shapiro	Spearman	Low-Rate	High-Rate
Canada	1.30	0.79*	0.39	0.93*	7	7
Germany	–0.30	0.49	–0.28	0.26	6	6
United Kingdom	0.00	–0.43	–0.22	0.83*	6	6
United States	0.90	0.07	–1.29	0.52	8	9
Antigua & Barbuda	–0.06	0.00	0.83	0.77*	5	6
Dominica	2.32*	–0.12	1.04	0.57	8	8
Grenada	–0.15	0.80	1.07	0.80	4	4
St. Kitts & Nevis	0.00	0.77*	0.74	0.26	6	6
St. Lucia	0.64	0.77*	–1.56	0.00	6	5
St. Vincent & the Grenadines	–0.4	0.27*	4.28*	0.4	12	11

Source: Author's calculations.

Notes: There are two types of phases for growth (deviation from trend) cycles: periods of low-rate (that is, below trend) and high-rate (above trend) phases in the growth of real GDP. The Brain-Shapiro statistic is an examination of duration dependence in the phases of real GDP growth. The null hypothesis of the Brain-Shapiro statistic is that the probability of terminating a phase is independent of the length of time a series has been in that phase. An asterisk denotes that the null hypothesis is rejected (using a 5 percent critical value for a two-tailed test)—any result greater than the critical value of 1.96 (in absolute value) indicates duration dependence in the series. The Spearman rank correlation coefficient examines whether there is any relationship between the duration and amplitude of a phase. The null hypothesis is no rank correlation between the amplitude of a phase and its duration. An asterisk denotes that the null hypothesis is rejected (using a one-tailed test) at the 5 percent level of significance, where $1.65/N^{1/2}$ gives the 5 percent critical value for significant correlations, where N is the number of high-rate or low-rate phases in the sample period.

whether the probability of ending a high-rate or low-rate phase in a series is dependent on how long the series has been in that respective phase. The null hypothesis of the Brain-Shapiro statistic is that the probability of exiting a phase is independent of the length of time a series has been in that phase. There are two possible alternatives. The longer a high-rate or low-rate phase persists, either the greater the likelihood that the phase will terminate (positive duration dependence), or the greater the likelihood that the phase will be self-perpetuating, and hence the lower the likelihood that the phase will terminate (negative duration dependence). The distribution of the Brain-Shapiro statistic is asymptotically $N(0,1)$, which it quickly approaches even in small samples.[16] The results of both the rank correlation and duration dependence tests are reported in Table 4.4.

[16]A negative (positive) Brain-Shapiro statistic is associated with positive (negative) duration dependence (Diebold and Rudebusch, 1992).

For the growth cycle, the Spearman rank correlation statistic indicates that for half the Caribbean countries (St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines) there is a relationship between the severity (absolute amplitude) of low-rate phases and their duration, and so there is some evidence of a consistent shape to low-rate phases. Apart from Antigua and Barbuda, this feature is not found for high-rate phases of the growth cycle.

For most Caribbean countries, the Brain-Shapiro statistic indicates that probability of a low-rate or high-rate phase of real GDP growth ending is independent of its duration. That is, for most Caribbean countries there is no historical evidence that the duration of positive (negative) output gaps increases the probability of switching to a low-rate (high-rate) phase. However, for Dominica the negative duration dependence in low-rate phases (given the significantly positive Brain-Shapiro statistic) indicates that the longer low-rate phases of real GDP growth continued, the lower was the probability of switching to a high-rate phase. Similarly, the negative duration dependence in high-rate phases of the growth cycle in St. Vincent and the Grenadines indicates that the termination probability of its high-rate phases shrank the longer the phase lasted.

Correlation and Concordance Statistics

Comovement in Real GDP (Classical Cycles)

To what extent do expansions and contractions in the level of real GDP move together, both among Caribbean countries and between individual Caribbean and non-Caribbean countries? That is, we are interested whether the turning points in classical business cycles are similar across countries. Two measures of comovement are used to analyze this question: the correlation of growth rates of real output, and the concordance between real output series.

The correlation matrix is presented in Table 4.5.[17] Many of the country pairs are significant at the 5 percent level or greater. On this basis, there appears to be evidence that the real output series of three of the six Caribbean countries tend to comove with cycles in Canadian output. For two of the Caribbean countries (Antigua and Barbuda and Grenada), out-

[17]The output correlations reported are contemporaneous correlations. We also examined leads and lags in the relationship between output growth, yet found that for most countries the correlations peak at or near lag zero, suggesting that output fluctuations are transmitted fairly quickly (within one year) across countries.

Table 4.5. Correlation Statistics: Annual Log Changes in Real GDP

	Canada	Germany	United Kingdom	United States	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines
Canada	1	0.07	**0.53***	**0.78***	**0.40***	0.11	**0.34***	**0.31***	0.12	0.14
Germany		1	0.12	0.22	0.15	0.05	**0.36***	0.11	0.16	0.04
United Kingdom			1	**0.63***	0.26	–0.05	**0.32***	0.27	0.08	–0.02
United States				1	**0.37***	0.09	**0.35***	0.25	0.3	0.2
Antigua & Barbuda					1	0.18	**0.51***	**0.45***	0.21	–0.1
Dominica						1	0.24	0.11	0.21	**0.38***
Grenada							1	**0.40***	**0.44***	0.2
St. Kitts & Nevis								1	**0.33***	0.2
St. Lucia									1	**0.72***
St. Vincent & the Grenadines										1

Source: Author's calculations.

Notes: Each series is the correlation between bivariate pairs of the first difference of the logarithm of real GDP. The 5 percent critical value for significant correlations is calculated as $1.96/T^{1/2}$, where T is the number of observations. Accordingly, for 1963–2003, $T = 40$, then individual cross-correlations exceeding (in absolute value) 0.309 will be significant at the 5 percent level. The cells in boldface with an asterisk indicate significance at the 5 percent level.

put appears to comove with cycles in U.S. output. The results suggest that the level of activity in industrial countries typically has a positive, yet often weak association with Caribbean output. Among the Caribbean islands, comovement in real output appears strongest between St. Vincent and the Grenadines and St. Lucia, with Antigua and Barbuda and Grenada, Dominica and St. Vincent and the Grenadines, and St. Lucia and St. Kitts and Nevis also displaying evidence of synchronized output.

Most previous analyses have used correlation statistics as their measure of comovement of economic time series. However, bivariate correlation measures are based on covariance, which is affected by amplitude changes (shifts in the level of the two series) as well as by the fraction of time that any two series are rising together and falling together. It is possible for a large, one-time shift in the level of two series (for example, those induced by the oil shock of 1974) to induce a significant correlation in otherwise unrelated series. In contrast, such a shock will only be important under a concordance test to the extent that the comovement lasts for a lengthy period of time. McDermott and Scott (2000) demonstrate that the covariance of two series may be dominated by the amplitude of a particularly long swing that is common to both series. Accordingly, it may be more relevant to know the degree of synchronization of national business cycles, and so examine the proportion of time that two output series are expanding together and contracting together.

For this purpose, we make use of the concordance statistic originally proposed by Harding and Pagan (2002a). Concordance is measured by a simple nonparametric statistic that describes the proportion of time that two series, x_i and x_j, are in the same phase (Harding and Pagan 2002a, 2002b). Specifically, let $\{S_{i,t}\}$ be a series taking the value unity when the series x_i (real GDP in country i) is in an expansion state, and zero when it is in a contraction state; and let $\{S_{j,t}\}$ be a series taking the value unity when the series x_j (real GDP in country j) is in an expansion state, and zero when it is in a contraction state. The degree of concordance is then:

$$C_{ij} = T^{-1}\left\{\sum_{t=1}^{T}(S_{i,t} \cdot S_{j,t}) + \sum_{t=1}^{T}(1 - S_{i,t}) \,.\, (1 - S_{j,t})\right\}, \tag{3}$$

where S_i and S_j are as defined above, T is the sample size and C_{ij} measure the proportion of time that the two series are in the same state. To interpret C_{ij}, a value of, say, 0.7 for the index indicates that x_i and x_j are in the same phase (that is, expanding or contracting together) 70 percent of the time. The series x_i is exactly procyclical (countercyclical) with x_j if $C_{ij} = 1$ ($C_{ij} = 0$).

As a proportion, the values that C_{ij} may take are clearly bounded between zero and one. Faced with a realized concordance index of, for

example, 0.7, it is natural to assume that this is large relative to zero. However, even for two unrelated series the expected value of the concordance index may be 0.5 or higher. For example, consider the case of two fair coins being tossed. The probability that both coins are in the same phase—that is, both heads or both tails—is 0.5.

More generally, a disadvantage of C_{ij} is that it does not provide a means of determining if the extent of comovement (or synchronization) between cycles in the two series is statistically significant. To do so we need a concordance test statistic. If the expected value of C_{ij} is evaluated under the assumption of mean independence, then, following Harding and Pagan (2002b), the *t*-statistics examining the null hypothesis of no concordance between the two series can be computed from the regression coefficient estimate attached to $S_{i,t}$ in the regression of $S_{j,t}$ against a constant term and $S_{i,t}$.[18,19]

The results of the concordance statistic (shown in Table 4.6) reveal that the association between real GDP within the ECCU countries and between developed country and ECCU country pairs appears to be very strong. For example, real output in Canada and Antigua and Barbuda is highly synchronized—both move in the same direction 93 percent of the time. This suggests that real output in these 10 countries spends much of the time in the same phase of the classical cycle. However, the pairwise correlations of phase states are typically rather small (and often negative), which suggests that it is the very high values of the mean value of S_i, rather than a strong correlation between phase states, that underpins the high measured value of concordance (see the bottom row of Table 4.6). That is, the fact that most countries spend a very large proportion of the sample in an expansion phase has biased upward the measured value of concordance. This effect is important for Canada, which has a mean value of its phase state indicator of 0.93 and shows concordance with the Caribbean economies in the range of 0.80 to 0.93, yet only shows correlations of phase states with Caribbean economies in the range of –0.10 to 0.37. Once the concordance statistic is mean corrected (which is essentially what occurs when using the correlation of phase states), there is only evidence of sig-

[18]In addition, given that the errors from such a regression are unlikely to be *i.i.d.*, due to the strong likelihood of serial correlation or heteroscedasticity in $S_{i,t}$, the *t*-ratio for the regression coefficient has been made robust to higher-order serial correlation and heteroscedasticity. Positive serial correlation in $S_{i,t}$ biases hypothesis tests toward rejecting the null of no concordance (Harding and Pagan, 2002b).

[19]See also Cashin and McDermott (2002) and Artis, Marcellino, and Proietti (2002) for earlier uses of the concordance statistic to examine comovement of cycles in economic time series.

Table 4.6. Concordance Statistics: Log of Real GDP

	Canada	Germany	United Kingdom	United States	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines
Canada		0.85	0.85	0.9	0.93	0.8	0.85	0.88	0.88	0.88
Germany	0.18		0.8	0.85	0.88	0.8	0.85	0.83	0.83	0.83
United Kingdom	0.18	0.09		**0.95***	0.83	0.76	0.8	0.83	0.88	0.83
United States	0.47	0.32	**0.77***		0.88	0.76	0.8	0.83	0.88	0.83
Antigua & Barbuda	0.37	0.26	–0.08	0.26		0.83	0.88	0.9	0.9	0.9
Dominica	–0.1	0.09	–0.14	–0.14	–0.08		0.9	0.83	0.88	0.88
Grenada	–0.08	0.18	–0.1	–0.1	–0.06	0.47		0.88	0.93	0.93
St. Kitts & Nevis	–0.06	–0.08	–0.08	–0.08	–0.05	–0.08	–0.06		0.9	0.9
St. Lucia	–0.06	–0.08	0.26	0.26	–0.05	0.26	0.37	–0.05		0.95
St. Vincent & the Grenadines	–0.06	–0.08	–0.08	–0.08	–0.05	0.26	0.37	–0.05	0.47	
Mean S_i	0.93	0.88	0.88	0.88	0.95	0.88	0.93	0.95	0.95	0.95

Source: Author's calculations.

Notes: Concordance measures the extent to which the cycles in two series are synchronized, and is the proportion of time that real output (the classical cycle) of two countries are concurrently in the same phase (that is, concurrently in an expansion period or concurrently in a contraction period). The concordance statistic C_{ij} is above the diagonal, while the correlation statistic is below the diagonal and the mean value of S_i is in the bottom row of the table. Following Harding and Pagan (2002b), the *t*-statistics testing the null of no association were computed from the least squares regression of $S_{j,t} = a + bS_{i,t} + u_t$, where: *a* is a constant term, u_t is the error term, $S_{i,t}$ is a series taking the value unity when real output in the *i* th country is in an expansion phase and zero when real output in the *i*th country is in a contraction phase, and $S_{j,t}$ is a series similarly defined for real output of the *j*th country. The *t*-statistic tests the null hypothesis of no synchronization (that is, H_0: $b = 0$ in the above regression) between series $S_{i,t}$ and series $S_{j,t}$, and the *t*-statistics were computed using the White heteroscedastic autocorrelated consistent standard errors. The bolded cell (with an asterisk) indicates significance at the 5 percent level.

nificant synchronization of classical cycles (involving rejection of the null hypothesis of no concordance) for the United Kingdom and the United States, which are in the same state of the classical cycle 95 percent of the time. This result highlights the need to use hypothesis testing procedures rather than relying on point estimates of concordance. In summary, evidence for the null hypothesis of no association between the classical cycles of the 10 countries is quite strong.

Comovement in Real GDP Deviations from Trend (Growth Cycles)

Similarly, we may be interested in the question as to whether output deviations from trend move with each other—that is, how synchronized across countries are output gaps? To analyze this question we follow Scott (2000) and examine the cross-correlation and concordance statistics for filtered output.

The correlation matrix presented in Table 4.7 looks at the cross-correlation of FD-filtered output in one country and a similarly-transformed output series for another country. On this basis, there appears to be strong evidence that filtered output (output gap) series of all but two of the six Caribbean countries tend to comove with cycles in Canadian filtered output. In contrast, there is no evidence that output gaps in Caribbean countries comove with either the United States or United Kingdom output gaps. Among the Caribbean islands, comovement in filtered output appears strongest between St. Lucia and St. Kitts and Nevis. Antigua and Barbuda and Grenada, and St. Lucia and Grenada, also have evidence of synchronized output gaps.

As previously, we also use the concordance statistic to examine whether Caribbean economies are above or below potential at the same time. Here the formula for the concordance statistic is as given above in equation (3), with $\{S_{i,t}\}$ a series taking the value unity when the series x_i (deviation of output from trend in country i) is in a high-rate phase, and zero when it is in a low-rate phase; and $\{S_{j,t}\}$ a series taking the value unity when the series x_j (deviation of output from trend in country j) is in a high-rate phase, and zero when it is in a low-rate phase.

The concordance results examining the synchronization of output gaps are given in Table 4.8. There is strong evidence of an association between the growth cycles of Canada and Grenada and Canada and St. Kitts and Nevis, which expand (and contract) together 66 percent of the time. Importantly, while the United States and the United Kingdom have synchronized growth cycles, there is little evidence of synchronization between the growth cycles of the United States and the Caribbean, or the growth cycles of the United Kingdom and the Caribbean. Among

Table 4.7. Correlation Statistics: Filtered Real GDP (Output Gap)

	Canada	Germany	United Kingdom	United States	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines
Canada	1.00	–0.16	**0.38***	**0.37***	**0.41***	0.14	**0.51***	**0.49***	**0.36***	0.03
Germany		1.00	0.10	0.08	0.08	–0.06	**0.35***	–0.01	0.08	0.01
United Kingdom			1.00	**0.56***	0.13	–0.18	0.07	0.16	0.02	–0.09
United States				1.00	0.12	0.02	0.05	–0.01	0.07	0.10
Antigua & Barbuda					1.00	0.24	**0.38***	**0.35***	0.09	–0.24
Dominica						1.00	0.20	0.12	–0.12	0.22
Grenada							1.00	**0.45***	**0.49***	–0.08
St. Kitts & Nevis								1.00	**0.62***	–0.05
St. Lucia									1.00	0.20
St. Vincent & the Grenadines										1.00

Source: Author's calculations.

Notes: Each series is the correlation between bivariate pairs of FD-filtered output (in percent). The 5 percent critical value for significant correlations is calculated as $1.96/T^{1/2}$, where *T* is the number of observations. Accordingly, for 1963–2003, T = 40, then individual cross-correlations exceeding (in absolute value) 0.309 will be significant at the 5 percent level. The bolded cell (with an asterisk) indicates significance at the 5 percent level.

Table 4.8. Concordance Statistics: Filtered Real GDP (Output Gap)

	Canada	Germany	United Kingdom	United States	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines
Canada		0.63	**0.68***	0.63	0.59	0.61	**0.66***	**0.66***	0.49	0.51
Germany	0.27		0.61	0.61	0.51	0.59	**0.68***	0.54	0.56	0.54
United Kingdom	**0.40***	0.23		**0.66***	0.51	0.49	0.49	0.54	0.37	0.39
United States	0.28	0.22	**0.31***		0.56	0.49	0.49	0.49	0.51	0.54
Antigua & Barbuda	0.17	0.02	0.03	0.12		**0.68***	0.54	**0.68***	0.37	**0.34***
Dominica	0.21	0.17	0.02	–0.01	**0.37***		0.56	0.51	0.44	0.61
Grenada	**0.31***	**0.37***	0.02	–0.01	0.04	0.1		**0.71***	0.63	0.46
St. Kitts & Nevis	**0.31***	0.07	0.12	–0.01	**0.37***	–0.01	**0.40***		0.59	0.41
St. Lucia	–0.03	0.12	–0.24	0.03	–0.27	–0.15	0.25	0.15		**0.73***
St. Vincent & the Grenadines	0.03	0.07	–0.23	0.07	**–0.31***	0.23	–0.07	–0.17	**0.47***	
Mean S_i	0.54	0.51	0.37	0.46	0.51	0.59	0.59	0.59	0.56	0.49

Source: Author's calculations.

Notes: Concordance measures the extent to which the cycles in two series are synchronized, and is the proportion of time that the deviation of output from trend (filtered output or the growth cycle) of two countries are concurrently in the same phase (that is, concurrently in a high-rate growth period or concurrently in a low-rate growth period). The concordance statistic C_{ij} is above the diagonal, while the correlation statistic is below the diagonal and the mean value of S_i is in the bottom row of the table. Following Harding and Pagan (2002b), the *t*-statistics testing the null of no association were computed from the least squares regression of $S_{j,t} = a + bS_{i,t} + u_t$, where: *a* is a constant term, u_t is the error term, $S_{i,t}$ is a series taking the value unity when the growth cycle in the *i*th country is in a high-rate phase and zero when the growth cycle in the *i*th country is in a low-rate phase, and $S_{j,t}$ is a series similarly defined for the growth cycle of the *j*th country. The *t*-statistic tests the null hypothesis of no synchronization (that is, H_0: $b = 0$ in the above regression) between series $S_{i,t}$ and series $S_{j,t}$, and the *t*-statistics were computed using the White heteroscedastic autocorrelated consistent standard errors. The bolded cell (with an asterisk) indicates significance at the 5 percent level.

the Caribbean islands, evidence of comovement in growth cycles appears strongest for the pairs Antigua and Barbuda and Dominica, Grenada and St. Kitts and Nevis, and St. Lucia and St. Vincent and the Grenadines. Interestingly, growth cycles in Antigua and Barbuda and St. Vincent and the Grenadines are countercyclical, in that they move together only 34 percent of the time.

Caribbean Links with Industrial Country Business Cycles

This section further examines the relationship between output (GDP) fluctuations in each of j industrial countries ($y_{j,t}$) and output in each of i ECCU countries ($x_{i,t}$). The degree of comovement of output series is measured by the magnitude of the cross-correlation coefficients at (annual) lag k, $\rho(k)$, where $k \in \{0, \pm1, \pm2, \pm3\}$. These correlations (as reported in Table 4.9) are between the stationary components of the output series (y_t and x_t), with both components derived using the FD filter. The cross-correlation indexes indicate the shift in time of x_{t+k} (the cycle in Caribbean country output) in comparison with y_t (the cycle in industrial country output). In line with the existing literature, we say that x_t *leads* the industrial output cycle (that is, $x_{i,t+k}$ leads $y_{j,t}$) by k periods (years) if $|\rho(k)|$ is maximum for a negative k; the Caribbean output cycle is *synchronous* with the industrial country output cycle (that is, $x_{i,t+k}$ is synchronized with $y_{j,t}$) if $|\rho(k)|$ is maximum for $k = 0$; and the Caribbean output cycle *lags* the industrial country output cycle (that is, $x_{i,t+k}$ lags $y_{j,t}$) by k periods (years) if $|\rho(k)|$ is maximum for a positive k.[20] Possible shifts (leads and lags) in the cyclical movements of each series are identified by how early or late with respect to the contemporaneous period the highest statistically significant correlation occurs.

Business cycle fluctuations in Caribbean countries tend to be correlated with cycles in industrial country output. As reported in Table 4.5, the contemporaneous correlations between industrial country output and Caribbean output are positive for a majority of Caribbean countries. However, there is little evidence of Caribbean output being correlated with either U.S. or U.K. cycles, even when allowing for leads and lags in cycles (Table 4.9). Germany's output is positively contemporaneously correlated with Grenada, with some indication that German output appears to have a negative effect on Grenada's (and St. Lucia's) output with a lag of about two years.

[20]For an earlier study which examines bivariate correlations in detrended macroeconomic time series, see Agénor, McDermott, and Prasad (2000).

Table 4.9. Comovement of Developed Country and Eastern Caribbean Currency Union Output

	k (–3)	*k* (–2)	*k* (–1)	*k* (0)	*k* (1)	*k* (2)	*k* (3)
	Cross-Correlation of United States Output (at time *t*) with						
Output of Country (at time *t* + *k*)							
Antigua & Barbuda	0.05	–0.20	–0.11	0.12	0.04	–0.01	0.01
Dominica	0.23	–0.01	0.06	0.02	–0.17	–0.08	–0.05
Grenada	0.01	–0.02	–0.11	0.05	0.05	–0.01	0.03
St. Kitts & Nevis	–0.02	0.06	–0.02	–0.01	0.03	–0.10	0.04
St. Lucia	–0.03	0.07	–0.01	0.07	–0.05	–0.06	–0.02
St. Vincent & the Grenadines	–0.04	0.26	0.06	0.10	–0.23	–0.15	0.13
	Cross-Correlation of United Kingdom Output (at time *t*) with						
Output of Country (at time *t* + *k*)							
Antigua & Barbuda	–0.10	–0.10	–0.01	0.13	0.19	0.04	–0.07
Dominica	–0.10	0.07	0.06	–0.17	–0.19	0.03	0.18
Grenada	0.01	–0.01	–0.04	0.07	0.04	–0.06	0.04
St. Kitts & Nevis	–0.11	–0.03	0.03	0.16	0.16	0.05	–0.04
St. Lucia	0.07	0.19	0.11	0.02	–0.13	–0.17	–0.04
St. Vincent & the Grenadines	–0.09	0.22	0.15	–0.09	–0.15	–0.04	0.01
	Cross-Correlation of Canadian Output (at time *t*) with						
Output of Country (at time *t* + *k*)							
Antigua & Barbuda	–0.19	–0.05	0.27	**0.41***	0.25	0.05	–0.08
Dominica	0.23	0.04	0.10	0.15	0.02	0.00	–0.08
Grenada	**–0.51***	–0.20	0.16	**0.51***	**0.52***	**0.38***	0.21
St. Kitts & Nevis	**–0.44***	–0.22	0.11	**0.49***	**0.48***	0.19	0.01
St. Lucia	**–0.29***	–0.05	0.11	**0.36***	**0.31***	0.20	0.08
St. Vincent & the Grenadines	0.03	0.17	–0.01	0.03	–0.16	–0.15	0.08
	Cross-Correlation of German Output (at time *t*) with						
Output of Country (at time *t* + *k*)							
Antigua & Barbuda	–0.02	0.01	0.06	0.08	–0.03	–0.04	–0.12
Dominica	0.13	–0.01	0.01	–0.06	–0.13	–0.12	–0.11
Grenada	0.04	0.19	**0.37***	**0.35***	–0.11	**–0.45***	**–0.40***
St. Kitts & Nevis	0.29	0.14	–0.01	–0.01	–0.11	–0.18	–0.17
St. Lucia	0.20	0.33	0.24	0.08	–0.17	**–0.34***	**–0.34***
St. Vincent & the Grenadines	0.14	0.12	0.02	0.01	0.12	–0.04	–0.29

Source: Author's calculations.

Notes: ECCU denotes Eastern Caribbean Currency Union. Each series is the correlation between bivariate pairs of FD-filtered output (in percent). Entries are cross-correlation coefficients, calculated as set out in the penultimate section of this chapter. The central column displays the contemporaneous cross-correlations. Columns on the left (right) are correlations between the contemporaneous growth cycle of industrial country output ($y_{j,t}$) and the growth cycle in each of the ECCU countries ($x_{i,t+k}$) shifted backward (forward) by one, two, and three years. Lag *k* indicates the correlation between contemporaneous values of the growth cycle of a developed country and the *k*th lag of the growth cycle of an ECCU country, where k < 0 (k > 0) denotes a lead (lag). The 5 percent critical value for significant correlations is calculated as $1.96/T^{1/2}$, where *T* is the number of observations. Accordingly, for the period 1963–2003, *T* = 40, then individual cross-correlations exceeding (in absolute value) 0.309 will be significant at the 5 percent level. A bolded cell (with an asterisk) indicates significance at the 5 percent level.

Consistent with the earlier results, the strongest business-cycle links are between Canadian and Caribbean output. Canadian output appears to have a positive (synchronous) effect on the output of four of the six Caribbean countries at or near lag zero, suggesting that Canadian output fluctuations are transmitted fairly rapidly to Caribbean countries (Table 4.9).[21]

Conclusions

The relative mildness of economic fluctuations in many developed economies since the 1950s, in tandem with recent developments in time-series analysis, has led to a renewed interest in growth cycles (cyclical movements in trend-adjusted output) in comparison with classical cycles (cyclical movements in trend-unadjusted output). This study has examined the key stylized facts of Caribbean business cycles over 1963–2003 and calculated a chronology for the classical cycle (involving expansions and contractions in the level of real output) and the growth cycle (involving alternating periods of above- and below-trend economic growth). In obtaining new measures of classical and growth cycles, we applied simple rules to date turning points in the classical business cycle, and used a recently developed frequency domain filter to estimate the growth cycle.

Several findings emerged from examining the stylized features of Caribbean business cycles. First, Caribbean growth cycles are relatively symmetric in both duration and amplitude. This is unlike the Caribbean classical cycle, which typically exhibits long-lived expansions and much shorter-lived contractions, as well as much greater amplitude of output movement in expansions than contractions. Second, for about half the Caribbean countries there is evidence of a relationship between below-trend movements in real GDP and their duration; for all but one of the Caribbean countries there is no evidence of a similar relationship for above-trend movements in real GDP. Third, for most Caribbean countries there is little evidence that either below- or above-trend phases in real GDP growth are duration dependent. Accordingly, while there are some

[21]There are several important links between Canada and the countries of the eastern Caribbean. First, Canada is a major provider of bilateral overseas development assistance flows to the countries of the eastern Caribbean (OECD, 2004). Second, Canadian-licensed banks are active in all ECCU countries. Third, Canada has traditionally been an important emigrant destination for Caribbean nationals, and accounts for a large share of remittance flows into the Caribbean.

similarities in the ups and downs of Caribbean growth cycles, no two business cycles are exactly alike. Fourth, while movements in the Canadian classical cycle appear to be reasonably synchronized with movements in the classical cycle of Caribbean countries, there is less synchronization of Caribbean movements in real output with those of the United States and the United Kingdom. Fifth, there is little synchronization of Caribbean output deviations from trend (growth cycles) with growth cycles of the United States and the United Kingdom, and some comovement between Canadian and Caribbean growth cycles. While there is some evidence of synchronization among the classical business cycles of Caribbean countries, there is stronger evidence of synchronization of Caribbean growth cycles.

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5

Islands of Stability? Determinants of Macroeconomic Volatility in the Eastern Caribbean Currency Union

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With their high degree of openness, dependence on tourism, and proneness to natural disasters, the countries of the Eastern Caribbean Currency Union (ECCU) are unusually exposed to external shocks. Nevertheless, the volatility of economic output in the ECCU has over past decades been markedly lower than in other high-middle-income countries. This chapter finds that this relative stability is explained by fiscal policies and international capital flows that are less procyclical than typically is the case in other developing countries. The scope for continued stability could be ending, however, as high public debt may force outcomes to become more procyclical.

The literature on macroeconomic volatility would predict high output volatility in the ECCU; however, the evidence in the region does not support this hypothesis. A number of studies—including Acemoglu and Zilbotti (1997), Easterly and Kraay (2000), Easterly, Islam, and Stiglitz (2000), and Pritchett (2000)—have sought to uncover the sources of economic volatility. Their findings suggest that output volatility is typically associated with a low level of income, lack of diversification, and openness to trade. One would then expect the ECCU countries to be extremely volatile, considering that their sum of imports and exports amounts to about 130 percent of GDP, their tourism receipts account for roughly half of total exports of goods and services, and they endure frequent devastat-

ing hurricanes. Historically, however, the ECCU economies have been remarkably stable. Indeed, the analysis finds that the standard indicators of vulnerability identified in the literature suggest a level of real GDP volatility that is about twice as high as that actually observed. The exceptionally low volatility of the ECCU would therefore seem related to factors that are unique to the region.

The low level of output volatility in the ECCU has so far received little attention. There is a large literature on the special vulnerability of small island states (Atkins, Mazzi, and Easter, 2000), but most of the studies do not address the fact that the ECCU countries fail to fit into this picture in terms of their historical output volatility. Berezin, Salehizadeh, and Santana (2002)—in one of the few studies to mention this anomaly—suggest five causes: macroeconomic stability; absence of large-scale social conflicts; a declining role of agriculture; low correlation between sectors; and stable export earnings. This chapter builds on their work by exploring the causes of low output volatility and discusses possible implications.

The region's reliance on tourism has contributed to the relative stability, but it does not appear to be the dominating determinant. Dependence on tourism has not created volatility as one could have expected, as it is an unusually stable industry. Indeed, despite the lack of diversification, the volatility of overall exports of goods and services is lower in the ECCU than in the average developing country. In addition, private capital inflows into the ECCU countries are predominantly in the form of comparatively stable foreign direct investments. Nevertheless, the impact of these two sources of stability appears limited, as estimates suggest that private sector volatility in the ECCU is relatively high.

A key source of stability in the ECCU has been the ability to pursue countercyclical policies. Contrary to the procyclical tendencies in developing countries documented by Kaminsky, Reinhart, and Végh (2004), fiscal policy and international capital flows in the ECCU countries are found to have been only mildly procyclical or even countercyclical. The absence of this "when it rains, it pours" syndrome helps explain why the effects of high external vulnerability have been so muted. A key reason for the ECCU countries' ability to pursue countercyclical policy is that they have had relatively easy access to capital in good and bad times. This, in turn, may be related to the exceptional stability of the common quasi-currency board arrangement, with the Eastern Caribbean dollar pegged to the U.S. dollar since 1976 and to the pound sterling before that. Such an explanation would also be consistent with recent studies by Acemoglu and others (2003) and Satyanath and Subramanian (2004), who argue that institutions are the fundamental determinants of economic outcomes, and that

macroeconomic policies are symptoms rather than root causes of volatility. This may be a mixed blessing, however. If the monetary arrangement has provided easier access to capital it may also have contributed to the buildup of debt.[1]

While the ECCU countries so far have been islands of stability, there are worrying signs that this might be ending. Fiscal balances have deteriorated sharply in the ECCU since the mid-1990s, and public debt has risen rapidly. With public debt-to-GDP ratios now among the highest in the world, governments will not likely be able to borrow to the extent they have in the past when faced with the next downturn. Such procyclical tendencies would lead to greater volatility and have detrimental consequences. Ramey and Ramey (1995), for example, find that higher output volatility leads to significantly lower economic growth. In addition, given risk aversion and a limited capacity to insure, volatility itself is associated with a welfare cost that may be very large in developing countries (Pallage and Robe, 2003; Chapter 7 of this volume).

Stylized Facts: High Vulnerability but Low Volatility

The ECCU countries share a number of structural features that make them exceptionally vulnerable to external shocks. Part of this exposure is related to their very small size—the combined annual GDP of the ECCU-6, the six member countries that also belong to the IMF, is less than US$3 billion, and their total population is just 570,000.[2]

The countries also share a number of other features that add to their vulnerability (Table 5.1). The most visible vulnerability is exposure to natural disasters. As will be documented in Chapter 7, the ECCU countries are among the most frequently hit in the world by several types of natural disasters, primarily hurricanes but also earthquakes and volcanoes. Estimates of the costs of natural disasters are subject to considerable uncertainty, but available data suggest that the value of damage in the ECCU is equivalent to 2 percent of GDP per year on average. Some catastrophic events caused damage exceeding 100 percent of GDP, such as Hurricane David in Dominica (1979), Hurricane Georges in St. Kitts and Nevis (1998), and Hurricane Ivan in Grenada (2004). Over the past three

[1]See Chapter 3 for a discussion of the moral hazard problem inherent in the monetary arrangement.

[2]The ECCU-6 are Antigua and Barbuda, Dominica, Grenada, St. Lucia, St. Kitts and Nevis, and St. Vincent and Grenadines.

Table 5.1. Selected Indicators of Exposure to Exogenous Shocks

	Number of Natural Disasters Divided by Population (Index)	Average Annual Damage from Natural Disasters (Percent of GDP)	Imports of Goods and Services (Percent of GDP)	Exports of Goods and Services (Percent of GDP)	Tourism Receipts (Percent of total exports)
ECCU-6	747	3.0	72	57	48
Antigua & Barbuda	799	0.7	84	76	63
Dominica	906	3.6	68	53	33
Grenada	393	6.8	75	58	39
St. Kitts & Nevis	1,171	4.0	75	46	39
St. Lucia	459	2.0	71	56	74
St. Vincent & the Grenadines	751	1.0	61	53	42
Small island developing states	392	1.8	70	57	36
All countries	100	0.7	49	44	18
Low-income	51	0.8	43	33	16
Low-middle-income	109	1.0	49	40	20
High-middle-income	210	0.8	53	51	23
High-income	47	0.1	54	59	14

Sources: IMF, World Economic Outlook database; World Bank, World Development Indicators database; Emergency Disasters Data Base (EM-DAT) (CRED, 2005); and IMF staff estimates.

Notes: The data on natural disasters refer to 1970–2004; all other data are for 2000. Figures for country groups are unweighted averages. ECCU-6 denotes the six countries in the Eastern Caribbean Currency Union that also are members of the IMF.

decades, the 12 most damaging disasters in the region were associated with a median 2.2 percentage point same-year decline in the growth rate of real GDP, which has clearly contributed to output volatility.

A second striking feature of the ECCU economies is their dependence on international trade. Openness renders countries vulnerable to volatile international markets and has been found to lead to high output volatility (Easterly and Kraay, 2000). In the ECCU countries, the sum of exports and imports is very high, at about 130 percent of GDP. Imports alone represent about 70 percent of GDP, reflecting the high dependence of the tourism sector and domestic markets on imported goods.

A third source of vulnerability is the lack of economic diversification. A concentrated production structure can be expected to lead to higher output volatility (Jansen 2004; Mobarak, 2004). In the ECCU, the large export sector is heavily dependent on tourism. In addition, a single agricultural crop typically dominates merchandise exports.

All the standard indicators of economic vulnerability would suggest that the ECCU economies are among the most vulnerable in the world.

Table 5.2. The Commonwealth Composite Vulnerability Index Rankings

	Export Dependence	Export Diversification	Vulnerability to Disasters	Composite Vulnerability Index
Antigua & Barbuda	5	69	7	2
Dominica	28	85	13	12
Grenada	35	62	17	15
St. Kitts & Nevis	16	59	67	29
St. Lucia	9	40	37	19
St. Vincent & the Grenadines	32	44	43	24

Source: Atkins, Mazzi, and Easter (2000).

Notes: The composite index is a weighted average of the three variables, where export dependence is measured by exports of goods and services as a fraction of GDP, export diversification is given by the UNCTAD diversification index for merchandise exports, and vulnerability to natural disasters is given by the percent of population affected by disasters. The weights are given by the importance of these variables in determining output volatility. The sample has 111 countries. For each measure, the country deemed the most vulnerable is assigned a ranking of "1."

A number of studies have sought to synthesize the different variables into a composite vulnerability index, as exemplified in Table 5.2. By this measure, all of the ECCU countries are among the top 30 of the 111 countries considered, with Antigua and Barbuda taking second place.[3]

The ECCU countries may also lack resilience to adverse events stemming from a low capacity to absorb shocks. Hausmann and Gavin (1996) find that inflexible exchange rate regimes contribute to higher macroeconomic volatility because of their inability to absorb real shocks. Thus, most of the adjustment must take place via changes in output. From this perspective, the ECCU's fixed exchange rate regime would be a source of added volatility. Also contributing to low resilience is that even if some relative price movements take place, the responsiveness of tourism tends to be smaller than that of other exports.[4] Consequently, countries would find it difficult to expand tourism to compensate for downturns in other parts of the economy. This general tendency may well be especially pronounced in the ECCU, where the dominant form of high-end tourism is widely considered to be price inelastic.

[3]Other vulnerability indexes have been produced by Briguglio (1992, 1993, 1995, 1997), Crowards and Coulter (1998), and Crowards (2000). These other indexes also consider transport costs and dependence on strategic imports as sources of vulnerability. The general conclusion is that small island states tend to be more economically vulnerable than other groups of countries.

[4]See Pain and Van Welsum (2004) and references therein for a discussion on the relatively low price elasticity of tourism and other services in comparison with merchandise trade.

Table 5.3. Volatility of Real GDP, 1971–2003
(Annual percent change)

	Average Real GDP Growth	Standard Deviation	Coefficient of Variation	Number of Years with Growth Less than: –2 percent	Average less 4 percent
ECCU-6	4.5	3.9	0.9	1.3	3.3
Antigua & Barbuda	4.9	3.1	0.6	1	3
Dominica	3.5	5.5	1.6	3	4
Grenada	4.5	3.2	0.7	1	3
St. Kitts & Nevis	4.8	2.8	0.6	1	3
St. Lucia	4.6	5.1	1.1	1	5
St. Vincent & the Grenadines	4.5	3.6	0.8	1	2
Small island developing states (34)	3.8	5.5	1.4	3.4	4.7
All countries (175)	3.5	5.5	1.5	3.5	4.4
Low-income (55)	3.3	6.0	1.8	4.5	5.1
Middle-income (50)	3.5	5.5	1.6	3.8	4.6
High-middle-income (33)	3.8	6.2	1.6	3.4	5.0
High-income (37)	3.7	4.1	1.1	3.1	4.4
Developing countries by region					
Caribbean (14)	3.5	4.8	1.4	13.7	4.5
Latin America & the Caribbean (31)	3.3	4.6	1.4	3.4	4.4
East Asia & Pacific (17)	4.5	5.1	1.1	3.0	4.5
South Asia (7)	5.1	3.4	0.7	1.1	1.3
Europe & Central Asia (26)	2.3	7.0	3.0	5.2	5.4
Sub-Saharan Africa (44)	3.4	6.3	1.8	4.7	5.5
Middle East & North Africa (13)	4.3	7.5	1.8	3.9	5.5

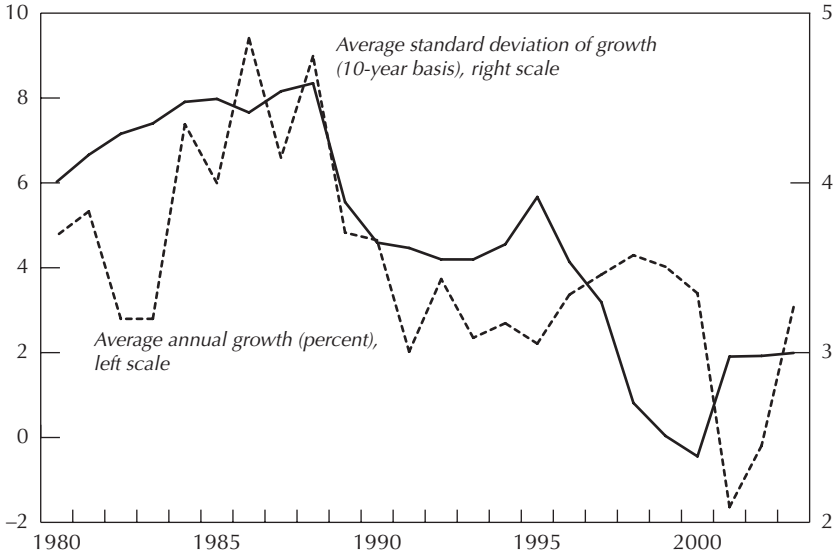
Sources: IMF, International Financial Statistics and World Economic Outlook databases; Eastern Caribbean Currency Union country authorities; and IMF staff estimates.

Notes: Figures for country groups are simple averages, with the number of countries in parentheses. ECCU-6 denotes the six countries in the Eastern Caribbean Currency Union that also are members of the IMF.

Economic Volatility: Cross-Country Evidence

Surprisingly, the ECCU countries have been islands of stability in a volatile developing world. In other words, the high degree of vulnerability identified in the previous section has not been associated with the high output volatility one would have expected. It is well documented that output volatility tends to be markedly higher in developing than in high-income countries (Agénor, McDermott, and Prasad, 2000) and that small economies have experienced higher volatility than large economies (Easterly and Kraay, 2000). However, as Table 5.3 indicates, the volatility of real GDP growth in the ECCU—as measured by the standard deviation over the past three decades—has on average been lower than in virtually

Figure 5.1. Eastern Caribbean Currency Union: Real GDP



Source: Eastern Caribbean Currency Union country authorities.

all regions of the world. This finding is robust to alternative measures of volatility—for example, measured by the coefficient of variation (the standard deviation divided by the mean) or the fraction of years with growth below a certain threshold. Moreover, volatility in the ECCU has been on a declining trend since the mid-1980s (Figure 5.1). This section seeks to explain the reason for this remarkably low level of output volatility.[5]

The core variables that have been used to explain output volatility in cross-country regressions cannot account for the unusual stability in the ECCU. Table 5.4 shows the results of regressing countries' historical output volatility on a series of explanatory variables capturing potentially relevant characteristics of the economies, including measures of vulnerability discussed in the previous section. Regression (1) includes a core set of explanatory variables that have emerged in the literature on determinants

[5]See World Bank (2003) for additional background on growth and volatility in the ECCU. The study presents data showing that consumption volatility in the region has been higher than output volatility and also relatively high in comparison with other countries. However, data on consumption levels in the ECCU are weak, and the high degree of consumption volatility may reflect a measurement problem.

of volatility: institutional quality; the degree of openness; the size of the economy; and average per capita income.[6] It shows significant coefficients associated with each of these variables, with the signs of the first three as expected. Contrary to some previous findings (such as Jansen, 2004) and the simple correlation identified in Table 5.3, the coefficient on per capita income is positive, suggesting that higher income does not lower volatility when controlling for the other variables. While these variables explain a sizable share of the cross-country variation in output volatility, the regression fails to explain the ECCU's very low volatility, as reflected by the negative and highly significant coefficient for the ECCU dummy variable. Indeed, the magnitude of the coefficient on the ECCU dummy suggests that the region's volatility has been only half of what the other variables imply. In contrast, the coefficient on the dummy variable for other small island developing states is much smaller and barely significant at the 10 percent level.

Other explanatory variables used in previous studies do not explain the puzzle. Regression (2) includes measures of terms of trade volatility, export concentration, exposure to natural disasters, and the importance of agriculture in the economy. None of these variables has significant coefficients, although the explanatory power of the regression increases and some of the previous coefficients lose their significance.[7] Regression (3) introduces a series of regional dummies. Here the dummies for developing countries in Europe and Central Asia and the Middle East and North Africa are found to be statistically significant, reflecting those countries' high volatility, while the other coefficients are broadly similar to those in regression (1). In both regressions the coefficient on the ECCU dummy variable remains strongly negative. This shows that even a broad set of explanatory variables fail to account for the stability of the ECCU output, with regressions (1) to (3) all pointing to predicted volatility about double the actual level.

[6]See Appendix 5.1 for a detailed description of the data sources and definitions. The measure of institutional quality is an index of regulatory quality developed by the World Bank that captures the incidence of market-unfriendly policies and perceptions of the burdens imposed by excessive regulation.

[7]Others have found these variables to have a significant impact on volatility. For example, Atkins, Mazzi, and Easter (2000) find a positive impact from susceptibility to natural disasters and export concentration; Easterly and Kraay (2000) find a positive impact from terms of trade volatility; and Fiaschi and Lavezzi (2003) find a negative impact from the size of the agricultural sector. Some of these differences in results may reflect different estimation periods and data sources, but they may also reflect that those studies fail to include important control variables.

Table 5.4. Determinants of Output Volatility, 1971–2003

(Cross-country OLS regressions with the natural logarithm of the standard deviation of annual real GDP growth as the dependent variable)

	Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for						
ECCU-6	–0.506 (0.202)**	–0.498 (0.229)**	–0.469 (0.214)**	–0.666 (0.243)***	–0.385 (0.210)*	–0.093 (0.241)
Other small island developing states	–0.177 (0.105)*	–0.051 (0.148)	–0.077 (0.108)	–0.064 (0.174)	–0.063 (0.122)	–0.002 (0.165)
Institutions (regulatory quality)	–0.297 (0.050)***	–0.314 (0.071)***	–0.230 (0.055)***	–0.252 (0.079)***	–0.276 (0.072)***	–0.263 (0.079)***
Openness (ratio of exports to GDP)	0.002 (0.001)*	0.000 (0.002)	0.002 (0.001)*	0.000 (0.003)	0.001 (0.002)	0.007 (0.003)**
Size (U.S. dollar GDP†)	–0.085 (0.020)***	–0.079 (0.028)***	–0.083 (0.021)***	–0.074 (0.031)**	–0.079 (0.023)***	–0.025 (0.028)
Income (PPP GDP per capita in 1970†)	0.131 (0.041)***	–0.026 (0.072)	0.085 (0.049)*	0.011 (0.065)	0.095 (0.057)*	0.034 (0.061)
Terms of trade volatility		0.000 (0.002)				
Export concentration		0.157 (0.223)				
Agriculture share in GDP		–0.007 (0.006)				
Damage from natural disasters		0.000 (0.001)				
Dummy for developing countries in						
Latin America & Caribbean			0.040 (0.124)			
East Asia & Pacific			–0.010 (0.173)			
South Asia			–0.291 (0.205)			
Europe & Central Asia			0.363 (0.133)***			
Sub-Saharan Africa			0.068 (0.162)			
Middle East & North Africa			0.292 (0.159)*			

M2 ratio to GDP				0.005 (0.002)**		
Financial flows ratio to GDP				–0.006 (0.012)		
standard deviation				0.019 (0.006)***		
Exchange rate regime				–0.006 (0.051)		
Transfers ratio to GDP					–0.002 (0.010)	
Services share in exports					–0.002 (0.003)	
Foreign direct investment ratio to GDP					0.008 (0.005)	
Public consumption ratio to GDP						0.010 (0.010)
standard deviation						0.000 (0.011)
Fiscal procyclicality						0.037 (0.010)***
Constant	0.842 (0.260)***	2.054 (0.600)***	1.045 (0.397)***	1.347 (0.396)***	1.074 (0.374)***	0.757 (0.357)**
Number of observations	168	107	168	87	127	89
R-squared	0.364	0.442	0.444	0.476	0.399	0.559
Adjusted *R*-squared	0.340	0.384	0.401	0.407	0.353	0.508
F-test	15.37***	7.6***	10.3***	6.91***	8.64***	11.10***

Sources: See Appendix 5.1.

Notes: Figures in parentheses are standard deviations, and *, **, *** indicate significance at, respectively, the 10, 5, and 1 percent level. Variables denoted with a † are expressed in natural logarithms. PPP denotes purchasing power parity. OLS denotes ordinary least squares.

Table 5.5. Selected Indicators

	Standard Deviation of U.S. Dollar Export Growth (percent per year)	Services Share in Total Exports (percent)	Private Current Transfers (percent of GDP)	Foreign Direct Investment (percent of GDP)	Broad Money (M2) (percent of GDP)
ECCU-6	20	55	4.7	9.9	60
Antigua & Barbuda	36	75	3.9	5.3	67
Dominica	18	38	4.2	7.2	46
Grenada	14	62	5.3	6.9	78
St. Kitts & Nevis	21	47	8.1	16.8	65
St. Lucia	17	57	2.6	7.5	52
St. Vincent & the Grenadines	13	52	4.3	15.4	52
Small island developing states	23	45	3.9	6.2	52
All countries	22	26	2.4	4.6	43
Low-income	26	22	3.7	5.1	25
Low-middle-income	21	26	4.2	3.8	44
High-middle-income	22	32	1.0	5.4	52
High-income	17	26	–0.8	4.3	68

Sources: IMF, World Economic Outlook database.

Notes: The data refer to 1971–2003, except for current transfers and foreign direct investment, which are averages over 1995-2003. ECCU-6 denotes the six countries in the Eastern Caribbean Currency Union that also are members of the IMF.

Several other factors could explain the relative stability of the ECCU. Part of the explanation may be that the volatility of exports of goods and services has not been particularly high given the lack of diversification (Table 5.5). This can be attributed to the relative stability of the large tourism industry and, to a lesser extent, the stable export prices afforded to agricultural exports under preferential trading arrangements. Another possible source of stability is that the ECCU nations have a large diaspora and receive substantial remittances (see Chapter 9) that could potentially help offset economic difficulties, although Cashin and Wang (2005) find that such transfers have tended to be procyclical. In addition, the countries receive exceptionally high levels of foreign direct investment (FDI) that are relatively stable in comparison to inflows of portfolio investment. Finally, the ECCU countries are highly monetized compared with other developing countries, which may have helped buffer adverse shocks.

Accounting for the factors noted in the previous paragraph still leaves unresolved questions. Regression (4) introduces a series of variables related to the financial sector, and shows the M2-to-GDP ratio and the standard deviation of international financial flows entering with significant positive

Table 5.6. Indicators of Economic Volatility, 1984–2003
(Standard deviations)

	Real GDP Growth (Percent per year)	Government Expenditure (Percent of GDP)	"Private" Real GDP Growth (Percent per year)[1]
ECCU-6	3.7	4.8	8.0
Antigua & Barbuda	3.5	3.4	4.9
Dominica	3.3	4.4	8.3
Grenada	3.6	7.6	12.0
St. Kitts & Nevis	3.0	8.0	9.8
St. Lucia	5.0	2.5	6.6
St. Vincent & the Grenadines	3.8	2.5	6.3
Small island developing states	4.7	3.9	6.8
Low-income countries	5.4	4.0	6.5
Low-middle-income countries	5.3	3.2	6.3
High-middle-income countries	5.6	4.0	6.7
High-income countries	3.3	2.3	4.2

Sources: IMF, International Financial Statistics and World Economic Outlook databases; Eastern Caribbean Currency Union country authorities; and IMF staff estimates.

Note: ECCU-6 denotes the six countries in the Eastern Caribbean Currency Union that also are are members of the IMF.

[1]Defined as the change in $y(1 - g)$, where y is the index of real GDP and g is government expenditure as a share of GDP.

coefficients (Table 5.4). However, after controlling for these factors, the coefficient on the ECCU dummy becomes even more negative. Regression (5) includes measures of the magnitude of service exports, international transfer receipts, and FDI to capture some of the other atypical features of ECCU economies. None of these variables has a significant impact on output volatility, although the coefficient on the ECCU dummy is slightly reduced.

The key reason for the relatively low volatility of output in the ECCU appears to have been the countercyclical fiscal policy pursued by national governments. Excluding the public sector's contribution to GDP suggests that private sector output volatility has been relatively high in the ECCU (Table 5.6).[8] The high level of volatility in the private sector is what one would expect given the high level of vulnerability to external shocks identified above. This suggests that the low level of overall volatility is a result of developments in the public sector.

[8]Fiscal data for the ECCU is only available since 1983. However, the pattern of output volatility is broadly the same in the post-1983 period as in the 1971–2003 period considered earlier.

Table 5.7. Measures of Procyclicality

	Fiscal Policy	Capital Flows
ECCU-6 average	1.5	–1.4
Antigua & Barbuda	7.0	6.2
Dominica	–0.7	–5.8
Grenada	–3.9	–1.3
St. Kitts & Nevis	1.8	–2.3
St. Lucia	2.5	0.6
St. Vincent & the Grenadines	2.2	–6.0
Small island developing states	4.2	. . .
Low-income countries	8.6	0.3
Middle-low-income countries	4.2	1.2
Middle-high-income countries	6.5	1.4
High-income countries	0.4	0.1

Sources: IMF staff estimates for Eastern Caribbean Currency Union countries, 1983–2004; Kaminsky, Reinhart, and Végh (2004) for 104 other countries, 1960–2003.

Notes: Fiscal policy refers to the average annual growth in central government real expenditure. Capital flows refer the financial account balance in percent of GDP. In both cases, the index is computed as the difference between the average value in good times (real GDP growth above median) and the average value in bad times (real GDP growth below median). Higher values are thus associated with more procyclical developments. ECCU-6 denotes the six countries in the Eastern Caribbean Currency Union that also are members of the IMF.

Fiscal policy in the ECCU has been relatively countercyclical. Government expenditure in developing countries tends to grow much faster in good times than in bad times (Table 5.7). Except for Antigua and Barbuda, this tendency is mostly absent in the ECCU. Indeed, by this measure, fiscal policy in the ECCU has on average been almost as countercyclical as in high-income countries.[9] The critical importance of fiscal policy is evident in regression (6), where the measure of fiscal procyclicality enters with a positive and strongly significant coefficient (Table 5.4).[10] This regression has the highest R-squared of the six, with the measures of institutional quality and openness being the only other variables associated with significant coefficients. Moreover, in this regression the coeffi-

[9]The applied measures of cyclicality are from Kaminsky, Reinhart, and Végh (2004).

[10]There is a possibility that fiscal policy procyclicality, at least in part, depends on output volatility rather than the other way around, which would impair the statistical properties of the regression. Nevertheless, it seems likely that fiscal policy would depend more on the root causes of volatility, such as the size and openness of the economy. Also, similar endogeneity issues present themselves with respect to several of the other variables, notably the measure of institutional quality. Other studies have attempted to correct for potential endogeneity problems by using instrumental variable techniques (Acemoglu and others, 2003; Satyanath and Subramanian, 2004), but they still find that institutions have an important impact on volatility.

cient on the ECCU dummy variable is substantially reduced and becomes statistically insignificant.

An even more striking result is that international capital flows have been much more countercyclical in the ECCU countries than in other regions, including the high-income countries. Since public sector borrowing has driven a large part of capital inflows into the ECCU, the countercyclicality of international capital flows is to some extent the result of the low degree of procyclicality in fiscal policy. Both measures reflect that the ECCU governments have had unusually easy access to credit, allowing them to borrow in periods when other developing countries have typically been cut off. Importantly, Antigua and Barbuda, the one ECCU country that has been decidedly procyclical, is also the one that has been cut off from traditional international capital markets following defaults on its external debt dating back more than a decade (Table 5.7).

The quasi-currency board arrangement is likely to have been an important contributor to output stability in the ECCU. Given that a countercyclical stance is a goal that governments typically aspire to but are often unable to achieve, the question arises as to why the ECCU countries have been less financially constrained than other developing countries. Although the cross-country regressions do not point to any significant effect from the exchange rate regime, the relatively countercyclical nature of fiscal policy and international capital flows in the ECCU could be related to the stability provided by the monetary arrangement.[11] Having maintained a fixed exchange rate against the U.S. dollar for almost three decades, the system has undoubtedly contributed to keeping inflation and interest rates low and stable, and has facilitated the development of deep financial systems. Indeed, there are very few other countries in the world that have maintained a fixed exchange rate for so long. (Panama is the only other country with an equally impressive record in the Reinhart-Rogoff [2002] dataset.)[12] That the cross-country regressions do not detect a significant impact of the exchange arrangement may simply reflect that

[11]The Reinhart and Rogoff (2002) measure of exchange rate flexibility takes values on a scale of 1 to 15, with 1 indicating regimes with no separate legal tender. The ECCU countries all receive 2s (for pre-announced peg or currency board arrangement) throughout the 1940–2001 sample period. See Appendix 5.1 for additional details.

[12]Among IMF member countries, there are seven countries aside from the ECCU countries that have managed to maintain an exchange rate relative to the U.S. dollar that has never varied by more than 1 percent since 1980 on a year-average basis: The Bahamas, Bahrain, Barbados, Belize, Djibouti, Panama, and Qatar. However, as with the Reinhart and Rogoff (2002) index, a dummy variable for these countries is not associated with a significant coefficient in the cross-country-regression analysis.

there are very few other countries that have managed to establish such enduring pegs. Also, while a fixed exchange rate may help provide access to credit and thereby facilitate the operation of countercyclical forces, the overall impact on output volatility is ambiguous, as the effect of reduced price flexibility identified by Hausmann and Gavin (1996) would work in the opposite direction. Another possible explanation is that, with the exception of Antigua and Barbuda, the ECCU countries by and large have had (until recently) an excellent record of remaining current on sovereign borrowings, a factor that has been found to be an important determinant of a country's borrowing capacity (Reinhart, Rogoff, and Savastano, 2003).

Concluding Remarks

Despite the frequency of real shocks, the volatility of output in ECCU countries has been surprisingly low. This exceptionally low volatility has been associated with the fact that fiscal policy has been markedly less procyclical than in other developing countries. The ability to borrow as a result of a good record of debt repayment in most countries, and the stability of the monetary system, are two important factors that have allowed ECCU countries to pursue countercyclical policies.

Cross-country experience shows that countercyclical fiscal policy is one of the main drivers of low economic volatility. The analysis indicates that the cyclicality of government expenditure is a key determinant of output volatility. High output volatility is also strongly linked to low institutional quality, and there is partial evidence of a positive impact from openness, small size of the economy, high per capita income, and a high degree of monetization. Several of these variables may be interrelated and it is therefore difficult to pinpoint their individual significance. It is clear, however, that the countercyclical fiscal policy pursued by ECCU countries has helped dampen what would otherwise have been a much higher level of volatility.

Future stability of the ECCU economies will depend on the continued capacity to pursue fiscal policies that are markedly less procyclical than in other developing countries. If public debt continues to rise and borrowing limits are reached, expenditure reductions in downturns may become inevitable, thereby contributing to greater output volatility. Debt distress is already evident in Antigua and Barbuda, Dominica, and Grenada, indicating that it will be difficult to pursue expansionary fiscal policies in the near future.

Appendix 5.1. Data Sources

Real GDP	Country authorities for data on the ECCU. Otherwise, International Financial Statistics (series ...99BVPZF...) where available, and else World Economic Outlook (WEO) database (series W...NGDP_R).
Size	Gross domestic product, current prices, U.S. dollars from WEO (series W...NGDPD). Values used are the average levels over 1971–2003.
Income	Purchasing power parity (PPP) per capita from WEO (series W...PPPPC). Values used are the levels in 1970.
Institutions	Regulatory quality from the World Bank's Worldwide Governance Research Indicators dataset. Scores range between –2.5 (worst) and +2.5 (best). Values used are average scores for 1996–2002.
Openness	Ratio of exports of goods and services to GDP, both in U.S. dollars, from WEO (series W...TX and W...NGDPD). Values used are the average levels over 1971–2003.
Terms of trade volatility	Terms of trade, goods and services index from WEO (series W...TT). Values used are the standard deviations over 1971–2003.
Export concentration	Concentration of exports (goods only) index from UN Conference on Trade and Development (UNCTAD). Values used are the levels in 2000.
Agriculture share in GDP	Agriculture value added (percent of GDP) from the World Bank's World Development Indicators (series ...NVAGRTOTLZS). Values used are the average levels over 1971–2003, including countries with partial series if there are at least 10 observations.
Damage from natural disasters	Cumulative damage during 1970–2002 (in percent of GDP) from Chapter 7, based on EM-DAT data.
M2 ratio to GDP	Broad money and GDP, both in national currency, from WEO (series W...FMB and W...NGDP). Values used are the average levels over 1971–2003.

Financial flows ratio to GDP	Financial account balance and GDP, both in U.S. dollars, from WEO (series W...BF and W... NGDPD). Values used are the average levels over 1971–2003, and the standard deviation over the same period.
Exchange rate regime	Coarse annual classification by Reinhart and Rogoff (2002) available at *http://www.wam.umd.edu/~creinhar/Links.html*. Values used are average levels over 1970–2002.
Transfers ratio to GDP	Current private transfers and GDP, both in U.S. dollars, from WEO (series W...BTRP and W... NGDPD). Values used are the average levels over 1995–2003.
Services share in exports	100 minus export of goods in percent of value of exports of goods and services, both in U.S. dollars, from WEO (series W...BXG and W...TX). Values used are average levels over 1971–2003.
FDI ratio to GDP	Direct investment in reporting economy in percent of GDP, both in U.S. dollars, from WEO (series W...BFDI and W...NGDPD). Values used are the average levels over 1995–2003.
Public consumption ratio to GDP	Public consumption expenditure in percent of GDP, both in national currency, from WEO (series W...NCG and W...NGDP). Values used are the average levels over 1971–2003, and the standard deviation over the same period.
Fiscal procyclicality	From Kaminisky, Reinhart, and Végh (2004), augmented with own calculation for the ECCU countries using the same methodology based on data from ECCU country authorities.
Country classification	Income classification according to World Bank (*http://www.worldbank.org/data/countryclass/classgroups.htm*); regional classification according to World Bank (*http://www.worldbank.org/data/countryclass/classgroups.htm*); and small island developing states according to Small Island Developing States Network (*http://www.sidsnet.org/docshare/other/20040219161354_sids_statistics.pdf*)

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III

Financial Sector Issues

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6

The Eastern Caribbean Currency Union Banking System in a Time of Fiscal Challenge

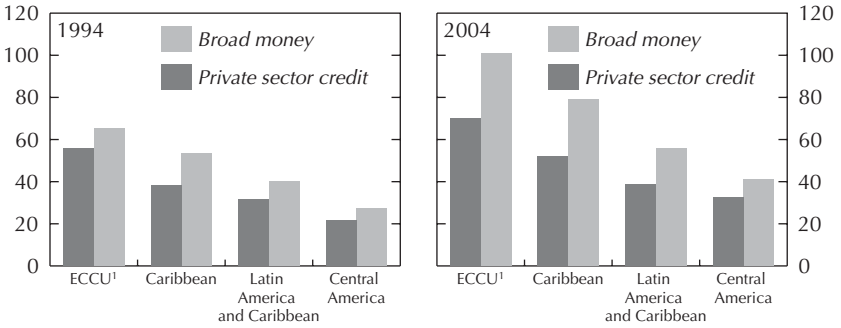
JINGQING CHAI

The small island economies of the Eastern Caribbean Currency Union (ECCU) have not fared well since the mid-1990s, having been hit by a number of external shocks including natural disasters, erosion of trade preferences, and adverse shocks affecting tourism. Partly as a consequence of these shocks, GDP growth slowed sharply. Reflecting the costs of higher employment in the public sector and of disaster recovery and management, both public expenditure and debt as a share of GDP rose sharply in the late 1990s (IMF, 2004a). Compared with the early part of the 1990s, macroeconomic performance in a number of ECCU countries has deteriorated relative to other Caribbean countries (see Chapter 2), and some have experienced fiscal crises as their governments failed to meet payment obligations.

At the same time, the ECCU's financial system appears to have been resilient and its status compares favorably with countries at similar levels of economic development. The onshore banking system—the main institution in resource and credit allocation—expanded at an average annual rate of 10 percent from 1994–2004. The depth of the ECCU banking system, measured as the ratio of private sector credit or broad money to GDP, is greater than averages for the wider Caribbean, the wider Caribbean and Latin America, and Central America (Figure 6.1).

A sound and profitable financial system increases an economy's resilience to adverse macroeconomic shocks and promotes economic growth

Figure 6.1. Financial Sector Development by Region
(In percent of GDP)



Sources: IMF, International Financial Statistics database; and author's calculations.
[1]Eastern Caribbean Currency Union.

through efficient intermediation. In light of challenging macroeconomic conditions and the continued vulnerability of the ECCU economies to external shocks, it is critically important to assess the strengths and weaknesses of the ECCU financial system. This chapter compares the performance of the ECCU banking system with that of other Caribbean countries and examines the impact of large fiscal imbalances in the currency union on the performance of its banking system.

Overview of the ECCU Financial System

The ECCU's financial system is dominated by commercial banks. As of the end of 2004, 39 licensed commercial banks managed assets totaling 61 percent of GDP. In addition, a large number of institutions that are near banks (e.g., cooperative credit unions) manage assets equivalent to about 24 percent of GDP. The insurance sector, consisting of 146 insurance companies and agencies, manages assets totaling about 12 percent of GDP. There is also a sizable offshore financial services sector (IMF, 2004b).

The ECCU's financial system has a relatively strong presence of foreign banks, with branches of well-established banking groups headquartered in Canada and the United Kingdom. These foreign branches dominated the ECCU banking system in the 1980s, but their market share declined thereafter, as indigenous (local) banks expanded. However, foreign branches still account for the lion's share of the total banking system (about 50

percent) as compared with Latin America (21 percent) and Asia (28 percent) (Claessens, Dermigüç-Kunt, and Huizinga, 2001). Since the early 2000s, other Caribbean regional banks (mainly those based in Trinidad and Tobago) have aggressively entered the ECCU market, and while these banks are locally incorporated, they are wholly owned by Caribbean financial groups.

The currency, price, and financial stability achieved under its quasi-currency board arrangement has contributed to the ECCU's financial sector development. The Eastern Caribbean Central Bank (ECCB), a largely independent central bank, eliminates the option of monetizing fiscal deficits, thereby stemming a major source of inflationary pressure and helping maintain public confidence in the Eastern Caribbean (EC) dollar.[1]

The currency union's liberal approach to financial policy is another factor contributing to relatively deep financial development in the ECCU. The financial system has been for the most part free from financial repression. There are generally no restrictions to the entry of new banks, which are largely free to set interest rates and determine credit allocation.[2] Unremunerated reserve requirements in the ECCU, which act as an effective tax on commercial banks, are the lowest in the Caribbean—6 percent of demand liabilities—compared with a range of 15 percent in The Bahamas to 47 percent in Jamaica (World Bank, 1998). Unlike some of the other Caribbean countries (such as Barbados and Trinidad and Tobago until recently), there have been no explicit investment requirements on government securities. This liberal approach is complemented by capacity building through the ECCB's banking supervision, a generally fair judiciary system that respects creditor rights, and current account and de facto capital account convertibility, which has facilitated capital movement in and out of ECCU countries (IMF, 2003).

The ECCU regional money and capital markets, established in 2001–02, consist of the Eastern Caribbean Securities Exchange (ECSE), the Regional Government Securities Market (RGSM), and an interbank market. Market capitalization is still very small in comparison with the rest of the financial system, and trading on the three markets is light. The

[1]However, a common monetary union with a fixed exchange rate may be associated with free-riding incentives among member countries, arising from their ability to postpone the inflationary costs of fiscal slippages to the future and dilute them across other member governments (see Chapter 3).

[2]Traces of interventionist sentiments of the founding ECCU-member governments can be found in the 1983 ECCB Act, which reserves governments' right to control, among others things, all interest rates. A minimum savings rate requirement is currently maintained.

interbank money market is relatively small and inactive, notably involving foreign banks lending to their affiliates.

How Has the ECCU Banking System Performed?

This section examines the performance of the ECCU banking system in comparison with seven other Caribbean countries of the Caribbean Community and Common Market (CARICOM) from 1999–2004.[3] These countries share a number of common characteristics: they are relatively small, open island economies; all are part of the Caribbean Single Market and Economy (CSME), which aims to achieve free movement of goods, capital, and labor among member countries in the near future;[4] and their financial services have a limited scope for diversification and lack of economies of scale, as there is a high degree of financial fragmentation.

At the same time, recent economic and macroeconomic developments differ between these countries. Trinidad and Tobago and The Bahamas are the two best macroeconomic performers in terms of prudent fiscal stance, growth and stability. In contrast, the four ECCU countries of St. Kitts and Nevis, Antigua and Barbuda, Dominica, and Grenada, as well as the four non-ECCU countries of Barbados, Belize, Guyana and Jamaica, all experienced widening fiscal deficits and rapidly rising public sector debt, and are now among the top 10 most-indebted emerging market countries in the world (see Chapter 2).

Some caveats to such a comparison need be noted upfront. First, the regulatory framework and supervisory practices vary considerably across the banking systems in the CARICOM region. Thus, the prudential indicators compiled here are not strictly comparable. Nonetheless, they give a general pattern of the conditions of the banking systems, and point to any persistent differences in performance. Second, there may be some variations in the value of prudential indicators, depending on whether the financial year of the reporting bank coincides with a calendar year. However, such variations at the aggregate level should not change the overall picture of a country's banking system. Finally, while the prudential indicators used here are provided by the country authorities, they are not necessarily verified through on-site or off-site inspections.

[3]The Bahamas, Barbados, Belize, Guyana, Jamaica, Suriname, and Trinidad and Tobago. Montserrat and Haiti are excluded due to data limitations.

[4]See Chapter 12 for additional details.

Table 6.1. Regional Comparison: Bank Capital Adequacy Ratio, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	20.6	16.7	15.3	14.7	14.0	13.0	15.7
Dominica	38.2	30.8	35.4	34.1	28.5	23.0	31.7
Grenada	13.4	13.5	14.1	15.6	17.7	14.9	14.9
St. Kitts & Nevis	27.3	26.2	30.0	44.2	33.7	36.5	33.0
St. Lucia	15.2	15.5	16.2	14.7	16.5	18.0	16.0
St. Vincent & the Grenadines	11.4	11.4	12.2	12.8	11.6	8.9	11.4
Bahamas, The	19.4	19.9	29.0	29.1	23.2	. . .	24.1
Barbados	14.9	15.9	18.2	18.8	25.0	17.9	18.5
Trinidad & Tobago	17.5	20.1	19.5	20.6	20.3	23.3	20.2
Belize	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Jamaica	22.7	25.6	23.6	18.5	16.1	15.9	20.4
Suriname[1]	10.1	19.0	17.6	14.8	9.2	9.3	13.3
Guyana	16.7	16.2	16.2	14.3	12.7	14.3	15.1
Eastern Caribbean Currency Union	21.0	19.0	20.5	22.7	20.3	19.1	20.4
Caribbean	19.0	19.2	20.6	21.0	19.0	17.7	19.5

Source: Country authorities.
[1]The figure for 2004 is end-September.

The comparisons that follow across CARICOM countries focus on four groups of prudential banking indicators: capital adequacy, asset quality, profitability, and liquidity.

Capital Adequacy[5]

The stronger the capital position of a bank, the more defense it has against unexpected risks. Moreover, the more capital bank owners have at risk, the less likely it is that they will take undue risks. Getting banks to this position is achieved by requiring them to comply with a risk-weighted capital-to-asset ratio determined by the regulator, with riskier assets assigned higher capital charges.

The ECCU banking system appears to be adequately capitalized. The average capital adequacy ratio (CAR) for 1999–2004 stood at 20.4 percent, more than double the 8 percent prudential requirement set by the ECCB (Table 6.1).

The ECCU's aggregate ratio compares favorably with that in the lower-income Caribbean countries, is comparable to that in Barbados, Trinidad, and Jamaica, but is considerably less than that in The Bahamas.

[5]Capital adequacy ratios are not applicable to foreign branches, which do not have independent capital bases.

Table 6.2. Regional Comparison: Bank-Nonperforming-Loan Ratio, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	9.2	9.3	12.4	11.3	14.4	14.8	11.9
Dominica	17.9	17.4	22.6	19.2	21.7	22.5	20.2
Grenada	10.0	8.5	5.9	5.8	4.5	6.0	6.8
St. Kitts & Nevis	32.5	12.6	11.6	12.7	9.6	7.8	14.5
St. Lucia	11.8	12.7	16.5	20.6	17.7	17.3	16.1
St. Vincent & the Grenadines	13.1	10.9	13.0	11.3	11.1	9.6	11.5
Bahamas, The	4.0	4.3	3.5	4.1	5.1	4.9	4.3
Barbados	3.8	3.8	5.0	7.9	9.3	7.5	6.2
Trinidad and Tobago	4.9	3.9	3.2	3.6	2.0	2.4	3.3
Belize[1]	5.4	6.2	4.5	3.9	3.7	. . .	4.7
Jamaica	12.7	11.0	6.8	4.6	3.8	3.0	7.0
Suriname[2]	. . .	10.9	6.7	8.7	10.4	10.1	9.4
Guyana	31.4	35.7	38.2	37.2	23.3	17.8	30.6
Eastern Caribbean Currency Union	15.8	11.9	13.7	13.5	13.2	13.0	13.5
Caribbean	13.1	11.3	11.5	11.6	10.5	10.3	11.3

Source: Country authorities.
[1]The figure for 2003 is end-September.
[2]The figure for 2004 is end-September.

However, such a cross-country comparison may be problematic. The prudential requirement of calculating the CAR differs from one country to another, and the quality of capital is uncertain in some countries. In the ECCU, the capital of many local banks may be overstated by practices including under-provisioning, ever-greening, taking accrued interest on government loans in arrears into income, and the zero risk-weights applied to public sector debt in arrears (IMF, 2004b). For example, as shown below, the average loan loss provisioning as a share of nonperforming assets is notably lower for the ECCU than for other Caribbean countries.

Asset Quality

A bank will suffer a loss in the economic value of its assets when borrowers become unable or unwilling to service their debt (credit risk). When the losses exceed a bank's required and voluntary reserves as well as its capital cushion, the bank becomes insolvent. One crude way of measuring credit risk in a bank's asset portfolio is the ratio of nonperforming loans (NPLs) to total loans (or the NPL ratio).[6]

[6]NPLs are broadly defined as loans and advances that are 90 days or more overdue. The measure used here also includes nonperforming investments. There are other criteria in the ECCB prudential guidelines that would trigger the classification of a loan to be nonperforming.

Table 6.3. Regional Comparison: Bank-Provisioning-to-Nonperforming-Loan Ratio, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	19.1	19.6	22.3	23.8	19.5	23.5	21.3
Dominica	37.3	40.0	30.2	36.7	34.8	32.2	35.2
Grenada	25.9	31.2	43.6	45.6	61.7	81.9	48.3
St. Kitts & Nevis	7.7	24.7	30.5	27.2	20.8	17.0	21.3
St. Lucia	25.5	28.4	28.1	28.2	42.2	36.1	31.4
St. Vincent & the Grenadines	20.4	35.2	30.4	41.5	34.1	34.3	32.6
Bahamas, The	37.2	40.2	40.4	31.0	40.1	44.9	39.0
Barbados	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Trinidad & Tobago	38.2	47.3	57.7	70.8	117.5	69.7	66.9
Belize[1]	42.7	45.3	64.0	65.5	. . .	. . .	54.4
Jamaica	88.0	137.0	150.0	139.0	125.0	121.0	126.7
Suriname[2]	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Guyana	54.5	49.4	49.1	53.7	33.3	39.7	46.6
Eastern Caribbean Currency Union	22.6	29.8	30.9	33.8	35.5	37.5	31.7
Caribbean	36.0	45.3	49.7	51.2	52.9	50.0	47.6

Source: Country authorities.
[1]The figure for 2003 is end-September.
[2]The figure for 2004 is end-September.

The ECCU banking system compares less than favorably with most other Caribbean countries (Table 6.2). The 1999–2004 period average NPL ratio for the ECCU system is 13.5 percent, compared with the range of 4.3 to 9.4 percent in the Caribbean (except for Guyana). This ratio is also considerably higher than the 5 percent prudential target set by the ECCB, which is based on international standards. The high level of NPLs seems to persist in Antigua and Barbuda, Dominica, and St. Lucia, reflecting the prolonged process for foreclosure and bankruptcy, economic vulnerability to external shocks, and a historical dearth of financial information to reduce credit risk (Box 6.1).

Proactive loan loss provision mitigates the effect of NPLs on a bank's solvency by serving as a buffer in the event that NPLs become loan losses. However, the level of provisioning is persistently lower for the ECCU banking system than the Caribbean regional average (Table 6.3). While this reflects the ECCU's reliance on real estate collateral, persistent underprovisioning is troublesome because it erodes a bank's capital without being detected.[7] Of the Caribbean countries, Jamaica has the highest pro-

[7]One possibility is that the NPL portfolios of ECCU banks have consistently better quality than those of non-ECCU banks. However, this would imply, implausibly, that the NPLs of non-ECCU banks consistently deteriorate faster than those of ECCU banks.

Box 6.1. Factors Explaining the Nonperforming Loan Problem in the Eastern Caribbean Currency Union

There are both structural and economic explanations for the persistent problem of nonperforming loans (NPLs) in the ECCU. One such structural factor is the prolonged process for foreclosure and bankruptcy, especially when certificates of title are used as proof of ownership, as in Antigua and Barbuda, Dominica, and St. Kitts and Nevis. In St. Lucia, like Guyana, the civil code requires three bidders and court approval of the minimum property price—a procedure that is often subject to disputes and prolonged court proceedings. These difficulties have translated into persistently high levels of NPLs due to the delay in resolving problem assets.

Other structural factors that contribute to high NPL levels in the region include high migration rates, which are often associated with defaults in personal loans, and the lack of established credit bureaus that could provide reliable information to assess creditworthiness of borrowers.

A key economic explanation for the NPL problem is the region's vulnerability to external shocks, As discussed earlier, the region is susceptible to natural disasters and other adverse external shocks that affect its major export commodities (sugar and bananas) and leading sector, tourism. Empirical analyses show that the NPL ratio is significantly negatively correlated with real GDP growth with a one-year lag.[1] For example, average real GDP growth in the ECCU fell by 5 percent in 2001 in the wake of Hurricane Iris and the September 11, 2001 terrorist attack in the United States. It is estimated that this could have lead to, on average, a 2 percentage point increase in the NPL ratio in 2002–03.

[1]However, the significance of this result is not robust to the inclusion of country fixed effects, possibly reflecting the small size of the dataset. Instead, the grouped fixed effect for countries with foreclosure difficulties is highly significant.

visioning ratio, as required by banking regulations following that country's 1994–97 banking crisis.

Besides individual credit risk, ECCU banks have large exposures to the household sector (Table 6.4). Except for The Bahamas, the shares of household loans (including mortgage loans) to total bank loans in the ECCU is high when compared with other Caribbean countries. The risk in the concentration of exposure in the household sector may be mitigated, at least on aggregate, by household savings deposited in the banking system—net household saving within the ECCU banking system amounted to 16 percent of total banking system assets (equivalent to 18

Importantly, hurricanes alone do not seem to have had a significant effect on NPL ratios. Grenada is a case in point. While Hurricane Ivan devastated the island in 2004, NPLs did not rise significantly. This can be explained by the pragmatic approach taken by Grenadian banks—a six-month moratorium initially, followed by the refinancing of many loans—and the liquidity injection from donor aid, insurance payouts, and family aid. All of this facilitated rebuilding efforts and provided construction jobs to those displaced by Hurricane Ivan.

Ordinary Least Squares Regression Results for the Eastern Caribbean Currency Union

	NPL ratio					
	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth with one-year lag	–0.43* (0.22)	–0.48** (0.24)	–0.40* (0.23)	–0.46* (0.24)		
Shocks (hurricanes and September 11 attacks)		1.14 (1.64)		1.51 (1.69)		0.54 (1.60)
Real GDP growth (three-year moving average)					–0.59* (0.34)	–0.61* (0.35)
Real GDP growth with two-year lag			–0.17 (0.22)	–0.22 (0.23)		
Observations	54	54	54	54	54	54
R-squared	0.07	0.08	0.08	0.09	0.06	0.06
Adjusted *R*-squared	0.05	0.04	0.04	0.04	0.04	0.02

Sources: Eastern Caribbean Central Bank, and author's calculations.

Notes: Standard errors are in parentheses. * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. NPL denotes nonperforming loans.

percent of GDP) at end-2004. However, the lack of data on household financial liabilities remains a concern.

Reflecting the ECCU banking system's dependence on a tourism-driven local economy, the credit risk in lending is correlated with a number of sectors related to tourism. Besides the household sector, the distributive trade and transportation industries, which have a combined 15 percent share in total bank credit, also depend importantly on tourism receipts. ECCU bank data by sector show that the NPL ratio for personal loans and loans to the distributive trade industry deteriorated during the recent economic downturn triggered by the September 11 shock to regional tourism.

Table 6.4. Regional Comparison: Bank Household Loans to Total Loans, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	44.0	43.3	43.5	42.7	41.0	41.7	42.7
Dominica	41.5	40.5	42.2	43.5	47.0	52.1	44.5
Grenada	52.9	52.9	54.4	57.3	59.9	59.4	56.1
St. Kitts & Nevis	36.3	37.1	39.8	39.2	44.4	38.1	39.2
St. Lucia	47.5	48.6	46.4	44.0	48.3	47.7	47.1
St. Vincent & the Grenadines	51.2	51.5	54.4	55.0	54.9	55.1	53.7
Bahamas, The	61.1	59.8	61.5	61.2	62.5	65.6	61.9
Barbados	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Trinidad & Tobago	48.8	45.7	42.8	41.3	40.4	40.7	43.3
Belize	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Jamaica	30.6	26.8	28.0	23.1	26.1	5.5	23.3
Suriname	10.4	11.0	19.0	5.3	. . .	. . .	11.4
Guyana	17.9	16.1	14.9	17.2	20.1	17.5	17.3
Eastern Caribbean Currency Union	45.6	45.7	46.8	46.9	49.2	49.0	47.2
Caribbean	40.2	39.4	40.6	39.1	44.5	42.3	40.0

Source: Country authorities.

Profitability

Low profitability, if sustained, erodes a bank's ability to generate the reserves that can be used to buffer unexpected losses. Data on profitability (measured as the pretax return on assets) reveal that the ECCU banking system is broadly profitable, comparing favorably with the Caribbean regional average for 1999–2004 (Table 6.5). Belize and The Bahamas have the highest average return on assets in the Caribbean. The return on assets reflects three of a bank's key operational features: the cost efficiency of its operation, its ability to achieve a net interest margin for lending and investments, and its risk management stance.[8]

Average deposit rates, lending rates, and lending spreads in the ECCU are among the lowest in the Caribbean (Tables 6.6 to 6.8). The lending spread averaged 7.3 percent for 1999–2004, slightly lower than the estimate of 7.9 percent for 1991–96.[9] The low interest rates and spread of the ECCU

[8]However, in a number of high-debt countries, banks also seem to be fairly profitable. This may reflect the underclassification of NPLs and the underprovisioning in St. Kitts and Nevis, the very high return from banks' investment in government securities (19 percent), high spreads in Jamaica, and the relatively high lending rates in Belize.

[9]Randall (1998) estimated that implicit average interest rate spreads during 1991–96 were 7.9 percent for ECCU banks compared with 2.2 percent for the United States. Randall attributed the relatively high ECCU bank spreads to high reserve and operating costs and provisioning for loan losses.

Table 6.5. Regional Comparison: Bank Return on Assets, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	2.7	1.6	1.6	1.7	1.4	1.6	1.8
Dominica	2.7	3.2	3.0	1.3	1.4	1.2	2.1
Grenada	2.3	2.5	2.4	2.3	2.9	0.5	2.1
St. Kitts & Nevis	2.8	3.1	3.4	2.6	2.4	2.8	2.8
St. Lucia	3.1	2.5	1.7	0.9	1.4	2.4	2.0
St. Vincent & the Grenadines	1.7	0.8	1.0	1.2	1.0	1.2	1.1
Bahamas, The	2.5	3.4	3.3	2.6	2.1	2.7	2.8
Barbados	2.4	2.5	2.2	2.7	2.0	2.2	2.3
Trinidad & Tobago	1.7	1.9	2.0	2.4	2.1	3.7	2.3
Belize	3.2	5.1	4.6	4.7	3.2	. . .	4.2
Jamaica	1.6	1.7	2.4	2.9	3.9	0.7	2.2
Suriname[1]	. . .	1.4	1.5	1.5	1.7	1.5	1.5
Guyana	1.3	0.7	0.5	0.4	1.2	1.4	0.9
Eastern Caribbean Currency Union	2.5	2.3	2.2	1.7	1.8	1.6	2.0
Caribbean	2.3	2.3	2.3	2.1	2.1	1.8	2.2

Source: Country authorities.
[1]The figure for 2004 is end-September.

banks relative to other Caribbean countries may be explained by their relatively low reserve requirements, low provisioning for loan losses, and, possibly, a higher degree of competition, at least in the mortgage segment of the credit market. In contrast, Jamaica has among highest average lending rates and lending spread, possibly reflecting the high inflation-adjusted

Table 6.6. Regional Comparison: Bank Average Deposit Rates, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	4.4	5.2	4.5	4.4	4.9	4.4	4.6
Dominica	4.4	3.9	4.0	3.9	3.7	3.3	3.8
Grenada	4.3	4.2	4.2	3.6	3.4	3.3	3.8
St. Kitts and Nevis	4.3	4.3	4.2	4.0	4.5	4.5	4.3
St. Lucia	4.8	4.8	4.9	4.3	5.5	3.0	4.5
St. Vincent & the Grenadines	4.5	4.5	4.6	4.4	4.6	3.3	4.3
Bahamas, The	4.6	4.1	4.2	4.3	3.9	3.8	4.2
Barbados	4.4	5.0	4.0	2.7	2.6	2.5	3.5
Trinidad & Tobago	8.5	8.2	7.7	4.8	2.9	2.8	5.8
Belize	5.8	5.3	4.3	4.3	4.8	5.1	5.0
Jamaica	13.5	11.6	9.6	8.6	8.5	8.0	10.0
Suriname	15.6	15.5	11.9	9.0	8.3	8.3	11.4
Guyana	9.8	9.4	8.1	4.8	3.3	2.9	6.4
Eastern Caribbean Currency Union	4.4	4.5	4.4	4.1	4.4	3.6	4.2
Caribbean	6.8	6.6	5.9	4.8	4.7	4.3	5.5

Source: IMF, International Financial Statistics database.

Table 6.7. Regional Comparison: Bank Average Lending Rates, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	12.1	12.2	11.6	11.4	12.8	12.4	12.1
Dominica	11.4	11.7	11.1	11.0	11.5	8.9	10.9
Grenada	11.6	11.6	10.2	11.3	12.0	10.2	11.2
St. Kitts & Nevis	11.2	11.1	11.1	10.9	12.2	10.3	11.1
St. Lucia	12.8	13.1	13.0	12.6	15.0	11.1	12.9
St. Vincent & the Grenadines	11.5	11.5	11.6	11.6	11.8	9.7	11.3
Bahamas, The	14.6	14.3	13.9	13.1	13.8	12.9	13.8
Barbados[1]	9.4	10.2	9.6	8.5	8.5	8.3	9.1
Trinidad & Tobago[2]	17.0	16.5	15.7	12.5	11.2	9.3	13.7
Belize	16.3	16.0	15.5	14.8	14.3	13.9	15.1
Jamaica	27.0	23.3	20.6	18.5	18.9	18.1	21.1
Suriname	27.3	29.0	25.7	22.2	21.0	20.4	24.3
Guyana	17.6	17.5	17.3	16.8	15.0	14.2	16.4
Eastern Caribbean Currency Union	11.8	11.8	11.4	11.5	12.6	10.4	11.6
Caribbean	15.4	15.2	14.4	13.5	13.7	12.3	14.1

Source: IMF, International Financial Statistics database.
[1]Prime rates.
[2]Basic prime rates (median).

risk in lending (including lending to the government) and the very high provisioning requirement, the cost of which is passed on to borrowers (Table 6.3).

Table 6.8. Regional Comparison: Bank Average Spreads, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	7.6	7.0	7.1	7.0	8.0	8.0	7.5
Dominica	7.0	7.8	7.2	7.1	7.8	5.7	7.1
Grenada	7.3	7.4	6.0	7.7	8.7	6.9	7.3
St. Kitts & Nevis	6.9	6.8	6.8	6.9	7.7	5.7	6.8
St. Lucia	8.0	8.3	8.1	8.3	9.5	8.0	8.4
St. Vincent & the Grenadines	7.1	6.9	7.1	7.2	7.3	6.4	7.0
Bahamas, The	10.0	10.2	9.6	8.8	9.9	9.0	9.6
Barbados[1]	5.0	5.2	5.5	5.8	5.9	5.8	5.5
Trinidad & Tobago[2]	8.5	8.3	8.0	7.7	8.3	6.5	7.9
Belize	10.5	10.7	11.1	10.5	9.6	8.8	10.2
Jamaica	13.5	11.7	11.0	9.9	10.4	10.2	11.1
Suriname	11.7	13.5	13.9	13.2	12.8	12.1	12.9
Guyana	7.8	8.1	9.2	12.0	11.6	11.2	10.0
Eastern Caribbean Currency Union	7.3	7.4	7.0	7.4	8.2	6.8	7.3
Caribbean	8.5	8.6	8.5	8.6	9.0	8.0	8.6

Source: Author's calculations, based on IMF, International Financial Statistics database.
[1]Prime rates.
[2]Basic prime rates (median).

Table 6.9. Eastern Caribbean Currency Union (ECCU): Bank Interest Income and Expense, 1999–2004
(End of period, in percent of average earning assets)

	1999	2000	2001	2002	2003	2004	Average
Interest income							
Antigua & Barbuda	10.5	10.3	9.6	8.7	8.5	8.0	9.3
Dominica	10.0	10.0	9.1	7.7	7.2	6.5	8.4
Grenada	10.3	10.0	9.7	8.9	8.7	7.7	9.2
St. Kitts & Nevis	10.5	10.5	9.3	8.2	8.4	8.7	9.3
St. Lucia	11.3	11.0	10.9	9.1	8.2	8.0	9.8
St. Vincent & the Grenadines	9.2	8.9	8.2	10.6	8.2	7.9	8.8
ECCU	10.3	10.1	9.5	8.9	8.2	7.8	9.1
Interest expense							
Antigua & Barbuda	4.7	5.2	4.9	4.3	4.5	3.9	4.6
Dominica	4.3	3.9	3.7	3.9	3.4	3.2	3.7
Grenada	4.6	4.4	4.4	3.9	3.4	2.8	3.9
St. Kitts & Nevis	4.9	4.6	4.1	3.7	3.7	3.6	4.1
St. Lucia	4.6	4.9	5.1	4.3	3.4	2.7	4.2
St. Vincent & the Grenadines	4.5	4.3	4.2	5.1	3.9	3.0	4.2
ECCU	4.6	4.5	4.4	4.2	3.7	3.2	4.1
Net interest margin							
Antigua & Barbuda	5.8	5.0	4.7	4.4	4.0	4.1	4.7
Dominica	5.7	6.1	5.4	3.8	3.7	3.3	4.7
Grenada	5.7	5.6	5.3	5.1	5.4	4.9	5.3
St. Kitts & Nevis	5.7	5.9	5.2	4.4	4.6	5.0	5.1
St. Lucia	6.7	6.2	5.8	4.9	4.8	5.3	5.6
St. Vincent & the Grenadines	4.8	4.6	4.0	5.4	4.3	4.9	4.7
ECCU	5.7	5.6	5.1	4.7	4.5	4.6	5.0

Source: Country authorities.

The average interest rate data suggest that lending spreads increased in several ECCU countries over 1999–2003. However, the net interest margin, which adjusts for the nonaccrual of interest income of NPLs, has shown a steady decline in a number of ECCU countries (Table 6.9).

The ECCU banking system's operating costs (as a percentage of gross income) appear comparable with those of the rest of the Caribbean (Table 6.10). However, reflecting the ECCU region's lack of economies of scale and relatively low degree of competition, its operating costs and lending spreads are high when compared to the Asian newly industrialized countries and the member countries of the Organization for Economic Cooperation and Development, where operating costs as a percentage of assets averaged 0.8 to 3.7 percent and lending spreads 1.1 to 3 percent over 1990–94, compared with 2.5 to 4.8 percent (operating costs) and 6 to 9.5 percent (lending spreads) in the ECCU (Goldstein and Turner, 1996).

Table 6.10. Regional Comparison: Bank Noninterest Expense to Gross Income, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	39.8	38.6	39.8	40.6	41.4	43.6	40.6
Dominica	40.6	39.1	36.8	43.3	44.6	44.9	41.6
Grenada	40.4	37.9	36.8	38.4	37.1	62.4	42.2
St. Kitts & Nevis	32.9	30.8	24.7	29.1	33.7	32.4	30.6
St. Lucia	39.0	41.7	44.8	51.3	50.6	45.3	45.5
St. Vincent & the Grenadines	40.8	50.5	44.3	47.0	54.2	55.3	48.7
Bahamas, The	38.1	35.4	35.2	35.8	39.0	35.2	36.5
Barbados	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Trinidad & Tobago	40.0	39.0	39.5	43.3	50.7	38.2	41.8
Belize	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Jamaica	41.0	38.6	39.3	38.4	35.1	45.8	39.7
Suriname[1]	. . .	83.4	82.2	83.1	78.4	71.3	79.7
Guyana	42.1	40.8	44.8	53.4	51.9	51.5	47.4
Eastern Caribbean Currency Union	38.9	39.8	37.9	41.6	43.6	47.3	41.5
Caribbean	39.5	43.3	42.6	45.8	47.0	47.8	44.9

Source: Country authorities.
[1]The figure for 2004 is end-September.

For ECCU banks, fees and commission incomes account for about 15 percent of gross income. This may reflect the high costs of transaction in payment settlements in the Caribbean region. Evidence available on the ECCU countries shows that while check clearing within each country is generally efficient, clearing across countries within the region is cost inefficient (Commonwealth Secretariat, 1997). Some banks have also derived fees and commissions from underwriting government or commercial paper directly to investors, rather than from lending margins.

Liquidity

Banks typically borrow in the short term and lend in both the short and long term. Cash and liquid assets are thus required to cover larger-than-usual deposit withdrawals or a sudden outflow of deposits due to a loss of confidence in the domestic currency or in the health of the particular bank in question. However, too much liquidity in a bank, held either voluntarily or involuntarily through nonremunerated reserve and/or liquidity requirements, negatively affects a bank's profitability.

The ECCU banking system is currently highly liquid, and this liquidity has been increasing since the late 1990s (Table 6.11). From 1999 to 2004, the ECCU region as a whole held a higher proportion of its assets as liquid

Table 6.11. Regional Comparison: Bank Liquid Assets to Total Assets, 1999–2004
(End of period, in percent)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	25.1	23.8	26.7	28.7	32.8	32.5	28.3
Dominica	30.9	23.9	24.7	37.0	38.4	45.5	33.4
Grenada	21.2	18.8	22.8	28.7	32.5	38.4	27.0
St. Kitts & Nevis	28.6	33.6	38.5	41.7	45.5	38.9	37.8
St. Lucia	13.8	12.0	14.5	16.1	23.3	22.7	17.1
St. Vincent & the Grenadines	30.8	35.6	35.8	32.2	35.4	36.0	34.3
Bahamas, The	18.3	12.9	13.6	13.8	15.5	17.7	15.3
Barbados	20.6	24.5	24.8	26.7	29.9	25.5	25.3
Trinidad & Tobago	16.5	17.3	17.8	16.1	15.9	12.3	16.0
Belize	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Jamaica	32.9	31.8	30.7	27.4	23.5	27.6	29.0
Suriname[1]	53.0	40.9	34.4	30.2	38.9	34.9	38.7
Guyana	25.1	25.5	23.5	23.9	26.4	33.3	26.3
Eastern Caribbean Currency Union	25.1	24.6	27.2	30.7	34.6	35.7	29.6
Caribbean	26.4	25.0	25.7	26.9	29.8	30.4	27.4

Source: Country authorities.
[1]The figure for 2004 is end-September.

than most Caribbean countries. At end-2004, liquid assets as a percentage of total assets averaged 36 percent, compared with 25 percent at end-1999. This increase took the form of short-term government treasury bills, which increased from an average of 2 percent of total assets in 1999 to 15 percent of total assets in 2004.

The increase in bank liquidity was particularly strong in 2003–04. While external borrowing by some ECCU governments and strong remittance flows from the diaspora have been important contributors, the recent rebound in the tourism sector and related increase in construction activities—most of them externally funded at lower cost—have further fueled deposit growth.

As liquidity was high and increasing, the cost of funding declined in the ECCU despite the presence of the minimum saving deposit rate requirement (Box 6.2). The regional average deposit rates declined from 4.4 percent in 1999 to 3.6 percent in 2004, mostly reflecting a decline in time deposit rates (Table 6.6). Another perhaps more accurate indicator of the cost of funding is the interest expense as a percent of earning assets, which also showed a steady decline from 1999 onward (see Table 6.9).

The recent increases in bank liquidity have been sustained by structural features of the ECCU economies. There are limited avenues for investment of household income, on the one hand, and an apparent lack of "bankable" projects, on the other. Households, the major contributor to banking

Box 6.2. Assessing the Role of the Minimum Savings Deposit Rate Requirement

The countries of the Eastern Caribbean Currency Union (ECCU) currently maintain a minimum deposit rate for saving deposits.[1] The initial objectives of this policy were to encourage saving and protect small depositors in an environment of limited availability of banking services. The minimum rate was set at 4 percent when the Eastern Caribbean Central Bank (ECCB) was first established in 1983, and was lowered to 3 percent in September 2002. What has been the impact of this policy and has it achieved its intended objectives?

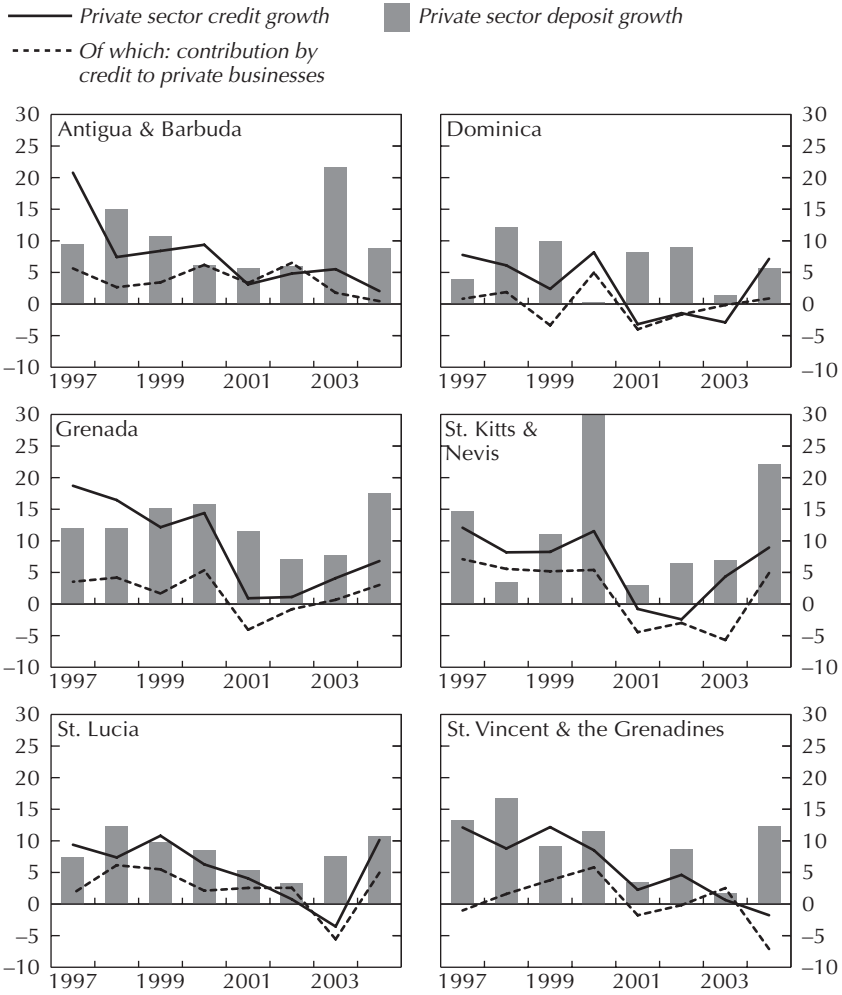
Experience in other countries suggests that the level of the interest rate has little impact on savings, particularly when real interest rates are positive, which has been the case in the ECCU. Moreover, when the minimum saving deposit rate was lowered in September 2002, growth in deposits actually accelerated. Household deposits grew 11 percent in 2003–04, nearly double the 6½ percent growth achieved in 2001–02.

However, there is evidence that depositors have taken advantage of the minimum savings rate requirement to shield themselves from declining deposit rates. As banks lowered time deposit rates in response to the high liquidity in the system, time deposits as a share of total private sector deposits declined from 30 percent in 2001 to 23 percent in 2004, while the share of saving deposits increased from 46 to 49 percent.

This welfare gain for depositors must be weighed against the efficiency losses associated with the minimum savings rate requirement. Savings deposits in the ECCU have no term maturity and are available with on-demand withdrawal. The increasing share of savings deposits and lengthening of loan maturity (reflecting mortgage lending) result in a growing maturity mismatch, which heightens banks' interest rate risk. Moreover, the minimum savings rate requirement prevents banks from adjusting deposit rates to fully respond to the liquidity in the market. Although deposit rates did fall in the aggregate in response to increasing liquidity in the system, the adjustment would have been greater if banks had been allowed to lower rates on savings deposits. Should the minimum rate requirement be removed or phased out, the cost of funds would decline when there is too much liquidity in the system, and so would the lending rates, given a fixed markup in banking lending.

[1]Of the other Caribbean Community and Common Market (CARICOM) economies, only Barbados and Belize currently maintain minimum savings rate requirements.

Figure 6.2. Eastern Caribbean Currency Union: Private Sector Deposit and Credit Growth
(In percent)



Sources: Eastern Caribbean Central Bank; country authorities; and IMF staff calculations.

system deposits, continue to channel savings and remittance inflows into the banking system, while private sector credit growth has lagged behind deposit growth (Figure 6.2). The average annual growth in loans to private businesses was particularly weak, ranging from –0.1 percent in Dominica to 3.7 percent in Antigua and Barbuda for 1996–2004.

Table 6.12. Eastern Caribbean Currency Union (ECCU): Bank Nonresident and Private Sector Deposit Growth
(Annual average percentage growth)

	1997–2000	2001–04
Nonresident deposits		
Antigua & Barbuda	22.7	12.6
Dominica	0.8	14.8
Grenada	14.6	18.0
St. Kitts & Nevis	11.6	4.0
St. Lucia	6.2	9.5
St. Vincent & the Grenadines	12.9	3.0
ECCU	11.5	10.3
Private sector deposits		
Antigua & Barbuda	10.3	10.5
Dominica	6.5	6.0
Grenada	13.7	10.9
St. Kitts & Nevis	14.8	9.6
St. Lucia	9.5	6.7
St. Vincent & the Grenadines	12.6	6.5
ECCU	11.2	8.4
Memo items:		
3-month LIBOR		
U.S.	5.8	2.1
Euro	3.7	3.0

Sources: IMF and author's calculations.

Moreover, since late 2000, there have been persistent, albeit declining, spreads between ECCU deposit rates and international money market rates. This raises the question whether the relatively attractive interest rate in the ECCU has encouraged an inflow of foreign funds. In the ECCU, the evidence is mixed (Table 6.12). One obvious place to look is the non-FDI inflows, but the data from national balance of payments is highly volatile, suggesting data consistency problems. One might also look for patterns in deposit growth. During 2001–04, growth in nonresident deposits and private sector deposits declined from the previous period of 1997–2000 in half of the ECCU countries. The relatively high cost of transferring funds may have discouraged the inflow of funds.

There may be good reasons why the ECCU banking system has such high liquidity. First, lending by ECCU banks is largely limited to the local economy, and a shock to the local economy is likely to lead to simultaneous problems with a large proportion of a bank's loan portfolio. A prudent bank will, therefore, hold more short-term liquid assets as a buffer in comparison with a bank with a more diversified portfolio. Second, a lack of alternatives for liquidity management will engender higher liquidity than might otherwise occur. Indeed, the interbank market has not been active

Table 6.13. Relative Ranking in Banking Performance, 1999–2004

	Capital Adequacy[1]	Asset Quality	Return on Assets	Lending Spread	Total Scores
Bahamas, The	1	2	1	4	8
Barbados	5	3	3	1	12
Trinidad & Tobago	2	1	2	3	8
Jamaica	3	4	4	6	17
Suriname	7	5	6	7	25
Guyana	6	7	7	5	25
Eastern Caribbean Currency Union	4	6	6	2	18

Sources: Country authorities; and author's calculations.
Note: Based on the period average of prudential indicators.
[1]The ranking for the ECCU is adjusted using a 40 percent provision for nonperforming loans.

due to perceived counterparty risk and foreign branches' ready access to low-cost foreign funds. For reasons described below, local banks are perceived to be riskier than foreign bank branches, which are subject to both the consolidated supervision by their headquarter countries and supervision by the ECCB. When lending opportunities arise, foreign branches tend to borrow from their parent banks rather than the interbank market in order to limit the counterparty risk and lower the cost of funding. In contrast, local banks may have to offer higher deposit rates to secure funds, even when there is excess liquidity in other banks. This segmentation of the interbank market has led to higher aggregate liquidity than would an otherwise efficient interbank market.

In summary, a number of findings emerged. First, cross-country comparisons of bank performance indicators suggest that countries with better macroeconomic performance tend to also have better overall banking performance (Table 6.13). Second, the ECCU banking system has relatively high levels of NPLs, relatively low levels of provisioning, and a high proportion of consumer loans compared with other Caribbean countries. These are among the factors that have been shown by the literature to be associated with bank fragility.[10] The relatively high nonperforming ratio may be related to economic downturns, which reflect the vulnerability of the small economies to natural disasters and other external shocks. Operating efficiency and profitability are comparable to the regional aver-

[10]A number of studies of banking systems in the Caribbean have found that contractions in real GDP, lower liquidity, a high portion of consumer loans, a low return on assets, fast credit growth relative to GDP, a high ratio of expense to assets, and a high NPL ratio are among the factors associated with a high incidence of bank failure. See Worrell, Cherebin, and Polius-Mounsey (2001).

age, while interest rates and spreads of the ECCU banks are low relative to other Caribbean countries, reflecting the relatively low reserve requirement, low provisioning for loan losses, and, possibly, a high degree of competition in the ECCU.

The Effect of Widening Fiscal Imbalances on the ECCU Banking System

In the early years of independence, ECCU countries typically maintained very modest fiscal deficits.[11] This stance contributed to monetary stability and manageable debt levels, which enabled the banking system to grow free from government repression and the pressure to finance fiscal deficits.

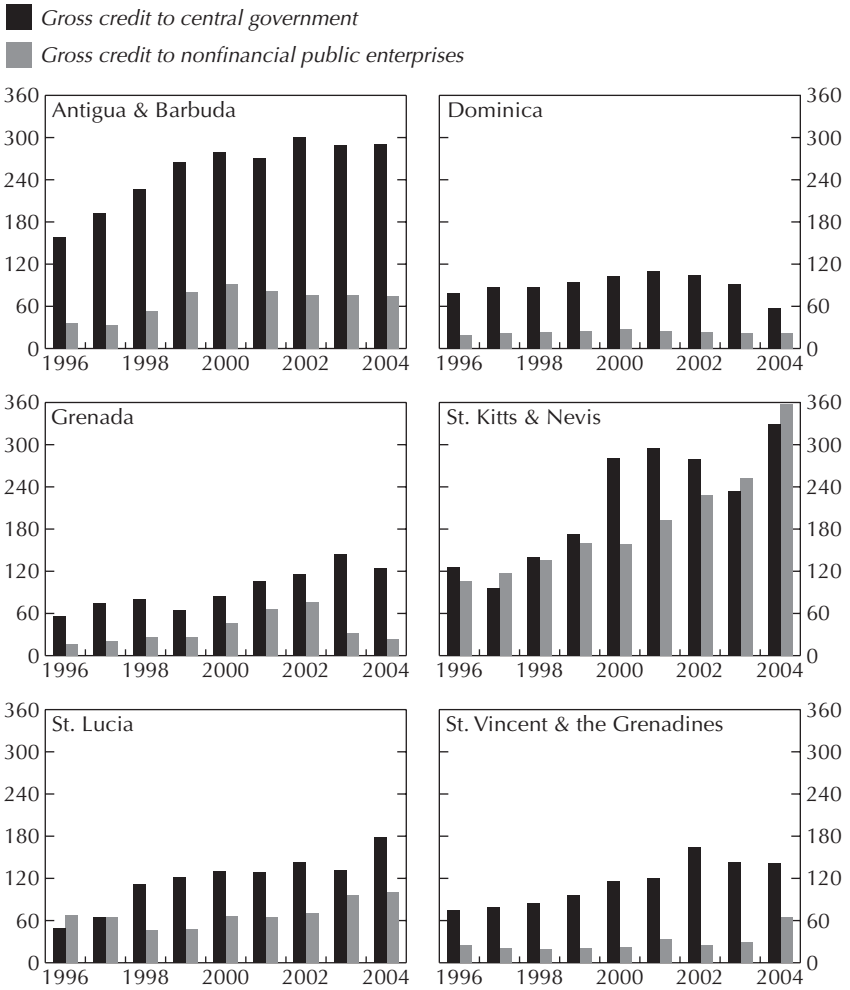
However, since the mid-1990s, fiscal performance in the ECCU has deteriorated sharply. As fiscal deficits widened, public sector debt rose to very high levels. By the end of 2004, the ECCU countries were among the top 30 most indebted emerging market countries. St. Lucia and St. Vincent and the Grenadines have debt in the range of 50 to 90 percent of GDP, and the other four ECCU countries have debt beyond 100 percent of GDP. If policies followed in the last five years were to continue in the medium term, the public debt could rise to extreme levels and endanger macroeconomic stability (see Chapter 2).

There is a substantial literature that examines the various channels by which high debt can crowd out growth. The common channels are through higher interest rates and less available loanable funds, due to high lending to the public sector. Hauner (2006) showed that continuously large public sector borrowing from the domestic banking sector is likely to harm the depth and quality of financial development in 70 middle-income countries. The less obvious channel is through the greater degree of risk aversion in lending if banks' net worth is adversely affected by impairment of public sector obligations.[12] This section focuses on the impact of fiscal pressures on the role of the banking system in financing public sector deficits, and the implications of fiscal and debt unsustainability for banking system fragility.

[11]An exception is Antigua and Barbuda, which accumulated a high level of public debt and arrears throughout the late 1980s.

[12]For example, some ECCU countries have not been current on loan payments to domestic banks, and government treasury bills and bonds have been rolled over with few interest payments.

Figure 6.3. Eastern Caribbean Currency Union: Banking System's Gross Exposure to the Public Sector
(In millions of Eastern Caribbean dollars)

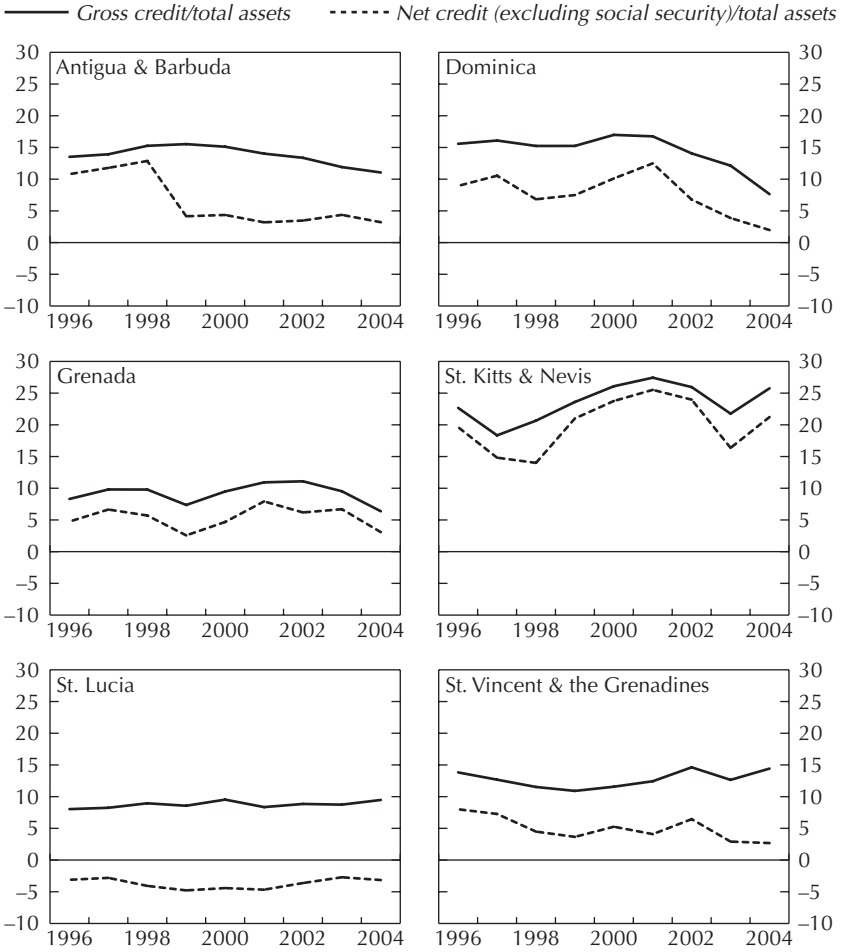


Sources: Eastern Caribbean Central Bank; country authorities; and IMF staff calculations.

Extent of the Banking System's Exposure to the Public Sector

As public sector debt in the ECCU has accumulated since the mid-1990s, the banking systems' gross exposure to each country's public sector has also increased, especially in Antigua and Barbuda and St. Kitts and Nevis, the two countries with the highest debt levels in the ECCU (Figure 6.3).

Figure 6.4. Eastern Caribbean Currency Union: Banking System's Gross Exposure to the Public Sector
(In percent of total assets)



Sources: Eastern Caribbean Central Bank; country authorities; and IMF staff calculations.

Antigua and Barbuda began accumulating arrears with external creditors as early as the 1980s. By the early 1990s, access to external financing more or less dried up and the government resorted to the domestic banking and social security systems to finance its deficits. Between 1996 and 2004, the banking system's gross credit to the central government nearly doubled. In St. Kitts and Nevis, the banking system's exposure to the public sector

Table 6.14. Regional Comparison: Banks' Exposure to Local Public Sector, 1999–2004
(End of period, in percent of total bank assets)

	1999	2000	2001	2002	2003	2004	Average
Antigua & Barbuda	15.5	15.1	14.0	13.4	11.9	11.1	13.5
Dominica	15.2	17.0	16.8	14.1	12.1	7.6	13.8
Grenada	7.4	9.5	10.9	11.1	9.5	6.4	9.1
St. Kitts & Nevis	23.6	26.1	27.4	26.0	21.8	25.8	25.1
St. Lucia	8.6	9.5	8.4	8.8	8.7	9.5	8.9
St. Vincent & the Grenadines	10.9	11.6	12.4	14.6	12.6	14.4	12.8
Bahamas, The	4.6	3.8	3.1	2.5	3.7	4.6	3.7
Barbados	18.9	22.0	21.9	21.7	23.0	23.7	21.9
Trinidad & Tobago	12.9	9.3	12.7	13.7	11.1	10.4	11.7
Belize	10.0	9.9	9.6	6.6	5.2	6.9	8.0
Jamaica	13.3	16.5	21.6	31.2	27.7	26.3	22.8
Suriname[1]	. . .	. . .	. . .	. . .	8.2	6.4	8.1
Guyana	13.5	17.6	17.4	18.4	24.5	26.9	19.7
Eastern Caribbean Currency Union	13.5	14.8	15.0	14.7	12.8	12.5	13.9
Caribbean	12.9	14.0	14.7	15.2	13.8	13.8	13.8

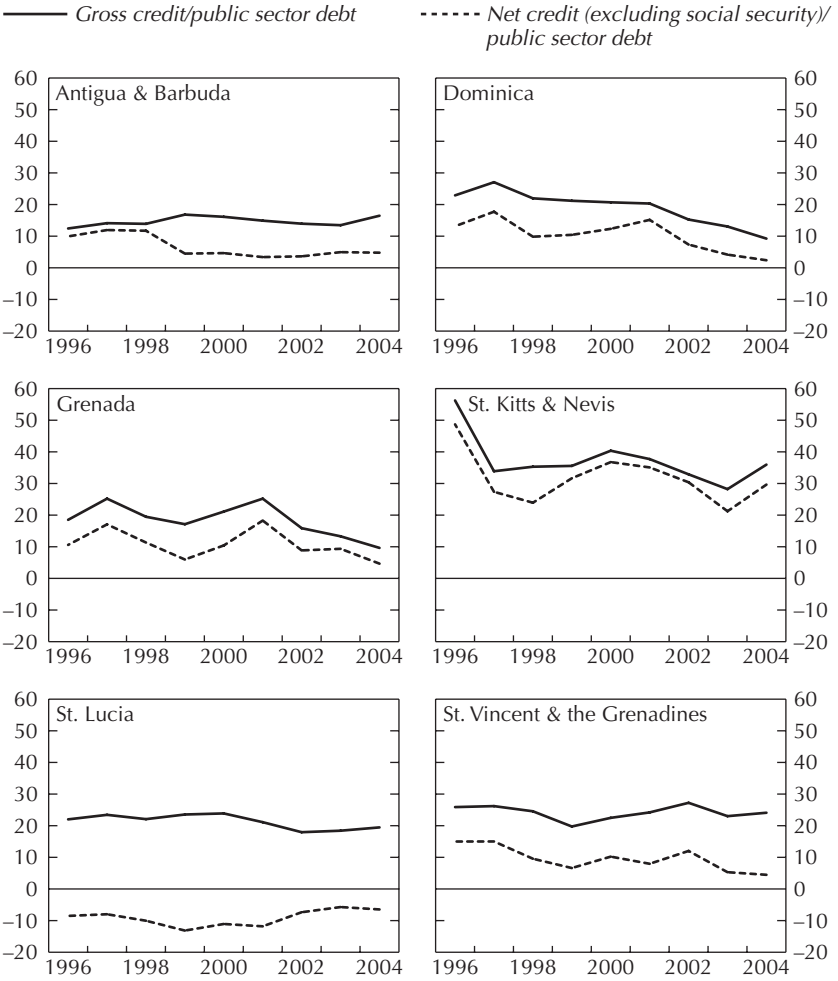
Sources: Country authorities; and IMF, International Financial Statistics database.
[1]Central government only.

nearly tripled over the same period, reflecting a ballooning in lending by the state-owned bank to the loss-making state sugar company, and the rapid deterioration of fiscal balances.

However, with the notable exception of St. Kitts and Nevis, banks' exposure to the public sector has not increased relative to their assets (Figure 6.4). The share of public sector credit in total bank assets has been broadly unchanged since 1996 in most of the ECCU countries and has declined in Dominica and Antigua and Barbuda, where the fiscal problems of the government have made banks reluctant to take on more public sector exposure. Moreover, with the exception of St. Kitts and Nevis, the ECCU banking system's exposure to the public sector relative to the size of their assets seems comparable to the Caribbean average, although it is higher than that of The Bahamas, Trinidad and Tobago, and Belize (Table 6.14).

Similarly, the role of the banking system in financing public sector debt has not increased since 1996. As of the end of 2004, banking systems in the region funded on a gross basis about 19 percent of public sector debt, compared with 26 percent at the end of 1996. The share of bank credit to the public sector in total public sector debt was broadly unchanged in half of the ECCU countries, and declined in the other half. This decline reflects the relatively easy access to external borrowing in lower-debt countries, and governments' increasing reliance on social security funds

Figure 6.5. Eastern Caribbean Currency Union: Banking System's Financing of Public Sector Debt
(In percent of public sector debt)



Sources: Eastern Caribbean Central Bank; country authorities; and IMF staff calculations.

in high-debt countries as banks become increasingly wary of the growing risk in government exposures (Figure 6.5).

The risk in the banking systems' gross exposures to the public sector may be reduced by deposits held by the public sector. As of the end of 2004, banks' net exposures to the public sector, excluding social security

Table 6.15. Eastern Caribbean Currency Union: Composition of Banks' Exposure to Local Public Sector, 2004
(In percent of total bank assets)

	Antigua & Barbuda	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent & the Grenadines
Gross credit	11.1	7.6	6.4	25.8	9.5	14.4
Central government	8.8	5.6	5.4	12.3	6.1	9.9
Nonfinancial public enterprises	2.3	2.1	1.0	13.4	3.4	4.5
Net credit	2.0	–1.4	–0.9	7.7	–11.1	–4.2
Net credit (excluding social security)	3.2	2.0	3.1	21.2	–3.2	2.7
Central government	7.4	0.7	3.0	9.9	–4.8	–0.2
Nonfinancial public enterprises	–4.2	1.3	0.1	11.4	1.6	2.9

Sources: Eastern Caribbean Central Bank; and IMF staff calculations.

deposits, ranged from debit of 3 percent of assets in St. Lucia to a credit of 21 percent of assets in St. Kitts and Nevis (Table 6.15). However, some proportion of government deposits with the banking systems (estimated to range from 15 to 40 percent) are tied to blocked project funds disbursed by international donors, and thus are not freely available.

The banks' exposure to other ECCU public sectors has been limited, but it has been increasing in recent years. The deepening of the Regional Government Securities Market has provided ECCU banks with an avenue for liquidity management and diversification away from the risk exposure to their home country (Box 6.3). The average share of banks' non-ECCU investment jumped from 0.6 percent of total assets to 2 percent in 2003–04. This has contributed to the relatively low yields of recently floated government securities.

Are State-Owned Banks Different?

The aggregate picture displayed of all ECCU commercial banks masks significant differences between individual banks. In particular, how are banks operating under different types of ownership affected by fiscal pressures on their national governments? During the 1990s, efforts were made to improve the capitalization of some indigenous (local) banks through mergers and privatizations. As a result, the number of fully or majority state-owned ECCU banks was reduced from six to three by 2004, and their union-wide market share declined from 28 percent in the mid-1980s to 17

Box 6.3. Recent Developments in the Eastern Caribbean Regional Government Securities Market

Activity in the Regional Government Securities Market (RGSM) has increased in recent years. In 2003, St. Vincent and the Grenadines and Grenada floated a total nominal amount of EC$184 million of treasury bills on the RGSM. In 2004, St. Lucia joined in, and the nominal amount of treasury bills and bonds issued increased to EC$415 million. Most of the treasury bills issued are of 91-day maturity, and bonds of 10-year maturity. The main investors are Eastern Caribbean Currency Union (ECCU) commercial banks (60 percent), social security funds (20 percent), and insurance and investment companies (10 percent).

The yield on these securities, especially the shorter maturity papers, has steadily declined since 2003. This may be explained by the excess demand for low-risk government paper. As of end-2004, the three countries that successfully placed securities in the RGSM (St. Vincent and the Grenadines, St. Lucia, and Grenada) had relatively low debt and a clean debt service record. The three countries were considered less risky than the other three ECCU countries—Antigua and Barbuda has longstanding arrears, Dominica has

Real Government Securities Market Auction Results, 2003–04

	Average Yield (in percent)	Oversubscription (in millions of Eastern Caribbean dollars)
2003		
91-day treasury bill	5.2	104
365-day treasury bill	6.0	4
2004		
91-day treasury bill	5.2	167
365-day treasury bill	5.3	23
5-year bond	5.8	26
6-year bond	6.0	5
10-year bond	7.0	62

Sources: Eastern Caribbean Central Bank; and author's calculations.

percent at end-2004. However, these state-owned banks remain dominant within their respective countries, each commanding from one-third to one-half of the market share.

ECCU bank data show that as of end-2004, the performance of state-owned banks was considerably weaker than that of foreign bank branches. Relative to foreign banks, the state-owned local banks have more NPLs,

been restructuring its public sector debt, and St. Kitts and Nevis has very high debt. The availability of shorter-maturity paper issued by these less-risky governments provides a good opportunity for ECCU banks to place their short-term liquidity and to reduce risk from exposure to their own governments.

On the supply side, while activity has increased in the RGSM, a majority of the issues are simply to roll over previous issues. Net issues on the market are small, especially relative to the amount of excess liquidity in the region's banking system. As of end-2004, total RGSM capitalization stood at EC$387 million, while commercial banks held a total of EC$300 million in unremunerated excess reserves with the ECCB. The excess demand has been manifested in oversubscriptions to many of the RGSM auctions.

The yield of government securities on the RGSM appears to be comparable to other Caribbean countries. Caribbean treasury bill rates appear to be negatively correlated with the macroeconomic performance rankings shown in Chapter 2. For example, Jamaica, the country with the highest inflation and exchange rate risk, has the highest government borrowing costs, whereas The Bahamas has the lowest borrowing costs.

Regional Comparison: Treasury Bill Rates, 2001–04
(In percent)

Grenada	6.6
St. Lucia	6.6
St. Vincent & the Grenadines	6.0
Bahamas, The	1.7
Barbados[1]	2.0
Belize	4.2
Jamaica	18.4
Trinidad & Tobago[1]	5.7
Guyana	4.8

Source: IMF, International Financial Statistics database.
[1]Banks are required to hold a portion of liquidity in government treasury bills.

a lower return on assets, much lower loan loss provisioning, and a lower loan-to-asset ratio (Table 6.16). Moreover, reflecting the influence of government ownership, the gross exposure of state-owned local banks to the public sector is very high relative to total assets or capital, when compared with either foreign bank branches or private local banks. Even when public sector deposits are considered, the net exposure of all ECCU state-owned

Table 6.16. Eastern Caribbean Currency Union: Performance Indicators by Type of Bank Ownership, 2004
(In percent)

	Foreign Bank Branches	Private Local Banks	State-Owned Local Banks
Nonperforming loan ratio	5.5	16.5	16.5
Return on assets	2.0	1.3	1.5
Net interest margin/assets	3.8	3.9	4.0
Provision/nonperforming loans	56.7	34.7	25.7
Provision/total loans	3.1	5.7	4.2
Loan/assets	60.9	50.3	49.4
Capital adequacy ratio	. . .	14.3	28.3
Gross government exposure/total assets	6.4	8.2	26.9
Gross government exposure/capital	. . .	96.9	242.1
Memo items:			
Share of total loans	49.6	35.0	15.5
Share of total assets	44.7	38.1	17.2

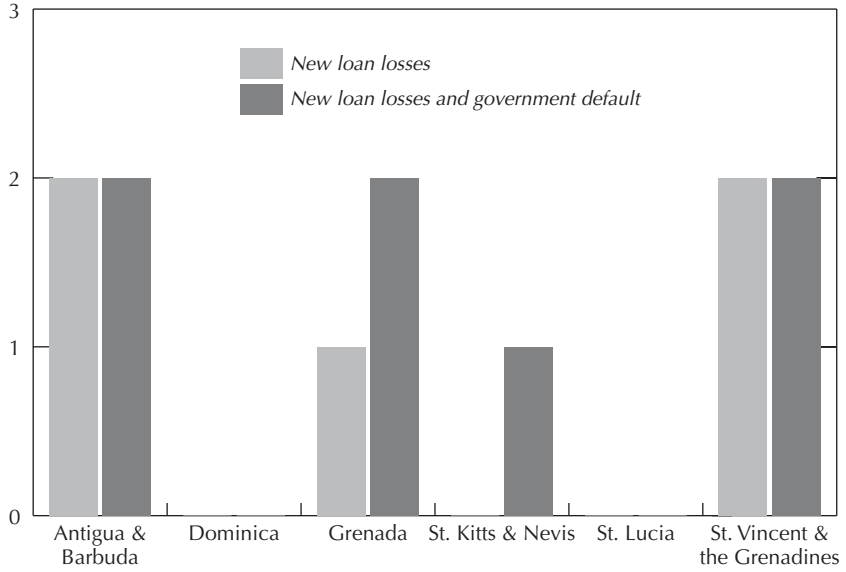
Sources: Eastern Caribbean Central Bank; and IMF staff calculations.

banks to the public sector stood at 21.3 percent of total assets at end-2004. Local private banks are also weak when compared with foreign branches. Their NPL ratio is as high as state-owned banks, and while provisioning is higher, it is not clear whether that explains the low capital adequacy ratio in local banks compared with state-owned banks. However, local banks' exposure to the public sector is considerably lower than that of state-owned banks.

There are at least two reasons why bank ownership makes a difference in risk exposure management and overall performance. First, state-owned banks tend to face additional legal restrictions or moral suasion to use mobilized funds to support national development, which often means lending to the public sector, sometimes at below-market rates.[13] Second, foreign banks that operate in the region belong to financial groups that are based either in developed economies or in larger Caribbean countries. These banks tend to have stricter internal controls and country risk limits, in part because they are subject to consolidated supervision elsewhere. They also tend to have more efficient practices and technology, in part due to the resource support from the parent group.

[13]Juan-Ramón, Randall, and Williams (2001) examine the differences in bank performance across three groups of banks (public, private local, and private foreign) in the ECCU during three subperiods in the 1990s. They found that private foreign and private local banks had similar distribution patterns with respect to operating expenses, but that private foreign banks were most profitable.

Figure 6.6. Results of a Simple Stress Test[1]
(Number of local banks becoming undercapitalized)[2]



Source: Author's calculations.
Note: Test is based on end-2004 data.
[1]It is assumed that the shocks cause an additional 5 percent of total loans in losses and the government's nonrepayment of 10 percent of outstanding principal amount.
[2]Undercapitalization is defined as capital adequacy ratio being below 8 percent.

Because of high exposure to the public sector and poor asset quality, local banks are particularly vulnerable to impairment of government defaults as well as further deterioration in asset quality, both of which may be triggered simultaneously by an exceptionally large but plausible shock. Results of a simple stress testing exercise show that, given a shock that simultaneously increases loan losses and impairs government repayments, a number of local banks would fall below the 8 percent prudential minimum requirement of the ECCB (Figure 6.6).[14] More importantly, the undercapitalized banks are systemically important in terms of deposits, ranging from 35 percent of total bank deposits in Antigua and Barbuda to 58 percent in St. Vincent and the Grenadines.

[14]These results do not take into account potential indirect effects stemming from a deterioration in overall confidence in the banking system and the possible bank runs that might result.

The region's weak local banking sectors represent a substantial contingent fiscal liability. Resident private sector deposits in indigenous banks are around 50 percent of GDP, except in Grenada, where they exceed 80 percent. The deposits of social security funds (or national insurance schemes) concentrated in indigenous banks, particularly those that are owned by the government, are substantial relative to their assets (e.g., deposits are about half of national insurance scheme assets in St. Vincent and the Grenadines). As there is no formal deposit insurance scheme in place, the failure of an indigenous bank—particularly one that is government owned—could create a substantial fiscal obligation.

Has Public Sector Borrowing Crowded Out Private Sector Credit?

Given the region's underdeveloped capital market, the banking system remains the most important financial institution in providing credit to businesses in the ECCU region. While there is a tradition of family businesses that tend to rely on their own funds, the banking system could play a greater role in supporting growth by allocating scarce resources to investments that have high returns. This section examines the role of the banking system in financial intermediation in the ECCU, and provides explanations for what may constrain it from playing a larger role, including whether bank lending to the private sector has been crowded out by public sector borrowing.

Commercial banks' credit allocation shows that the household sector is the largest user of loanable funds in the ECCU banking system (Table 6.17). As discussed above, lending to households—principally loans to finance the acquisition of properties—accounted for nearly half of total ECCU bank loans and advances at end-2004, having increased from 40 percent at end-1996. Other personal lending, which includes credit cards, travel, and education, also increased as a share of total bank lending, most notably in Grenada and St. Kitts and Nevis. Distributive trade and public administration were the second-largest users of bank credit, each receiving on average 9 to 11 percent of total bank loans. Compared to end-1996, however, the relative importance of lending to the distributive trade fell in most ECCU countries.

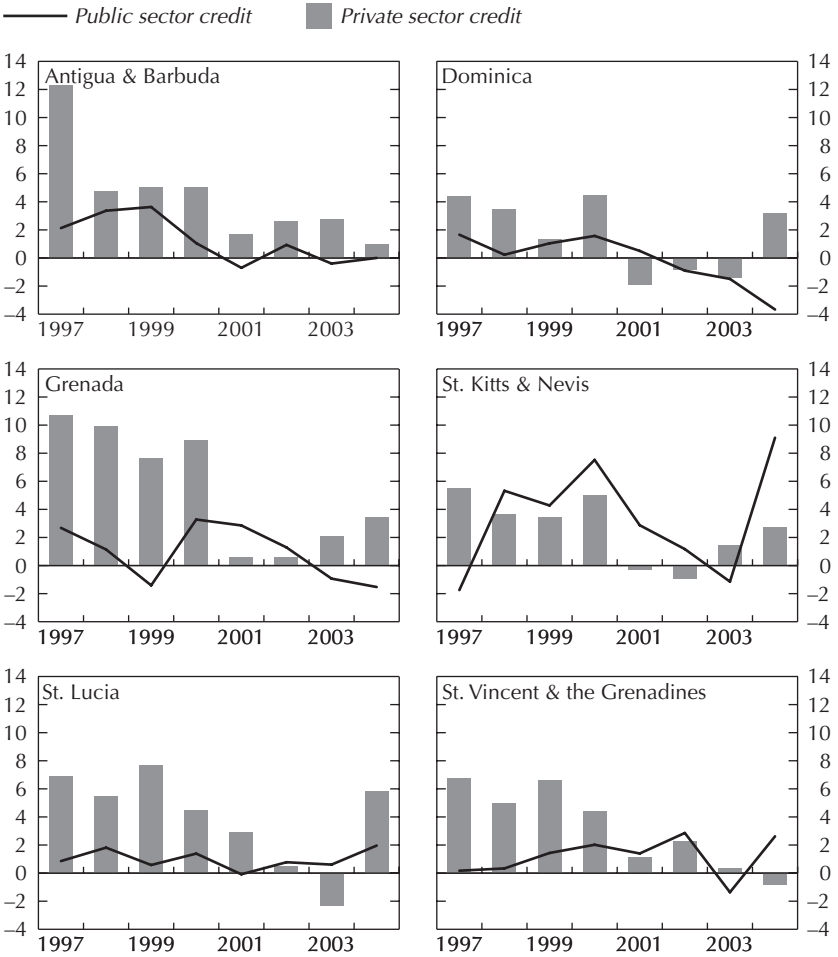
Tourism and agriculture, the two most important sectors for growth and employment, received relatively small shares of banking system credit. Excluding St. Lucia, where tourism accounted for a larger share than public administration, ECCU countries had only about 5 percent of bank credit allocated to tourism as of end-2004. In four countries, the relative share of tourism credit actually declined. Except for St. Kitts and Nevis,

Table 6.17. Eastern Caribbean Currency Union: Commercial Banks' Credit Allocation by Economic Activity, 1996 and 2004
(In percent of total)

	Antigua & Barbuda		Dominica		Grenada		St. Kitts & Nevis		St. Lucia		St.Vincent & Grenadines	
	1996	2004	1996	2004	1996	2004	1996	2004	1996	2004	1996	2004
Agriculture	0.3	0.4	1.0	1.8	1.9	1.5	8.3	18.7	3.8	1.6	4.4	1.5
Sugar	—	—	—	—	—	0.1	8.1	18.6	0.1	—	—	—
Tree crops	—	—	0.8	1.7	1.5	1.1	—	—	2.9	0.4	3.9	1.3
Fisheries	0.1	—	—	—	0.4	0.3	—	—	0.1	0.3	0.2	0.1
Mining and quarrying	0.2	0.4	1.2	1.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
Manufacturing	3.1	3.0	8.6	3.1	5.4	2.6	3.2	1.4	3.3	2.6	6.7	2.0
Utilities	0.4	3.5	3.8	7.4	6.3	2.9	2.7	2.6	1.8	1.2	0.4	0.7
Construction and land development	4.6	7.0	3.1	3.7	3.3	4.7	12.3	6.5	3.3	6.0	6.1	3.4
Distributive trade	14.4	9.8	18.0	15.8	16.3	7.4	10.4	9.2	15.0	10.8	12.0	10.7
Tourism	10.0	6.6	3.4	3.5	11.0	6.0	4.8	5.2	12.2	11.0	5.5	3.5
Entertainment	1.9	1.6	0.6	0.5	0.9	0.8	2.2	0.6	1.0	1.1	1.0	0.7
Transport	2.1	1.7	2.7	0.9	5.0	3.1	1.1	0.5	3.6	1.3	3.8	2.6
Financial institutions	0.7	3.0	4.6	0.9	0.6	0.5	0.3	2.3	0.7	1.0	1.2	1.4
Professional and other services	5.8	9.4	4.5	3.9	3.3	5.1	4.5	2.7	6.1	11.2	2.6	3.4
Public administration	13.2	11.7	12.9	5.2	3.7	5.6	14.8	11.9	4.5	4.1	10.9	14.9
Personal	43.1	41.7	35.7	52.1	41.8	59.4	35.2	38.1	44.5	47.7	45.0	55.1
Acquisition of property	21.4	23.9	23.4	34.5	27.3	33.2	22.9	18.6	26.4	22.9	28.1	37.3
Durable consumer goods	6.2	5.0	2.3	1.7	4.8	4.0	3.8	1.4	5.3	4.5	3.7	2.2
Other personal	15.5	12.9	10.0	15.9	9.6	22.2	8.5	18.0	12.8	20.4	13.2	15.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Eastern Caribbean Central Bank; and IMF staff calculations.

Figure 6.7. Eastern Caribbean Currency Union: Private Sector versus Public Sector Credit
(Percentage contribution to growth in total assets)



Sources: Eastern Caribbean Central Bank; country authorities; and IMF staff calculations.

agriculture, vital to rural livelihoods in almost all of the ECCU countries, received less than 2 percent of bank credit.

Also with the exception of St. Kitts and Nevis, there is little evidence that the increase in banks' exposure to the public sector has crowded out lending to the private sector, as credit to private businesses accounted for

a larger proportion of increases in banking system assets throughout most of the 1997–2004 period (Figure 6.7). In St. Kitts and Nevis, however, the expansion of credit to the loss-making state sugar company by a state-owned bank meant that funds were increasingly channeled into the public sector.

There are a number of structural reasons why lending by ECCU banks to productive private businesses has been limited. One important reason for the lack of bank credit to the tourism sector is that large foreign direct investments in enclave tourism are often financed externally and at lower cost by financial groups that have established relations with foreign investors. The large domestic investments in tourism also are often financed externally, sometimes through the parent bank of a foreign branch, in part because the loan amount would have exceeded the large borrower limit of 25 percent of capital for local banks.

Other main constraints facing the local banking system, according to an ECCB survey, include the lack of acceptable collateral (cash and real estate); the lack of competitive financial infrastructure, which can lower the costs associated with contracting a loan and in turn the lending rates; the lack of business development education among small and medium-sized businesses; and until recently, the extra bank and government charges levied on nonresident borrowers, which tended to discourage investment by the diaspora.

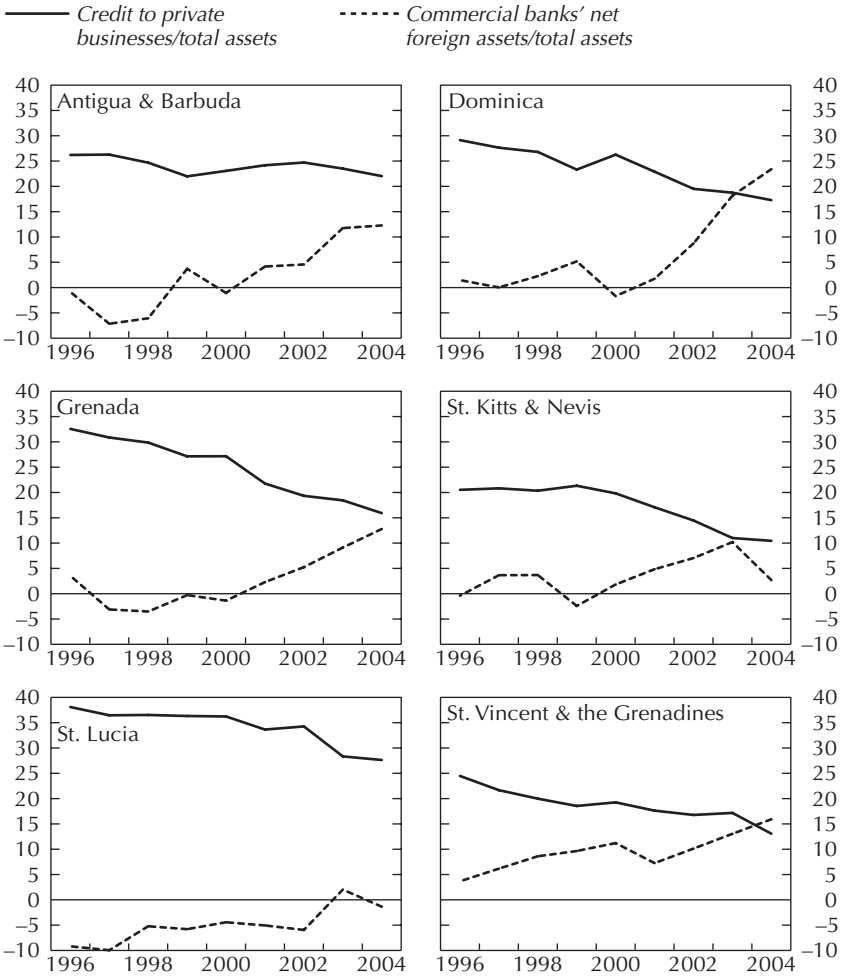
These structural constraints mean that macroeconomic stability alone is not sufficient to stimulate bank lending to the private business sector. Indeed, the conservative lending stances of many banks in the region have led them (despite the high level of liquidity in recent years) to place deposits in foreign banks and invest in other less risky sovereign securities, rather than undertake more risky lending to the private sector (Figure 6.8).

Concluding Remarks

The ECCU banking system has proven remarkably resilient to substantial shocks—hurricanes, the September 11 terrorist attack, and debt restructuring have all hit the region in the last few years. Moreover, despite the high and increasing fiscal risk in a number of ECCU countries, there has been continued public confidence in the currency peg and no banking crisis.

A number of factors have underpinned the stability of the financial system. The ongoing conservative stances of foreign bank branches, along

Figure 6.8. Eastern Caribbean Currency Union: Banks' Net Foreign Assets and Lending to Private Businesses
(In percent of total assets)



Sources: Eastern Caribbean Central Bank; country authorities; and IMF staff calculations.

with the strength they are perceived to possess, have contributed to continued confidence in the ECCU banking system. Other factors include post-hurricane liquidity injections from international donors, diaspora communities, and insurance receipts; revenue-earmarking for domestic debt payments of some governments, particularly Antigua and Barbuda,

which reduced the fiscal risk faced by domestic banks; creditors' apparent ability to differentiate countries experiencing fiscal crisis from better fiscal performers in the region; and the preferential treatment of domestic creditors, particularly banks, in debt restructuring arrangements (such as the recent case of Dominica). As a result, banks generally have not experienced liquidity problems or crippling losses from their exposure to the public sector. Indeed, government holdings have been an important source of income and a key liquidity management tool of ECCU banks.

However, a number of vulnerabilities that have been shown to be associated with bank failures in other countries are very much present in the ECCU banking system. In particular, local banks have high levels of NPLs and low levels of loan loss provisioning, and are heavily exposed to public sector borrowing, rendering them highly vulnerable to shocks that disrupt tourism for a sustained period of time or trigger disorderly government sector defaults. These vulnerabilities, and the ensuing erosion of the value and capital base of banks, may persist for years without public acknowledgement or reporting. But a systemic banking crisis may be triggered when depositors or private external creditors withdraw funding. Based on cross-country historical evidence, events that could cause such withdrawals include a political change that calls into question a government's stability; a loss of confidence in a government's ability to protect depositors (for example, due to fiscal constraints); or a loss of credibility in a central bank's commitment to maintain a fixed exchange rate regime (for example, due to pressures from a government to bail out a large bank).

To ensure financial stability and enable ECCU banks to play a more efficient role in financial intermediation, it is imperative to implement measures to improve the institutional framework and reduce vulnerabilities. Among the measures that warrant consideration are those that would:

- enhance fiscal discipline to ensure continued macroeconomic stability
- bolster supervision by enforcing forward-looking asset classification and strengthening provision to ensure a more accurate, timely picture of a bank's health
- contain local banks' exposure to the public sector by enforcing the ECCB's recently-introduced requirement for risk weighting and provisioning of nonperforming government exposures
- remove the ECCU's minimum savings rate requirement to allow deposit rates to fully respond to market liquidity conditions
- establish fair and expeditious legal procedures in order to create a debt repayment culture and preempt incidences of delinquency

- institute a system to rate clients' credit and a network of information sharing among banks to improve loan quality and allow more efficient use of loan rates for risk management
- address deficiencies in balance sheet information to ensure that data are comprehensive, readily comparable, and audited
- harmonize legal and regulatory structures and business practices across ECCU countries to facilitate financial sector integration, which would help stabilize income and mitigate risks for both the financial and real sectors of ECCU economies.

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IV

Economic Implications of Natural Disasters

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7

Natural Disasters and Their Macroeconomic Implications

TOBIAS RASMUSSEN

Windstorms, floods, droughts, and other potentially damaging natural events occur regularly across the world, but only on occasion do they lead to natural disasters. Whether an event will develop into a natural disaster depends on its physical force, its location, the vulnerability of the population and infrastructure, the level of preparedness, and a host of other factors.

While natural hazards cannot be eliminated, much can be done to prevent disasters. Focusing on the implications for the eastern Caribbean, this chapter seeks to identify the determinants of vulnerability to natural disaster, their economic impact, and possible remedies.

The central source of data used in the analysis is the Emergency Disasters Data Base (EM-DAT) compiled by the Centre for Research on the Epidemiology of Disasters (CRED, 2005), the most comprehensive database on natural disasters that is publicly available. Natural disasters are defined here as events due to natural causes that have led to 10 or more fatalities, affected 100 or more people, or resulted in a call for international assistance or the declaration of a state of emergency. The database contains information on more than 9,000 natural disasters since 1900 and includes estimates of the number of people affected and the value of damage.[1]

[1]EM-DAT defines people affected by a natural disaster as those requiring immediate assistance during a period of emergency. The figures for damage capture the value of direct damage to infrastructure, crops, housing, and other capital. The figures are

According to these data, natural disasters since 1970 have affected more than 5 billion people and have caused more than US$1 trillion in damage.

The chapter provides a comprehensive cross-country comparison of the incidence of natural disasters. To this end, countries are compared along four dimensions: the number of events divided by land area; the number of events divided by population; the number of affected persons divided by the total population; and the damage divided by GDP. Each of these measures has been used individually in previous studies, but bringing them together provides a broader understanding of countries' vulnerabilities.

The results show that developing countries tend to suffer most from natural disasters, especially in terms of the number of persons affected and the value of the damage. Small island states are found to have an especially high frequency of natural disasters, with the countries of the Eastern Caribbean Currency Union (ECCU) standing out owing to the large number of hurricanes that strike the region.[2] Based on the experience since 1970, a natural disaster inflicting damage equivalent to more than 2 percent of the affected country's GDP can be expected to hit the ECCU roughly once every 2½ years. The very high exposure to natural hazards in the eastern Caribbean has recently been exemplified in Grenada, which suffered devastating damage from Hurricane Ivan in September 2004.

Vulnerability to natural disasters is found to have important policy implications. Managing disaster risk would ideally involve use of market insurance mechanisms. However, the market for natural disaster insurance is either not well developed or absent altogether in many developing countries (see Chapter 8). As an alternative, countries can self-insure by generating public savings in good times to cover potential increases in expenditure necessitated by future natural disasters. More appropriate construction practices and other preventive measures may also substantially lessen a country's exposure to natural hazards.

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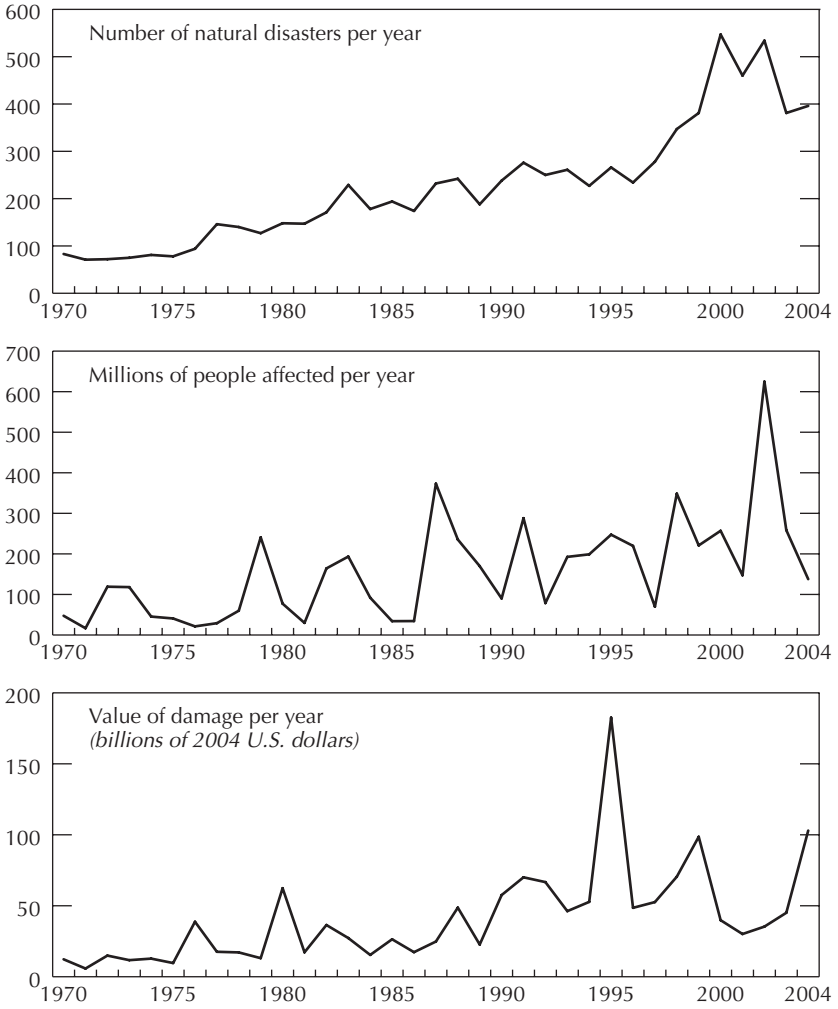
based on a large number of different primary sources and are associated with substantial uncertainty, especially the estimates of damage where different agencies often report widely different numbers. Despite the wealth of information, the data still suffer from underreporting, especially in the earlier periods, and the analysis therefore focuses on the period since 1970.

[2]The ECCU countries are Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. Anguilla and Montserrat are British dependencies and are not analyzed independently.

Figure 7.1. Global Frequency and Impact of Natural Disasters



Sources: Emergency Disasters Database (EM-DAT) (CRED, 2005); and IMF, World Economic Outlook database.

Incidence of Natural Disasters

Figure 7.1 shows the increasing frequency of natural disasters, with three times as many disasters recorded in the 1990s as in the 1970s. There have been broadly similar increases in estimates of the number of persons affected and the cost of damage. While part of the increase may reflect more com-

prehensive reporting, it is widely believed that there are two fundamental reasons for these developments: an increased concentration of population in high-risk areas (Freeman, Keen, and Mani, 2003), and an increase in the frequency and intensity of extreme weather events. This second development is generally thought to be associated with the rise in mean global surface temperatures and is expected to become more pronounced during the 21st century (Intergovernmental Panel on Climate Change, 2001).

Of the more than 7,000 natural disasters recorded during 1970–2004, three-fourths of the events and 99 percent of the people affected were in developing countries (Table 7.1). Natural disasters have, on average, affected more than 2 percent of the population each year in developing countries and caused more than one-half of 1 percent of GDP in costs from damage. Both these figures are about 10 times greater than in advanced economies. This observation is consistent with other studies of the implications of natural disasters, which find that—both across and within countries—the poor are usually the primary victims. This is because they tend to live in high-risk areas, rely on fragile infrastructure, and have jobs that depend on the weather (Freeman, Keen, and Mani, 2003; IMF, 2003; and World Bank, 2003).

In order to assess the frequency of events—in contrast to their costs, as reflected by the estimates of damage and the number of affected persons—it is useful to consider the number of natural disasters in relation to a country's size. Comparing the number of events to land area and population shows that small island states tend to have the highest frequency of natural disasters (Figure 7.2). This result reflects the fact that many small island states are located in areas prone to tropical cyclones to which they are especially vulnerable owing to their relatively long coast lines. In many cases, the high frequency of natural disasters in small island states appears to translate into relatively high levels of damage. However, the number of affected persons is not particularly high in most of these countries. This may well reflect the fact that most small island states have substantially higher income levels than the average developing country.

Cross-country regression analysis points to a clear negative relationship between income levels and the number of persons affected by natural disasters, suggesting that the capacity of countries to avoid the human cost of disasters improves as income increases. Regressing the percentage of population affected on the number of natural disasters divided by population and on per capita income produces highly significant coefficients with the expected signs (Table 7.2). When adding other explanatory variables, the quality of governance is found to have a positive impact on the percentage of the population affected, perhaps because countries scoring poorly on

Table 7.1. Frequency and Impact of Natural Disasters, 1970–2004

	1970s	1980s	1990s	2000–04	1970–2004	Ratio 1990s to 1970s
In ECCU-6 countries						
Number of natural disasters	6	18	18	6	48	3.0
Number affected (thousands of persons)	94	200	96	61	451	1.0
In percent of population[1]	2.08	3.93	2.53	2.00	2.77	1.2
Number of observations	3	11	16	4	34	5.3
Damage (millions of 2004 U.S. dollars)	112	445	290	889	1,737	2.6
In percent of GDP[2]	1.90	2.97	1.70	6.78	2.61	0.9
Number of observations	2	11	5	1	19	2.5
In developing countries (excluding ECCU, 118 countries)						
Number of natural disasters	641	1,277	1,938	1,640	5,496	3.0
Number affected (millions of persons)	723	1,390	1,894	1,390	5,397	2.6
In percent of population[1]	1.53	2.62	2.30	2.50	2.18	1.5
Number of observations	448	889	1552	1341	4,230	3.5
Damage (billions of 2004 U.S. dollars)	72	109	290	90	561	4.0
In percent of GDP[2]	0.47	0.67	0.96	0.63	0.69	2.1
Number of observations	226	315	513	323	1,377	2.3
In advanced economies (24 countries)						
Number of natural disasters	197	399	561	415	1,572	2.8
Number affected (millions of persons)	6.2	6.7	34.6	3.6	51.0	5.6
In percent of population[1]	0.08	0.05	0.52	0.07	0.20	6.2
Number of observations	72	156	320	303	851	4.4
Damage (in billions of 2004 U.S. dollars)	73	147	402	150	772	5.5
In percent of GDP[2]	0.07	0.10	0.09	0.07	0.08	1.3
Number of observations	95	212	361	148	816	3.8
Worldwide (148 countries)						
Number of natural disasters	844	1,694	2,517	2,061	7,116	3.0
Number affected (billions of persons)	0.73	1.40	1.93	1.39	5.45	2.6
In percent of population[1]	1.31	2.25	1.93	2.08	1.85	1.5
Number of observations	523	1,056	1,888	1,648	5,115	3.6
Damage (in billions of 2004 U.S. dollars)	145	257	692	241	1,334	4.8
In percent of GDP[2]	0.46	0.67	0.85	0.79	0.67	1.8
Number of observations	323	538	879	472	2,212	2.7

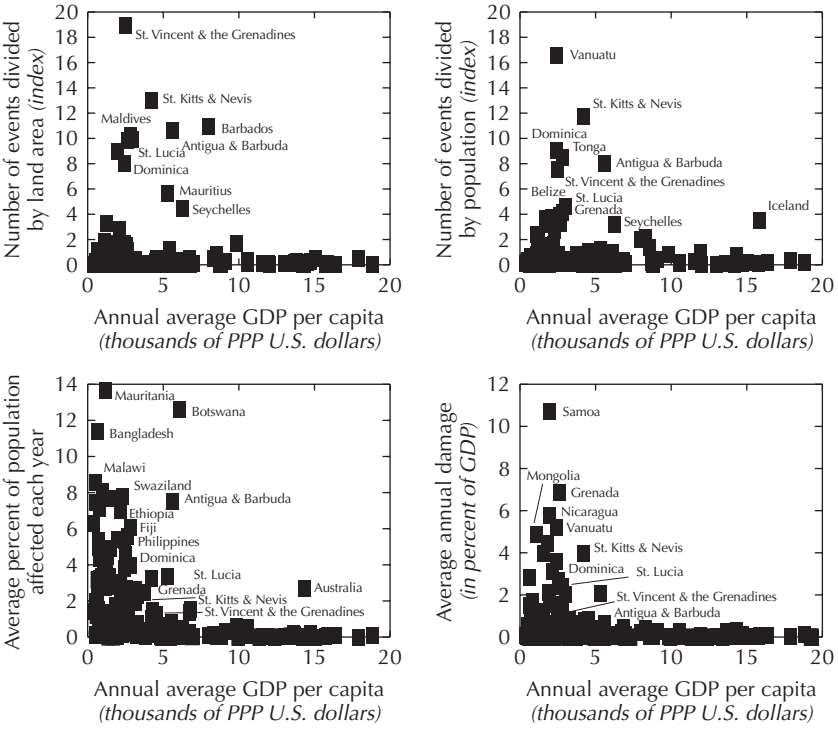
Sources: Emergency Disasters Data Base (EM-DAT) (CRED, 2005); and IMF, World Economic Outlook database.

Notes: Omits countries without at least one natural disaster associated with a cost estimate or missing information on GDP. ECCU–6 denotes those countries in the Eastern Caribbean Currency Union that also are members of the IMF.

[1]Average percentage of population affected each year. Figures are unweighted averages across countries.

[2]Average damage each year in percent of GDP. Figures are unweighted averages across countries.

Figure 7.2. Cross-Country Frequency and Impact of Natural Disasters, 1970–2004



Sources: Emergency Disasters Database (EM-DAT) (CRED, 2005); and IMF, World Economic Outlook database.
Note: PPP denotes purchasing power parity.

this measure tend to underreport the human costs. Adding other variables also reduces the significance of the number of natural disasters per capita, underscoring that the number of affected persons is primarily determined by factors other than the frequency of events.

When considering the value of damage divided by GDP as the dependent variable in the regressions, only the frequency of events per capita shows a consistently significant coefficient. In contrast to the percentage of the population affected, the economic costs of natural disasters do not appear to depend on the level of income once other factors are taken into consideration. However, drawing firm conclusions is complicated by the fact that the variables are correlated, and neither the share of agriculture in GDP, the investment-to-GDP ratio (a proxy for the size of the capital stock potentially subject to damage), nor government effectiveness appear

Table 7.2. Determinants of Vulnerability to Natural Disasters, 1970-2002
(Ordinary least squares regressions with robust standard errors)

Estimated Coefficients									
Constant	Number of events divided by land area	Number of events divided by population	PPP-based GDP per capita (in logs)	Agriculture (share of GDP)	Investment (share of GDP)	Government effectiveness	Obs.	R^2	*F*-test
Dependent variable: number affected (in percent of population)									
96.17***	. . .	8.17**	–38.49***	. . .	. . .	. . .	150	0.25	22.58
(12.08)	. . .	(3.54)	(6.57)	. . .	. . .	. . .			
108.70**	–5.88	15.25	–51.48**	0.19	–0.23	26.72**	113	0.25	4.59
(46.99)	(4.18)	(9.27)	(21.12)	(1.14)	(1.66)	(10.73)			
Dependent variable: damage (in percent of GDP)									
22.06***	. . .	8.63***	–8.64***	. . .	. . .	. . .	150	0.22	28.70
(5.48)	. . .	(1.24)	(2.48)	. . .	. . .	. . .			
10.71	–0.64	8.06**	–1.72	0.04	0.10	–6.68	113	0.26	4.75
(11.30)	(1.87)	(3.11)	(6.31)	(0.31)	(0.42)	(4.43)			

Sources: Emergency Disasters Data Base (EM-DAT) (CRED, 2005); IMF, World Economic Outlook database; and World Bank, Worldwide Governance Research Indicators Dataset (www.worldbank.org/wbi/governance/govdata2002/index.html).

Notes: Figures in parentheses are standard deviations, and *, **, and *** indicate significance at, respectively, the 10, 5, and 1 percent level. Standard errors are corrected for hetereoskedasticity using the MacKinnon-White HC3 method. The "government effectiveness" variable is from the Worldwide Governance Research Indicators dataset, which captures six different dimensions of governance and assigns scores between –2.5 (worst) and +2.5 (best). The variable measures quality of public service provision and bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies—the numbers used here are the averages of scores for 1996–2002.

to have a significant impact, as one might have expected. In all cases, the measure of frequency based on dividing the number of events by population is associated with a more significant coefficient than the one based on dividing by land area.

The eastern Caribbean is in the Atlantic hurricane belt, and several of the countries are also subject to potential volcanic eruptions. Typically occurring during the June–November period, windstorms caused 37 of the 48 natural disasters recorded during 1970–2004 in the six ECCU countries that are members of the International Monetary Fund (Table 7.3). On average, a natural disaster occurred once every 4½ years in the individual countries. Considering only incidents that affected at least 2 percent of a country's population or inflicted damage of at least 2 percent of GDP, larger events occurred once every nine years in the individual countries, or once every 2½ years somewhere in the region. Among these large disasters, the median number of affected persons amounted to 5 percent of the country's population and the median value of damage was equivalent to 13 percent of the affected country's annual GDP.

Some events have been truly devastating, affecting the population of an entire country and causing damage exceeding 100 percent of annual GDP. For example, Hurricane David hit Dominica in 1979 with winds in excess of 130 mph, killing 42 people, damaging 95 percent and destroying 12 percent of buildings, damaging or destroying the entire banana crop and 75 percent of the country's forests, rendering virtually the entire population homeless, and leading to the temporary exodus of about a quarter of the population (Benson and others, 2001). Consequently, GDP plummeted by 17 percent, central government current expenditure increased by 31 percent, with capital expenditure increasing even more rapidly, and the fiscal deficit increased from 3.1 percent of GDP in 1978 to 8.1 percent in 1981, despite a sizable increase in foreign grant receipts. The damage to Grenada from Hurricane Ivan in 2004 exceeded 200 percent of GDP, with 30 percent of houses destroyed and extensive damage to the productive sectors.

By several measures, the ECCU countries are among the most disaster prone in the world (Table 7.4).[3] When comparing the number of natural

[3]Crowards and Coulter (1999), ECLAC and IDB (2000), and Pollner (2001) reach a similar conclusion. At a broader level, the findings are also in line with the composite vulnerability indexes proposed by several international institutions (see Atkins, Mazzi, and Easter, 2000; Crowards, 2000a; and United Nations, 2000). In addition to proneness to natural disaster, these indexes include factors such as susceptibility to terms of trade shocks and concentration of exports to rank countries according to their overall vulnerability. The different indexes all find that small and isolated low-income countries are the most vulnerable, with the ECCU countries in most cases ranking near the very top.

Table 7.3. Natural Disasters in Eastern Caribbean Currency Union Countries, 1970–2004

Country	Year	Event	Total Number of Persons Affected		Estimated Damage	
			Number	Percent of population	Thousands of U.S. dollars	Percent of GDP
Antigua & Barbuda	1983	Drought	75,000	100.0	. . .	. . .
Antigua & Barbuda	1989	Hurricane Hugo	8,030	12.4	80,000	21.4
Antigua & Barbuda	1990	Hurricane Gustav	. . .	. . .	. . .	. . .
Antigua & Barbuda	1995	Hurricane Luis	68,702	100.0	500	0.1
Antigua & Barbuda	1998	Hurricane Georges	2,025	3.0	. . .	. . .
Antigua & Barbuda	1999	Hurricane Jose	2,534	3.8	. . .	. . .
Antigua & Barbuda	1999	Hurricane Lenny	3,423	5.1	. . .	. . .
Dominica	1970	Hurricane	. . .	. . .	. . .	. . .
Dominica	1979	Hurricanes David and Frederick	72,100	100.0	44,650	100.8
Dominica	1980	Hurricane Allen	. . .	. . .	. . .	. . .
Dominica	1984	Hurricane Klaus	10,000	14.2	2,000	2.2
Dominica	1989	Hurricane Hugo	710	1.0	20,000	13.0
Dominica	1995	Hurricane Luis	3,001	4.2	3,428	1.6
Dominica	1999	Hurricane Lenny	715	1.0	. . .	. . .
Dominica	2001	Hurricane Iris	175	0.2	. . .	. . .
Dominica	2004	Earthquake	100	0.1	. . .	. . .
Grenada	1975	Flood	. . .	. . .	4,700	13.4
Grenada	1980	Hurricane Allen	. . .	. . .	5,300	7.7
Grenada	1990	Tropical Storm Arthur	1,000	1.1	. . .	. . .
Grenada	1999	Hurricane Lenny	210	0.2	5,500	1.4
Grenada	2004	Hurricane Ivan	60,000	58.8	889,000	203.3
St Kitts & Nevis	1984	Hurricane Klaus	. . .	. . .	. . .	. . .
St Kitts & Nevis	1987	Flood	. . .	. . .	500	0.6
St Kitts & Nevis	1989	Hurricane Hugo	1,330	3.1	46,000	32.1
St Kitts & Nevis	1990	Hurricane Gustav	. . .	. . .	. . .	. . .
St Kitts & Nevis	1995	Hurricane Luis	1,800	4.2	197,000	85.4

Table 7.3 ***(concluded)***

Country	Year	Event	Total Number of Persons Affected		Estimated Damage	
			Number	Percent of population	Thousands of U.S. dollars	Percent of GDP
St Kitts & Nevis	1998	Hurricane Georges	10,000	23.2	. . .[1]	. . .[1]
St Kitts & Nevis	1999	Hurricane Lenny	1,180	2.7	41,400	13.6
St Lucia	1980	Hurricane Allen	80,000	61.5	87,990	66.0
St Lucia	1983	Storm	3,000	2.2	1,290	0.8
St Lucia	1986	Tropical Storm Danielle	. . .	. . .	. . .	. . .
St Lucia	1987	Hurricane Emily	. . .	. . .	. . .	. . .
St Lucia	1988	Hurricane Gilbert	. . .	. . .	. . .[2]	. . .[2]
St Lucia	1994	Tropical Storm Debby	750	0.5	. . .	. . .
St Lucia	1996	Landslide	175	0.1	. . .	. . .
St Lucia	1999	Hurricane Lenny	200	0.1	. . .	. . .
St Lucia	2004	Hurricane Ivan	. . .	. . .	. . .	. . .
St Vincent & the Grenadines	1971	Volcano	2,000	2.3	. . .	. . .
St Vincent & the Grenadines	1977	Flood	. . .	. . .	. . .	. . .
St Vincent & the Grenadines	1979	Volcano	20,000	18.6	. . .	. . .
St Vincent & the Grenadines	1980	Hurricane Allen	20,500	18.8	16,300	26.8
St Vincent & the Grenadines	1986	Flood	152	0.1	. . .	. . .
St Vincent & the Grenadines	1987	Hurricane Emily	208	0.2	5,300	3.7
St Vincent & the Grenadines	1987	Flood	1,000	0.9	5,000	3.5
St Vincent & the Grenadines	1992	Flood	200	0.2	. . .	. . .
St Vincent & the Grenadines	1999	Hurricane Lenny	100	0.1	. . .	. . .
St Vincent & the Grenadines	2002	Hurricane Lili	. . .	. . .	. . .	. . .
St Vincent & the Grenadines	2004	Hurricane Ivan	. . .	. . .	. . .	. . .

Sources: Emergency Disasters Data Base (EM-DAT) (CRED, 2005); IMF, World Economic Outlook database; and IMF staff estimates.
[1]St. Kitts and Nevis National Emergency Management Agency estimates damage of US$402 million (140 percent of GDP).
[2]Omits EM-DAT's entry for damage (US$1 billion, or 305 percent of GDP), which is erroneous.

Table 7.4. Worldwide Incidence of Natural Disasters, 1970–2004

	All Recorded Disasters					With Estimates of Persons Affected			With Estimates of Damage		
	Number of events	Number of events divided by land area		Number of events divided by population		Number of events	Cumulative number affected (percent of population)		Number of events	Cumulative damage (percent of annual GDP)	
		Index	Rank	Index	Rank		Total	Rank		Total	Rank
All countries	7,116	100	75	100	75	5,115	65	75	2,212	24	75
Advanced economies	1,572	18	74	35	96	851	7	118	816	3	102
Caribbean	190	587	23	378	22	140	71	60	64	53	45
ECCU-6	48	1,173	5	747	5	34	95	47	19	100	16
Antigua & Barbuda	7	1,067	4	799	5	6	248	8	2	22	36
Dominica	9	804	9	906	3	7	125	27	4	118	9
Grenada	5	986	7	393	9	3	60	56	4	226	2
St. Kitts & Nevis[1]	7	1,304	2	1,171	2	4	33	70	4	132	7
St. Lucia[2]	9	989	6	459	7	5	64	53	2	67	16
St. Vincent & Grenadines	11	1,891	1	751	6	9	42	68	3	34	26
Other Caribbean	142	196	35	133	34	106	55	69	45	21	65
Bahamas, The	7	47	33	215	18	4	4	110	2	13	51
Barbados	7	1,091	3	204	19	6	3	116	3	7	70
Belize	10	29	41	413	8	7	131	25	7	50	21
Dominican Republic	31	43	34	35	61	21	63	54	7	18	42
Guyana	6	2	126	60	41	3	89	45	2	4	78
Haiti	45	109	22	53	46	39	90	43	5	9	62
Jamaica	25	155	18	80	34	17	88	46	14	89	12
Netherlands Antilles	2	168	16	81	33	1	20	80	1	1	126
Trinidad & Tobago	9	118	19	56	45	8	5	103	4	1	123
Other	5,354	51	82	76	77	4,124	77	67	1,332	24	72
GDP per capita of top 20[3]	. . .	. . .	4.5	. . .	5.5	. . .	. . .	1.4	. . .	. . .	2.0

Sources: Emergency Disasters Data Base (EM-DAT) (CRED, 2005) for data on natural disasters, including estimates of the number of people affected and the value of damage; World Bank, World Development Indicators database for data on land area; IMF, World Economic Outlook database for data on GDP and population.

Notes: The sample contains 148 countries after omitting countries without at least one natural disaster associated with a cost estimate and/or missing information on GDP (24 advanced economies, 15 Caribbean countries, and 109 other developing countries). Simple unweighted averages are used for country groupings. Rankings are in descending order, with "1" indicating the most exposed to natural disaster. ECCU-6 denotes those countries in the Eastern Caribbean Currency Union that also are members of the IMF.

[1]Using the St. Kitts and Nevis National Emergency Management Agency's damage estimate for Hurricane Georges in 1998 would have implied a ranking of "2" in the last column.

[2]Excludes EM-DATs damage estimate for Hurricane Gilbert in 1988. If included, this would have implied a ranking of "1" in the last column.

[3]In thousands of 2002 U.S. dollars.

disasters during 1970–2004 to land area, all six ECCU countries rank among the 10 most disaster prone in the world. By this measure, they were about 12 times as exposed as the average country. The incidence is only slightly lower when one compares the number of disasters to population, with all six countries again among the 10 most disaster prone. Interestingly, the results do not reveal clear differences between the ECCU countries. Given that the northern islands (Antigua and Barbuda, St. Kitts and Nevis, and Dominica) are closer to the center of the hurricane belt than the southern islands (St. Lucia, St. Vincent and the Grenadines, and Grenada), one might have expected the former countries to rank higher in terms of vulnerability to natural disaster. But that is not consistently the case.

In the ECCU, average annual damage from natural disasters was equivalent to 2.6 percent of GDP, compared to a worldwide average of 0.7 percent. Although high, this figure is somewhat lower than the very high frequency of events would suggest, with only three of the six countries in the top 10 according to this measure. In terms of the human cost, only Antigua and Barbuda was among the top 10 according to the percentage of the population affected. The relatively small number of persons affected by natural disasters in the ECCU is consistent with the tendency for countries to become more resilient as they become wealthier. Average per capita GDP in the six ECCU countries was US$5,500 in 2002, compared with US$1,400 for the 20 most vulnerable countries based on the percentage of the population affected. The relatively high level of income in ECCU countries thus appears to substantially mitigate the human cost of the frequent natural disasters.

Macroeconomic Implications of Natural Disasters

In principle, one can distinguish between several sources of loss from natural disasters. There is a direct cost from loss of assets, as reflected by EM-DAT's measure of damage. In addition, disruption of economic activity may lead to loss of income. Finally, these impacts may cause spillovers at the macroeconomic level, as fiscal and external pressures can lead to imbalances that spark economic crises, and an increase in the incidence of poverty can create social unrest. It is therefore useful to examine the broader impact.

Short- and Medium-Term Impact

Studies of the impact of natural disasters (Box 7.1) point to a discernible short-term impact. A common finding is an immediate contraction in

output and a worsening of external and fiscal balances, with the impact somewhat softened by an increase in transfers from abroad. Figure 7.3 shows the dynamic impact of the 12 natural disasters in the ECCU countries during 1970–2002 for which the damage estimate exceeded 2 percent of GDP. While the small number of observations prevents formal statistical analysis, the results suggest that the impact conformed to the general pattern, although in some cases it seems to have been more severe than seen elsewhere.

The 12 large natural disasters in the ECCU were associated with a median reduction in same-year real GDP growth of 2.2 percentage points compared to the previous year. This coincided with a large decline in agricultural production and an offsetting increase in investment. Exports declined and imports increased, resulting in a staggering median increase in the current account deficit equal to 10.8 percent of GDP. These very large same-year effects are all the more striking when one considers that all the events occurred in the second half of the year. The impact on the central government was less clear, with a large variation in outcomes. Nevertheless, the tendency appears to have been a marked increase in expenditure and a small reduction in total revenue (including grants) despite an increase in inflows of official assistance and aid. As a result, the median public-debt-to-GDP ratio increased sharply by a cumulative 6.5 percentage points over three years.

The deterioration in fiscal and external balances is not surprising, as governments and households would be expected to borrow in response to temporary shocks. As such, the very large impact on the current account deficit seen in the ECCU countries is a reflection of the region's high degree of openness and access to international capital. Reliance on capital markets to mitigate the impact of natural disasters also represents a source vulnerability, however, as access to financing may suddenly dry up, making it difficult to service existing debts and necessitating deep cuts in consumption.

Long-Term Effects

Natural disasters can affect long-term outcomes through a number of channels, including environmental damage to agriculture, fishing, and forestry (ECLAC and IDB, 2000). The destruction of schools can have a long-lasting negative impact on the stock of human capital; reconstruction efforts can crowd out productive capital expenditure; increased indebtedness can raise the rate of interest and reduce investment; and a

Box 7.1. Review of Literature on Macroeconomic Implications of Natural Disasters

As outlined below, a number of studies reveal that natural disasters are typically associated with an immediate contraction in economic output, a worsening of external balances, a deterioration in fiscal balances, and an increase in poverty.

- *An immediate contraction in economic output.* Natural disasters have usually been accompanied by a reduction in same-year GDP growth, with the impact ranging from very small to 20 percentage points or more (e.g., Dominica in 1979). Among studies looking at Latin America and the Caribbean, Auffret (2003a) considers 16 natural disasters and finds that 1 percent of GDP in direct damage reduced same-year GDP growth by 0.5 percentage point; Charvériat (2000) analyzes 35 events with median damage of 3 percent of GDP and finds that same-year GDP growth fell in 28 cases, with an overall median reduction of 1.7 percentage points; and Crowards (2000b) finds that same-year GDP growth fell by an average of 3.1 percentage points following 21 major disasters. Evidence of an impact on growth beyond the contemporaneous drop is mixed. For example, Caselli and Malhotra (2004) present a comprehensive statistical study and conclude that disasters have no significant impact on the growth path.
- *A worsening of external balances.* Several studies have found that natural disasters typically result in an increase in imports (e.g., for reconstruction materials and to compensate for lost production) and that exports tend to suffer. For example, ECLAC and IDB (2000) considers 42 large natural disasters in Latin America and the Caribbean and finds that they were, on average, associated with a deterioration in the balance of payments by

worsening of fiscal and external balances can trigger inflation or financial crises.[4]

Evidence of the long-term economic effects of natural disasters is inconclusive, however. There has been little empirical analysis, and drawing firm conclusions is difficult. Among the few available studies, Benson and Clay (2003b) present findings suggesting that proneness to natural disasters has a negative impact on long-term economic growth, while the World Bank (2003) finds no significant impact.

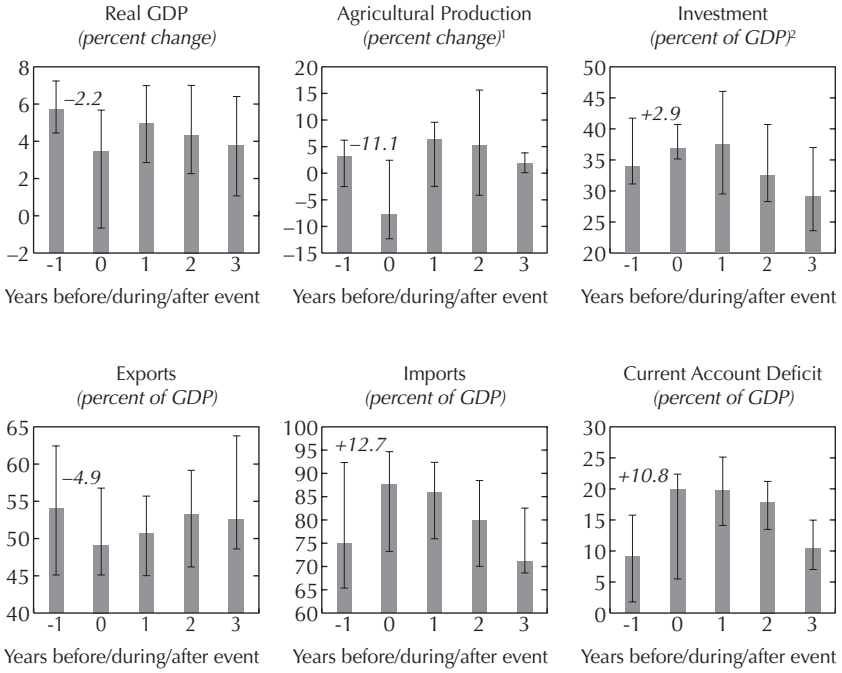
[4]IMF (2003), citing a number of different studies, finds that exogenous shocks and the associated policy responses have contributed to the accumulation of unsustainable external debt in many developing countries.

an amount equal to about one-third of the estimated damage. Crowards (2000b) finds that 21 major natural disasters led to an average worsening of the trade balance owing to an increase in import growth and, to a lesser extent, a reduction in export growth. Benson and others (2001) find that a country's dependence on agricultural exports is an important indicator of the magnitude of the deterioration in the trade balance.

- *A deterioration in fiscal balances*. While significant relationships are difficult to establish, the literature suggests that natural disasters can put substantial pressure on public finances. Emergency assistance and reconstruction efforts call for higher government expenditure. At the same time, tax revenue may shrink because of the decline in economic activity. Consequently, the result is usually a worsening of public balances. For example, IMF (2003) finds that five large exogenous shocks in Africa were associated with same-year increases in fiscal deficits of up to 3 percent of GDP. However, in many cases natural disasters appear to have had very little impact on fiscal balances, perhaps because countries are constrained by existing expenditure envelopes (Benson and Clay, 2003a).
- *An increase in poverty*. Natural disasters have been found to have a disproportionate impact on the poorer segments of the population. Low-income households often settle in the most vulnerable areas and live in poorly constructed housing (World Bank, 2003). In addition, the poor have fewer assets and limited access to credit and are therefore less able to cushion the impact on consumption of disruptions to income (IMF, 2003). While natural disasters thus appear to have an adverse effect on poverty, it is unclear how quickly affected households can recover.

Table 7.5 presents rank correlations between the different measures of proneness to disasters and key macroeconomic indicators. The results do not point to any persistently significant correlations and some have unexpected signs. In line with the findings above, the percentage of the population affected is strongly associated with low levels of income. The correlations also suggest that proneness to natural disasters—especially in terms of the percentage of the population affected—is associated with high volatility of income, consumption, and fiscal balances; a large agricultural sector; and a low investment-to-GDP ratio. All this is as one would expect. Contrary to what one might expect, the number of recorded events divided by land area and the percentage of the population affected are both positively correlated with GDP growth, although

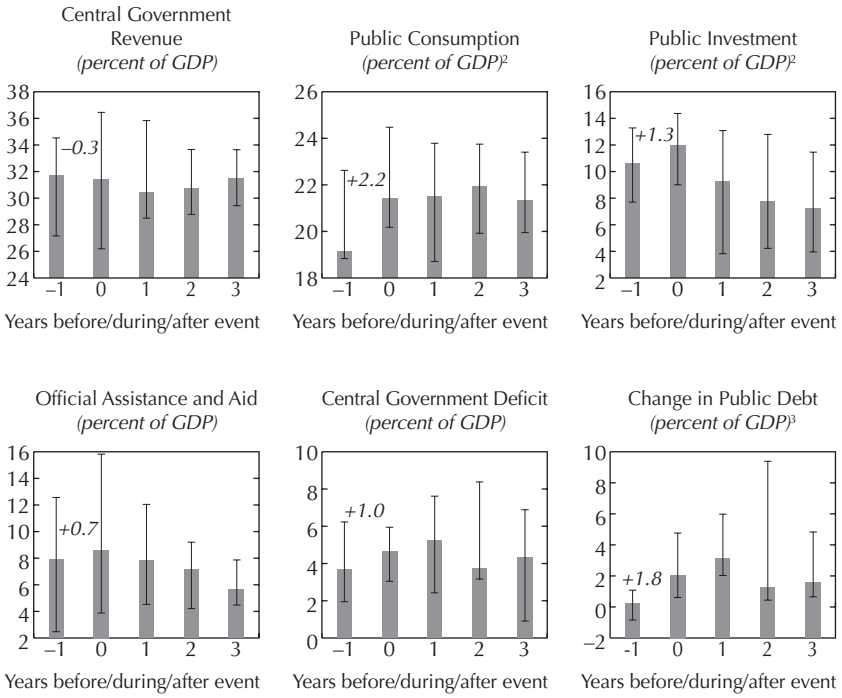
Figure 7.3. Median Impact of 12 Large Natural Disasters in the Eastern Caribbean Currency Union, 1970–2002
(Change of median from year –1 to year 0)



the relationship is not strongly significant and could be driven by other factors.

The Caribbean suffers from very volatile consumption (Table 7.6), which could plausibly be the result of the region's proneness to natural disasters, as suggested by the findings in Table 7.5. However, using cross-country regression analysis, the World Bank (2003) finds that natural disasters do not appear to be a significant determinant of consumption volatility. Also, although there is substantial variation between countries, income volatility (as measured by the standard deviation of annual real GDP growth) is not especially high in the Caribbean compared with other middle-income countries (see Chapter 5). This suggests that the impact of natural disasters on aggregate volatility, if any, is small. This is perhaps not surprising given that large events are relatively rare occurrences. Very volatile consumption in the Caribbean, therefore, probably has less to do with proneness to natural disasters than it does with inadequate mechanisms for consumption smoothing, in particular

Figure 7.3 ***(concluded)***



Sources: IMF, World Economic Outlook database; World Bank, World Development Indicators database; and IMF staff calculations.

Notes: Includes the 12 natural disasters with estimated damages exceeding 2 percent of GDP occurring during 1970–2002, as shown in Table 7.3. (The 1987 hurricane and flood in St. Vincent and the Grenadines are treated as a single event.) Bars indicate the range between the first and third quartile of the distribution.

[1]Excludes Grenada in 1975 and St. Lucia in 1980.

[2]Excludes Grenada in 1975 and in 1980.

[3]Excludes Antigua and Barbuda in 1989, Dominica in 1979, and St. Lucia in 1980.

a relatively limited use of insurance (Auffret, 2003a, 2003b; Chapter 8 of this volume); the absence of countercyclical fiscal policy (World Bank, 2003); and generally high volatility in small states (Easterly and Kraay, 2000). Nevertheless, even if the direct impact is small, it is still possible that natural disasters have an indirect impact on aggregate volatility. For example, low levels of insurance in the Caribbean may be, in part, a result of the proneness to natural disasters impeding the efficiency of the market.

Table 7.5. Correlations Between Measures of Proneness to Natural Disasters and Selected Macroeconomic Variables, 1970–2002

	freq1	*freq2*	*affect*	*damage*	*lpppc*	*lgdpc*	*grgdp*	*vrgdp*	*vcons*	*vgovbp*	*agri*	*tiratio*
Number of events divided by country area												
Number of observations	150	150	150	150	150	149	149	149	120	140	137	117
Correlation	. . .	0.67	0.08	0.23	–0.06	–0.07	0.20	–0.05	0.19	0.07	–0.10	–0.10
Spearman's ρ	. . .	**0.57**	**0.20**	**0.28**	0.05	0.07	**0.16**	–0.11	0.09	–0.05	0.01	0.01
p-value	. . .	**0.00**	**0.01**	**0.00**	0.55	0.40	**0.05**	0.17	0.35	0.58	0.91	0.93
Number of events divided by country population												
Number of observations	150	150	150	150	150	149	149	149	120	140	137	117
Correlation	0.67	. . .	0.22	0.43	–0.09	–0.08	0.12	–0.04	0.18	0.06	–0.06	–0.07
Spearman's ρ	**0.57**	. . .	**0.46**	**0.35**	–0.15	–0.14	0.12	0.04	**0.31**	**0.22**	0.12	**–0.22**
p-value	**0.00**	. . .	**0.00**	**0.00**	0.07	0.09	0.15	0.60	**0.00**	**0.01**	0.16	**0.02**
Persons affected (in percent of population)												
Number of observations	150	150	150	150	150	149	149	149	120	140	137	117
Correlation	0.08	0.22	. . .	0.26	–0.40	–0.35	0.20	0.04	0.29	0.15	0.36	–0.34
Spearman's ρ	**0.20**	**0.46**	. . .	**0.54**	**–0.61**	**–0.62**	**0.19**	**0.17**	**0.43**	0.07	**0.53**	**–0.47**
p-value	**0.01**	**0.00**	. . .	**0.00**	**0.00**	**0.00**	**0.02**	**0.03**	**0.00**	0.43	**0.00**	**0.00**
Damage (in percent of GDP)												
Number of observations	150	150	150	150	150	149	149	149	120	140	137	117
Correlation	0.23	0.43	0.26	. . .	–0.23	–0.20	–0.04	0.08	0.11	0.08	0.13	–0.18
Spearman's ρ	**0.28**	**0.35**	**0.54**	. . .	**–0.28**	**–0.26**	0.13	0.05	0.14	–0.02	**0.25**	–0.15
p-value	**0.00**	**0.00**	**0.00**	. . .	**0.00**	**0.00**	0.12	0.52	0.13	0.85	**0.00**	0.10

Sources: IMF, International Financial Statistics and World Economic Outlook databases; and World Bank, World Development Indicators database.

Notes: Bolded figures indicate that the rank correlations are significant at the 5 percent level (one-sided test). A positive correlation suggests that higher values of the variable are associated with an increased proneness to natural disaster, as reflected by the four measures in the first column.

Variables: *freq1:* number of events divided by country land area; *freq2:* number of events divided by country population; *affect:* percentage of population affected; *damage:* damage in percent of annual GDP; *lpppc:* average level of current price GDP per capita at PPP exchange rate; *lgdpc:* average level of current price GDP in USD per capita; *grgdp:* average growth rate of constant price GDP; *vrgdp:* standard deviation of constant price GDP; *vcons:* standard deviation of total consumption in U.S. dollars; *vgovbp:* standard deviation of central government balance in percent of GDP; *agri:* share of agriculture in GDP; *tiratio:* average ratio of total investment to GDP.

Table 7.6. Volatility of Income and Consumption, 1970–2002
(Standard deviation of annual growth rates, in percent)

		Consumption	
	GDP	Households	Government
ECCU-6 (average)	4.5	11.0	9.9
Antigua & Barbuda	3.2	13.3	7.9
Dominica	5.8	6.9	8.9
Grenada	3.6	8.3	11.2
St. Kitts & Nevis	3.2	11.1	8.8
St. Lucia	7.6	13.4	10.0
St. Vincent & the Grenadines	3.5	12.7	12.4
Low-income countries	6.1	10.7	16.2
Middle-income countries	6.0	8.2	9.5
High-income countries	3.3	2.9	2.4

Sources: World Bank, World Development Indicators database; ECCU country authorities; and IMF staff estimates.

Notes: Underlying data in constant 1995 U.S. dollars. ECCU-6 denotes those countries in the Eastern Caribbean Currency Union that also are members of the IMF.

Mitigating Disasters

This section reviews ways in which countries can reduce the cost of natural disasters and suggests that these can be substantially mitigated. Insurance and capital markets can provide compensation for loss of capital and income, alleviating the damage to household and government balance sheets, and reducing the immediate impact on consumption possibilities. Good construction practices and other precautionary arrangements can lessen the impact of natural hazards before they happen. Unfortunately, these mechanisms function poorly in many of the countries most vulnerable to natural disasters, including the ECCU countries.

Coping with Risk: The Role of Insurance and Capital Markets

Insurance can reduce the negative impact of natural disasters by spreading the burden over space and time. The insurance market is mainly international, with local insurers reinsuring part of their exposure with larger, often global, companies. However, the market for natural hazard insurance does not operate very smoothly and is limited in scope. As described in Pollner (2001), natural disasters are "high severity, low frequency" events that are more difficult to manage for insurance companies than the "low severity, high frequency" risk that they prefer to cover. In addition, objective information on damage and risks is difficult to obtain. Consequently, the market for catastrophe risk insurance is well known to be inefficient,

Box 7.2. New Instruments for Dealing with Natural Hazard Risk

A number of capital market instruments have recently become available for weather and disaster-related risks. Most prominent among these are catastrophe bonds, or cat bonds; other instruments include exchange-traded catastrophe options, catastrophe swaps, and weather derivatives. Cat bonds offer high yields but are subject to default if a covered catastrophe occurs during the life of the bond. Securitizing catastrophe risk in this way enables the risk to be spread more widely, thereby improving the efficiency of risk transfer.

While cat bonds and similar instruments are still in their infancy and have so far been used only in developed countries, they could potentially help developing countries obtain large-scale protection against the risk of natural hazards. For example, a government could issue a cat bond to protect itself against the risk of a major hurricane. The proceeds from the bond would then be invested in risk-free securities, with the spread between the two representing the recurring cost of insurance. If the specified hurricane occurs, the government would default on the cat bond and would then be free to use the funds placed in risk-free securities to cover its reconstruction costs. In order to minimize ambiguity, the bond should be tied to objective criteria such as wind speed or flood height at a specified location.

with high prices for coverage, excessive volatility, and insufficient pooling of risk. A more efficient risk-sharing procedure would use capital markets to spread the exposure over a larger number of investors. The recent emergence of catastrophe bonds in advanced markets could help address the problem, but use of this tool is still not very widespread (Box 7.2).

The shortcomings of the market for natural hazard insurance are especially pronounced in many developing countries where the insurance sector is only at an early stage of development and there is very little spreading of natural hazard risk (Freeman, Keen, and Mani, 2003). This is evident in the fact that the percentage of natural disaster damage covered by insurance is much lower than in advanced economies. According to Charvériat (2000), Latin America and the Caribbean has the lowest insurance cover of any region in the world, with only 3.9 percent of natural disaster damage from 1985–99 covered by insurance, compared with 34.5 percent in North America, the region with the highest coverage.

While the ECCU insurance market is relatively advanced in comparison with other developing countries, coverage is not widespread and costs

are much higher than in advanced economies. Relative to the economy, total property insurance premiums in the ECCU (about 2.4 percent of GDP) are not that much lower than in the United States (3.3 percent). However, this is largely a reflection of high prices, with base property insurance rates in the ECCU countries about double the rate prevailing in less hurricane-exposed cities in the United States (Pollner, 2001).

Overall, the eastern Caribbean insurance market suffers from a high expense ratio, high fragmentation, and a low level of available risk capital. Pollner (2001) finds that the expense ratios of local insurance companies are 30 to 40 percent of premium income, compared with the U.S. average of 26 to 28 percent. With a limited domestic capital base and about 80 percent of gross property insurance premiums transferred to reinsurers, the eastern Caribbean insurance market is highly exposed to the volatile global reinsurance market. This has caused local insurance rates to be unduly affected by natural disasters in industrial countries. For example, swings in global reinsurance rates following Hurricane Andrew in Florida (1992) and the earthquake in Northridge, California (1994) had a pronounced impact on property insurance rates in the eastern Caribbean, with the annual cost of insurance jumping from 0.4 percent of insured value in 1990 to 1.3 percent in 1994 before declining to 0.7 percent in 1998.

Insurance coverage in the ECCU is highly uneven. The vast majority of property insurance relates to large commercial businesses, especially in the tourism sector. In contrast, even though lenders typically require mortgage holders to be insured, a large number of private dwellings are uninsured, particularly among low-income households. Public sector use of market insurance is generally limited, although some countries have recently moved toward insuring most government assets. In addition, crop insurance is not always available to farmers, one exception being the Windward Islands Crop Insurance (WINCROP) scheme that provides storm insurance for banana growers.[5]

Policies to Reduce Risk and Mitigate Impact

While many countries have taken steps to improve their preparedness for natural disasters, there appears to be scope for increasing the efficacy

[5]The scheme covers the entire export crop in Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines, but provides cover only against a small proportion (about 20 percent) of losses. This has proven sufficient, however, to enable growers to rehabilitate quickly.

of policy measures. Of particular importance in the ECCU is the need to improve the functioning of the insurance market, both to increase coverage in the face of the high natural hazard risk and to reduce economic volatility. Here, government property could be insured more widely, possibly by using catastrophe bonds or other financial innovations (Box 7.2). Policies to encourage more widespread insurance of dwellings and crops would also be beneficial, particularly in low-income communities. Strengthening financial regulation would improve the insurance product, making it attractive to a wider segment of the economy.

In addition to promoting market-based insurance, modest investments can often substantially reduce the structural vulnerability of infrastructure. By one estimate, investments of US$40 billion in disaster preparedness, prevention, and mitigation would have reduced global economic losses in the 1990s by US$280 billion (Freeman, Keen, and Mani, 2003). For example, simple measures such as tying walls to the foundation and roofs to walls may dramatically increase buildings' resistance to hurricanes (Pollner, 2001). Well-designed and strictly-enforced building codes and zoning regulation are central to ensuring that construction methods are appropriate for the local environment. Implementing hurricane-resistant home improvement programs to encourage safer building practices in the informal sector, as is done in several of the ECCU countries, can also have very positive results. In other areas, governments should refrain from subsidizing monoculture, as diversification within agriculture and from agriculture to other sectors would lessen the concentration of risk.

Natural disasters cannot be entirely eliminated, especially in high-risk regions such as the ECCU. Ensuring an effective response requires administrative initiatives, such as preparing emergency procedures and social safety nets. It also requires financial preparedness. In principle, when market insurance is not available, risk-averse governments, each year, should save an amount equal to the expected cost of disasters (Freeman, Keen, and Mani, 2003). Accumulation of contingency funds, such as those held at the Eastern Caribbean Central Bank, would be the most obvious channel for such savings. For countries with very high debt levels, however, it may be more practical to use precautionary savings to pay down existing debt.

International Assistance and Cooperation

External assistance plays an important role in helping countries mitigate the effects of exogenous shocks. An increasing share of official development assistance is being devoted to emergency assistance, and multilateral

financial institutions are also doing more in this area.[6] Nevertheless, the rapid increase in the frequency of natural disasters around the world suggests a need for increasing the effort. In addition, most external assistance for natural disasters has been concentrated on a few very visible events, and it is possible that smaller disasters getting little media coverage are receiving too small a share of assistance. Given the limited funds, cooperation among agencies is important to ensure that resources are distributed appropriately.

Of particular relevance for the ECCU countries are the programs sponsored by the Caribbean Development Bank (CDB), the World Bank, the Caribbean Disaster Emergency Response Agency (CDERA), and the IMF. The CDB, which provides assistance for disaster relief, mitigation, and preparedness projects, disbursed US$50 million in loans for 27 operations during 1998–2001. The World Bank disbursed more than US$30 million in the region during the same period, in large part for projects relating to disaster management and emergency recovery. CDERA, a regional agency established in 1991 to provide an immediate and coordinated response to disastrous events, is engaged in a wide array of disaster-management services, ranging from local information campaigns to logistical support for dispatch of relief supplies. The IMF has several instruments for providing financial assistance in response to natural disasters, the most directly targeted being emergency assistance for natural disaster, which has been used six times by ECCU countries since 1962, for total disbursements of US$16 million.

Summary of Findings

On average, natural disasters affect about 2 percent of a country's population each year and cause damage amounting to well over one-half of 1 percent of GDP. The incidence is especially pronounced in developing countries, with the ECCU countries standing out as among the most vulnerable in the world in terms of the frequency of events. Given the high and increasing cost of disasters, there is a need for polices to better mitigate their impact.

Natural disasters are typically associated with an immediate contraction in economic output, a worsening of external and fiscal balances, and

[6]See IMF (2003) for an overview of international financing mechanisms for addressing exogenous shocks.

an increase in poverty. The impact is clearly seen in the ECCU, where natural disasters have had pronounced macroeconomic effects.

Despite the vulnerability to natural disasters, insurance plays a limited role in developing countries. Although the insurance market is more advanced in the ECCU than in many other developing countries, property insurance is still not widespread, especially among low-income households. Overall, the ECCU insurance market suffers from a high expense ratio, high fragmentation, high volatility, and a small capital base.

Natural disasters cannot be eliminated, but it is important for governments to be prepared for them. Modest investments in preventive measures can often substantially mitigate the impact of such events. Among other things, a tighter fiscal policy during good times would leave more room to increase expenditures during emergencies.

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8

Government Responses to Natural Disasters in the Caribbean

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Economic vulnerability in the Caribbean region is extremely high. A major driver of this vulnerability is the region's exposure to external shocks generated by natural disasters—over the last three decades, all of the six Eastern Caribbean Currency Union (ECCU) countries that are members of the IMF were ranked among the top 10 in the world in terms of natural disaster events per square mile (see Chapter 7).

Despite this susceptibility to natural disasters, Caribbean risk mitigation activities have been limited and the region's risk-transfer markets are generally weak.[1,2] As a result, natural disasters have a large negative impact on economic activity and poverty in the Caribbean. This chapter briefly sets out the major channels through which small, disaster-prone countries

[1]A disaster is the realization of risk (the potential for significant loss), requiring the presence of a hazard, and the vulnerability of physical and human capital to that hazard. While the Caribbean is the most disaster-prone region in the world, there are significant differences in disaster (typically hurricane) exposure within the region (Rasmussen, 2004). Traditionally, the Leeward Islands (St. Kitts and Nevis, Anguilla, Montserrat, and Antigua and Barbuda) are more exposed to hurricanes than the northern Windward Islands (St. Lucia, Dominica) and Barbados, which in turn are more exposed than the southern Windward Islands (Grenada, St. Vincent and the Grenadines) and Trinidad and Tobago.

[2]Cashin (2004) finds that Caribbean output volatility is about twice that of the United States, while Auffret (2003) attributes much of this excessive volatility to exogenous natural disaster shocks.

can respond to the challenges posed by natural disasters, with an emphasis on options for ameliorating disaster risk in the Caribbean.

Disaster Risk Mitigation

In addition to obtaining needed post-reconstruction funds, at the government level there are three main responses to the economic vulnerability induced by natural disasters.

Risk identification and reduction focus on mitigating the effects of a disaster should one occur. Proper risk identification involves hazard data collection and mapping, and vulnerability and risk assessments. Similarly, risk reduction activities can tackle revealed vulnerabilities through broad programs of disaster mitigation and preparedness, such as strengthening and relocating structures, retrofitting existing structures, and implementing and enforcing land use codes and building standards.[3] Such activities are important, as they can sharply (and permanently) reduce disaster risk exposure and help lower the cost of risk transfer mechanisms by reducing the underlying structural risk of physical assets. Organizations such as the U.S. Agency for International Development (USAID), the European Union, the Caribbean Development Bank, and the World Bank have funded a series of disaster mitigation initiatives in the region in recent decades.

The second government response is *self-insurance*, which involves establishing economy-wide insurance through the intertemporal transfer of national resources. A typical example might involve the accretion of a precautionary saving fund (based on actuarial probabilities) to draw down upon in the event of a disaster.[4] For many developing countries, the first response to a natural disaster involves the diversion of revenue sources from development expenditure to disaster relief and reconstruction, as has been the experience in Grenada in 2004 following Hurricane Ivan. Other

[3]While economic diversification and the restructuring of economies away from disaster-prone activities are traditional means of risk mitigation, they represent a much greater challenge in small island economies with economic agents subject to covariant disaster risk.

[4]However, contingency funds maintained in liquid accounts offer a lower rate of return than that typically earned on alternative investments of such funds, and there may be political difficulties in maintaining annual commitments and protecting accumulated funds (Benson and Clay, 2003).

forms of self-insurance involve domestic borrowing and tapping external saving (through borrowing and remittance flows).[5]

The third government response to the economic vulnerability induced by natural disasters is *risk transfer*, which involves the transfer of resources across states of nature. Risk transfer mechanisms can, in principle, provide a valuable channel for providing capital for rapid rehabilitation and reconstruction of public and private assets. There are several types of risk transfer mechanisms: (1) external assistance, through sovereign debt relief and official development assistance; (2) market insurance and reinsurance, which can provide replacement coverage for public and private assets beyond the capacity of self-insurance; (3) insurance risk pooling, whereby geographical or cross-industry pooling lowers the high cost of disaster risk insurance emanating from the correlation of disaster risks; (4) capital-market-based risk transfer instruments, such as catastrophe bonds, catastrophe options, or weather-related derivatives; (5) contingent lines of credit, whereby sums of credit are made available to insurers and banks in the event of a large disaster, on the basis of the payment of an annual commitment fee; and (6) changes in the composition and structure of public borrowing, which could promote risk-sharing between debtors and creditors.

Some developing countries have undertaken precautionary measures such as establishing disaster funds to draw upon in the event of a natural disaster.[6] These funds are based on the principle that as self-insurers, governments should garner sufficient funds to cope with disasters. As a useful rule of thumb, such calamity funds should concentrate on absorbing catastrophic risks that cannot be readily transferred—in particular, disaster-related damage suffered by farmers, the underinsured or noninsured, and the poor. While budgets in Caribbean countries do make provision for disasters, it is typically not to provide resources for disaster

[5]Reconstruction financed by borrowing does increase national public debt, but typically does not increase a country's ability to service its debt. In addition, most of the six ECCU countries have public debt stocks that are extremely high. Reliance on debt-financed disaster reconstruction is not an optimal policy for highly indebted disaster-prone countries.

[6]In 1996, Mexico established a Fund for Natural Disasters (FONDEN) that is an annual budgetary allocation designed to meet postdisaster expenditures. The fund is designed to finance the repair of uninsured infrastructure, restore the productivity of affected low-income farmers, and support disaster relief activities (particularly in rural areas). However, FONDEN was insufficiently capitalized to accomplish its multiple obligations, and was recapitalized with the assistance of the World Bank in 2002. In addition, it is important to bear in mind that public commitment to extend disaster coverage to private assets reduces the incentive for economic agents to purchase risk-transfer instruments.

funds, but rather for current expenditure on emergency relief and disaster response activities.

As a self-insurance strategy, diversification of labor income through emigration and remittances is a useful means to insure against covariant risk arising from natural disasters. The Caribbean has the highest emigration rate in the world—about 12 percent of the labor force of the region migrated to countries in the Organization for Economic Cooperation and Development during 1970–2000 (Mishra, 2006). The Caribbean is also the largest recipient of remittances (in proportion to GDP) in the world. Remittances were about 10 percent of regional GDP in 2002, an amount much larger than overseas development assistance and foreign direct investment flows. It has been pointed out in the literature that remittances play a critical role in insurance and in reducing consumption vulnerability arising from shocks.[7]

Implications and Weaknesses of the Caribbean Natural Disaster Management Approach

The catastrophe insurance industry faces higher risks and has less developed means of risk assessment than other types of insurance, resulting in higher and more variable premiums. Generally, insurance premiums transfer risk across time and space using well defined techniques for risk assessment. Insurance premiums are calculated based on three main factors: the probability distributions of adverse events, the structural vulnerability of the insured assets, and the value of such assets.[8] Unfortunately, because catastrophic events are by definition rather rare and very severe, there is a limited actuarial base available for calculating probability distributions and intensities of their future occurrence. As a result, catastrophe

[7]Evidence from econometric analysis using panel data from 1980–2002 for 13 Caribbean countries indicates that while there is weak support for a contemporaneous insurance motive, the insurance effect does occur with a lag of two years. A 1 percent decrease in real GDP is associated with an increase in remittances of about 3 percent, following a two-year lag. There is also evidence that countries with higher remittances have lower volatility of real private consumption, a result that is consistent with the insurance motive (Mishra, 2006).

[8]Typically, only certain public assets are insured in most Caribbean countries, such as key public buildings, as well as some hospitals and airports. Catastrophe insurance is more common in insuring hotels and private tourism infrastructure. While there is no compulsory insurance coverage in the eastern Caribbean, catastrophe coverage (involving all natural hazards) is typically required to secure a mortgage.

insurance must compensate for this uncertainty factor with higher premiums. Hence, the premiums for catastrophe insurance are proportionally higher than the probability of the insured events. When catastrophic events happen with greater than anticipated frequency (such as hurricanes and earthquakes in the mid-1990s), insurance companies (particularly reinsurance companies) respond with increased premiums, especially for vulnerable regions. For instance, Caribbean countries faced 200 to 300 percent higher insurance premiums in 1992 after Hurricane Andrew in Florida and in 1994 after the Northridge earthquake in California.

National and regional disaster contingency funds are too small to meet financing needs following a disaster. High reliance on donor emergency assistance throughout the Caribbean adversely affects the creation of any sizeable contingency funds. The Eastern Caribbean Central Bank has created a fiscal reserve fund for all member countries in economic difficulties (including those caused by disasters), with contributions sourced from each country's share of central bank profits. However, the fund's small size is insufficient for major disaster relief. Another contingency fund for the region is the Disaster Mitigation Facility for the Caribbean (DMFC). In 2001, with support from the USAID Office of Foreign Disaster Assistance, the Caribbean Development Bank established the DMFC, marking an important step in promoting and coordinating risk management within the region. Activities of the DMFC include support for strengthened building standards and enforcement mechanisms, and assistance to member countries in developing national risk management policies and plans.

Traditional insurance markets in the Caribbean are characterized by relatively concentrated coverage, high prices, and low risk transfer. According to a World Bank study (Pollner, 2001), the proportion of residential and commercial properties in the Caribbean covered by traditional insurance is significantly higher (at around 2.3 percent of GDP) than in other developing countries. Relative to population size, the Caribbean enjoys one of the highest densities of insurance companies—one company per 14,000 inhabitants versus one per 107,000 inhabitants for the United States. This translates into an overcrowded industry, with an average insurance company writing barely over US$1 million in premiums, less than 1 percent of a comparative U.S. insurance firm. In such a market, most Caribbean insurance companies act as mere agencies of large reinsurance companies (transferring some 70 percent of premiums and risks to reinsurers in Europe and the United States), rather than genuine underwriters. The cost of reinsurance in the Caribbean is high, largely due to the small capitalization of local insurers and the high exposure of the region to disasters. Further complicating this situation is the insurance

industry's almost exclusive focus on medium-sized to large dwellings and private businesses. Most low-income households, small businesses, and public infrastructure in the region remain uninsured. It is estimated that between 25 and 40 percent of the dwellings in the region are uninsured (and largely uninsurable)—the great majority of them belonging to the above-mentioned groups.[9]

While the regulatory framework for insurers in the Caribbean is generally adequate, the specifics of the region's insurance market necessitate reforms aiding market consolidation. National governments regulate insurance markets in the Caribbean, and most countries have adopted European insurance regulations, including registration and capital requirements. However, due to fragmentation of the Caribbean insurance market, the expense ratios of insurance companies are high by international standards. The resulting situation prevents adequate buildup of capital, and makes local insurance companies more vulnerable. Furthermore, the tax systems of some Caribbean countries discourage insurers from setting up specific reserve provisions prior to catastrophic events. Another limitation of insurance market fragmentation is the unwillingness of local companies to insure special risk categories, such as power utilities or major hotels and tourist resorts. Regulations increasing minimum capital requirements and tightening solvency ratios could contribute to industry consolidation and wider insurance coverage in the region.

Ex post financing of damage following natural disasters by international financial institutions and bilateral donor assistance has provided the largest pool of funds for rehabilitation and reconstruction in disaster-affected Caribbean countries. The World Bank has supported natural disaster reconstruction projects across the region, and in recent years has expanded its investments in disaster mitigation projects in members of the Organization of Eastern Caribbean States (OECS).[10] Similarly, since 1962, the IMF has provided assistance on nonconcessional terms to 26 member countries afflicted by 29 separate natural disasters (Table 8.1) through Emergency Assistance for Natural Disasters (ENDA) initiative. Since January 2005, IMF members eligible for the Poverty and Growth

[9]Auffret (2003) confirms that Caribbean catastrophe insurance premiums represented about 1.5 percent of GDP over 1970–99, while average (insured and uninsured) losses were only about 0.5 percent of GDP. Both would be equal under actuarially fair pricing, and confirm that the price of catastrophe insurance in the Caribbean can be characterized as high.

[10]Worldwide, the World Bank funded postdisaster reconstruction projects in the 1980s and 1990s totaling more than US$14 billion. The projects focused on repairs to transportation infrastructure, energy systems, and essential social services.

Table 8.1. International Monetary Fund Emergency Assistance for Natural Disasters, 1962–2005

Country	Year	Event	Purchases: In millions of U.S. dollars	Purchases: In percent of quota
Egypt	1962	Crop failure	24.0	26.7
Yugoslavia	1963	Earthquake	30.0	25.0
India	1966	Drought	187.5	25.0
Nicaragua	1973	Earthquake	14.5	44.4
Chad	1974	Drought	3.4	21.5
Dominica	**1979**	**Hurricane**	**1.3**	**50.0**
Dominican Republic	**1979**	**Hurricane**	**22.2**	**31.8**
St. Lucia	**1980**	**Hurricane**	**2.3**	**50.0**
St. Vincent & the Grenadines	**1980**	**Hurricane**	**0.5**	**25.0**
Yemen	1982	Floods	16.8	25.0
Yemen, Arab Republic	1983	Earthquake	10.7	50.3
Madagascar	1986	Cyclone	19.0	25.0
Mexico	1986	Earthquake	320.1	25.0
Solomon Islands	1986	Cyclone	1.5	25.0
Ecuador	1987	Earthquake	48.2	25.0
Bangladesh	1988	Floods	96.8	25.0
Jamaica	**1989**	**Hurricane**	**48.1**	**25.0**
Pakistan	1992	Floods	261.4	25.0
Bangladesh	1998	Floods	138.2	25.0
Dominican Republic	**1998**	**Hurricane**	**55.9**	**25.0**
Haiti	**1998**	**Hurricane**	**21.0**	**25.0**
Honduras	1998	Hurricane	65.6	50.0
St. Kitts & Nevis	**1998**	**Hurricane**	**2.3**	**25.0**
Turkey	1999	Earthquake	501.0	37.5
Malawi	2002	Food shortage	23.0	25.0
Grenada	**2003**	**Hurricane**	**4.0**	**25.0**
Grenada	**2004**	**Hurricane**	**4.4**	**25.0**
Maldives	2005	Tsunami	6.3	50.0
Sri Lanka	2005	Tsunami	158.4	25.0

Source: International Monetary Fund.

Reduction Facility (PRGF) have been able to access this facility at concessional rates (an interest rate of one-half of 1 percent a year), with the interest subsidies financed by grant contributions from bilateral donors.[11] A higher amount of resources can be accessed under other IMF facilities, such as Stand-By Arrangements and the PRGF, but they are slower to disburse, subject to conditionality, and not geared toward the specific financing problems induced by natural disasters.

[11]As of April 30, 2005, four countries—Grenada, Malawi, Maldives, and Sri Lanka—had outstanding purchases under the IMF's ENDA policy. Both Grenada and Malawi have accessed ENDA at subsidized rates of interest.

While most Caribbean countries have looked to international financial institutions and bilateral donor agencies for assistance to recover from disasters, it is rather uncommon for such flows to fully offset the losses incurred. This shortfall has arisen largely due to stagnation in the level of resources available from international donors.[12] Overseas development assistance flows from developed countries to developing countries have fallen in real terms since the early 1980s, with average flows to ECCU countries having declined from 11 percent of ECCU GDP in the 1980s to less than 5 percent over 2000–03. Of this shrinking amount, an increasing proportion has been allocated to postdisaster reconstruction.

External assistance from the international community has typically been made available without any conditions on undertaking disaster mitigation measures, thereby creating moral hazard problems. As a result, development institutions (both multilateral and bilateral) have served, in effect, as reinsurers of last resort. In addition, given that international financial institutions and bilateral donors find it difficult to commit themselves *not* to provide such assistance, moral hazard arises because there is then little incentive for disaster-affected countries to undertake disaster mitigation investments, or to self-insure against future disasters. A useful option for international financial institutions would be to provide disaster-related lines of credit, with access contingent on the ex ante undertaking of disaster mitigating activities.

In spite of the existence of risk-transfer mechanisms, very few developing country governments use them to reduce the resource gap (defined as the difference between funds available and needed for postdisaster reconstruction expenditure). The size of the resource gap rises with the probability of adverse events—the gap for 1-in-20-year events (5 percent probability of occurrence) is typically smaller than that for 1-in-100-year events (1 percent probability). Unfortunately, little reconstruction funding is provided by traditional insurance coverage in Caribbean countries. In addition, sovereigns rarely purchase disaster insurance, and typically do not insure public assets, while catastrophe bonds and weather derivatives issued by developing country sovereigns are nonexistent. At present, the major channels for resource flows for postdisaster expenditure typically involve external aid flows, reallocation of budget expenditures, increased domestic

[12]A study of Dominica in the year following the 1995 hurricane season (during which it was hit with two hurricanes and a tropical storm) revealed that pledged grants and loans totaled about 40 percent of the total cost of storm damage. Similarly, pledges received following Hurricane Ivan's devastation of Grenada in 2004 amounted to about 20 percent of storm damage.

credit (chiefly through local commercial banks), redirection of existing loans from international financial institutions, and additional external commercial credit or credit from international financial institutions.

Scope for Improved Disaster Management

Transferring catastrophic risks to the capital market has been effectively used in some countries as means of spreading risk, stabilizing the insurance market, and increasing insurance coverage. Given the capital constraints of reinsurance companies (and the resulting fluctuations in catastrophe insurance rates), as well as domestic risk aversion of local insurers, there is scope for seeking additional risk-bearing capacity in capital markets. Securitization of catastrophe risk into marketable financial securities is one such solution, and several instruments have been actively trading in developed country markets (United States, Europe, and Japan) since the mid-1990s. A prime example of such a security is catastrophe bonds, which pay investors high yields but are subject to default on all or part of principal and interest if a catastrophic event occurs during the life of the bond. The insured invests the principal in a risk-free asset and is allowed to withdraw only when the specified catastrophic event occurs.[13] Other examples of such securities include exchange-traded catastrophe options (the purchaser of such an option can demand payment if an insurance claims index exceeds a prespecified level); catastrophe equity puts (an option which allows the insurer to sell equity shares after a disaster); catastrophe swaps (whereby an insurance portfolio with potential payment liability is swapped for a security with cash-flow payment obligations; and weather derivatives (contracts that provide payments on the occurrence of specified weather events).[14]

[13]In capturing the financial risk of catastrophic events and transferring them to capital markets, catastrophe bonds pay out if a defined event (such as a category 4 hurricane on the Saffir-Simpson scale) occurs. Catastrophe bonds have traditionally been issued by insurance or reinsurance companies to assist in transferring underwriting risk. However, while such bonds are of potential relevance to governments in developing countries, as yet no such country (including those in the Caribbean) has used these bonds to transfer catastrophe risk.

[14]Weather-indexed securities have not been as successful as originally envisaged, even in developed countries. A major stumbling block appears to be that of "basis risk"—indexes such as the Saffir-Simpson scale or quantity of rainfall are often poorly correlated with the extent of individual losses.

Capital market-based instruments are potentially relevant to the Caribbean, but have yet to be used. They could address current market failures—mainly enabling public utilities and the government sector to obtain some form of insurance against catastrophic damage to public infrastructure. However, a major barrier to using these noninsurance hedges is their cost—in particular, the transaction cost of using these instruments (particularly for single transactions) makes catastrophe bonds (for example) significantly more expensive than traditional insurance as a means of transferring risk (Swiss Reinsurance Company, 1999). As such, catastrophe bonds and other securities are likely to find their greatest applicability in relation to large risk-transfer transactions that are beyond the capacity of insurance and reinsurance markets to bear. However, this is not the environment found in the Caribbean, where the demand for insurance has been more than adequately covered by insurers, who then reinsure the bulk of their risk. This state of affairs suggests that traditional insurance will continue to be the dominant option for Caribbean countries seeking to undertake additional ex ante transference of disaster risk.

Catastrophe insurance pooling might address many problems in the Caribbean insurance market. Instead of transferring insurance risk abroad or to capital markets, Caribbean governments would have the option of insurance pooling for the entire region. Insurance pooling can be much more efficient than individual country insurance. The primary reason is that insurance premiums depend not only on the probability of a given event but also on the uncertainty attached to that probability. Uncertainty of the catastrophic event for a single Caribbean country is much higher than the uncertainty for a group of countries. According to Pollner (2001):

> "Pooling not only institutionalizes the coverage via insurance of catastrophic risks for both the private and public sectors, but also allows more standardization in the rating and pricing of such risks. Pooling also provides more leverage to cover risks with limited capital available. By retaining some part of the risk that is bearable, this also helps stabilize the availability of such insurance funding and its pricing. This is accomplished via more efficient accumulation of catastrophe reserves which can help buffer some of the global market risks related to natural disasters." (p. 79)

Such pooling of insurance funds has been successfully implemented in several countries, including the United States, Japan, and New Zealand. Box 8.1 examines how pooling has been employed in Turkey.

It has been suggested in recent years that the high cost of insurance in the Caribbean could be reduced through disaster mitigation initiatives

Box 8.1. Turkish Catastrophe Insurance Pool

The Turkish Catastrophe Insurance Pool (TCIP) is a recent example of risk pooling for developing countries. The TCIP is relevant to the Caribbean region because it combines risk pooling with the introduction of appropriate incentives for loss mitigation. Specifically, the TCIP is an earthquake risk insurance pooling program that is mandatory for owners of urban residential property. The pool provides cover up to approximately US$50,000 for each dwelling, with a premium that varies across the country depending upon seismicity of the area and the type and quality of housing construction. The government exercises oversight to ensure that insurance pools are managed responsibly. Exposure of the insurance pool is managed by the TCIP's own reserves, with higher layers of exposure covered by the global reinsurance market and the World Bank.

The financial support provided by the World Bank in the form of liquidity readily available to insured homeowners affected by future events, along with the involvement of private insurers and reinsurers, have contributed to the success of the TCIP since its creation in 2000. That success is measured by the program's high penetration ratios (about 17 percent of households, the highest among similar pooling programs of national catastrophe insurance for homeowners). The TCIP has also produced greater insurance capacity for Turkey and Turkish risk, and has promoted a broader and more efficient (re)insurance market for such risk.

and regional pooling of insurance coverage (designed to diversify risk). The recommendation to establish a regional catastrophe insurance pool came out of a Caribbean Community and Common Market (CARICOM) Working Party on Insurance in the late 1990s. However, this attempt to establish a regional insurance pool for OECS countries (under the auspices of the World Bank) failed to take root, as several countries opted out of the discussions (in part due to the lack of grant funds to complete technical work assessing the actuarial viability of the project). In the wake of the disastrous 2004 hurricane season in the Caribbean, a second attempt is now underway, again under World Bank stewardship, to establish a risk pooling mechanism for CARICOM countries. At the heart of this proposal is the notion that risk pooling across different risk zones in the Caribbean has advantages in that it would lower the minimum net capital requirement and allow for more efficient reinsurance arrangements. Extending such pooling to other small island economies in the world would further diversify the risk, thereby lowering premiums.

Changing the composition and structure of public borrowing could also assist in the international transfer of the economic risk of a natural disaster. Compared with advanced countries, developing countries find it difficult to issue long-term debt in their own currencies. Sovereign borrowers also lack equity-like instruments to ensure that investors share in the gains and losses of the sovereign's economic performance. However, the risk-sharing benefits of equity can be mimicked by the issuance of financial instruments with payment terms indexed to real variables that are (1) partly within the control of national authorities, such as national GDP, or (2) exogenously-determined variables such as real commodity prices or the occurrence of a natural disaster. Such real indexation would provide insurance-like benefits by reducing both the likelihood of debt crises and (by acting as an automatic fiscal stabilizer) the need for procyclical fiscal policies. There is a role for international financial institutions to play in encouraging the creation of markets for the issuance of such real-indexed bonds through such activities as coordinating contacts between debt managers and international investors, and boosting the independence of national statistical agencies (Borenzstein and Mauro, 2002).

Issues of Relevance to Developing Countries

Consequences of Postdisaster Assistance

The provision of postdisaster financial aid has been the traditional strategy for dealing with Caribbean natural disasters, with international donors becoming the de facto insurer of last resort. However, Caribbean governments keen to implement precautionary disaster prevention and mitigation measures are required to undertake current expenditures to reduce future risk, and as with any expenditures, these have opportunity costs. At present, postdisaster assistance is highly subsidized, yet by purchasing insurance and disaster-risk transfer mechanisms, poor disaster-affected countries will have to bear many of the costs presently borne by international donors. Unless international donors can credibly commit to not provide postdisaster assistance, there is little incentive for countries to undertake risk-transfer strategies or engage in risk-reduction and mitigation efforts. This is the "Samaritan's dilemma," whereby households, farmers, and businesses rationally believe that governments will be under political pressure to recognize uninsured losses; in turn, governments rationally believe that external donors will provide postdisaster assistance. In both cases, there is likely to be rational underinvestment in ex ante disaster mitigation activities.

Demand for Risk-Transfer Mechanisms

The demand for risk-transfer mechanisms will be determined by a country's willingness to accept the risk of lower future income due to disasters. This willingness is a function of the probabilistic size of the risk, the cost of insurance, and the cost of other risk-transfer mechanisms (including subsidized postdisaster assistance). The degree of risk aversion in Caribbean countries will be a key determinant of the desirability of risk transfer mechanisms.[15] Moreover, the greater the postdisaster access to external savings, the lower will be the demand for risk-transfer mechanisms.

What Is Government Risk from Natural Hazards?

How does one measure government risk from natural hazards? In seeking to identify the risk that is being transferred, the responsibility of a developing country government for losses from natural disasters is often poorly defined. Is government risk to be limited to the rehabilitation of public assets (shifting the risk of government-owned assets)? Or is public risk to be extended to losses by household, farmers, and businesses (resolution of market failures in the provision of risk-transfer options to nongovernment),[16] or even extended further to work programs and public assistance to the poor? An important barrier to the adoption of risk-transfer mechanisms in developing countries is both the inability to calculate government risk from natural hazards and the tendency of developing country governments to assume private sector risks (World Bank, 2002).

However, for the transfer of catastrophe risks to operate, the risks being hedged against need to be precisely quantified. Typically there is a four-stage process in quantifying the hedging of government risk: first, there must be catastrophe modeling in order to quantify the expected annual loss; second, where the provision of government-sponsored insurance is

[15]Catastrophe insurance is expensive, with premia several times larger than the actuarially determined expected loss, chiefly due to a large risk premium arising from the variance of catastrophic losses (Froot, 1999). Over the past two decades, less than 1 percent of losses from catastrophes were insured in poor countries (Rasmussen, 2004).

[16]Crop insurance is not typically available in the Caribbean, which makes poor farmers especially vulnerable to natural disasters. Banana growers are the exception. Growers' cooperatives have banded together to provide crop insurance to farmers in Dominica, St. Lucia, Grenada, and St. Vincent and the Grenadines affected by windstorm damage through the Windward Islands Crop Insurance scheme. About one-fifth of losses (including those arising from disasters) are covered. The size of the fund has been hampered by limited reserves, traditional adverse selection and moral hazard constraints, costly monitoring of small farmers, and large covariant risk in insuring crop yields.

involved, additional ambiguities involving moral hazard and adverse selection must be taken into account; third, as disasters reduce income and destroy personal assets, it must be considered that the poor may have claims on public resources in times of crisis; and finally, the cost of any risk-transfer mechanism needs to be compared to existing sources of internal and external financing to cover disaster risk. To properly shift risk, the risk of loss itself needs to be defined. In developing countries, the risk of loss to government assets and activities of government may be so ambiguous that risk-shifting is not a viable option for the components of government risk.

Conclusions

The Caribbean ranks as one of the most disaster prone regions in the world. The macroeconomic impact of natural disasters often severely reduces the well-being of these small island economies, with a disproportionate impact on the poorest segments of the population and the mostly-uninsured public infrastructure.

Rather than preparedness for highly likely disaster events, Caribbean governments have emphasized responses after the fact. Given limited coverage for natural disaster risks provided by local insurance markets, and the dearth of incentives for governments and households to undertake risk mitigation investments, Caribbean governments have typically emphasized ex post responses to natural disasters through the receipt of donor-based emergency external assistance and the diversion of expenditures within domestic budgets. However, while the frequency of natural disasters and the value of assets at risk continue to rise, the capacity of donors to fund disaster assistance continues to be constrained. The end result is a growing gap between the need for, and availability of, resources for disaster reconstruction and relief.

Several tiers of nonmutually exclusive disaster risk management approaches are appropriate for Caribbean countries facing the world's highest risk of natural disaster. Broadly, Caribbean countries should continue to finance postdisaster expenditures with their traditional financing instruments, supplemented by innovations in insurance and risk-transfer instruments. As always, the appropriate mix of financing options will need to place strong weight on least-cost financing alternatives.

The mix of financing options for postdisaster expenditure can usefully be arrayed as a graduated response to increasing layers (or levels) of natural disaster risk:

- First, undertaking proper vulnerability assessments and fostering actions to mitigate disaster risk and enhance postdisaster response is a key means to reduce immediate catastrophe risk. Indeed, the lack of knowledge by Caribbean governments of the risk of disasters has hindered the ability of policymakers to plan for them. Precautionary actions would include adopting and enforcing strong building codes, enhancing disaster management agencies, and ensuring effective supervision of national insurance companies.
- Second, lower-level risk layers could be covered by the establishment of ex ante funding approaches, including the creation of taxpayer-funded national disaster contingency funds, emigration and remittance flows, and intertemporal consumption smoothing through the provision of traditional insurance for key public assets. While self-insurance will not provide the full cost of disaster reconstruction, it is important that sufficient funds be available to governments to meet the immediate short-term costs of disaster relief and rehabilitation. Continuation of self-insurance by national governments, through the exercise of their taxing and borrowing powers to provide financing for disaster reconstruction and relief, is also important. However, Caribbean governments also need to consider the sustainability of public debt stocks in any decision to incur additional domestic and external debt to finance postdisaster expenditures.
- Third, for higher-risk layers, greater recourse could be made to risk-transfer mechanisms such as regional insurance pools for catastrophe insurance of public and private assets. Where insurance markets are underdeveloped (as in the Caribbean), this may involve spreading risk by establishing a regional catastrophe insurance pool, potentially supported by reinsurance and catastrophe bonds, and by requiring mandatory insurance policies and stringent risk-mitigation initiatives.
- Fourth, for extremely high-risk layers, provision could be made for access to contingent lines of credit.
- Fifth, funding of postdisaster expenditures is important. Such funding includes the continuing provision by international financial institutions and bilateral donors of concessional loans and grants to finance postdisaster mitigation and reconstruction costs, focusing on disaster relief and the rehabilitation of low-income households. Such funds should be made at least partly contingent on undertaking ex ante risk mitigation activities, so as not to encourage excessive moral hazard (Gurenko and Lester, 2004).

While international capital market instruments (such as catastrophe bonds and weather derivatives) are promising risk-transfer mechanisms,

without subsidies from international financial institutions or donors they are likely to be beyond the reach of most developing countries. A more practical approach would be to continue to tap local insurance markets until they are saturated. Indeed, proposals by the World Bank to establish the Caribbean Catastrophe Insurance Pool combine both approaches, involving government-supported regional insurance pools and publicly-issued catastrophe bonds.

Importantly, the opportunity cost of greater use by developing countries of risk-transfer mechanisms needs to be considered. Indeed, it may be optimal from a developing country government perspective to engage in further borrowing, and to seek debt forgiveness and donor flows, as the main responses to natural disasters. That is, the public sector in most Caribbean countries does not typically insure its assets against catastrophic events, and this behavior may well be optimal given the existence of donor support and prevailing conditions in regional insurance markets.[17]

Risk-transfer mechanisms can also play a vital role in promoting risk mitigation. A key objective should be to transform the balance of catastrophe risk management in the Caribbean away from ex post and ad hoc responses and toward ex ante risk mitigation activities. As noted by the IMF (2003), the willingness of donors to fund ex post disaster relief and reconstruction is finite. Financing gaps between limited donor resources and the growing need for postdisaster funding will continue to widen unless disaster-prone Caribbean countries undertake more disaster risk identification and mitigation activities, supplemented by greater recourse to risk-transfer mechanisms.

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[17]From the perspective of Caribbean governments, the opportunity costs of risk-transfer mechanisms include the following: (1) creation of a catastrophic risk insurance program will limit discretion to provide disaster relief subsidies and lessen the ability of countries to access postdisaster external assistance; (2) accumulating funds in national disaster funds will divert scarce national savings from other productive uses; and (3) creation of a regional disaster insurance pool may result in the loss of reinsurance commissions to local insurers that have a relationship with international reinsurers.

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V

Managing External Flows

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9

Emigration and Brain Drain from the Caribbean

PRACHI MISHRA

While a vast amount of theoretical and empirical literature considers the impact of immigration on destination countries, little work has been done on emigration and its impact on source countries.[1] This is surprising because the share of the labor force leaving many individual source countries is considerably higher than the proportionate changes in the labor force of many receiving countries.

In several source countries, the reduction in the labor force due to emigration to the United States is in the range of 7 to 27 percent. To cite a few examples, the labor force in Mexico, El Salvador, and Jamaica was reduced by more than 10 percent due to emigration to the United States between 1970 and 2000. In comparison, immigrants constitute about 12 percent of the United State labor force (Davis and Weinstein, 2002). Immigration is considered an important issue for the United States and has attracted a great deal of attention in the literature.

However, the United States and the Western hemisphere are not the only parts of the world affected by such migrations. The labor forces of Turkey and Algeria have been reduced by about 10 percent due to emigration to Western Europe. There is also substantial migration to the Persian Gulf region from many countries that has not been well documented.

[1]See Borjas (1994, 1995) and Friedberg and Hunt (1995) for surveys of the empirical literature. The theoretical literature on international movement of factors includes Bhagwati and Hamada (1974), Rivera-Batiz (1989), and Quibria (1989).

Given the comparable magnitudes of emigration, it is surprising that there is little empirical research evaluating the impact on source countries, although there are some recent studies that have addressed this issue.[2] This literature, however, focuses mainly on large countries such as Mexico. An important region that has eluded this literature is the Caribbean. This chapter quantifies the magnitude and nature of migration flows from the Caribbean and estimates their costs and benefits.

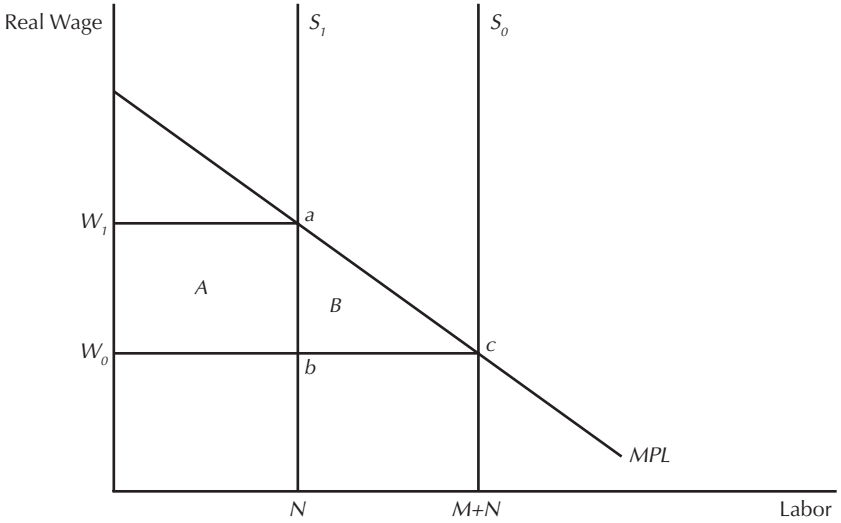
The Caribbean is an excellent case to study the effects of emigration, as it has the highest emigration rates in the world. Docquier and Marfouk (2005) have documented the shares of the labor force in several source countries that have emigrated to member countries of the Organization for Economic Cooperation and Development (OECD).[3] About 12 percent of the labor force in the Caribbean has migrated to OECD member countries—much higher than Central America, which ranks second at 7 percent. In terms of the absolute number of migrants, emigration from India and China is much greater, but their labor forces are so large that the migrants constitute a very small proportion of them.

The aggregate emigration rates, however, understate the loss of the educated population. The literature on immigration to the United States suggests that it has increased, by the greatest proportion, the supply of workers with zero to eight years of schooling (Borjas, Freeman, and Katz, 1997). However, there is a sharp contrast when looking at migration from the perspective of source countries. For most source countries and especially for the Caribbean, the percentage reduction in the labor force is much larger in the higher schooling categories. A majority of Caribbean countries have lost more than 50 percent of the labor force in the tertiary education segment, and more than 30 percent in the secondary education segment (9–12 years of schooling). For example, the tertiary educated labor force (with more than 12 years of schooling) in Jamaica and Guyana has been reduced by 85 and 89 percent, respectively, due to emigration to OECD countries. Haiti has the lowest aggregate emigration rate (about 10 percent) in the region, but the tertiary-educated labor force has been reduced by 84 percent due to emigration to OECD countries. In fact, almost all the Caribbean nations are among the top 20 countries in the world with the highest tertiary-educated migration rates (Docquier and Marfouk, 2005).

[2]See Mishra (forthcoming); Hanson (2003); Hanson, Robertson, and Spilimbergo (2002); and Desai and McHale (2002).

[3]The OECD member countries include industrial countries and emerging markets like Mexico and Turkey. For the complete list of OECD countries in the dataset, see Docquier and Marfouk (2005, p. 13).

Figure 9.1. Labor Demand-Supply Model: Welfare Impact of Emigration



The magnitude of these migration rates suggests that, potentially, emigration can have an enormous impact on local labor markets and on the welfare of those who stay behind in the Caribbean countries.

The simple labor demand-supply framework suggests that changes in domestic labor supply and wages due to emigration lead to a net welfare reduction (termed an "emigration loss") for the producers and workers who have stayed behind (Figure 9.1). The welfare loss occurs due to the movement of inframarginal workers (i.e., those who are paid less than their marginal product). The concept is analogous to the idea of immigration surplus that exists in the migration literature (Borjas, 1995). The concept was first developed by MacDougall (1960) in the context of capital flows.

There are several other costs of high-skilled emigration. Highly skilled workers often confer externalities to those who stay behind by affecting their productivity through transfer of know-how and also through better monitoring and motivation. If high-skilled workers confer a positive externality, then the loss due to their migration will be higher than the simple emigration loss. This chapter will estimate the *augmented emigration loss*—the emigration loss that takes into account the positive externality from the high-skilled labor force. Another important consideration in assessing the costs of migration is the education subsidies that finance the education of the migrants. Governments in Barbados, Trinidad and

Tobago, and Jamaica spend much more per capita on tertiary education than they do on primary and secondary education.

At the same time, emigration confers many benefits on source countries. One of the most important measurable "benefits" to the source countries are transfers from abroad, known as remittances. Most Caribbean countries rank among the top 30 countries in the world in terms of remittances as a percent of GDP. The Caribbean is the world's largest recipient of such remittances, which constituted about 13 percent of the region's GDP in 2002.

The main finding in the chapter is that the total losses due to skilled migration (which includes "emigration loss," externality effects, and government expenditure on educating the migrants) outweigh the recorded remittances for the Caribbean region on average, and for almost all the individual countries. The comparison of the welfare losses with remittances is subject to the caveat that the measurement of remittances is subject to data deficiencies. Most importantly, measured remittances do not include transfers through informal channels such as those carried by hand or by friends or family, or in-kind remittances of jewelry and consumer goods.[4]

The calculations in the chapter are not sufficient to conclude one way or the other about the overall impact of emigration. Migration has many other costs and benefits, the measurement of which is beyond the scope of this analysis. There are, for example, benefits to source countries because of migrant networks, which can lead to more trade and investment (Rauch and Trinidade, 2002). Emigration can also induce human capital formation in the source country by raising the expected returns from education (Beine, Docquier, and Rapoport, 2003). On the cost side, migration can result in a fiscal loss from the foregone tax revenue that would have accrued if the migrants had stayed behind (Desai, Kapur, and McHale, 2002). All these issues have been addressed in the literature, albeit separately.

There are three broad strands of literature that are related to this chapter. The first consists of studies that quantify welfare effects of immigration into the United States (Borjas, 1995; Davis and Weinstein, 2002). This chapter uses techniques similar to the study by Borjas (1995) on immigration. In addition to the techniques used in the previous literature, this chapter also includes the cost of education subsidies to the source countries in calculating the losses.

The second strand of literature includes recent studies that quantify the impact of emigration on source countries, particularly large source

[4]For details on issues regarding measurement of remittances, see IMF (2005).

countries such as Mexico and India (Chiquiar and Hanson, 2005; Desai, Kapur, and McHale, 2002; and Mishra, forthcoming). These studies do not address the Caribbean, where, as argued above, the potential impact of emigration on individual countries is likely to be large.

The third set of studies focus on migration from the Caribbean. The Caribbean countries have historically experienced large-scale migration, and some studies examine the history of this phenomenon (Carlson, 1994; Duany, 1994). Some studies also document the flow of remittances and discuss the potential impact (Wood and McCoy, 1985; Samuel, 2004; and Connell and Conway, 2000).

This chapter is the first to quantify the welfare impact of skilled emigration on any source country, taking into account the external effects and the costs of education subsidies. The analysis differs from the existing literature on Caribbean migration by bringing all three strands of the literature together using a detailed dataset on emigration rates, compiled by Docquier and Marfouk (2005) using census data from OECD member countries. Since the United States is a major destination for Caribbean migrants, the emigration rate to the United States is estimated separately, using data from the U.S. Census. As none of the existing studies on Caribbean migration have looked at the composition of emigration rates by skill level, this chapter will tackle that issue as well.

Theory

The quantitative estimates of the gains and losses resulting from emigration must rest on prior conceptualization of them. There are several costs and benefits of migration that accrue to both the recipient and source countries, as will be detailed in the sections that follow.

Losses Due to Emigration: A Simple Labor Demand Framework

The simple economic model of labor demand and supply is an important starting point to quantify the welfare implications, and it has been used in the literature in the context of immigration and capital flows (MacDougall, 1960; Borjas, 1995). The aim here is to quantify the welfare loss due to movement of labor, everything else remaining unchanged.[5] Welfare is measured by GDP accruing to those who have stayed behind in

[5]Davis and Weinstein (2002) simulate the welfare impact due to inflow of both labor and capital into the United States.

the source country. Consider a single numeraire good whose production function is given as:

$$Q = F(K,L), \tag{1}$$

where K is the fixed factor assumed to be internationally immobile, L is the labor employed in production, and Q is GDP. Figure 9.1 shows the simple model of labor demand and supply. The initial equilibrium wage is w_0. A large emigration flow of a magnitude M of workers reduces the labor force from $(N + M)$ to N. The wage rate as a result increases from w_0 to w_1. The workers who have stayed behind gain an area equal to w_0w_1ab (rectangle region A), owners of the fixed factors in the economy lose an area equal to w_0w_1ac (rectangle region A + triangle region B) and the country as a whole loses the triangle abc (region B). The triangle abc (region B) can be termed as the "emigration loss," which arises because the cost of employing the inframarginal workers who migrate is less than the value of their marginal product. The surplus on these workers is therefore lost due to emigration, which imposes a cost on those who have stayed behind.

Following Borjas (1995), the estimated welfare loss to the source countries as a percent of GDP can be expressed as:

$$\text{Emigration loss (triangle } B \text{ in Figure 9.1)} = (1/2)sem^2, \tag{2}$$

$$\text{Gain to the workers who have stayed behind} = sem(1 - m) \tag{3}$$

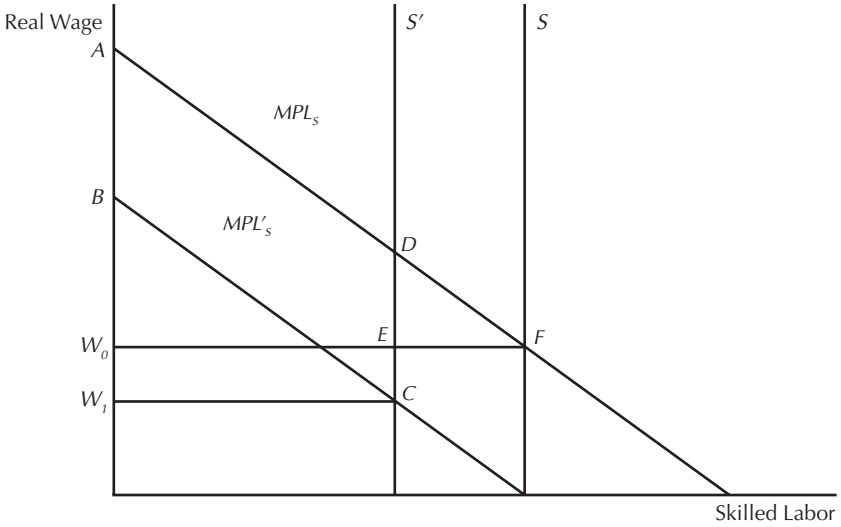
$$\text{Loss to the owners of the other factor} = sem(1 - 1/2m) \tag{4}$$

where e is the magnitude of elasticity of factor price of labor (i.e., the percentage change in wage resulting from a 1 percent change in the size of the labor force), m is the fraction of the labor force that has migrated, and s is the share of labor in *GDP*.

Measurement of External Effects

Even if the triangle emigration losses are of second order, the overall emigration loss can be substantial if emigration leads to a decline in the productivity of those who have stayed behind. Qualified doctors, engineers, and researchers are not only more productive themselves, but are also expected to make other workers in the economy more productive. External effects have been considered important in the immigration literature. Borjas (1995) calculates the "immigration surplus" and finds that it increases substantially in the presence of external effects. However, unlike Borjas, who looks at the overall immigration rate, this chapter focuses on external effects due to high-skilled emigration. If skilled labor

Figure 9.2. Labor Demand-Supply Model: Welfare Impact of Emigration with External Effects



is complementary to the other factors, then the production function can be expressed as:

$$q = f(l_s, l_u) L_S^{\gamma} \tag{5}$$

where q is the representative firm's output, l_s and l_u are the skilled and unskilled labor employed by the representative firm, L_S is the aggregate stock of skilled labor employed in the economy, and γ is the percentage change in marginal product of skilled and unskilled labor due to a 1 percent change in the aggregate stock of skilled labor. As skilled migrants leave the economy, the marginal product of both skilled and unskilled labor decreases. With this production function that accounts for external effects, emigration not only reduces the supply of labor but also shifts the marginal product of labor curve inwards. The emigration loss is larger than that without incorporating external effects.

Figure 9.2 shows the emigration loss in the presence of external effects. The welfare impact of emigration of skilled labor is analyzed, assuming that only skilled labor moves. Emigration of skilled labor reduces its supply from S to S'. The marginal product of skilled labor also shifts from MPL_S to MPL'_S. The "emigration loss" is given by area *ABCD* plus triangle *DEF*. The area *ABCD* has been added to the emigration loss due to the external effects of labor employment. Emigration of skilled labor would also

lead to a decline in productivity of unskilled labor (which is not shown in the figure). First, the loss due to emigration of skilled labor is calculated without incorporating external effects, and then augmented to include external effects.

The magnitude of the loss (as a fraction of GDP) without incorporating external effects can be expressed as:

$$\text{Emigration loss (triangle } DEF \text{ in Figure 9.2)} = 1/2 s_s e_s m_s^2 \tag{6}$$

The magnitude of the loss (as a fraction of GDP) including external effects is given as:

$$\text{Emigration loss with external effects} = \frac{1}{2} s_s e_s m_s^2 + \frac{\gamma s_s m_s}{1-\gamma}(1 - s_s m_s) + \frac{\gamma s_u m_s}{1-\gamma}(1 - s_u m_s) \tag{7}$$

where s_s and s_u are, respectively, the skilled and unskilled labor shares of national income, e_s is the magnitude of elasticity of factor price of skilled labor (i.e., percentage change in wage of skilled labor resulting from a 1 percent change in the size of the labor force), and m_s is the fraction of skilled labor force that emigrates. The second and third terms denote the external effects on skilled and unskilled labor, respectively. The expression in equation (7) is similar to Borjas' (1995) study of immigration.

Even if the triangle emigration losses are of second order, the overall emigration loss can be substantial if the external effects are large. The magnitude of the external effects in turn depends on the assumption about the elasticities. In order to calculate the emigration loss in the presence of external effects, we require data on elasticity of factor price of skilled labor and elasticity of marginal product of labor. Both these elasticities are difficult to estimate. The calculations in the chapter have been made under varying assumptions on the elasticities.

Education Cost of Skilled Migrants

An important cost that emigration imposes on source countries (and estimates of which have largely been ignored in the literature) is the public expenditure on the education of migrants. This cost is particularly high for the tertiary-educated migrants in developing countries like Barbados, Jamaica, and Trinidad and Tobago (UNESCO, 2004).

Subsidized education is generally rationalized as reflecting the gap between private and social costs of education—that is, educated citizens confer external benefits in the economy. As emigrants do not stay in the

the economy, the entire subsidy for their education could be treated as a social cost. The public expenditure on education of migrants is a loss to the source country, since there is an opportunity cost to this expenditure in terms of expenditure forgone or higher-than-necessary tax rates. There are many other costs of emigration which have not been considered in this chapter. For example, emigration can result in a fiscal loss from the foregone tax revenue that would have accrued if the migrants had stayed behind (Desai, Kapur, and McHale, 2002).

In order to place the estimated losses due to emigration in perspective, the next section discusses the different benefits from emigration to source countries and compares the calculated losses to a quantifiable benefit from migration—that is, remittances.

Benefits of Emigration

The most immediate benefit from emigration is the flow of remittances or transfers by migrants to the country of origin. Latin America and the Caribbean are the largest recipient of remittances in the world and also have the fastest growth in its receipts. In 2003, remittance flows exceeded combined flows of foreign direct investment (FDI) and official development assistance to the region (Terry, 2004).

Several other channels through which emigration can benefit source countries have been identified in the literature. There are possible network effects of migration. Rauch and Trinidade (2002) have estimated large impacts of the networks in trade and FDI in a cross-section of countries.[6] In the long run, benefits from emigration can occur also from its favorable effect on human capital formation. Emigration, if it is biased toward the high skilled, can raise their relative wages and returns to higher education, and induce human capital formation. A positive probability of emigration to a high-wage country can also raise the expected returns from human capital accumulation and thus induce skill formation (Beine, Docquier, and Rapoport, 2003).

[6]Davis and Weinstein (2002) look at terms of trade effects of immigration into the United States. If migration from the Caribbean results in a relatively larger reduction in factor supplies and output in the export sector, thereby reducing the supply of exports on the world market, then this can result in a terms of trade gain for the region. For the terms of trade gain to be significant in magnitude for individual countries, those countries should be large in an economic sense, i.e., their demand and supplies should affect world prices. To the extent that Caribbean countries lack market power, we can assume this effect to be of a small magnitude for these individual countries.

Data and Evidence

Measurement of Emigration Rates

It is difficult to quantify the magnitude of emigration because source countries, in general, do not record information on those who leave. Emigration is measured by obtaining information on the migrants from censuses in recipient countries (Mishra, forthcoming; Docquier and Marfouk, 2005; and Carrington and Detriagache, 1998).

Two sources of data have been used for this chapter—emigration rates to OECD member countries from Docquier and Marfouk (2005), who estimate the aggregate migration rates for a number of source countries in the world, and emigration rates to the United States using the data on migrants from the U.S. Census.

Emigrants to most OECD member countries are defined by their country of birth. For example, an emigrant from source country *j* residing in the United States is defined as a person whom the U.S. Census counts as being born in country *j*. The migrants include naturalized citizens, temporary and permanent residents, and unauthorized migrants. Migrants to the United States also include asylum seekers who sought refuge from political turmoil, oppression and totalitarian governments.[7] The only exceptions are Germany, Greece, Italy, Japan, and Korea, where an emigrant is defined by citizenship.

About 95 percent of the Caribbean migrants enumerated in the 2000 U.S. Census arrived between 1965 and 2000. Detailed information on the year of immigration is not available for migrants to other OECD member countries. However, since the United States is the major destination for migrants from the Caribbean, one can argue that the largest proportion of migrants to OECD member countries migrated between 1965 and 2000.

The emigration *rate* to OECD member countries is defined as the fraction of labor force having migrated to OECD member countries. It is expressed as:

$$m_t^j = \frac{M_t^j}{M_t^j + N_t^j} \tag{8}$$

where M_t^j is the number of migrants from country *j* counted in the receiving country's census at time *t* and N_t^j is the labor force in source country

[7]The Caribbean is also one of the largest sources of illegal aliens, with the Dominican Republic, Haiti, and Jamaica ranking only behind Mexico (Carlson, 1994).

j at time t. The emigration rate from country j in schooling category S is defined as:

$$m^j_{t,s} = \frac{M^j_{t,s}}{M^j_{t,s}, + N^j_{t,s}} \tag{9}$$

where $M^j_{t,s}$ is the number of migrants from source country j with schooling S who are recorded in the OECD censuses at time t, and $N^j_{t,s}$ is the labor force in source country j with schooling S.

Magnitude of Emigration from the Caribbean

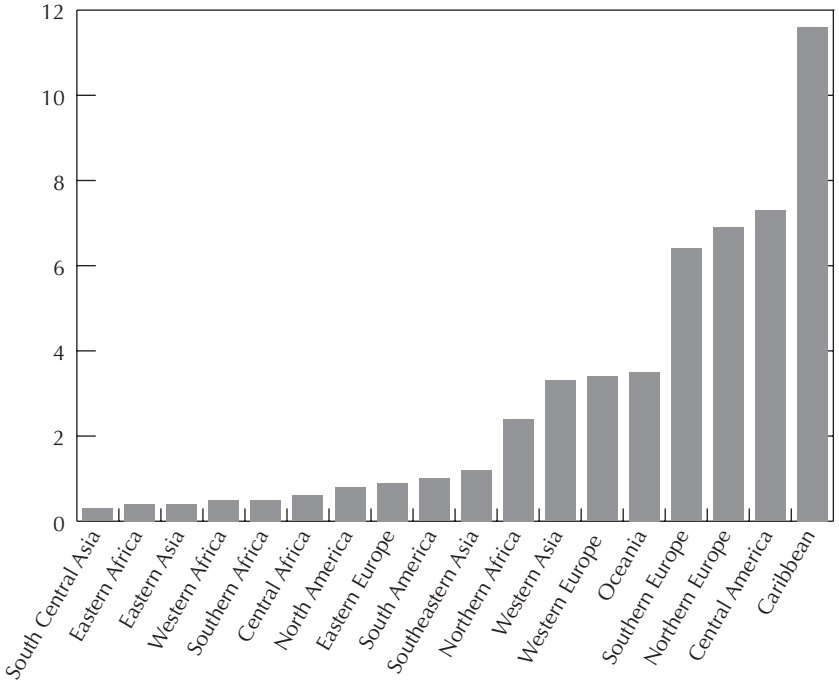
Migration has been described as "embedded in the Caribbean psyche" and is a fact of life in the region (Reyes and Stubbs, 2004). Every year, a large number of Caribbean nationals emigrate to other countries for work, education, or other reasons. About 12 percent of the labor force from the Caribbean migrated to OECD member countries during 1965–2000, the highest migration rate into OECD member countries of any region in the world (Figure 9.3). The second-highest source of emigrants to the OECD countries was Central America, which lost about 7 percent of its labor force.

The figures for the individual Caribbean countries are even more striking. The average of 12 percent for the Caribbean as a whole is largely due to the low migration rates of five countries—Haiti, Dominican Republic, The Bahamas, St. Lucia, and Trinidad and Tobago. As Figure 9.4 shows, most of the other Caribbean countries have lost more than a quarter of their labor force due to emigration to OECD member countries.[8]

The most significant destination for migrants from the Caribbean is the United States. As shown in Figure 9.5, the proportion of the total number of migrants whose destination is the United States ranges from about 60 to 90 percent. More than three-fourths of migrants from The Bahamas, Belize, Dominican Republic, and Haiti reside in the United States. Geographical proximity (i.e., low migration cost), higher wage differentials (relative to other destinations), and the nature of U.S. immigration laws are the most likely reasons for such a bias. The U.S. Immigration and Nationality Act of 1965 changed the basis of entry into the United States from country quotas to family-based reunification. This led to a drastic change in the composition of migrants from developed to developing countries.

[8]There is anecdotal evidence of a reasonable amount of intra-Caribbean migration, but it has not been systematically documented.

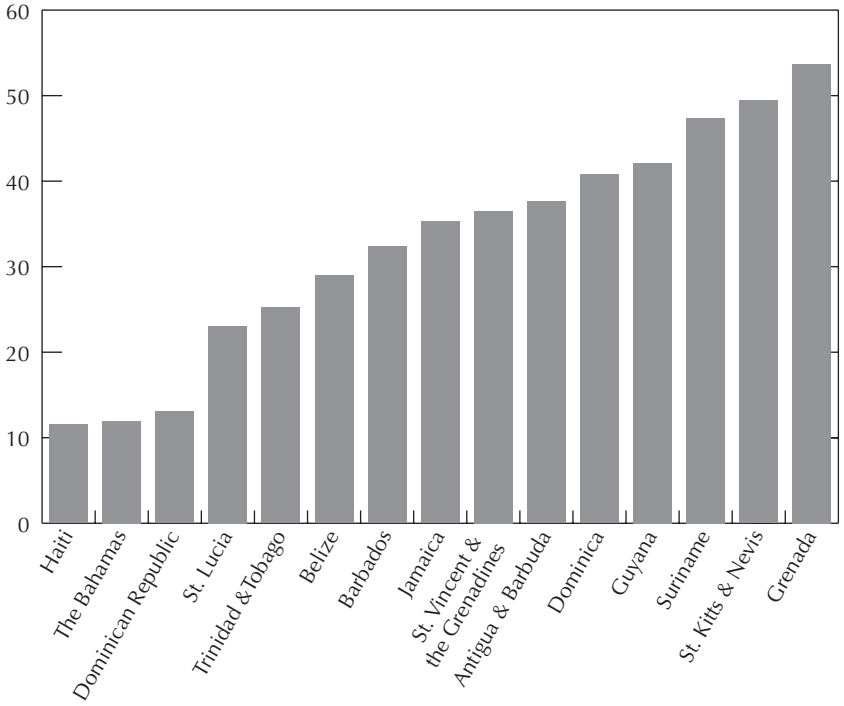
Figure 9.3. Percent of Labor Force that Migrated to OECD Member Countries: Caribbean vs. the Rest of the World, 1965–2000



Source: Docquier and Marfouk (2004).
Note: OECD denotes Organization for Economic Cooperation and Development.

The migration rates by schooling are even more striking—70 percent of the tertiary-educated labor force has migrated from the Caribbean to OECD member countries. Table 9.1 shows the breakdown of emigrants from the Caribbean by their skill (education groups). The figures in the secondary and tertiary schooling categories are of particular note. Guyana, Grenada, Jamaica, and St. Vincent and the Grenadines have the highest tertiary emigration rates, followed by Haiti, Trinidad and Tobago, and St. Kitts and Nevis. In fact, as Figure 9.6 shows, most Caribbean countries rank in the top 20 in the world in terms of skilled emigration rates (with skilled defined as those with more than 12 years of schooling). Table 9.2 shows the emigration rates to the United States, by skill categories. About 60 percent of the tertiary educated labor force has migrated from the Caribbean to the United States. The rankings are similar to the emigration rates to OECD member countries in Table 9.1, with Guyana, Haiti,

Figure 9.4. Percent of Labor Force that Migrated from the Caribbean Countries to OECD Member Countries, 1965–2000



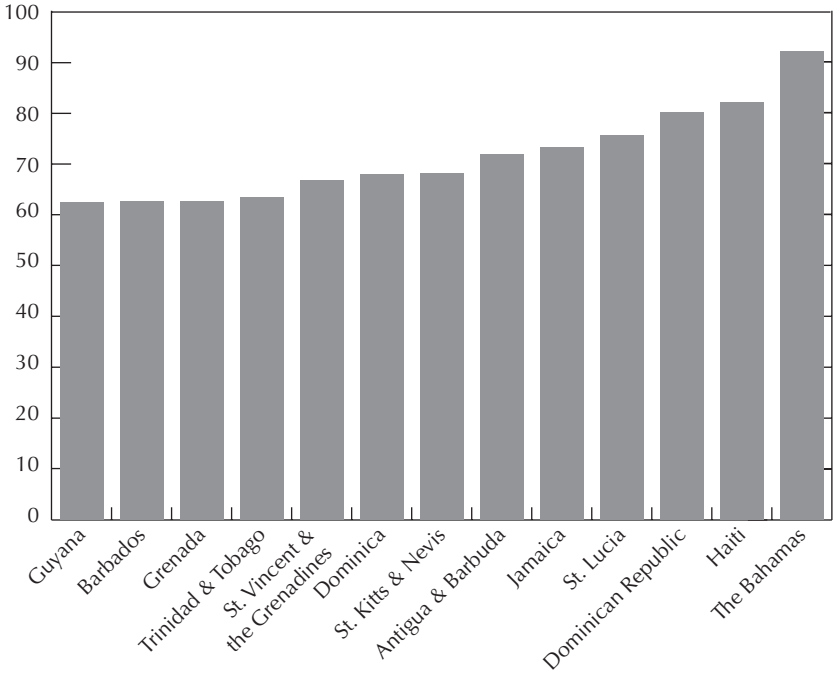
Source: Docquier and Marfouk (2005).
Note: OECD denotes Organization for Economic Cooperation and Development.

Jamaica, and Grenada having the highest tertiary emigration rates to the United States.

Where Did Migrants Go to School?

The migration rates by level of schooling do not take into account where migrants went to school. The estimates of emigration rates by schooling are based on the assumption that the migrants recorded in the OECD censuses received their schooling in the Caribbean. Alternatively, for those who received their schooling in the OECD—the counterfactual assumption is that had they stayed behind, they would have received the same level of schooling. For the migrants who received their schooling in the destination countries, it is not clear that their emigration constitutes shocks to which schooling groups in the source countries.

Figure 9.5. Percent of Total Number of Migrants from the Caribbean Countries to the United States, 1965–2000



Sources: U.S. Census (2000); and Docquier and Marfouk (2005).

The censuses in the recipient countries do not record information on where the migrants received their schooling. Hence, given the data, it is not possible to conclude the direction of the bias. However, we can try to adjust for this bias in the case of the migrants to the United States. There is strong evidence in the case of migrants from developing countries like Mexico that those who migrate in their late teens or later are much less likely to obtain their schooling in the United States (Grogger and Trejo, 2002; Gonzalez, 2002; Chiquiar and Hanson, 2005; and Clark and Jaeger, 2002).

The U.S. Census provides information for the foreign-born on years spent in the United States. Using this information, it is possible to calculate their age at migration. Restricting the sample of migrants to those who emigrated at age 16 or older, it is less likely that these migrants would obtain their schooling in the United States. Chiquiar and Hanson (2005) and Mishra (forthcoming) use a similar strategy to adjust for the bias. The adjusted emigration rates are shown in Table A9.1.

Table 9.1. Percent of Labor Force that Migrated to OECD Member Countries, 1965–2000, by Level of Schooling

	Primary	Secondary	Tertiary
Antigua & Barbuda	9	64	67
Bahamas, The	3	10	61
Barbados	18	28	63
Belize	7	58	65
Dominica	19	67	64
Dominican Republic	6	33	22
Grenada	25	71	85
Guyana	18	43	89
Haiti	3	30	84
Jamaica	16	35	85
St. Kitts & Nevis	32	42	78
St. Lucia	12	21	71
St. Vincent & the Grenadines	18	33	85
Suriname	39	74	48
Trinidad & Tobago	8	22	79
Average	15	42	70

Source: Docquier and Marfouk (2005).

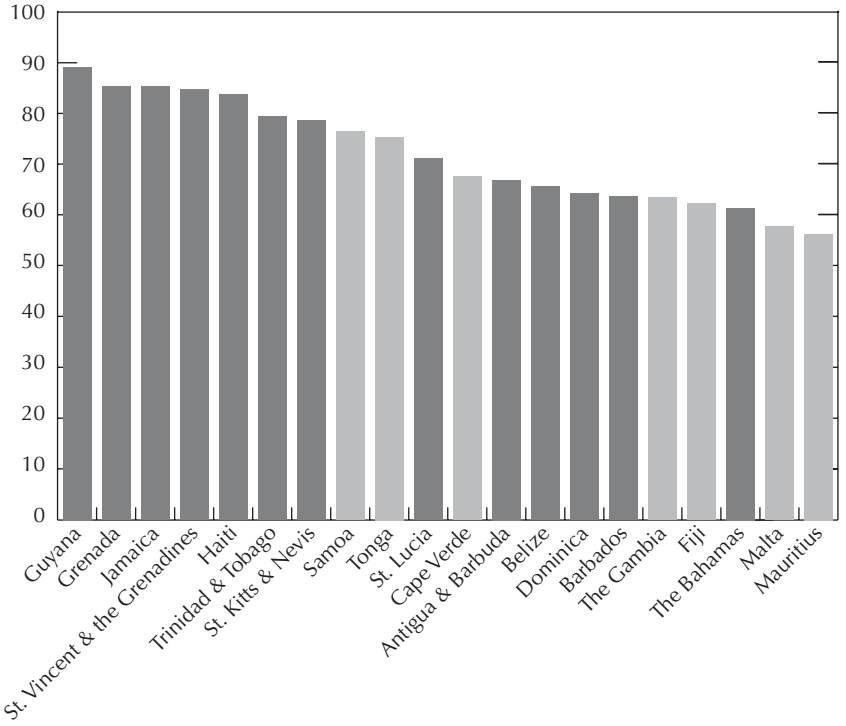
The magnitude of the *adjusted* emigration rates in the tertiary schooling category decreases (as compared with Table 9.2), but is still much larger in relation to the primary schooling category. In both cases (adjusted and unadjusted), Guyana, Haiti, Jamaica, and Grenada have the highest tertiary emigration rates in the region, followed by St. Vincent and the Grenadines, Trinidad and Tobago, and St. Kitts and Nevis. The highly educated labor force in the region has been reduced by 58 percent due to emigration to the United States, even after making the adjustment.

Remittances

Worker remittances—defined as the value of monetary transfers sent to the source countries by workers who have been abroad for more than one year—are becoming increasingly important as a source of external funding for many developing countries. Worker remittances are recorded under "current transfers" in the current account of the IMF's *Balance of Payments Statistics Yearbook*.

During the past two decades, economic analysis of remittances has received considerable attention in academic and policy circles. Little has been written, however, regarding remittances and the Caribbean, even though the region is the largest recipient of remittances in the world in proportion to its GDP (Figure 9.7). The next biggest recipient is South Asia, followed by the Middle East and Northern Africa.

Figure 9.6. Top 20 Countries in the World with the Highest Emigration Rates, 1970–2000
(Percent of educated labor force that has migrated to OECD member countries)



Source: Docquier and Marfouk (2005).
Notes: Educated labor force is defined as workers having more than 12 years of completed schooling. OECD denotes Organization for Economic Cooperation and Development.

A broader measure of remittances that has been used previously in the literature includes worker remittances, compensation of employees, and migrant transfers (Ratha, 2003; Kapur, 2004). Compensation of employees is defined as the gross earnings of foreigners residing abroad for less than 12 months, including the value of in-kind benefits such as housing and payroll taxes. Migrant transfers are defined as the net worth of migrants who move from one country to another. For example, the value of IBM stock owned by a migrant who moves from France to Germany is transferred in international accounting from France to Germany. In the IMF's *Balance of Payments Statistics Yearbook*, compensation of employees is recorded under

Table 9.2. Percent of Labor Force that Migrated to the United States, 1965–2000, by Level of Schooling

	Primary	Secondary	Tertiary
Antigua & Barbuda	3	57	56
Bahamas, The	2	10	58
Barbados	4	20	46
Belize	4	54	62
Dominica	6	56	49
Dominican Republic	5	28	18
Grenada	7	61	75
Guyana	7	35	80
Haiti	2	27	79
Jamaica	5	29	78
St. Kitts & Nevis	8	31	65
St. Lucia	2	13	53
St. Vincent & the Grenadines	4	23	71
Trinidad & Tobago	3	17	68
Average	4	33	61

Sources: U.S. Census (2000); and Docquier and Marfouk (2005).

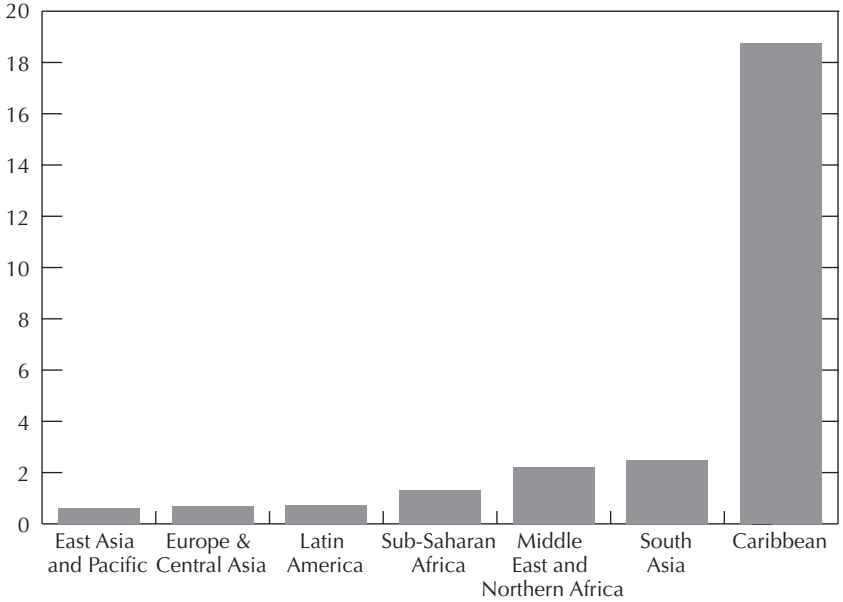
the "income" subcategory of the current account, and migrant transfers are recorded under "capital transfers" in the capital account. It is important to note that both the simple worker remittances and the more comprehensive definition of remittances do not include transfers through informal channels such as those carried by hand or by friends or family, or in-kind remittances of jewelry and consumer goods. There are also commercial transfers known as *hawala* that are unrecorded in the estimated remittances.[9]

Remittance flows are the largest source of external funding for the Caribbean (Figure 9.8a). In 2002, total remittances—defined as the sum of worker remittances, compensation of employees, and migrant transfers—constituted about 13 percent of the region's GDP. In comparison, FDI constituted 6 percent and official development flows only 1 percent of GDP.

Remittance flows have been rising, while both FDI and official development assistance have declined. Between 1990 and 2002, the latter declined from 4 to 1 percent of GDP. In recent years, FDI has also declined, from 9 percent in 1999 to about 6 percent in 2002. In contrast, remittances increased from 3 to 13 percent of GDP during the same time period. As shown in Figure 9.8b, many Caribbean nations are among the top 30 nations in the world in terms of remittances received as a proportion of GDP.

[9]Hawala is defined as an informal transfer system that operates outside the formal banking or financial channels.

Figure 9.7. Worker Remittances, 2002
(In percent of GDP)



Sources: IMF, *Balance of Payments Statistics Yearbook*; and country authorities.

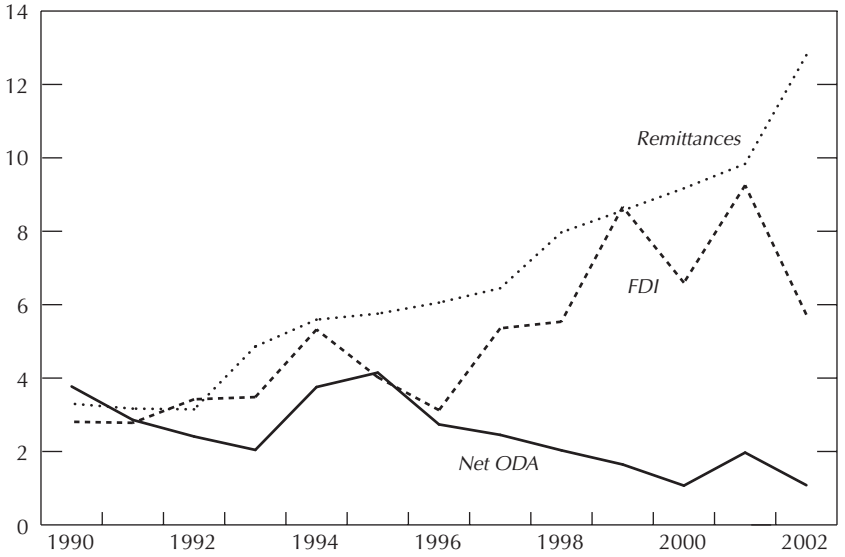
Figure 9.9 shows the total remittances for Caribbean countries averaged over 1980–2002. Grenada was the largest recipient in the region, followed by Haiti, Dominica, and Jamaica. Migrant transfers to Grenada constituted about half of total remittances.

Public Expenditure on Education

Governments in developing countries, including the Caribbean, cover a major portion of the cost of education of their citizens in the form of education subsidies. Table 9.3 shows the estimates of government expenditure on education per student by schooling categories for countries in Caribbean for which data are available. These estimates are taken from UNESCO (2004) and are averages over 1999–2002. For Barbados, Jamaica, and Trinidad and Tobago, the expenditure on tertiary education is much larger relative to the subsidy on primary and secondary education.

The total public expenditure on education is defined as the sum of the spending on education and educational administration made by local,

Figure 9.8a. Remittances, FDI, and ODA to the Caribbean
(In percent of GDP)



Sources: IMF, *Balance of Payments Statistics Yearbook*; World Bank, World Development Indicators database; Organization for Economic Cooperation and Development; and country authorities.
Notes: FDI denotes foreign direct investment; ODA denotes official development assistance.

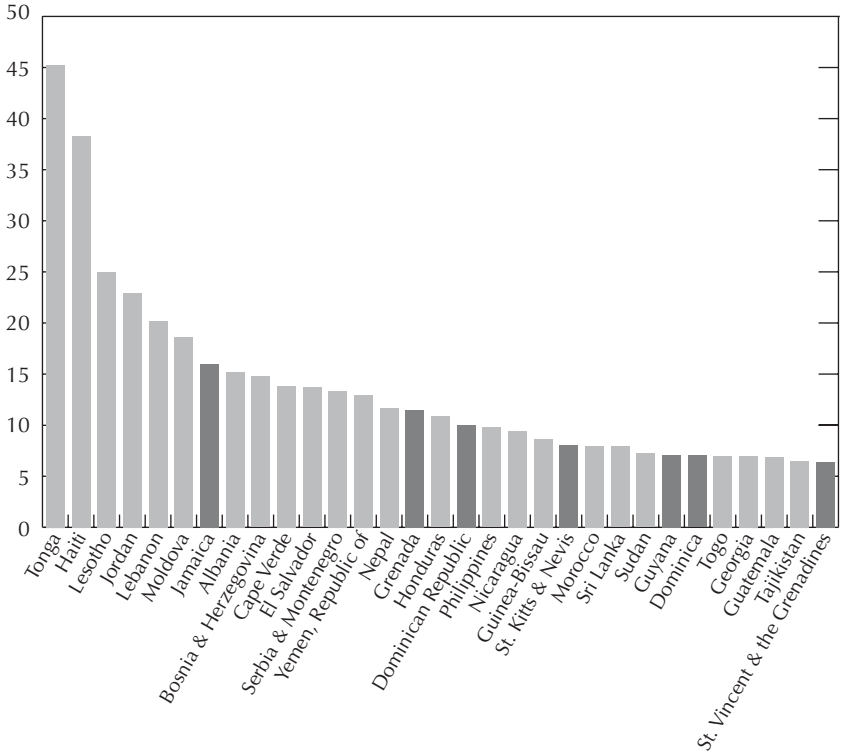
regional, and central governments. It includes current and capital expenditures on education.

Current expenditure on education includes spending for goods and services consumed within the current year (staff salaries, pensions, and benefits); contracted or purchased services; other resources including books and teaching materials; welfare services and other current expenditure such as subsidies to students and households; and furniture and minor equipment and repairs, fuel, telecommunication, travel, insurance, and rents.

Capital expenditure on education covers spending for assets that last longer than one year. This includes expenditure for construction, renovation and major repairs of buildings, and purchase of heavy equipment or vehicles.

Expenditure per student on primary and secondary education for Caribbean countries with missing data is approximated by using data from

Figure 9.8b. Total Remittances, Top 30 Countries in the World, 2002
(In percent of GDP)

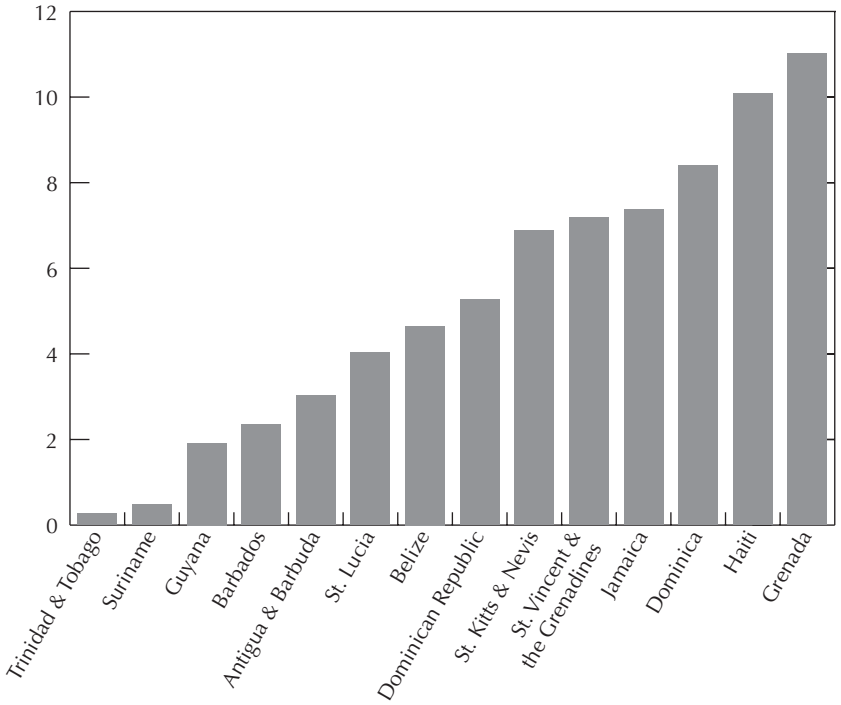


Sources: IMF, *Balance of Payments Statistics Yearbook*; and country authorities.
Note: Total remittances include worker remittances, compensation of employees, and migrant transfers.

another country in the Latin America and Caribbean region that is closest in per capita income. However, expenditure on tertiary education for countries with missing data is assumed to be zero, since those countries might not be spending significantly on tertiary education. The data on expenditure per student is multiplied by the total number of migrants recorded in the OECD censuses.

The estimated government expenditure on the education of individuals who eventually left the Caribbean countries (largely to the United States, between 1965 and 2000) varies across countries but is higher in the larger countries. Figure 9.10 shows that the estimated government expenditure on education of the emigrants is the highest for Barbados, Jamaica, and

Figure 9.9. Total Remittances, Average over 1980–2002
(In percent of GDP)



Sources: IMF, *Balance of Payments Statistics Yearbook*; and country authorities.
Note: Total remittances include worker remittances, compensation of employees, and migrant transfers.

Trinidad and Tobago, reflecting primarily the heavy public investment on the tertiary education of migrants in these countries.

Results

Emigration Loss

Calculating the emigration loss as a percentage of GDP requires estimates for: elasticity of factor price for labor, labor's share in national income, and the emigration rate. The share of labor in national income is assumed to be 70 percent, following Borjas (1995) and Hall and Jones

Table 9.3. Government Education Expenditure per Student, Average over 1999–2002
(Percent of GDP per capita)

	Primary	Secondary	Tertiary
Barbados	17	26	62
Belize	17	19	. . .
Dominica	21	35	. . .
Dominican Republic	7	5	. . .
Guyana	1	2	. . .
Jamaica	16	24	76
St. Kitts & Nevis	9	9	. . .
St. Lucia	13	2	. . .
St. Vincent & the Grenadines	28	28	. . .
Trinidad & Tobago	14	15	69

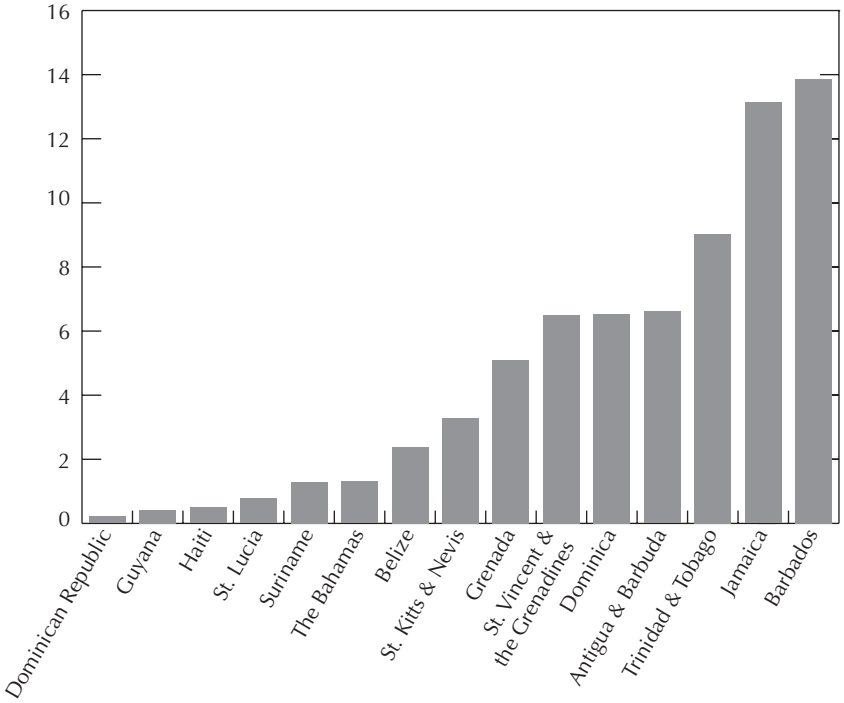
Source: UNESCO (2004).

(1999). In a study of Mexico, Mishra (forthcoming) finds that a 10 percent reduction in the size of the labor force due to emigration to the United States increases Mexican wages by 4 percent. Also, the vast empirical evidence on labor demand, surveyed by Hamermesh (1993), suggests that the elasticity of the factor price of labor is on the order of –0.3 (that is, a 10 percent reduction in the size of the labor force increases wages by 3 percent). The two elasticity assumptions of 0.3 and 0.4 used in this chapter follow from Hamermesh (1993) and Mishra (forthcoming), respectively.

The emigration loss predicted by the labor demand-supply model is small. Table 9.4 shows the estimates of emigration loss to individual Caribbean countries as a percentage of GDP. In order to put these numbers into perspective, column 3 shows the figures for remittances to the Caribbean as a proportion of countries' GDP. Since elasticities and the share of labor in GDP are assumed to be the same for all countries, the differences in emigration losses come only from differences in the emigration rates across countries. On average, official remittances outweigh the emigration loss for the region. Even under the assumption of high elasticity, except for Guyana, Suriname, and Trinidad and Tobago, official remittances outweigh emigration loss in all countries. Also, since the wage differentials between the Caribbean and OECD member countries are large, the emigration loss would be easily outweighed by the gains of the migrants themselves.

Emigration loss is, however, an aggregate measure. It is a net effect of a gain to the workers who stay behind and a loss to the owners of other factors that are assumed to be internationally immobile (capital). In other

Figure 9.10. Estimated Government Expenditure on Education of Migrants, Average over 1999–2002
(In percent of GDP)



Source: UNESCO (2004).

words, emigration involves a redistribution of the reduced aggregate income in favor of the workers. Table A9.2 shows that this redistributive impact of emigration is significant in magnitude. On average, the gain to the workers who have stayed behind is 6 percent of GDP and the loss to the owners of the other factors is about 7 percent of GDP. Even for Trinidad and Tobago, where the emigration losses are relatively small (in relation to remittances), there is a sizable redistribution in favor of the workers.

Losses Due to High-Skill Migration

The loss due to emigration of skilled labor, all else being equal, is significant. One of the most notable characteristics of migration from the Caribbean region, apart from the very high rates of migration, is the loss

Table 9.4. Emigration Loss and Remittances

	Emigration Loss $e = 0.3$	Emigration Loss $e = 0.4$	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	1.5	2.0	3.0
Bahamas, The	0.2	0.2	. . .
Barbados	1.1	1.5	2.3
Belize	0.9	1.2	4.7
Dominica	1.7	2.3	8.4
Dominican Republic	0.2	0.2	5.3
Grenada	3.0	4.0	11.0
Guyana	1.9	2.5	1.9
Haiti	0.1	0.2	10.1
Jamaica	1.3	1.7	7.4
St. Kitts & Nevis	2.6	3.4	6.9
St. Lucia	0.6	0.7	4.0
St. Vincent & the Grenadines	1.4	1.9	7.2
Suriname	2.4	3.1	0.5
Trinidad & Tobago	0.7	0.9	0.3
Average	1.3	1.7	5.2

Source: Author's calculations.

Notes: *e* denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). Emigration loss is calculated using equation (2).

of the educated population. Table 9.5 estimates that the emigration loss as a proportion of GDP due to emigration of high-skilled workers (all else remaining unchanged) is much larger. The aggregate emigration rate combines the emigration rates of the high-skilled as well as the low-skilled. As lower-skill groups have smaller emigration rates, their inclusion results in a smaller measure of the emigration rate. If instead, only the high-skilled workers are considered, the emigration rates are higher. Consequently the emigration loss is also larger. Still, remittances outweigh or almost equal the emigration loss due to high-skilled migration for the region as a whole and for most of the countries (except Guyana, Suriname, and Trinidad and Tobago).[10]

The loss due to emigration is amplified if emigrants confer a positive externality on nonemigrants. In that case, not only is the surplus on the inframarginal workers lost due to emigration (emigration loss), but there is

[10]In the calculations, the assumed skilled labor share of GDP is 0.3. This follows from the assumption that the highly educated belong to the top 20 percent of income earners. The average income share of the top 20 percent is about 0.4, as estimated by Dollar and Kraay (2002). Consequently, the assumed share of skilled labor in GDP is: overall labor share in GDP * 0.4 = 0.7 * 0.4 = 0.28.

Table 9.5. Emigration Loss Due to High-Skilled Migration

	Emigration Loss $e = 0.3$	Emigration Loss $e = 0.4$	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	2.0	2.7	3.0
Bahamas, The	1.7	2.3	. . .
Barbados	1.8	2.4	2.3
Belize	1.9	2.6	4.7
Dominica	1.9	2.5	8.4
Dominican Republic	0.2	0.3	5.3
Grenada	3.3	4.3	11.0
Guyana	3.6	4.7	1.9
Haiti	3.1	4.2	10.1
Jamaica	3.3	4.3	7.4
St. Kitts & Nevis	2.8	3.7	6.9
St. Lucia	2.3	3.0	4.0
St. Vincent & the Grenadines	3.2	4.3	7.2
Suriname	1.0	1.4	0.5
Trinidad & Tobago	2.8	3.8	0.3
Average	2.3	3.1	5.2

Source: Author's calculations.

Notes: *e* denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). Emigration loss is calculated using equation (6).

a loss of the positive externality as well (the external effects). Two values for the elasticity of marginal product with respect to the aggregate stock of skilled labor (gamma) are assumed, 0.05 and 0.1, respectively. (Borjas, 1995, also uses identical values.)

Table A9.3 shows the estimates of emigration loss due to high-skilled migration in the presence of external effects. For high values of the elasticities, in the presence of external effects, emigration loss outweighs remittances for many Caribbean countries—Antigua and Barbuda, Barbados, Belize, Guyana, St. Lucia, Suriname, and Trinidad and Tobago. Emigration loss almost equals remittances for Jamaica, St. Kitts and Nevis, and St. Vincent and the Grenadines. The magnitudes of the emigration losses are much higher than the estimates of immigration surplus in the presence of external effects in Borjas (1995), which range between 0.3 and 0.7 percent of GDP. The reason for the larger effect is that emigration rates from the Caribbean are greater relative to the immigration rate into the United States.

Table 9.6 shows the total losses due to skilled emigration. The total losses comprise emigration loss from the simple labor demand supply framework, external effects (i.e., the impact on productivity of those who have stayed behind), and government expenditure on the education of

Table 9.6. Total Losses Due to High-Skill Emigration vs. Remittances

	Estimated Education Expenditure (percent of GDP)	Emigration Loss (percent of GDP) Gamma = 0.1 e = 0.4	Emigration Loss plus Estimated Education Expenditure	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	6.6	5.4	12.1	3.0
Bahamas, The	1.3	4.2	5.6	. . .
Barbados	13.9	4.9	18.7	2.3
Belize	2.4	4.8	7.2	4.7
Dominica	6.5	5.2	11.7	8.4
Dominican Republic	0.2	1.4	1.6	5.3
Grenada	5.1	7.7	12.7	11.0
Guyana	0.4	7.8	8.3	1.9
Haiti	0.5	6.6	7.1	10.1
Jamaica	13.1	7.2	20.3	7.4
St. Kitts & Nevis	3.3	6.8	10.0	6.9
St. Lucia	0.8	5.3	6.0	4.0
St. Vincent & the Grenadines	6.5	7.2	13.7	7.2
Suriname	1.3	3.9	5.2	0.5
Trinidad & Tobago	9.0	6.3	15.4	0.3
Average	4.7	5.6	10.4	5.2

Source: Author's calculations.

Notes: e denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). Gamma denotes the elasticity of the marginal product of labor (the percentage change in the marginal product of skilled labor due to a 1 percent change in aggregate stock of skilled labor). Emigration loss is calculated using equation (7).

migrants. The results shown in Table 9.6 are under the assumption of high elasticities.

The first observation from Table 9.6 is that the total losses due to high-skill emigration are indeed significant for most countries. The losses range from 2 percent of GDP in the Dominican Republic to 20 percent in Jamaica. Second, on average, the losses outweigh the official recorded remittances for the Caribbean region and for almost all the individual countries (except Haiti and the Dominican Republic). Even under an assumption of low elasticities (not shown in the table), the losses outweigh remittances for most countries.

The results from the welfare calculations are similar when considering only emigration to the United States. Since an overwhelming majority of Caribbean migrants go to the United States, it is instructive to look at the magnitude of emigration loss from migration to the main destination country. Also, the U.S. census allows the calculation of adjusted emigration rates by restricting the sample to migrants only above a certain age at migration. This allows for filtering out those migrants who are likely to

have received their education in the source country. Table A9.4 shows the total losses due to emigration to the United States, under assumptions of high elasticities. The results are similar to the cases when the emigration rates to OECD member countries are considered (Table 9.6). On average, the total losses due to high-skilled emigration outweigh the remittances to the region. Also, total losses outweigh or almost equal remittances for most individual countries (except the Dominican Republic, Grenada, and Haiti).

Table A9.5 shows the corresponding losses due to emigration to the United States when the migrants are restricted to those who have migrated at age 16 or older. On average, the total losses still outweigh official remittances to the Caribbean. For the individual countries, the losses almost equal or are larger than the remittances for many countries—Antigua and Barbuda, Belize, Barbados, Guyana, Jamaica, St. Vincent and the Grenadines, and Trinidad and Tobago.

Conclusions

For most countries in the Caribbean, the total losses due to migration of the skilled—which include the emigration loss predicted by the labor-demand supply framework, augmented with external effects, and government expenditure on educating the migrants—outweigh remittances. The caveat remains there are many other possible costs and benefits, the measurement of which is beyond the scope of this chapter.

There are two possible approaches countries could take with regard to migration: first, minimize losses by trying to retain the highly skilled; and second, increase the benefits of emigration by adopting a "diaspora approach." The latter approach uses the diaspora to build networks for trade, tourism, and investment promotion, harnesses its knowledge, skills, and assets, and aims to attract higher amounts and more efficient forms of remittances.

Even if countries incur a net loss due to emigration, a border tax might not be the most reasonable policy response. Appealing to the pioneering work of Jagdish Bhagwati in the 1970s and 1980s on policy responses to emigration, there could be an argument for a border tax on migrants (similar to a Tobin tax). Bhagwati (1976) proposed the tax with the prior that developing countries lose due to migration. It is in principle also an extension of the idea of progressive income taxation—the improvement of the well being of migrants is taxed for the benefit of those left behind.

The main reasons for considering the border tax as unreasonable are the problems in implementing it. Taxes can also have distortionary effects. Since the absolute number of migrants from Caribbean countries is not very large, the per capita tax rate would have to be very large to raise a sizable amount of revenue. In fact, the United States is the only country that taxes individuals on the basis of citizenship rather than place of residence.

Retaining the highly skilled without the possibility of taxes would be facilitated by reorienting education. The high rates of emigration from the region are due not only to the "pull factor" (i.e., higher wages abroad), but also the limited opportunities for highly, but similarly, educated people in the same small geographical areas (i.e., the "push factor"). One approach to creating the right incentives is to reorient the higher education system toward providing skills in demand within the region, in particular the services sector, which dominates these economies. Such reorientation could include establishing hotel management institutes or specialized banking and finance institutes. It is particularly important for the Caribbean governments to consider the possibilities for reorienting education, as a major portion of the cost of education of their citizens is covered by education subsidies. Governments might reap higher returns by investing in education infrastructure that leads to more retention of the highly skilled.

Since the international experience has been that it is difficult to prevent emigration, the real policy challenge is how Caribbean countries can maximize the benefits from their population living and working overseas. Remittances should be the most immediate focus, as they can affect growth through investment. Evidence from micro-level studies suggest that remittances lead to greater human and physical capital investment (see Cox and Ureta, forthcoming, for a study of El Salvador; Hanson and Woodruff, 2001, and Woodruff and Zenteno, 2001, for studies of Mexico; and Lucas, 1987, for a study of Africa.) Finally, the Caribbean countries need to recognize the importance of remittances and improve recording of data that could provide critical information about remittances and thus facilitate optimal decision making.

Appendix

Table A9.1. Percent of Labor Force that Migrated to the United States, 1965–2000

(Restricting age migration to 16 or older)

Country	Primary	Secondary	Tertiary
Antigua & Barbuda	3	58	53
Bahamas, The	2	11	55
Barbados	4	20	43
Belize	5	56	59
Dominica	7	57	45
Dominican Republic	5	30	17
Grenada	7	61	73
Guyana	8	37	79
Haiti	2	27	76
Jamaica	5	29	76
St. Kitts & Nevis	8	31	62
St. Lucia	2	14	48
St. Vincent & the Grenadines	3	24	67
Trinidad & Tobago	5	18	65
Average	5	34	58

Sources: U.S. Census (2000); Docquier and Marfouk (2005); and author's calculations.

Table A9.2. Distributional Impact and Remittances

	Gain to Workers $e = 0.3$	Gain to Workers $e = 0.4$	Loss to Other Factors $e = 0.3$	Loss to Other Factors $e = 0.4$	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	4.9	6.6	6.4	8.5	3.0
Bahamas, The	2.2	2.9	2.4	3.2	. . .
Barbados	4.6	6.1	5.7	7.6	2.3
Belize	4.3	5.8	5.2	6.9	4.7
Dominica	5.1	6.8	6.8	9.1	8.4
Dominican Republic	2.4	3.2	2.6	3.4	5.3
Grenada	5.2	7.0	8.3	11.0	11.0
Guyana	5.1	6.8	7.0	9.3	1.9
Haiti	2.1	2.9	2.3	3.0	10.1
Jamaica	4.8	6.4	6.1	8.1	7.4
St. Kitts & Nevis	5.2	7.0	7.8	10.4	6.9
St. Lucia	3.7	5.0	4.3	5.7	4.0
St. Vincent & the Grenadines	4.9	6.5	6.3	8.4	7.2
Suriname	5.2	7.0	7.6	10.1	0.5
Trinidad & Tobago	4.0	5.3	4.6	6.2	0.3
Average	4.3	5.7	5.6	7.4	5.2

Source: Author's calculations.

Notes: *e* denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). The distributional impact is calculated using equations (3) and (4).

Table A9.3. Emigration Loss with External Effects Due to High-Skilled Migration

	Low Elasticities Gamma = 0.05 e = 0.3	High Elasticities Gamma = 0.1 e = 0.4	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	3.3	5.4	3.0
Bahamas, The	2.6	4.2	. . .
Barbados	3.0	4.9	2.3
Belize	3.0	4.8	4.7
Dominica	3.1	5.2	8.4
Dominican Republic	0.7	1.4	5.3
Grenada	4.8	7.7	11.0
Guyana	5.0	7.8	1.9
Haiti	4.3	6.6	10.1
Jamaica	4.6	7.2	7.4
St. Kitts & Nevis	4.2	6.8	6.9
St. Lucia	3.3	5.3	4.0
St. Vincent & the Grenadines	4.6	7.2	7.2
Suriname	2.2	3.9	0.5
Trinidad & Tobago	4.0	6.3	0.3
Average	3.5	5.6	5.2

Source: Author's calculations.

Notes: e denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). Gamma denotes the elasticity of marginal product of labor (the percentage change in marginal product of skilled labor due to 1 percent change in aggregate stock of skilled labor). Emigration loss is calculated using equation (7). Skilled emigration rate to the United States, with restricted age at migration, is used for the calculations.

Table A9.4. Total Losses Due to High-Skilled Emigration to the United States vs. Remittances

	Estimated Education Expenditure (percent of GDP)	Emigration Loss (percent of GDP) Gamma = 0.1 e = 0.4	Emigration Loss plus Estimated Education Expenditure	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	4.7	5.4	10.1	3.0
Bahamas, The	1.5	5.6	7.1	. . .
Barbados	7.4	4.3	11.7	2.3
Belize	2.2	6.0	8.3	4.7
Dominica	4.2	4.6	8.8	8.4
Dominican Republic	0.2	1.5	1.8	5.3
Grenada	3.1	7.7	10.8	11.0
Guyana	0.2	8.3	8.6	1.9
Haiti	0.4	8.2	8.6	10.1
Jamaica	9.1	8.0	17.1	7.4
St. Kitts & Nevis	1.9	6.4	8.2	6.9
St. Lucia	0.4	5.0	5.4	4.0
St. Vincent & the Grenadines	3.2	7.2	10.3	7.2
Trinidad & Tobago	5.5	6.8	12.3	0.3
Average	3.1	6.1	9.2	5.6

Source: Author's calculations.

Notes: e denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). Gamma denotes the elasticity of marginal product of labor (the percentage change in marginal product of skilled labor due to 1 percent change in aggregate stock of skilled labor). Emigration loss is calculated using equation (7); the skilled emigration rate to the United States is used to do the calculations.

Table A9.5. Total Losses Due to High-Skilled Emigration to the United States vs. Remittances
(Age at migration restricted to 16 or older)

	Estimated Education Expenditure (percent of GDP)	Emigration Loss (percent of GDP) Gamma = 0.1 *e* = 0.4	Emigration Loss plus Estimated Education Expenditure	Remittances as a Percent of GDP (average over 1980–2002)
Antigua & Barbuda	3.7	3.3	7.0	3.0
Bahamas, The	1.0	3.4	4.4	. . .
Barbados	6.0	2.4	8.4	2.3
Belize	1.8	3.9	5.7	4.7
Dominica	2.9	2.6	5.5	8.4
Dominican Republic	0.2	0.7	0.9	5.3
Grenada	2.5	5.3	7.8	11.0
Guyana	0.2	5.9	6.1	1.9
Haiti	0.3	5.6	5.9	10.1
Jamaica	7.1	5.6	12.7	7.4
St. Kitts & Nevis	1.4	4.1	5.5	6.9
St. Lucia	0.3	2.8	3.1	4.0
St. Vincent & the Grenadines	2.4	4.6	7.1	7.2
Trinidad & Tobago	4.4	4.5	8.9	0.3
Average	2.5	3.9	6.4	5.6

Source: Author's calculations.

Notes: *e* denotes the elasticity of factor price of labor (i.e., percentage change in wages resulting from a 1 percent change in the size of the labor force). Gamma denotes the elasticity of marginal product of labor (the percentage change in marginal product of skilled labor due to 1 percent change in aggregate stock of skilled labor). Emigration loss is calculated using equation (7); the skilled emigration rate to the United States, with restricted age at migration, is used for the calculations.

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10

Tax Concessions and Foreign Direct Investment in the Eastern Caribbean Currency Union

JINGQING CHAI AND RISHI GOYAL

Tax concessions—defined as preferential tax treatment for certain types of firms or entities—are commonplace in developed as well as developing countries. Concessions are granted to promote investment, in which case they may be termed tax incentives or investment incentives, or to achieve defined social objectives. For example, corporate income tax (CIT) holidays for five to 10 years may be granted to firms that export goods and services or that locate in designated areas or regions. Exemptions from import-related duties and taxes may also be given, which may be on capital imports to promote investment or on a wide range of other imported goods for statutory or civic bodies or nonprofit organizations.

Cross-country experience in the use of tax concessions is varied. The trend of using tax concessions to attract foreign direct investment (FDI) has continued, and some countries have granted increasingly generous concessions, for instance, by extending the duration of existing tax holidays. However, realizing that concessions can be very costly as a tool to promote investment, many countries have begun taking legal and administrative steps to restrict eligibility criteria and enforce compliance (UNCTAD, 1996; Easson, 2004).

Evidence on the effect of tax incentives in developing countries is limited. The emerging consensus from this research is that a country's overall economic characteristics may be more important for attracting

successful investments than any tax incentives; and even if tax incentives play a role in securing an investment, they are not generally cost effective (Zee, Stotsky, and Ley, 2002). In a recent survey of 159 multinational firms operating in the Caribbean, tax concessions were not among the top 15 of the 40 areas that firms considered critical for their investments (Foreign Investment Advisory Service, 2004; World Bank, 2005). Although there is some evidence that when all else is equal tax concessions can tilt the balance in favor of a particular location, it is generally considered much more effective for a country to attract investment by building genuine economic advantages and a conducive investment environment—including a stable, low, and transparent tax policy—rather than by simply offering incentives (UNCTAD, 2004). Based on individual country experience, Easson (2004) shows that competition often leads to overly generous terms, rendering the investments cost ineffective.

Another branch of research examines the effect of taxes on FDI, using various measures of the tax rate including the average effective tax rate, the marginal effective tax rate, or the statutory rate on investment (Zee, Stotsky, and Ley, 2002; Sosa, 2006). Few studies include tax incentives directly, largely because the data on the use of tax incentives are sparse.

This chapter adds to the literature on tax concessions in developing countries. It documents the use of concessions in six Eastern Caribbean Currency Union (ECCU) member countries,[1] assesses the costs in terms of revenue forgone, and evaluates the effect of tax incentive regimes on FDI in a wide sample of countries. The chapter uses measures of FDI and tax incentive regimes as constructed in Wei (2000), who examines the effect of corruption on FDI. In a sample of 40 countries with mostly middle- and high-income economies, Wei found that FDI restrictions discourage and incentives encourage such investment. This chapter expands the sample to cover many developing and emerging market economies. The main finding is that the ECCU countries rely heavily on the use of tax concessions, and that reliance on these concessions has increased significantly in Antigua and Barbuda and in St. Kitts and Nevis over the past decade. In the region, tax revenues forgone are large, ranging from 9½ to 16 percent of GDP annually, while the effect of tax incentive regimes appears to be modest.

Previous work on tax concessions in the ECCU has analyzed costs in terms of revenues forgone and proposed administrative reforms. Bain (1995)

[1]This chapter studies the six ECCU countries that are also members of the IMF: Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines.

assessed the costs in the early 1990s, while Andrews and Williams (1999) suggested that the regime of administering concessions be streamlined. Lecraw (2003) made the case for a coordinated, harmonized approach to granting concessions. This chapter builds on this work, providing updated and additional calculations of revenue forgone, and analyzing benefits in terms of attracting FDI.

Tax Concessions in the ECCU

Tax concessions have been employed as a central component of the development strategy of ECCU member countries. The purposes for which concessions are granted can be broadly divided into two categories: tax concessions granted to induce investment (also called tax incentives), and concessions granted for regional, social, and welfare purposes. As will be shown below, contrary to the purported policy justification of stimulating investment, at least for import-related tax concessions, most revenue forgone from the granting of tax concessions was not investment related.

Concessions for investment in sectors such as tourism and light manufacturing have generally been provided through the member countries' Fiscal Incentives Act, Aid to Pioneer Industries Act, Hotels Aid Act, and sector-specific acts (such as the Offshore Banking Act and the International Business Companies Act). Tax concessions granted for regional, social, and welfare purposes are provided in the Common External Tariff Act, in specific legislation covering statutory bodies, state enterprises, large individual institutions (such as utilities companies), or in special government arrangements with regional or international bodies regarding the tax treatment of diplomats and returning residents.

Concessions are typically granted in the form of import-related tax exemptions and CIT holidays, and there is some evidence that competition in the tourism market has led to more generous terms of concessions as provided in the Hotel Aid Act. Exemptions from import-related taxes (import duties and the general consumption tax) on the importation of capital goods (raw materials and equipment) are the most common forms of concessions. Such exemptions may be on 100 percent of taxes and duties owed, or for lesser amounts. They may also be granted for varying lengths of time. Similarly, holidays on CIT may be of varying amounts and lengths of time. While little data are available on how the terms of the concessions have evolved over time, increasingly generous concessions appear to have been given. For instance, tax holidays granted to certain tourism facilities have been extended from a maximum of five to 25 years.

While individual country experience in the region varies, the process of granting tax concessions generally involves considerable discretion and a lack of transparency and monitoring. The laws do not provide detailed procedural rules or specific criteria for granting concessions. Rather, the cabinet or the minister of finance is vested with the authority to grant concessions, and in practice they have close to absolute discretion in all aspects of a decision, including, for example, whether the legal requirements are fulfilled in an application and what the terms of the concessions should be for an application. Moreover, there is little public disclosure of information on the decision-making process and on awarded incentives, leaving many investors concerned over unequal treatment, market distortion, and favoritism. Finally, there is little monitoring of the beneficiaries of the incentives, and the conditions set out in the awarded incentives are often not enforced, potentially leading to abuses of the system. Based on the experience of many other developing countries, these issues together tend to provide scope for corruption and rent-seeking activities and negatively affect the investment environment.

The widespread use of tax concessions has been cited as justifiable because of increased competition in the tourism market in the wider Caribbean, and because of the reported threat by firms that they would leave if the concession were not granted. Indeed, the ECCU increasingly has faced tougher competition from other Caribbean countries (Figure 10.1).[2] One reaction has been a divergence from the 1973 Caribbean Community Agreement to harmonize concessions (Lecraw, 2003). Moreover, multinationals and other large regional firms have tended to play one island off against another, thereby encouraging a race to the bottom (Box 10.1).

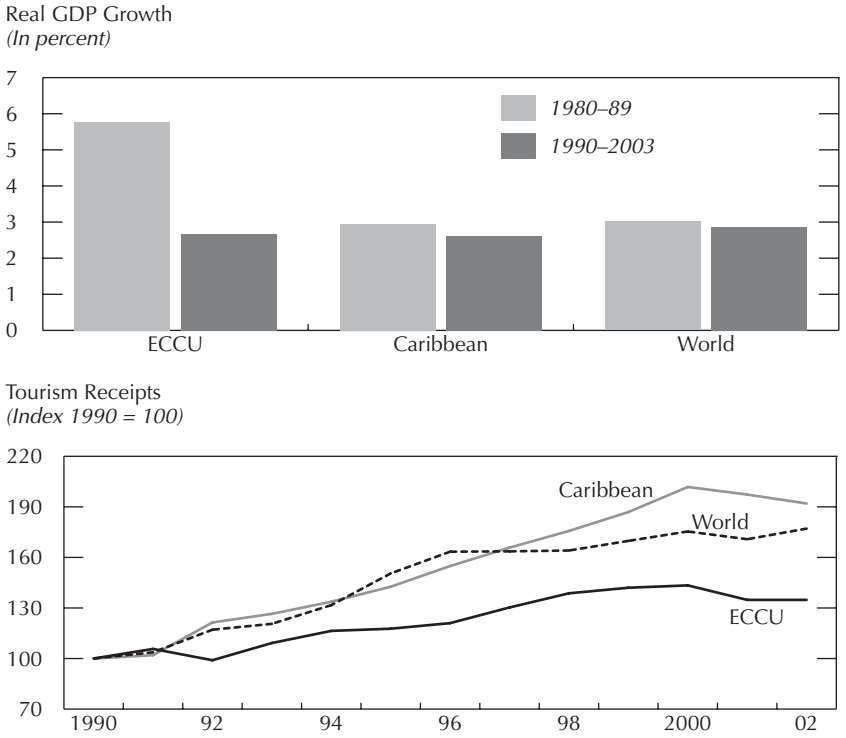
Revenue Costs of Concessions

The granting of tax concessions entails a number of costs: efficiency losses due to the preferential tax treatment to certain investors and consumers; revenue costs arising from forgone revenue; administrative costs; and social costs from corruption or rent-seeking associated with the abuse of tax concession provisions (Zee, Stotsky, and Ley, 2002).

While all these costs could be substantial, little data are available to quantify them. Data collected from the customs departments in the

[2]Hotel room capacity increased sharply in the wider Caribbean, while hurricane-related damage to hotel capacity in ECCU countries such as Antigua and Barbuda was significant.

Figure 10.1. Regional Comparisons: GDP Growth and Tourism Receipts



Source: Country authorities.
Note: ECCU denotes Eastern Caribbean Currency Union.

six ECCU countries allows for estimating the costs of tax concessions in terms of forgone revenue. Specifically, aggregated data were used to calculate revenue forgone from tax exemptions from import duties and consumption taxes for 2001–03 for each of the six ECCU countries. The customs departments compile some data on the revenue costs of concessions related to imports, as they verify the concessions vis-à-vis cabinet decisions and record the revenue forgone based on the reported import value.

The main finding is that overall revenue losses from concessions on import-related taxes and the CIT range between 9½ and 16 percent of GDP a year. As a percent of current revenues, the losses range between 30 and 70 percent.

Box 10.1. Use of Tax Concessions to Attract Foreign Direct Investment

There is a widespread perception in the Eastern Caribbean Currency Union that incentives are needed to secure investments. The authorities consider that they are competing for similar investments and feel compelled to offer generous incentive packages out of fear that potential investors will locate their investments in neighboring countries. They may also extend incentives on existing investments to keep investors from relocating.

Given the widespread use of incentives, the perceived need for them is self perpetuating. Potential investments are at a cost disadvantage vis-à-vis existing investments in similar activities that receive incentives. Potential investors could argue for, and the authorities may feel compelled to offer, incentives to induce the new investment.

One result is investments or firms that remain continually incentive-dependent. The investment regime becomes anchored around the granting of incentives not only for new investments but also for existing ones. Such incentives become quasi-permanent subsidies for the operation of firms.

A second result is that excessively generous incentives may be offered. As countries attempt to outbid one another for potential investments, the costs of incentives may outweigh the benefits. Such situations may result especially when there are political pressures to secure investments, while the costs are nontransparent or not well calculated.

Exemptions from Import Duties and Taxes

Revenue forgone from concessions on import duties or taxes has been large in the ECCU countries, exceeding 8 percent of GDP annually and increasing over the past decade.[3] The data collected by customs and excise departments in each country provided an estimate of the revenue forgone in the ECCU. For a check of consistency, the estimates were compared to estimates derived from the difference between the statutory tax rate on imports and the effective tax rate on imports. The data show that, in the early 2000s, exemptions granted ranged from 4.3 percent of GDP in Dominica to 12.2 percent in St. Kitts and Nevis (Table 10.1). In the early

[3]Although data on revenue forgone in other countries are generally not known, a recent study on the Philippines estimated revenue forgone at 1 to 2 percent of GDP annually (Easson, 2004).

Table 10.1. Eastern Caribbean Currency Union (ECCU): Customs Revenue Losses From Concessions
(In percent of GDP)

	1991–93	2001–03
Antigua & Barbuda	5.1	9.2
Dominica	4.2	4.3
Grenada	11.4	11.3
St. Kitts & Nevis	5.8	12.2
St. Lucia	5.9	5.9
St. Vincent & the Grenadines	6.7	6.1
ECCU average	6.5	8.2

Sources: Country authorities (customs and excise departments); and Bain (1995).

1990s, exemptions granted were about 6½ percent of GDP in the region, 1½ percent less than in the early 2000s.[4]

The difference between the statutory tax rate on imports (excise and duties) and the effective tax rate on imports is exploited to estimate revenue losses.[5] The statutory tax rate on imports is the sum of average import duties and consumption tax levied on imports. The effective tax rate is the ratio of revenues from international transactions to total imports. The difference in rates ranges from more than 8 percent in Dominica to more than 22 percent in Antigua and Barbuda. This difference in rates yields revenue losses similar to those shown by data from the customs and excise departments of each country (Figure 10.2). Average losses are nearly 8 percent of GDP for the region, with ranges from about 4 percent of GDP in Dominica to over 12 percent in St. Kitts and Nevis.

The increase in concessions since the early 1990s has been particularly evident in Antigua and Barbuda and in St. Kitts and Nevis. Customs revenue forgone in these two countries was about 5 percent of GDP a year higher in 2001–03 compared with the early 1990s (Table 10.1).

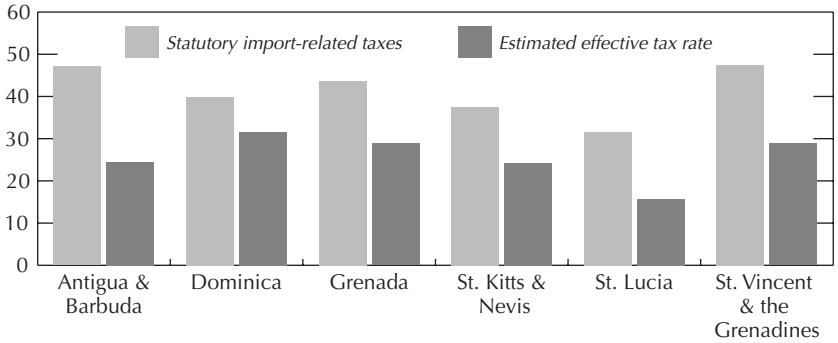
A detailed breakdown of the revenue forgone by purpose is not available except for Dominica and St. Vincent and the Grenadines, where revenue forgone by SRO 18 codes (2001) is used to calculate the share of the customs revenue forgone for investment purposes. Concessions granted under the Fiscal Incentives and Hotels Aid Acts, together with government agreements that deal with large special investors, account for less than 50 percent in value of the total customs duty concessions, whereas

[4]Data for the early 1990s are provided in Bain (1995).

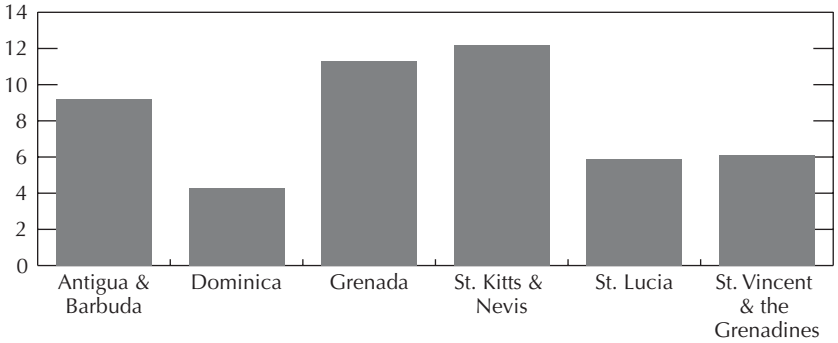
[5]Note that the revenue losses are due not only to concessions granted but also to leakages from administrative weaknesses.

Figure 10.2. Eastern Caribbean Currency Union: Import-Related Taxes and Revenue Forgone from Concessions, 2003

Statutory and Effective Import-Related Tax Rates
(In percent)



Customs Revenue Forgone[1]
(In percent of GDP)



Sources: National customs and excise departments; and authors' calculations.
[1]Average for 2001–2003.

concessions granted by special cabinet decisions—mostly consumption-related decisions such as exemptions on personal vehicles—accounted for about 20 percent. Concessions related to government and statutory bodies (including public investment) are in the range of 9 to 14 percent of total concessions (Table 10.2).

Two caveats need to be discussed. First, data are not available on the breakdown of the purposes for which the concessions were given for the early 1990s. Therefore, it is difficult to determine if changes in the revenue costs of concessions in a given country reflect the increasing use of tax concessions based on social and welfare considerations or in order to

Table 10.2. Customs Revenue Loss from Concessions, 2001–03
(Percent of total)

	Dominica	St. Vincent & the Grenadines
Fiscal incentives[1]	30.2	9.5
Special cabinet decisions	21.0	23.3
Government agreements[2]	15.8	33.1
Government and statutory bodies	9.2	13.7
Personal effects and vehicles	7.0	1.5
Tourism	3.9	0.3
Civil servants and parliamentarians[3]	3.5	0.3
Primary industry	2.5	0.7
Military and diplomat	2.5	0.8
Other approved purposes	2.0	1.2
Charities and churches	1.4	0.3
Education, culture, and health	0.9	0.8
Transportation	—	0.6
Unclassified	—	. . .

Sources: Country authorities; and authors' calculations.
Note: Based on SRO 18 codes of 2001.
[1]Primarily concessions granted under the Fiscal Incentive Act and the Hotel Aid Act.
[2]Special legislation involving such entities as Cable & Wireless, regional bodies, and large resorts.
[3]For Dominica, the code shows "Consumption Tax Order," which includes such items as concessions granted to civil servants to import cars free of duty.

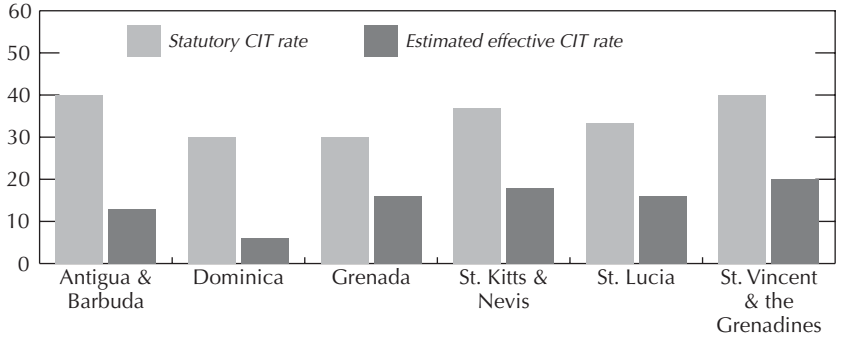
attract investments. For example, one possibility is that concessions were increased to facilitate reconstruction after the severe natural disasters of the 1990s. Second, data on the import prices are not available. It is possible that changes in the revenue costs of concessions in a given country are due to inflation in imports or in profits rather than the use of concessions. However, given the quasi-currency board arrangements and a stable dollar exchange rate, inflation in imports in the ECCU region has been broadly aligned with that in the U.S. goods market. Consumer price index inflation in the ECCU region—where most of the CPI basket is comprised of imports—has been low, at around 2 percent over the past decade. It can be concluded that the increase in forgone revenue in Antigua and Barbuda and St. Kitts and Nevis reflects a higher incidence or more generous terms of tax concessions, rather than inflation in imports and profits.

Corporate Income Tax Holidays

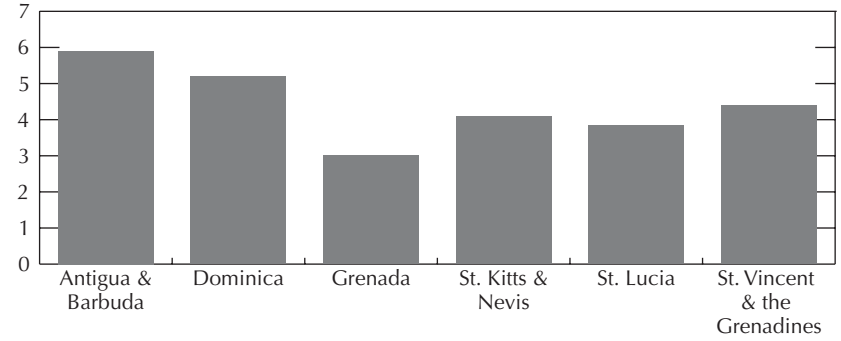
Revenue forgone from CIT holidays may have exceeded 4 percent of GDP annually. In the absence of data, forgone revenue is estimated from the difference between the statutory and the effective CIT rates. The

Figure 10.3. Eastern Caribbean Currency Union: Corporate Income Taxes (CIT) and Revenue Forgone from Concessions, 2003

Statutory and Effective Corporate Income Tax Rates
(In percent)



Estimated Corporate Income Tax Revenue Forgone
(In percent of GDP)



Sources: Country authorities; and authors' calculations.

effective CIT rates are calculated by dividing the CIT revenue by an estimated CIT base.[6] Statutory rates range between 30 and 40 percent in the region, whereas effective rates are between 6 and 20 percent. Given the large differences, estimated forgone revenue is also substantial, ranging from 3 percent of GDP in Grenada to about 6 percent in Antigua and Barbuda (Figure 10.3).

[6]National accounts data on the income side are not available for ECCU member countries. The corporate income tax base is assumed to be 25 percent of GDP, in line with the number for Jamaica.

Table 10.3. Eastern Caribbean Currency Union (ECCU): Corporate Income Tax Collections
(In percent of GDP)

	1990–94	1999–2003
Antigua & Barbuda	2.1	2.5
Dominica	3.4	0.9
Grenada	3.2	3.6
St. Kitts & Nevis	. . .	2.7
St. Lucia	4.2	4.0
St. Vincent & the Grenadines	4.5	4.4
ECCU average	3.5	3.0

Sources: Country authorities; and authors' calculations.

CIT yields have declined since the early 1990s, which could reflect an expansion in concessions granted. The average yield fell moderately from 3.5 percent of GDP from 1990–94 to 3 percent from 1999–2003 (Table 10.3). Declines were observed in some countries, particularly Dominica, but increased somewhat in two countries, although from low bases.

The decline in yields came at a time when CIT collections had eroded across many developing countries. With capital market integration appearing to have strengthened, low tax rates could be expected to apply to internationally mobile capital, all else being equal. If low rates are not applied, capital could be moved to other lower tax rate destinations.

Two assumption were made to derive the estimates: perfect tax administration and an even distribution of the aggregate profits.[7] Given relatively weak tax administration and a profit distribution skewed toward larger firms with excess profits in the ECCU, the biases go in opposite directions. Because of the considerable problems with tax administration, part of the estimate is due to leakages in tax administration rather than increasing use of CIT concessions. This tends to bias our estimates of the tax concessions upward. Very little data are available to quantify the distribution of profits in the region. However, discussions with inland revenue departments and banks suggest that a handful of large firms that currently enjoy tax holidays and other tax concessions have been very

[7]Distribution of profits and losses matters. For example, assume there are 20 companies and the sum of their profits is EC$100 (Eastern Caribbean dollars). If the statutory tax rate is 30 percent, then statutory revenue would be EC$30. However, if the distribution of profit is such that 15 companies make losses of EC$300 and five make profits of EC$400, then true statutory revenues are EC$120.

profitable, while many smaller firms have been struggling, especially in low tourism seasons. Therefore, the "actual" CIT tax base may be greater if this uneven distribution of profits is taken into account. This means that the effective CIT rate may be overestimated, biasing downward the estimate of tax concessions.

Revenue Collection from Removing Concessions: An Elasticities Approach

A common perception in the ECCU is that investment and revenue collection would decline in the absence of concessions. While there is agreement that revenue is forgone due to concessions, some consider that investments would not have taken place without the concessions. Hence, they argue that the employment and revenue resulting from the new investments that benefit from concessions are net gains.

However, calculations based on plausible demand elasticities suggest that revenue collections could increase substantially by removing concessions. Depending on demand elasticities, higher effective tax rates could offset declines in import volumes and corporate incomes were concessions to be removed. For instance, if demand were perfectly inelastic, then overall revenue collections would increase. But if demand were elastic, then overall revenue collections would decrease (Appendix 10.1).

Empirical studies have estimated relatively inelastic import price elasticities for developing countries, ranging between –1.0 and –0.4 (Khan, 1974; Khan and Knight, 1988). Indeed, in small and highly open economies such as those in the ECCU that import the bulk of goods consumed and invested, and that depend mainly on high-income, relatively price-inelastic tourist clienteles, import demand is arguably inelastic.

Assuming a price elasticity of –0.7 both for import volumes and corporate incomes, the revenue gain from removing concessions is 9 percent of GDP on average, ranging from 7 percent of GDP for Dominica to 12 percent for St. Kitts and Nevis (Table 10.4).

Benefits of Incentives: FDI Performance in the ECCU

The estimated revenue costs of tax concessions are large for the ECCU countries, begging the question of whether the costs can be justified by any benefits that may be derived from granting tax concessions. Possible benefits are delayed revenue benefits from induced investment and revenue from other type of taxes such as wage and hotel taxes. There are

Table 10.4. Revenue Gains from the Removal of Concessions: An Elasticities Approach
(In percent of GDP)

	Import-Related Taxes	Corporate Income Taxes	Total
Antigua & Barbuda	6.2	4.2	10.4
Dominica	3.1	4.1	7.2
Grenada	7.8	2.4	10.2
St. Kitts & Nevis	9.0	3.0	12.0
St. Lucia	4.6	2.9	7.6
St. Vincent & the Grenadines	4.1	3.2	7.3
Eastern Caribbean Currency Union average	5.8	3.3	9.1

Source: Authors' calculations.
Note: Table assumes a price elasticity of –0.7.

also perceived spillover benefits flowing from FDI such as job creation, technology transfer, and improved efficiency of domestic industries.

As shown above, possibly more than half of the tax concessions are used for various social and welfare purposes in the ECCU. The quantification of the benefits that may derive from achieving such objectives is beyond the scope of this chapter. However, the conventional wisdom on social spending is that taxes and preferential tax treatments are not the best instruments to achieve social objectives. Moreover, the manner in which the tax concessions are administered in the region—discretionary, opaque, and arbitrary—provides scope for corruption and rent-seeking, which negatively affect the investment environment.

The second main policy motivation for tax concessions is to stimulate investment, both FDI and domestic investment, and to create employment. Despite the fact that concessions have increased over the past decade, the ECCU's world ranking of FDI as a share of GDP has fallen (Table 10.5), and greater concessions do not seem to be reflected in changes in the FDI-to-GDP ratio (Figure 10.4). In an average ranking of the ratio of FDI to GDP of more than 150 countries, the ECCU countries fell from fifth to twentieth by 2002.[8] The ECCU share of Caribbean FDI inflows also declined from 12.3 to 3.7 percent over the same period (World Bank, 2005).

Measuring benefits in terms of employment is much more difficult, as no data are available on the employment generated by incremental investments or the other taxes derived from them. This data limitation

[8]See World Bank (2005). Even though the relative ranking of the ECCU region has fallen over time, the share of FDI in GDP has remained high, reflecting the region's natural endowment as a prime tourist destination and the small size of its economies.

Table 10.5. Foreign Direct Investment (FDI) Performance Index

	1979–83	1984–88	1989–93	1994–98	1999–2003
Antigua & Barbuda	24.1	12.3	11.4	3.5	2.6
Dominica	2.5	8.0	10.9	8.8	2.3
Grenada	1.8	7.1	8.5	6.2	5.3
St. Kitts & Nevis	12.3	16.4	19.2	7.0	8.4
St. Lucia	37.4	10.8	12.1	4.9	2.3
St. Vincent & the Grenadines	3.0	5.0	7.7	14.5	4.0
Eastern Caribbean Currency Union	16.0	11.7	11.7	8.1	4.3
Small island economies[1]	7.0	8.9	7.6	6.7	8.2
Latin America & the Caribbean	1.8	1.5	1.4	2.0	1.6
Developing countries	1.4	1.2	1.4	1.8	1.2

Sources: UNCTAD (2004); and authors' calculations.

Note: Performance index is the share of a country's FDI inflow in the world's FDI inflow, divided by the share of the country's GDP in the world's GDP.

[1]Includes the six ECCU countries in the table plus The Bahamas, Bermuda, Cayman Islands, Cyprus, Dominican Republic, Guyana, Haiti, Jamaica, Malta, Mauritius, Papua New Guinea, Samoa, Seychelles, and Trinidad and Tobago.

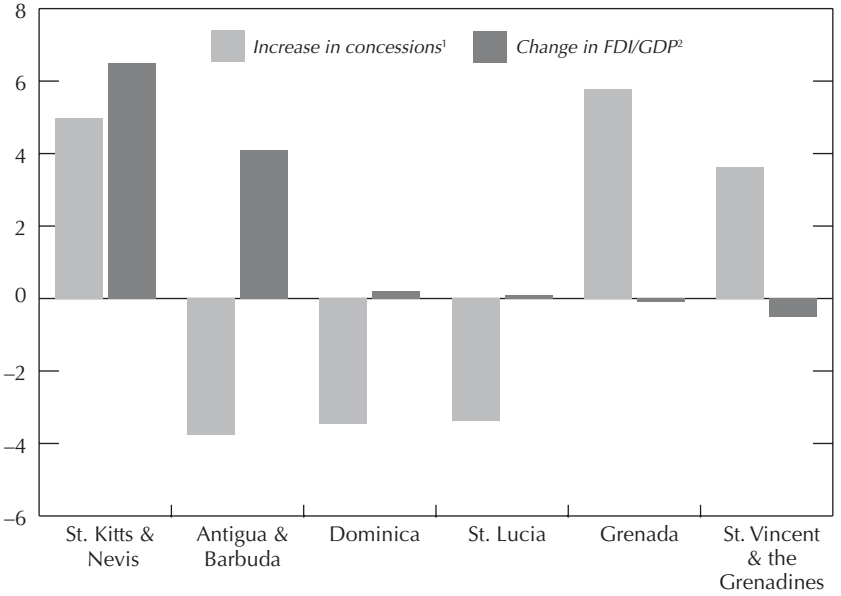
precludes any cost-benefit analyses in terms of job creation or net revenue gain. Based on a sample of firms collected by the authors receiving concessions in the ECCU region in the second half of the 1990s, there is some evidence that the terms of the concessions are positively correlated with the size of the firms both in terms of capital and employment.

Tax incentives are often granted with the justification that future revenues may outweigh the present revenue forgone from granting these incentives. However, in the ECCU there is evidence that concessions are granted not only to newly-established enterprises but also to well-established firms. The sample of firms receiving concessions in the ECCU region in the second half of the 1990s showed that a large proportion of firms receiving concessions had been established for several years (Box 10.2).[9]

To more systematically analyze the effect of incentives on FDI, a broad cross-country study was conducted. Two indices were constructed—an FDI restrictions index and an FDI incentives index—using the methodology of Wei (2000) to relate differences in incentive regimes with FDI performance. Wei's database was expanded to cover 80 countries (see Appendix 10.2 and Table A10.2.1). The ECCU countries have a generally pro-FDI policy, with incentives provided for select sectors (notably offshore financial services, tourism, and manufacturing) and exports.

[9]Data are not available on the costs of each concession granted or on the receiving firms' financial conditions, precluding any cost-benefit analyses at the firm level.

Figure 10.4. FDI/GDP and Tax Concessions, 1991–2003
(Change in percentage points)

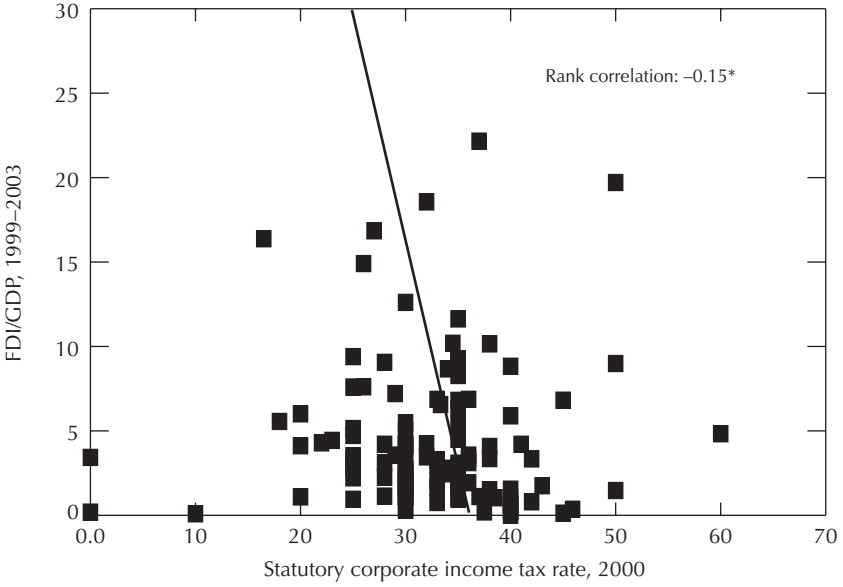


Sources: Country authorities; Eastern Caribbean Central Bank; and authors' calculations.
Note: FDI denotes foreign direct investment.
[1]Measured as the difference in customs revenue forgone from concessions in 2001–03 relative to 1991–93.
[2]Measured as the difference in FDI/GDP in 2001–03 relative to 1991–93.

Higher statutory CIT rates and import-related tax rates are negatively related to FDI (Figures 10.5 and 10.6) because they lower the after-tax return to capital and raise production costs, thereby hindering investment. The average CIT rate in the ECCU is 4 percentage points higher than in small island states, while the average import tariff rate is 2 percentage points higher (Table 10.6). Subject to fiscal constraints, there appears to be scope to reduce tax rates and broaden the tax base.

A restrictive FDI regime is negatively associated with FDI, but there is little evidence that FDI incentives are associated with higher FDI (Figures 10.7 and 10.8). These findings are consistent with past empirical studies of other regions, including surveys. The absence of a relationship between incentives and FDI is confirmed in cross-country regression analyses (Tables 10.7 and 10.8). The incentives index is insignificant in all econometric specifications. The finding that FDI performance is positively related to a low CIT rate is fairly robust across specifications. There

Figure 10.5. FDI/GDP and Statutory Corporate Income Tax Rate
(In percent)



Sources: UNCTAD (2004); country authorities; and authors' calculations.
Notes: *significant at 10 percent; FDI denotes foreign direct investment.

is also evidence that good governance and the lack of FDI restrictions are positively related to FDI.[10]

Summary and Policy Conclusions

Tax concessions have been employed as a key component of the investment and development strategy of ECCU member countries. Considerable discretion has been applied in the granting of concessions—mainly import-related tax concessions and corporate income tax holidays—for investment and social purposes. Incentives have been given not only for new investments but also for ones that have been in operation for several

[10]The statistical significance of the CIT rate is driven by three "tax haven" countries. When these countries are excluded from the estimation, the CIT has the correct sign, but is statistically insignificant. Instead, the FDI restrictions index and the ECCU fixed effect become statistically more significant.

Box 10.2. Firm-Level Analysis of Tax Concessions in the Eastern Caribbean Currency Union

Tax concessions in the ECCU are granted to a broad range of firms. In a sample collected by the authors of 145 firms receiving concessions from 1996 through 2000—covering such sectors as services, trade, and light manufacturing but excluding tourism facilities—all firms received exemptions from import-related taxes. About half also received exemptions from the corporate income tax (CIT). The size of the firms varied substantially, from as few as two employees to as many as 450, and from capital investment of about US$3,500 to US$5 million. Lack of ownership information on these firms precludes analysis of the question of whether foreign investors tend to receive more concessions than domestic investors.

Exemptions from import-related taxes are widely granted and holidays from CIT are also used frequently. On average, a firm in the sample received a tax holiday of 2.6 years, a 32 percent reduction in the effective CIT rate, and a 91 percent reduction in the effective import duty and consumption tax rate. One of 10 firms received an export allowance, and one out of four received either a tax holiday extension or expanded coverage in import duties and consumption tax exemptions.

Concessions are granted to newly-established firms as well as to existing firms. In 1996–97, about half of the firms receiving incentives had already been established, some several decades earlier. One of four existing firms had their concessions extended during 1996–97.

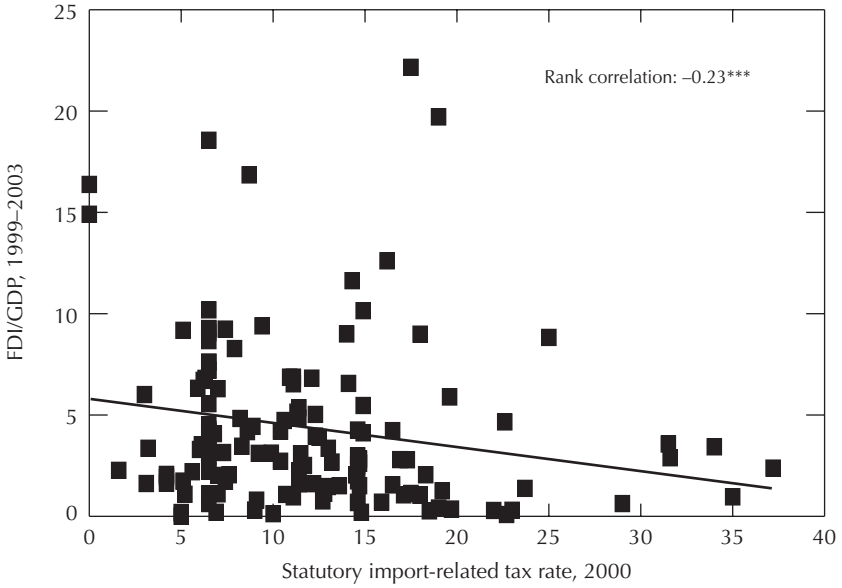
The size of firms matters. Large firms in terms of both employment and capital tended to receive longer tax holidays and face lower CIT rates. Firms with higher employment also received export allowances, while more capital-intensive firms received extensions on existing holidays and exemptions and concessions on business expansions.

Firm Size and Concessions: A Rank Correlation Analysis

	Years of Tax Holidays	Reduction in Effective CIT[1]	Reduction in Effective Tariff[2]	Export Allowance	Concession Extension[3]
Employment	0.337*	0.320*	0.015	0.171*	0.123
(No. of obs.)	(161)	(161)	(163)	(163)	(165)
Capital	0.208*	0.177*	–0.082	0.110	0.197*
(No. of obs.)	(138)	(138)	(140)	(141)	(141)

Source: Authors' calculations.
Note: * denotes significance at 5 percent.
[1]Corporate income tax.
[2]Import duties and consumption taxes.
[3]Extensions of tax holidays and extensions and expansions in coverage of import duty and consumption tax exemptions.

Figure 10.6. FDI/GDP and Statutory Import-Related Tax Rate
(In percent)



Sources: UNCTAD (2004); country authorities; and authors' calculations.
Notes: ***significant at 1 percent; FDI denotes foreign direct investment.

years. Larger firms have tended to receive more incentives and for longer periods of time.

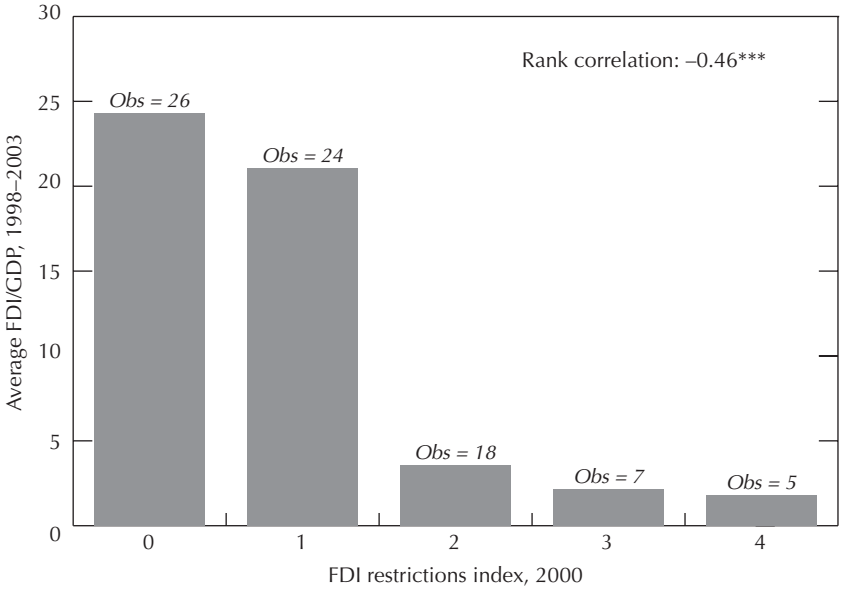
The benefits in terms of FDI appear to be limited, but the costs in terms of forgone revenue are substantial. A broad cross-country analysis shows that incentives are not related to FDI. Rather, in line with results from investor surveys and regression analyses in the economics literature, lower statutory tax rates, the absence of FDI restrictions, and better institutional and infrastructural quality are related to FDI. Estimates of forgone

Table 10.6. Average Statutory Tax Rates
(In percent)

	Corporate Income Tax Rates	Import-Related Tax Rates
Eastern Caribbean Currency Union	35.0	16.2
Small island states	31.1	14.3

Sources: Country authorities; and authors' calculations.

Figure 10.7. FDI/GDP and FDI Restrictions Index
(In percent)



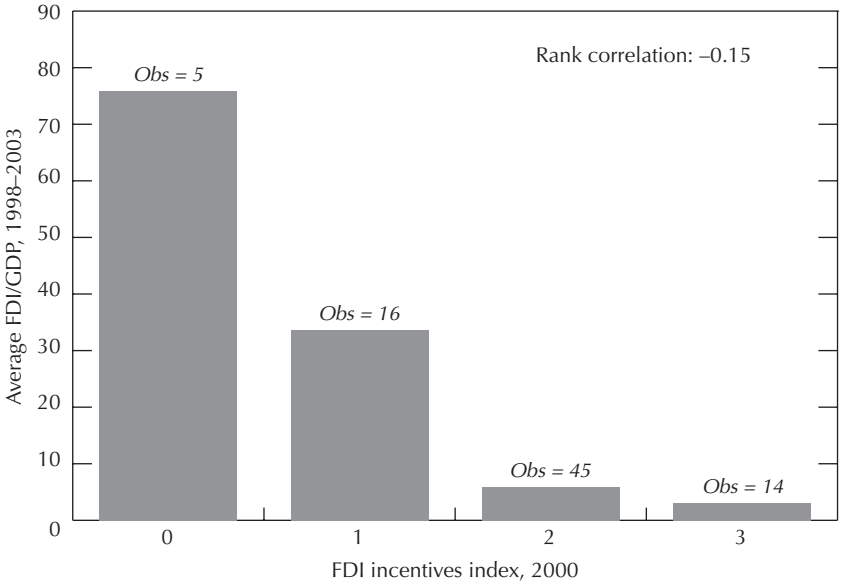
Sources: UNCTAD (2004); Wei (2000); and authors' calculations.
Notes: A higher value indicates a more restrictive foreign direct investment (FDI) policy.
***significant at 1 percent.

revenue range from 9½ and to 16 percent of GDP annually for the ECCU countries.

The strategy of using incentives to promote development should be reevaluated urgently, possibly within a regional context. A regional approach to harmonizing concessions would help limit each country's large revenue losses, and avoid the tax competition that has produced a race to the bottom.

The development strategy should, therefore, focus on enhancing the investment climate. Some countries, such as Mexico and Hong Kong SAR, have attracted substantial investments without tax incentives. Mexico's tourism industry attracted more than US$2.25 billion in new investments in 2003 without income tax holidays. In 2004, Mexico received a historic high of over 20 million international visitors and over US$10 billion in tourism receipts. Hong Kong SAR has been a top performer in attracting FDI, with a uniform 15 percent income tax rate and no tax incentives. Enhancing the investment climate entails addressing key investor con-

Figure 10.8. FDI/GDP and FDI Incentives Index
(In percent)



Sources: UNCTAD (2004); Wei (2000); and authors' calculations.
Note: A higher value indicates a broader foreign direct investment (FDI) incentives regime.

cerns such as improving the regulatory environment, developing infrastructure, and raising labor productivity through skills acquisition and labor market reform.

Concessions should be reduced significantly or phased out and the tax base broadened, while statutory tax rates should be lowered. If tax rates were lowered but concessions not phased out, the fiscal and macroeconomic environment would deteriorate, which would deter investment and lower growth.

Meanwhile, concessions should be nondiscretionary, transparent, and limited in size, duration, and scope. Legislation on concession-related investment should be revised to be rule-based with clear specification of eligibility criteria. This would alleviate the administrative burden on the cabinet and line ministries and free them up to focus on other pressing matters. Ad hoc concessions for social and welfare purposes should be eliminated and any social spending should be incorporated in the budget process. As an example, in Dominica, the policy since mid-December 2003 has been to not grant ad hoc import concessions. Existing concessions

Table 10.7. Cross Country Ordinary Least Square Regressions
(Dependent variable: Ln [FDI/GDP])

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FDI restrictions	–0.220*	–0.246*	–0.309*	–0.254*	–0.220*	–0.165	–0.164
	(0.101)	(0.113)	(0.118)	(0.113)	(0.103)	(0.102)	(0.104)
FDI incentives			–0.255	–0.142	–0.006	0.077	0.081
			(0.178)	(0.172)	(0.156)	(0.154)	(0.159)
Average import tariff	0.000				0.000		–0.002
	(0.017)				(0.017)		(0.018)
Corporate income tax		–0.047**		–0.044**		–0.009	–0.009
		(0.014)		(0.014)		(0.015)	(0.015)
Quality of institutions	0.041	0.053	0.041	0.044	0.041	0.033	0.032
	(0.026)	(0.027)	(0.031)	(0.029)	(0.027)	(0.027)	(0.028)
Quality of infrastructure						0.011	0.011
						(0.007)	(0.007)
Eastern Caribbean Currency Union fixed effect	0.806	0.867	0.613	0.861	0.806	0.817	0.828
	(0.437)	(0.496)	(0.518)	(0.497)	(0.440)	(0.423)	(0.444)
Observations	77	80	80	80	77	75	75
R-squared	0.19	0.29	0.20	0.30	0.19	0.24	0.24
Adjusted *R*-squared	0.15	0.25	0.16	0.25	0.14	0.18	0.16

Notes: Standard errors in parentheses. * significant at 5 percent; ** significant at 1 percent. FDI denotes foreign direct investment.

should be reviewed, and the cost of all concessions granted should be published in a tax expenditure annex to the budget. There is an urgent need to strengthen data gathering on the costs and benefits of the tax concessions through routine monitoring and review, and to make available public information on the costs and benefits of each of the concessions granted.

When incentives are granted, careful consideration should be given to the choice of instrument. Incentives may be granted in a variety of forms, each with differing characteristics (Zee, Stotsky, and Ley, 2002; Sosa, 2006). CIT holidays are relatively easy to administer, but have several disadvantages. Since profits are exempted irrespective of amount, they tend to benefit investors with high profits who would likely have undertaken the investment even without the incentive. Moreover, they increase the potential of tax avoidance through transfer pricing. To encourage investment, tax credits for investment, accelerated depreciation, and loss-carrying-forward provisions could be considered. Indirect tax incentives such as exemptions from import-related taxes are prone to abuse, including by the diversion of qualified purchases to those not intended to receive the incentives. They should thus be avoided.

Table 10.8. Cross Country Ordinary Least Square Regressions
(Dependent variable: Ln [FDI per capita])

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FDI restrictions	–0.193	–0.215	–0.293*	–0.229	0.197	–0.122	–0.100
	(0.125)	(0.138)	(0.143)	(0.138)	(0.127)	(0.120)	(0.121)
FDI incentives			–0.392	–0.261	–0.067	0.020	0.072
			(0.215)	(0.209)	(0.193)	(0.181)	(0.185)
Average import tariff	–0.019				–0.017		–0.027
	(0.021)				(0.021)		(0.021)
Corporate income tax		–0.056**		–0.051**		–0.014	–0.016
		(0.017)		(0.017)		(0.017)	(0.017)
Quality of institutions	0.264**	0.290**	0.271**	0.275**	0.261**	0.264**	0.253**
	(0.032)	(0.033)	(0.037)	(0.035)	(0.033)	(0.031)	(0.032)
Quality of infrastructure						0.016*	0.015
						(0.008)	(0.008)
Eastern Caribbean Currency Union fixed effect	0.909	0.888	0.589	0.877	0.899	0.846	1.035*
	(0.539)	(0.606)	(0.626)	(0.604)	(0.543)	(0.499)	(0.518)
Observations	77	80	80	80	77	75	75
R-squared	0.60	0.59	0.56	0.60	0.60	0.66	0.67
Adjusted *R*-squared	0.58	0.57	0.53	0.58	0.58	0.63	0.63

Notes: Standard errors in parentheses; * significant at 5 percent; **significant at 1 percent. FDI denotes foreign direct Investment.

Appendix 10.1. What Is the Change in Revenue after Removing Import-Related Tax Concessions?

The current revenue intake from imports given existing tax concessions can be expressed as: $\nu_c * \overline{p}_{cif} * t_e$, where ν_c is the quantity of imports with the tax concessions, $\overline{p}_{cif}$ is the average c.i.f value of the imports and is normalized to take the value of 1, and t_e is the average effective tax rate. The average effective after-tax import price is: $p_{aft} = 1 + t_e$.

The removal of tax concessions raises the average after-tax import price: $\Delta p_{aft}/p_{aft} = (t - t_e)/(1 + t_e)$, where t is the average statutory tax rate for imports and $t \geq t_e$. The change in the average after-tax import price affects the quantity of imports: this relationship is measured by the import price elasticities:

$$\frac{\Delta\nu/\nu}{\Delta p_{aft}/p_{aft}} = \varepsilon,$$

where $\varepsilon \leq 0$ generally. It follows that a change in quantity of imports is: $\Delta\nu = \nu - \nu_c = \nu_c\varepsilon(t - t_e)/(1 + t_e)$.

The change in revenue from imports after the removal of tax concessions will then be: $\Delta R = \nu t - \nu_c t_e = \nu_c[1 + \varepsilon(t - t_e)/(1 + t_e)]t - \nu_c t_e$. Adding and subtracting the term of $\nu_c[1 + \varepsilon(t - t_e)/(1 + t_e)]t_e$ and rearranging the terms arrives at the following expression: $\Delta R = \nu_c[1 + \varepsilon(t - t_e)/(1 + t_e)](t - t_e) + \nu_c t_e[\varepsilon(t - t_e)/(1 + t_e)]$. The first term captures the after-tax price effect of removing tax concessions, while the second term captures the volume effect of a higher after-tax import price.

From this expression, it is straightforward to show that:

$$\Delta R > 0, \text{ if } \varepsilon > -(1 + t_e)/t;$$

$$\Delta R < 0, \text{ if } \varepsilon < -(1 + t_e)/t;$$

$$\Delta R = 0, \text{ if } t = t_e; \text{ or } \varepsilon = -(1 + t_e)/t;$$

$$\frac{\delta \Delta R}{\delta \varepsilon} = \nu_c[(t - t_e)/(1 + t_e)]t > 0.$$

Khan (1974) and Khan and Knight (1988) estimated that aggregate import price elasticities range from –0.4 to 1 for developing countries, with small open countries being more price inelastic with respect to imports. Given the average statutory and effective tax rates in the ECCU (about 41 and 26 percent, respectively), revenue will increase after removing tax concessions, and the increase is greater the more price inelastic the ECCU countries are to imports.

Appendix 10.2. Constructing Foreign Direct Investment Regime Indices

The FDI restrictions and incentives indices measure the government's policies towards FDI and are constructed using the methodology of Wei (2000). Each index is a sum of four variables, each of which takes a value of either 0 or 1. Publicly available sources, including PricewaterhouseCooper's *Investment Guides* and various investment agency reports, were used in compiling the indices.

The FDI restrictions index measures whether (1) there are controls on foreign exchange that interfere with the ability of foreign firms to import intermediate inputs or repatriate profits; (2) there is a ban on foreign investments in strategic sectors (in particular, national defense and the mass media); (3) there is a ban on foreign investments in other sectors where their presence would be considered harmless in most developed countries; and (4) there are limits on ownership share.

The FDI incentives index measures whether (1) there are special incentives to invest in certain industries or geographical areas; (2) exports are specially promoted, including through export processing zones and special economic zones; (3) there are tax concessions specific to foreign firms, excluding those designed specifically for export promotion; and (4) there are cash grants, subsidized loans, reduced rent for land use, or other nontax concessions specific to foreign firms.

For additional details on FDI restrictions and FDI incentive indices, as well as on country-specific values of the indices, see Chai and Goyal (forthcoming).

Table A10.2.1. Summary Statistics of Key Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	No. of Observations
FDI restrictions[1]					
Overall sample	1.3	1.2	—	4.0	80
ECCU	—	—	—	—	6
Small island states	0.4	0.7	—	2.0	20
FDI incentives[2]					
Overall sample	1.9	0.8	—	3.0	80
ECCU	2.0	—	2.0	2.0	6
Small island states	2.3	0.6	1.0	3.0	19
Statutory corporate income tax rate					
Overall sample	32.0	9.0	—	60.0	123
ECCU	35.0	4.0	30.0	40.0	6
Small island states	31.1	11.6	—	45.0	22
Average import tariff					
Overall sample	11.8	6.9	—	37.2	140
ECCU	16.2	2.1	14.1	19.6	6
Small island states	14.3	6.7	6.5	34.0	20
Quality of institutions					
Overall sample	1.0	5.4	–12.4	11.7	143
ECCU	3.1	0.8	2.3	4.1	6
Small island states	2.6	3.6	–6.6	8.5	22
Quality of infrastructure					
Overall sample	9.5	14.9	0.1	100.0	138
ECCU	24.2	14.5	8.1	43.4	6
Small island states	20.7	24.6	0.6	100.0	19

Source: Authors' calculations.
Note: ECCU denotes Eastern Caribbean Currency Union.
[1]A higher value indicates a more restrictive FDI policy.
[2]A higher value indicates a broader foreign direct investment incentives regime.

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VI

Trade Integration and Tourism Developments

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11

Eastern Caribbean Tourism: Developments and Outlook

RUBY RANDALL

Tourism contributes significantly to GDP, public finances, and the balance of payments in the countries of the Eastern Caribbean Currency Union (ECCU).[1] During 1995–2003, the comovement between real economic growth and the growth in stayover tourist arrivals and tourism receipts in the ECCU was 60 and 87 percent, respectively, reflecting the strength of underlying sectoral linkages.[2] In the aftermath of the September 11 terrorist attacks, tourism to the Caribbean contracted sharply, and the ECCU suffered an unprecedented decline in output (a fall of 1.5 percent) in 2001, an increase in unemployment, and a sharp deterioration in its fiscal position, with the central government deficit widening from 5½ percent of GDP in 2000 to around 7 percent in 2001.

There are several channels through which tourism affects real economic activity, public finances, and the balance of payments. The direct effect results from the provision of hotel and restaurant services, recreation and entertainment, transportation, and retail trade. The indirect effect emanates from economic activity related to suppliers' provision of inputs (including raw materials and energy) to hotels, restaurants, and other retailers. Finally, there are also second-round effects on economic activity

[1]This chapter builds on an earlier paper prepared by Samuel and Randall (2003).
[2]As measured by the correlation coefficient.

from the spending of household disposable income derived from either the direct or indirect effects.[3]

While detailed studies for all ECCU countries are not available, a study by the Caribbean Tourism Organization (CTO) on St. Lucia in 1998 provides an example of the economic contribution of tourism. According to the study, each Eastern Caribbean (EC) dollar spent on tourism in St. Lucia generated EC$0.65 in income—64 percent through the direct effect, 23 percent through the indirect effect, and 13 percent through second-round effects (Caribbean Tourism Organization, 2000). Tourists' expenditures accounted for nearly 30 percent of GDP, about 20 percent of all St. Lucian jobs, and 20 percent of total government revenue. Visitor expenditures accounted for more than 70 percent of St. Lucia's exports of goods and services, suggesting a high level of dependency of foreign exchange earnings on tourism. However, the revenue leakage through tourism-related imports of goods and services was fairly substantial, at more than double the amount of its contribution to government revenue.

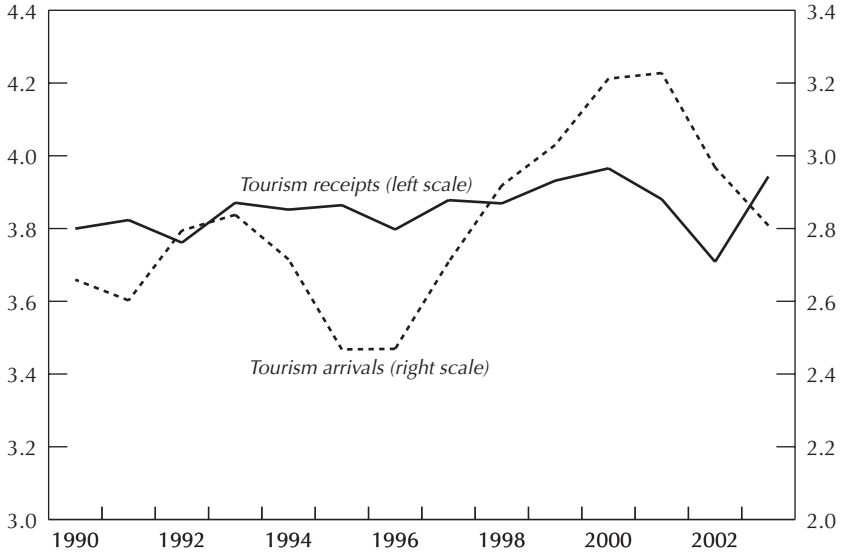
Aggregate Tourism Trends in the Caribbean

During the 1990s, there was uninterrupted growth in both Caribbean and world tourism. The Caribbean share of world tourist arrivals and tourism receipts increased during the decade, with average growth in Caribbean stayover arrivals and tourism receipts outpacing worldwide growth in both categories (Figure 11.1 and Table 11.1).

The terrorist attacks in the United States in 2001 had a pronounced deleterious effect on both world and Caribbean tourism, causing a contraction for the first time since 1990. During the first eight months of 2001, world and Caribbean stayover tourist arrivals grew by 3 and 2½ percent, respectively, relative to the same period in 2000 (Caribbean Tourism Organization, 2002a, 2002b, 2002c, 2003a). However, there was a sharp contraction of more than 10 percent and nearly 17 percent, respectively, in world and Caribbean tourism arrivals during the last four months of the year. With the decline in global stayover arrivals in 2001, the Caribbean share of world tourist arrivals declined marginally from 3 percent in 2000 to 2.9 percent (still slightly higher than the average over 1990–99), while the Caribbean's share of world tourism receipts was unchanged (at 4.2

[3]A thorough analysis of tourism's direct, indirect, and second-round effects on the ECCU region would constitute a major undertaking that is outside the scope of this study.

Figure 11.1. Caribbean Share of World Tourism
(In percent)



Sources: World Tourism Organization; and Caribbean Tourism Organization.

percent), since world tourism receipts declined more sharply than did Caribbean tourism receipts (Table 11.2).

Although world tourism rebounded in 2002, Caribbean stayover arrivals and tourism receipts did not (Table 11.2). In 2002, world stayover arrivals and receipts grew by 2.7 and 3.9 percent, respectively, while Caribbean tourism arrivals continued to contract (by 3.4 percent), although the decline in tourism receipts was less severe (by 3 percent). As a result, the Caribbean's share of world tourist arrivals fell from 2.9 to 2.7 percent over 2001–02 (a 12-year low), while the region's share of world tourism receipts fell from 4.2 to 3.9 percent (the 1998 level).

There was a sharp turnaround in Caribbean stayover arrivals (6.8 percent) in 2003, despite a slight contraction in world tourism (1.7 percent). However, the region's share of world tourism receipts continued to contract (Table 11.1). Although Caribbean stayover arrivals were nearly restored to their 2000 level, the increase in world tourism receipts outpaced that of the Caribbean, suggesting an erosion in the region's ability to retain its high-end tourism niche. Moreover, the decline in the world share of tourism receipts applied to all categories of Caribbean destinations, including the ECCU.

Table 11.1. International and Caribbean Tourism

	World		Caribbean		Caribbean World Share	
	Tourists (millions)	Percent Change	Tourists (millions)	Percent change	Share (Percent)	Percent change
Stayover tourist arrivals						
1990	457.2	7.2	12.8	6.7	2.8	–0.5
1991	464.0	1.5	13.1	2.3	2.8	0.8
1992	503.4	8.5	13.9	6.1	2.8	–2.2
1993	519.0	3.1	14.9	7.2	2.9	4.0
1994	550.5	6.1	15.7	5.4	2.9	–0.7
1995	552.3	0.3	16.2	3.1	2.9	0.4
1996	599.0	5.9	16.8	3.5	2.8	–2.3
1997	618.2	3.2	17.8	6.2	2.9	2.9
1998	636.6	3.0	18.3	2.7	2.9	–0.3
1999	652.2	2.5	19.1	4.7	2.9	2.5
2000	687.4	5.8	20.4	6.6	3.0	0.8
2001	684.0	–0.5	19.7	–3.3	2.9	–2.9
2002	702.7	2.7	19.0	–3.4	2.7	–5.9
2003	690.9	–1.7	20.3	6.8	2.9	8.6
1990–99 average	556.3	4.3	15.9	4.8	2.8	0.5
2000–03 average	691.3	1.6	19.9	1.7	2.9	0.2

	World		Caribbean		Caribbean World Share	
	Receipts (billions of U.S. dollars)	Percent change	Receipts (billions of U.S. dollars)	Percent change	Share (percent)	Percent change
Tourism receipts						
1990	267.8	21.1	9.8	12.6	3.7	–0.3
1991	277.6	3.7	10	2.0	3.6	–1.6
1992	313.6	13.0	11.9	19.0	3.8	5.3
1993	323.1	3.0	12.4	4.2	3.8	1.1
1994	352.6	9.1	13.1	5.6	3.7	–3.2
1995	403.0	14.3	14.0	6.7	3.5	–6.7
1996	437.6	8.6	15.2	8.6	3.5	0.0
1997	438.2	0.1	16.2	7.0	3.7	6.9
1998	439.4	0.3	17.2	6.0	3.9	5.7
1999	454.6	3.5	18.3	6.4	4.0	2.8
2000	476.3	4.8	19.8	8.1	4.2	3.1
2001	464.4	–2.5	19.5	–1.6	4.2	0.9
2002	482.4	3.9	18.9	–3.0	3.9	–6.7
2003	524.3	8.7	20.0	5.7	3.8	–2.7
1990–99 average	370.8	7.7	13.8	7.8	3.7	1.0
2000–03 average	486.9	3.7	19.5	2.3	4.0	–1.3

Sources: World Tourism Organization; and Caribbean Tourism Organization.

There was also a shift between 1990 and 2003 in the country origin of stayover visitors to the Caribbean, with a reduced share of visitors from the United States (Table 11.3). The share of visitors from the United States

Table 11.2. Tourist Arrivals and Receipts by Region
(Percent share of world total)

	2000		2001		2002		2003	
	Arrivals	Receipts	Arrivals	Receipts	Arrivals	Receipts	Arrivals	Receipts
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Africa	4.0	2.2	4.1	2.5	4.1	2.5	4.5	2.7
Americas	18.6	27.5	17.6	25.8	16.4	23.6	16.4	21.8
Caribbean	3.0	4.2	2.9	4.2	2.7	3.9	2.9	3.8
Eastern Caribbean Currency Union	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Asia and the Pacific	16.8	18.7	17.7	19.8	18.7	20.8	17.3	18.4
Europe	57.1	48.8	57.1	49.2	56.9	50.4	57.8	54.4
Middle East	3.5	2.8	3.5	2.7	3.9	2.7	4.2	2.7
Memorandum items:[1]								
World	687.4	476.3	684.0	464.4	702.7	482.4	690.9	524.3
Caribbean	20.4	19.8	19.7	19.5	19.0	18.9	20.3	20.0

Sources: World Tourism Organization; and Caribbean Tourism Organization.
[1]Arrivals data in millions and receipts expressed in billions of U.S. dollars.

fell from an average of 53.7 percent during 1990–99 to 50.4 percent during 2000–03, owing to increased competition, including from various U.S. destinations such as Florida and Hawaii. European tourists accounted for a growing share of Caribbean tourist arrivals, and constituted the second-largest market of origin. The European share of tourism arrivals rose from 22.5 percent during 1990–99 to 25.5 percent during 2000–03, reflecting in part the strength of the euro. The share of Canadian tourists declined initially, from 6.6 percent in 1990 through 1999, and then increased during the latter part of the period. Stayover tourists originating in other countries (including elsewhere in the Caribbean) averaged roughly 18 percent during 1990–99, and fell slightly to 17.4 percent over 2000–03 (Caribbean Tourism Organization, 2002a, 2002b, 2002c).

During 1990–2001, the members of the English-speaking Caribbean Community and Common Market (CARICOM)[4] lost world market share to newly emerging, lower-cost tourism destinations elsewhere in the Caribbean (Table 11.4). CARICOM's world market share of tourist arrivals declined from 1.03 percent in 1990 to 0.72 percent in 2003, while that of "other (non-CARICOM) Caribbean destinations" rose sharply from 0.78

[4]CARICOM is comprised of Antigua and Barbuda, The Bahamas (a member of the Community but not the Common Market), Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago. CARICOM's associate members include Anguilla, Bermuda, British Virgin Islands, Cayman Islands, and the Turks and Caicos Islands.

Table 11.3. Stayover Tourist Arrivals in the Caribbean by Main Market

		United States		Canada		Europe		Other	
Year	Total Tourist Arrivals (in millions)	Percent change	Percent share	Percent change	Percent share	Percent change	Percent share	Percent change	Percent share
1990–99 average	15.9	2.8	53.7	2.7	5.9	9.8	22.5	4.2	17.9
2000–03 average	19.9	3.1	50.4	8.1	6.7	2.1	25.5	–0.6	17.4

Sources: World Tourism Organization; and Caribbean Tourism Organization.

Table 11.4. Tourist Stayover Arrivals

	1990	1995	1999	2000	2001	2002	2003
				(In millions)			
World tourist arrivals	457.30	552.30	652.20	687.40	684.00	702.70	690.90
Of which							
English-speaking CARICOM	4.69	4.72	4.86	5.02	4.86	4.85	4.98
Of which							
ECCU	0.69	0.82	0.91	0.91	0.86	0.88	0.94
Other Caribbean countries[1]	3.57	11.69	14.26	15.37	14.85	14.19	15.35
				(In billions of U.S. dollars)			
World tourism receipts	267.80	403.00	454.60	476.30	464.40	482.40	524.30
Of which							
English-speaking CARICOM	3.45	4.04	4.86	5.16	4.89	4.98	5.31
Of which							
ECCU	0.67	0.79	0.95	0.96	0.90	0.90	0.95
Other Caribbean countries[1]	3.05	9.93	13.46	14.63	14.59	13.90	14.65
				(As a percent of world total)			
Total Caribbean arrivals	1.81	2.97	2.93	2.97	2.88	2.71	2.94
English-speaking CARICOM	1.03	0.85	0.75	0.73	0.71	0.69	0.72
ECCU	0.15	0.15	0.14	0.13	0.13	0.13	0.14
Other Caribbean countries[1]	0.78	2.12	2.19	2.24	2.17	2.02	2.22
Total Caribbean tourism receipts	2.43	3.47	4.03	4.22	4.26	3.98	3.81
English-speaking CARICOM	1.29	1.00	1.07	1.10	1.07	1.05	1.01
ECCU	0.25	0.20	0.21	0.20	0.20	0.19	0.18
Other Caribbean countries[1]	1.14	2.46	2.96	3.12	3.19	2.93	2.79

Sources: World Tourism Organization; and Caribbean Tourism Organization.

Notes: ECCU denotes Eastern Caribbean Currency Union. CARICOM denotes the Caribbean Community and Common Market.

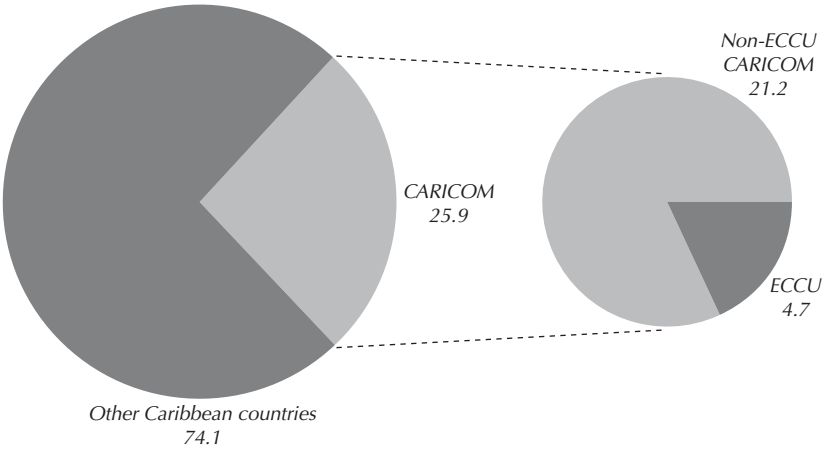
[1]Reflects the inclusion of the Dominican Republic and Puerto Rico in 1993, and Cancún and Cozumel in 1994.

percent in 1990 to 2.22 percent in 2003. Similarly, CARICOM's share of world tourism receipts declined from 1.29 percent in 1990 to 1.01 percent in 2003, while that of other Caribbean countries' rose from 1.14 percent in 1990 to 2.79 percent in 2003.

Tourism Trends in the ECCU

The ECCU represents less than 5 percent of total Caribbean stayover arrivals, while CARICOM's share is about 26 percent and "other Caribbean countries/destinations" account for the rest. During 1995–2001, average annual stayover arrivals to the ECCU ranged from a high of 250,000 in St. Lucia to just 9,900 in Montserrat. By contrast, non-ECCU CARICOM and other Caribbean destinations received an average of 3.9 million stay-

Figure 11.2. Average Percentage Share of Caribbean Tourist Arrivals, 1995–2001



Sources: World Tourism Organization; and Caribbean Tourism Organization.
Notes: CARICOM denotes Caribbean Community and Common Market; ECCU denotes Eastern Caribbean Currency Union.

over visitors (21 percent of Caribbean stayover arrivals) and 13.6 million visitors (74 percent of the Caribbean stayover arrivals), respectively, during this period (Figure 11.2). Among the various destinations included in the sample, Puerto Rico was clearly the industry leader, with an annual average of 3.2 million stayover visitors.

During 1995–2001, the ECCU and the rest of CARICOM had a much larger share of the cruise passenger tourist market in the Caribbean than the stayover market. On average, ECCU's average annual market share over the same period was 10½ percent, while non-ECCU CARICOM's share was nearly 27 percent.

ECCU and other CARICOM countries catered to the high-end of the tourism market, and as such, during 1995–2001 the ECCU's share of visitor expenditures exceeded its share of tourist arrivals. The ECCU received over 5 percent of average total receipts to the Caribbean (US$900 million), while CARICOM as a whole received nearly 27 percent (US$5.6 billion).

There was a noticeable decline in the relative shares of CARICOM vis-à-vis other Caribbean destinations in key tourism performance indicators between 1990 and 2001 (Table 11.5). In particular, the decline in CARICOM's Caribbean share of stayover arrivals, visitor expenditures,[5]

[5]Used interchangeably with tourism receipts.

Table 11.5. Selected Caribbean Market Share Indicators

Destination	1990[1]	1995	2000	2001	2002	2003	1995–97 Average	1998–2003 Average	Change from 1995–97	Change from 1998–2003
Stayover tourist arrivals										
CARICOM	31.3	27.8	24.6	24.6	25.5	24.5	27.1	25.1	–1.4	–1.3
ECCU	5.4	5.0	4.4	4.4	4.6	4.6	4.9	4.6	–0.2	–0.2
Other	68.7	72.2	75.4	75.4	74.5	75.5	72.9	74.9	1.4	1.3
Cruise passenger arrivals										
CARICOM	50.7	37.3	39.1	38.0	35.9	37.1	36.1	37.2	–2.4	1.9
ECCU	9.8	10.1	10.7	10.7	7.5	7.4	9.9	9.7	–0.1	–4.0
Other	49.3	62.7	60.9	62.0	64.1	62.9	63.9	62.8	2.4	–1.9
Estimates of visitor expenditure										
CARICOM	35.2	28.9	26.1	25.1	26.4	26.6	28.1	26.2	–1.7	0.2
ECCU	6.8	5.6	4.9	4.6	4.8	4.8	5.5	4.9	–0.3	–0.6
Other	64.8	71.1	73.9	74.9	73.6	73.4	71.9	73.8	1.7	–0.2
Rooms in tourist accomodations										
CARICOM	58.1	30.6	27.4	27.2	27.1	. . .	28.8	27.5	–1.8	. . .
ECCU	8.7	7.0	6.0	5.8	5.4	. . .	6.2	5.8	–0.9	. . .
Other	41.9	69.4	72.6	72.8	72.9	. . .	71.2	72.5	1.8	. . .

Source: Caribbean Tourism Organization.

Notes: CARICOM refers to English-speaking, traditional Caribbean Community and Common Market members, as defined in Randall (2004). The data in this table are expressed as ratios to the respective Caribbean totals.

[1]The 1990 column is only indicative, since data for key "Other Caribbean countries" (e.g., Cancún, Cozumel, the Dominican Republic, and Puerto Rico) are not available.

and rooms in tourist accommodations suggests a reduction in CARICOM's competitiveness vis-à-vis the rest of the Caribbean. Moreover, in each case, the ECCU's shares exhibited a steady decline. CARICOM's share of Caribbean (stayover) tourist arrivals declined from about 31 percent in 1990 to less than 25 percent in 2001, and ECCU's share also fell over the same period from 5.4 to 4.4 percent. Moreover, given that the average daily expenditure of stayover tourists typically surpasses that of cruise passengers, the erosion of CARICOM's stayover market share was also reflected in an erosion in CARICOM's market share of visitor expenditures, which declined from 35 percent in 1990 to 25 percent in 2001. Finally, consistent with its rapid expansion in the market share of stayover visitors, the "other Caribbean" group's market share of tourist accommodations also rose rapidly, from 42 percent in 1990 to 73 percent in 2001.

Tourist arrivals to ECCU countries increased in 2002 despite a contraction in total Caribbean tourist arrivals, although the ECCU's share of world tourist arrivals remained unchanged (Table 11.4). The decline in the Caribbean aggregate was primarily due to a general (and in some cases fairly significant) decline in arrivals to "other Caribbean countries." As a result, ECCU and CARICOM as a whole regained some lost ground vis-à-vis these other Caribbean destinations in terms of regional shares of stayover arrivals and tourism receipts in 2002 (Table 11.5). Arrivals to non-ECCU CARICOM countries also declined, but to a lesser extent.[6] ECCU arrivals increased again in 2003 and gained as a percentage of world tourist arrivals; however ECCU's share of world tourism receipts continued to decline (Table 11.4).

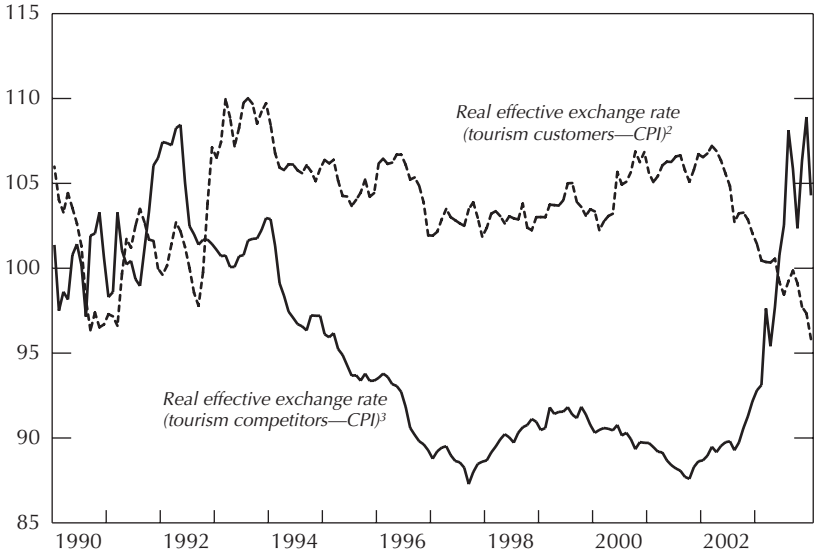
Caribbean Tourism: Trends in Competitiveness

The loss in CARICOM and ECCU market share to other Caribbean destinations during 1995–2001 can be associated with a decline in either price or nonprice competitiveness. Nonprice factors include product design, packaging, quality of service, reliability of supplies, after-sales service, distribution networks, marketing and market intelligence, and air access.

Movements in customer-based and competitor-based real effective exchange rates (REER) are key indicators of the ECCU region's price competitiveness—reflecting demand and supply-side factors, respectively

[6]For additional data on Caribbean tourism since 1990, see Randall (2004).

Figure 11.3. Eastern Caribbean Currency Union (ECCU): Real Effective Exchange Rates[1]
(1990 = 100)



Sources: IMF, International Financial Statistics database; and author's calculations.
Note: CPI denotes consumer price index.
[1]For real effective exchange rate indices. An increase (decrease) indicates an appreciation (depreciation). Excludes Anguilla and Montserrat in calculation of the ECCU average.
[2]Weighted average of consumer price index in a common currency. Customers: Antigua (Canada, U.K., U.S.); Dominica (France, U.K., U.S.); Grenada (Trinidad and Tobago, U.K., U.S.); St Kitts and Nevis (Canada, U.K., U.S.); St. Lucia (Canada, U.K., U.S.); St. Vincent and the Grenadines - (Trinidad and Tobago, U.K., U.S.). Weights are based on proportion of tourists arriving from each country in 2001.
[3]Weighted average of consumer price index in a common currency. Competitors: The Bahamas (23.4 percent), Barbados (8 percent), Dominican Republic (43.5 percent), Jamaica (19.4 percent), Trinidad and Tobago (5.7 percent). Weights are based on the share of tourism arrivals to the Caribbean in 2000.

(Figure 11.3).[7] The competitor-based REER index helps explain the loss of market shares since the late 1990s. It shows a sharp improvement in the ECCU's competitive position vis-à-vis other Caribbean competitors

[7]The customer-based REER uses the weighted average of the consumer price indexes of the ECCU countries. Customers are the top three originating markets for each country, and weights are based on the proportion of tourists arriving from each country in 2001. The competitor-based REER is a similar concept, where weights are the shares of tourist arrivals in the competitor Caribbean countries in 2000.

through much of 1997, followed by an appreciation that became quite pronounced from the second half of 2002 onward. On the other hand, the customer-based REER is not useful in explaining the declining share of ECCU in world tourism since the latter half of the 1990s.

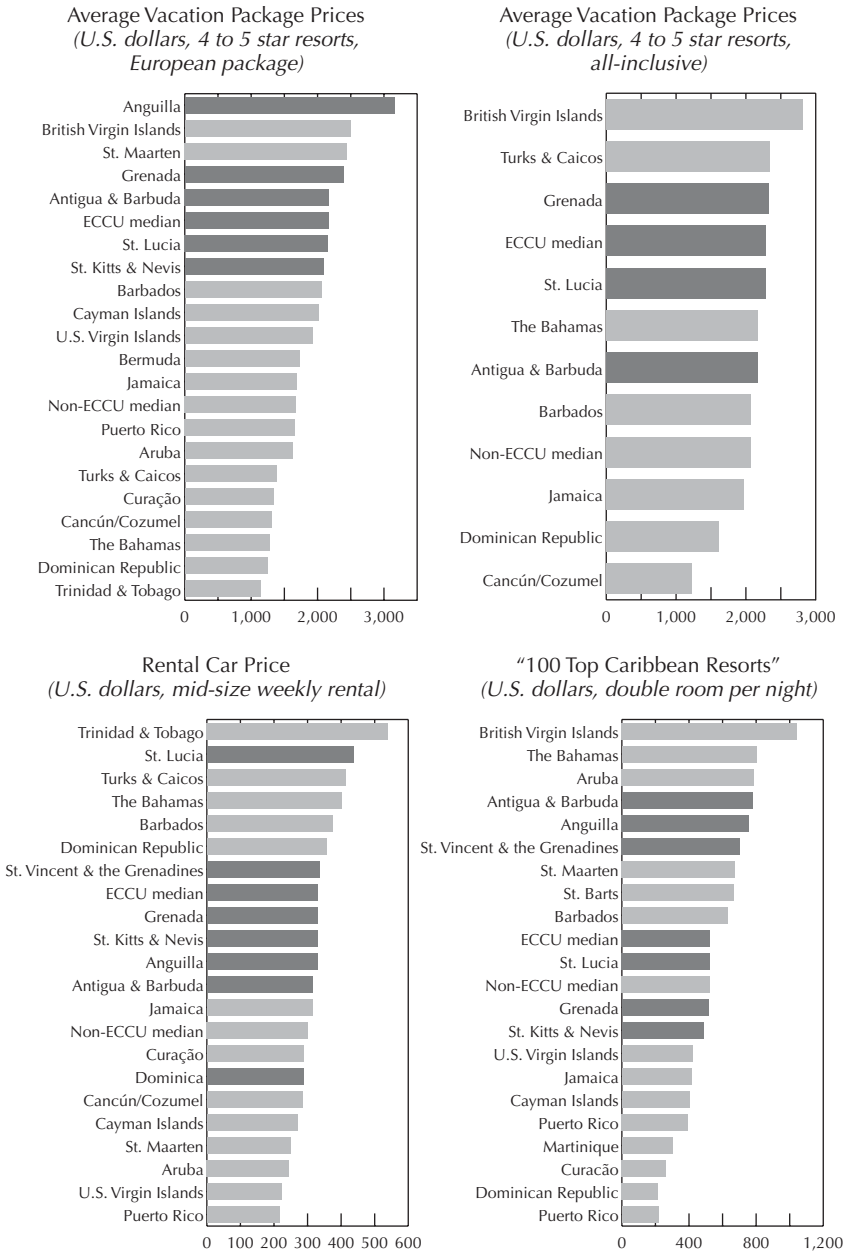
Since the customer-based REER does not account for it, the underperformance of the ECCU from 1995–99 suggests the possible dominance of nonprice factors or the rigidity of tourism-related products priced in U.S. dollars. In fact, the depreciation of the Eastern Caribbean dollar vis-à-vis its competitors did not translate into a decline in several key factors such as the cost of vacation packages, car rental prices, or long distance telecommunication charges. The role of industry-specific price and nonprice factors is further explored in the sections that follow.

Industry-Specific Price Competitiveness: Demand-Side Factors

The ECCU and other CARICOM destinations are characterized by higher tourism-related prices, reflecting their appeal to the high end of the tourism market.[8] Figure 11.4 provides a comparison of various competitiveness indicators for different Caribbean destinations (using 2003 data). These include average European vacation package prices for four- and five-star resorts (panel 1); average all-inclusive vacation package prices for four- and five-star resorts (panel 2); mid-size car weekly rentals (panel 3); and nightly hotel room rates at the top Caribbean resorts (panel 4). The data confirm that, for these indicators, prices in ECCU countries tend to be among the highest in the Caribbean. For instance, six of eight of the costliest European vacation packages were found in ECCU countries, and the most costly European vacation packages were found in Anguilla (also an ECCU member state). The ECCU median price for European vacation packages was US$2,170, while the non-ECCU median was US$1,623. In addition, ECCU member states accounted for four of the seven costliest all-inclusive four- and five-star resorts; the ECCU median price was US$2,282, while the non-ECCU median was US$2,069. Similar conclusions can also be reached regarding the ECCU and non-ECCU weekly rental prices of mid-size cars (a median of US$330 versus US$302) and for nightly hotel rates at the top Caribbean resorts (a median of US$615 versus US$525).

[8]Earlier studies have shown that the ECCU sub-region generally has higher hotel rates than elsewhere in Caribbean region (Blanchard, 2002).

Figure 11.4. Tourism Competitiveness Indicators in the Caribbean, 2003



Sources: Showker (2003). Data gathered by Abdul Abiad.
Note: ECCU denotes Eastern Caribbean Currency Union.

Table 11.6. Rank Correlation Coefficients Between Tourism Demand and Price Factors[1]

	Vacation Package (European package)	Telephone Calls (3 minutes to U.S.)	Cruise Passenger Tax
Demand-side factors:			
Average stayover arrivals, 1995–2001	–0.46**	–0.82***	
Number of observations	19	16	
Average cruise passenger arrivals, 1995–2001			0.83***
Number of observations			9

Sources: Caribbean Tourism Organization; Showker (2003); World Bank, World Development Indicators and Telecoms and Electricity databases; and national authorities.

[1]Denotes a significant relationship between bivariate pairs at * for the 10 percent level; ** for the 5 percent level; and *** for the 1 percent level (Zar, 1972).

Despite the appeal of the ECCU and CARICOM to the high end of the tourism market, there is evidence suggesting that tourists responded favorably to lower prices.[9] Table 11.6 explores the relationship between tourism demand and prices of European vacation packages, hotel taxes, and the cost of a three-minute international call using Spearman's rank correlation coefficient.[10] Table 11.7 provides a summary of average ranks of each of the significant paired variables discussed in this and subsequent sections discussing supply-side factors and nonprice factors.[11] The fact that the rank correlation coefficient between average stayover arrivals and average European vacation package prices at four- and five-star resorts was negative and statistically significant means that lower stayover arrivals tend to be associated with higher vacation package prices (Table

[9]This suggests that there is a limit to which prices of one differentiated product can exceed another (Lancaster, 1971).

[10]If data are presented in the form of ranks rather than actual values, then the technique of rank correlation can be used. Unlike standard correlation measures (such as Pearson's measure), rank correlations can be used when the underlying distribution of the actual data are unknown or are non-normal. Spearman's coefficient of rank correlation (r_s) is defined as follows:

$$r_s = 1 - \frac{6\sum d^2}{n(n^2 - 1)},$$

where d = the difference in ranks between two variables; n = the sample size; and $-1 \leq r_s \leq 1$. To test the statistical significance of any relationship, a hypothesis test can be performed on ρ_s, the corresponding population parameter: H_0: $\rho_s = 0$ and H_1: $\rho_s > 0$.

[11]The data were ranked in descending order, so the lowest average rank corresponds to the highest average price or value.

Table 11.7. Summary of Average Ranks of Paired Variables for Significant Spearman Correlations[1]
(Rank correlations)

Average	Average Rank		Rank
Demand-side factors: Tourism-specific price factors			
Vacation package (European package)		Average stayover arrivals, 1995–2001	
CARICOM	11.2	CARICOM	8.4
ECCU	8.9	ECCU	11.4
Other	12.8	Other	3.3
Telephone calls (3 minutes to U.S.)		Tourist stayover arrivals (thousands)	
CARICOM	6.5	CARICOM	10.4
ECCU	4.0	ECCU	12.7
Other	14.5	Other	2.8
Supply-side factors: Tourism-specific price factors			
Electricity (U.S.dollars/kWh)		Rooms in tourist accommodations	
CARICOM	5.8	CARICOM	8.5
ECCU	4.2	ECCU	9.2
Other	11.0	Other	2.0
Telephone subscription		Rooms in tourist accommodations	
CARICOM	8.3	CARICOM	9.4
ECCU	10.3	ECCU	7.7
Other	10.8	Other	8.0
Nonprice factors as a percentage of GDP			
2001 tourism budget[2,3]		Average stayover arrivals, 1995–2001	
CARICOM	9.8	CARICOM	10.9
ECCU	7.9	ECCU	13.9
Other	8.6	Other	4.5
Average cruise passenger arrivals (thousands), 1995–2001		Average stayover arrivals, 1995–2001	
CARICOM	15.0	CARICOM	15.4
ECCU	17.0	ECCU	20.3
Other	11.4	Other	11.1
Distance from Miami (miles)		Average stayover arrivals, 1995–2001	
CARICOM	10.8	CARICOM	20.5
ECCU	9.6	ECCU	24.4
Other	18.6	Other	14.2
Number of flights from the U.S. in 2003		Average stayover arrivals, 1995–2001	
CARICOM	19.0	CARICOM	20.5
ECCU	22.1	ECCU	24.4
Other	14.6	Other	14.2
Number of flights from Miami in 2003		Average stayover arrivals, 1995–2001	
CARICOM	19.3	CARICOM	20.5
ECCU	23.7	ECCU	24.4
Other	14.7	Other	14.2

Sources: As cited in Tables 11.6 and 11.8.

Notes: ECCU denotes the Eastern Caribbean Currency Union. CARICOM denotes the Caribbean Community and Common Market.

[1]Each row represents a ranked pair. The number of bivariate pairs differ based on data availability. A low rank indicates a higher underlying value since the data are sorted in a descending order.

[2]This rank correlation coefficient was positive as expected, but not statistically significant.

[3]This is a proxy for adequate marketing/advertising.

Table 11.8. Rank Correlation Coefficients Between Supply Conditions and Production Costs[1]

	Electricity Cost	Telephone Subscription
Supply-side factors:		
Rooms in tourist accommodations	–0.64**	–0.86***
Number of observations	13	17

Sources: Caribbean Tourism Organization; World Bank Electricity and Telecommunications database; and national authorities.

[1]Denotes a significant relationship between bivariate pairs at * for the 10 percent level; ** for the 5 percent level; and*** for the 1 percent level (Zar, 1972).

11.6). The underlying data, summarized in Table 11.7, confirm that during 1995–2001, ECCU countries had higher average European vacation prices and lower average stayover arrivals, while "other Caribbean destinations" had lower average European vacation package prices and a higher average number of stayover arrivals.

There was also evidence of demand sensitivity to telecommunication costs (Table 11.6). The rank correlation between calls to the United States (a proxy for the cost of international calls for tourists) and average stayover arrivals was negative and highly significant (at the 1 percent level). Table 11.7 confirms that the average cost of three-minute telephone calls to the United States was higher in ECCU countries and lower in other Caribbean countries, while average stayover arrivals were higher in other Caribbean countries and lower in ECCU countries.[12]

Industry-Specific Price Competitiveness: Supply-Side Factors

In CARICOM, there was a statistically significant negative relationship between hotel accommodations and both electricity and nonresidential telephone subscription costs, indicating a negative association between operating costs and tourist arrivals (Table 11.8). Table 11.7 confirms that electricity unit costs were higher in the ECCU, which in turn had a lower average number of rooms in tourist accommodation. By contrast, average

[12]The relationship between average stayover arrivals and hotel taxes was examined, but it was not statistically significant, suggesting that relatively affluent tourists may be indifferent to relatively small variations in hotel taxes across the different islands (Table 11.6). A perverse statistically significant relationship was found between cruise passenger taxes and cruise passenger arrivals. This relationship could be spurious (particularly since there were only nine observations, comprised mostly of ECCU countries) or could be suggestive of visitor indifference to relatively small fixed travel costs.

electricity unit costs were lower in "other Caribbean countries," which in turn had a higher average number of rooms in accommodations. In addition, monthly nonresidential telephone subscription costs were higher in CARICOM as a whole, while average accommodations were lower.[13]

Nonprice Competitiveness

The evidence pointing to a deterioration in the nonprice competitiveness of ECCU and the rest of CARICOM vis-à-vis other Caribbean countries is mostly circumstantial, as these data are more difficult to obtain. For instance, after 30 years of operation, significant investment (mainly foreign direct investment) is most likely needed to refurbish old hotels, build new ones and rejuvenate the industry. In addition, there are concerns that the quality of service in hotels, restaurants, and other attractions has not kept pace with market trends.[14] There is also the perception that the ECCU lags behind the rest of the world in technological advances to address the needs of customers, such as access to automated checkouts, internet access, and state-of-the-art websites for information and reservations.

The ECCU and CARICOM also have fallen behind in expenditure on advertising to improve their visibility in the market place. Moreover, in the immediate aftermath of the events of September 11, worsening fiscal positions constrained spending on advertising.

Traditionally, hotels have spent more on marketing than have public tourism organizations, but public promotion in the form of "destination advertising" is crucial in maintaining the industry's visibility in the marketplace.[15] Table 11.7 confirms that CARICOM as a group had a lower average ratio of tourism budgets to GDP. For instance, on average, ECCU countries were reported to have spent around US$14 per stayover visitor on promotions in 2001, compared with US$36 spent by the Cayman Islands. However, the rank correlation coefficient of average tourist arrivals and the ratio of tourism budgets was positive yet not statistically significant (Table 11.9).

[13]Other supply-side factors—such as wage rates and water costs—were not found to have a statistically significant association with tourist arrivals. In the case of the wage bill, the data set was too small to obtain meaningful results.

[14]It was not possible to formalize this analysis, however, owing to a dearth of comparative information on foreign direct investment across the set of tourism destinations included here.

[15]This type of advertising is an externality, as it would not be optimally provided by the private sector.

Table 11.9. Rank Correlation Coefficients Between Nonprice Factors and Tourist Arrivals[1]

	2001 Tourism Budget	Distance from Miami (miles)	Number of Flights from the U.S. in 2003	Number of Flights from Miami in 2003
Nonprice factors:				
Average stayover arrivals, 1995–2001	0.03	–0.47***	0.72***	0.62***
Number of observations	18	31	31	31

Source: Caribbean Tourism Organization (http://www.indo.com/distance/index.html).

[1]Denotes a significant relationship between bivariate pairs at * for the 10 percent level; ** for the 5 percent level; and *** for the 1 percent level (Zar, 1972).

Air access and distance from major customer countries appear to be important bottlenecks in expanding tourism in the region. Limits on air access are particularly acute during the high season, and have been aggravated by recent route cutting by major airlines. Regarding distance, Table 11.7 shows that on average, ECCU countries are furthest from Miami and also received fewer stayover visitors and had fewer flight arrivals from Miami and from the United States as a whole in 2003.[16] Table 11.9 confirms a highly significant negative rank correlation between distance from the United States and average stayover arrivals, and a highly significant positive rank correlation between average stayover arrivals and the number of flights from the United States and Miami.

The September 11 attacks prompted the adoption by Caribbean countries of a host of emergency remedial measures in the short term designed to mitigate the depressive effect of the shock. However, the shock also helped to foster a growing awareness of an underlying erosion in the ECCU's competitiveness, and of the need to adopt a medium-term response to restructure the industry to better ensure its long-term survivability The region's medium-term strategic response is summarized in Box 11.1.

The short-term strategic response to the events of September 11, 2001 included the following:

- Subsidies to the tourism industry in the form of tax waivers and incentives, subsidized credit to refurbish hotels, and subsidies to regional airlines so as to maintain air access to the region;
- Upgrading security at airports and ports to reassure travelers, with technical assistance and a US$21 million loan from the World Bank extended to five ECCU countries; and

[16]Tourism organizations often guarantee a percentage of the seats on major airlines and charters so as to ensure the continuity of service.

- Offers of deep discounts by hotels and airlines (as much as 30 to 50 percent), cost reductions by private sector firms to streamline their operations, including layoffs, and cost-cutting measures by airlines such as reducing the number of routes, flying smaller aircraft, and limiting the quality of in-flight food service.

The CTO also launched a US$16 million joint public/private sector promotional television campaign to market the region. The program was to be funded by the governments and private sector tourism interests in all of the CTO member countries, and markets the whole region as a destination, providing an umbrella under which national marketing programs could be developed. The share of the budget for each country is based on the number of hotel rooms. A number of high-profile destinations including Cancun, Cozumel, Dominican Republic, Puerto Rico, and the Cayman Islands have since pulled out, citing the need to use scarce promotional resources more effectively. The remaining countries continue to be committed to the campaign, however, with some borrowing from the Caribbean Development Bank (CDB) to finance their share of the budget.

Many of these promotions adversely affected the fiscal situation of the ECCU and CARICOM countries, either through direct expenditure or through reduced tax revenues from lower hotel receipts. Nevertheless, this was seen as unavoidable under then-prevailing conditions. However, in light of the deteriorating fiscal stance of the ECCU, individual governments may need to reexamine the cost effectiveness of such policies.

Policy Implications and Conclusions

Tourism is an important source of income and foreign exchange earnings, employment, and government revenue in the ECCU. During the period under review, the ECCU countries experienced a modest erosion in their price and nonprice competitiveness in comparison with other Caribbean countries. CARICOM's loss of tourism shares to "other Caribbean" markets is partly attributable to the recent appreciation of the competitor-based REER and to tourism-specific price and nonprice factors, including low quality of service. Ensuring the long-term survival of the industry will require implementing measures to enhance price and nonprice competitiveness and reduce U.S. dollar price rigidity in the tourism industry.

Regarding industry-specific supply-side factors, electricity and telecommunications rates appear to be quite high in CARICOM. This suggests the need for ECCU and other CARICOM countries to try to pursue common regional arrangements to regulate utilities and reduce market prices. Thus,

Box 11.1. Proposed Medium-Term Strategic Response by the Caribbean to 9/11

A Regional Tourism Strategic Plan formulated through the auspices of the Caribbean Tourism Organization (CTO) in the aftermath of the terrorist attacks of September 11, 2001 aims to achieve the following objectives by 2012:

- Grow visitor arrivals, increase tourism's economic impact, and achieve a more equitable distribution of its benefits;
- Create a product that is sustainable, competitive, and profitable;
- Modernize the industry to face a rapidly changing global environment;
- Fund tourism development on a sustainable basis; and
- Achieve synergies and economies of scale through greater cooperation.

To achieve these objectives, the medium-term strategic plan aims to:

- Promote regional marketing financed by establishing a Sustainable Tourism Development Fund via a mandatory US$5 tax on air and sea visitors.
- Further develop cruise tourism by bringing land-based and cruise entities together to create joint programs, and by adopting measures to increase the sourcing of supplies for the cruise sector from within the Caribbean.
- Promote better air access for travellers by negotiating air services agreements on a regional basis, providing incentives to improve functional cooperation among regional carriers, supporting the development of strategically placed hubs to improve air transportation efficiency, providing marketing support to external and regional carriers, establishing a regional aviation oversight authority, and commercializing the operations of airport authorities.
- Enhance competitiveness and productivity by researching the impact of taxes on tourism development, adopting strategic measures to accelerate the flow of investment into the sector, investigating the feasibility of a Caribbean Tourism Investment Fund and a Credit Guarantee Scheme, encouraging private sector investment in infrastructural improvements, improving access for small hotels to both equity and loan capital, and providing 100 percent loan guarantees for prestige developments.

the establishment of regional regulatory frameworks would help to enhance the productive efficiency and cost competitiveness of tourism enterprises.

There is an ongoing need to attract additional foreign direct investment to the region in order to refurbish old hotels and construct new ones. This calls for reducing the cost of doing business within ECCU. As this chapter has shown, high operating costs have deterred investment in new facilities. However, in addition to investment in physical capital, there is also a need for investment in human capital, especially in the hotel and hospitality industries, with a view to enhancing ECCU's nonprice competitiveness.

- Safeguard the environment and safety and security by publishing guidelines for the development of sustainable tourism, legislating Environmental Impact Analyses as preconditions to new tourism development, requiring concessions for capital investments that impact on water and energy consumption, providing lines of credit to help small businesses invest in environmental improvements, creating Tourism Police Task Forces, and outlawing all solicitation on beaches.
- Promote community tourism by providing concessions and establishing a revolving microcredit line for community-based projects, developing a national strategy to strengthen linkages, treating designated suppliers to the tourism sector as exporters, and helping develop and market the region's cultural products as part of economic development.
- Promote human resource development by developing a quality assurance framework for use within hospitality institutions, introducing tourism education at all levels of the formal education system, providing tertiary institutions with resources to develop world-class tourism education, reviewing the role of regional and national tourism operations and modernizing their systems and equipping them with the skills needed to manage a modern tourism industry, and legislating to achieve freedom of movement of skills and labor across the region.
- Foster information and technology by supporting the further development of regional and national internet sites, improving the timeliness and coverage of existing tourism information systems, implementing tourism satellite account systems, establishing a Regional Hotel Performance Monitoring System, and developing tourism research capability and programs by the CTO and tertiary institutions.

Source: Caribbean Tourism Organization (2002c).

Further intensification of efforts is needed to stem the decline in air access. This will necessitate better monitoring of air access to the region. In this regard, a user-friendly database could be developed that provides current and timely information on available flights to different Caribbean destinations.

The persistent decline in the Caribbean share of world tourism receipts, despite the recent recovery in the region's world market share of tourism arrivals, points to an erosion in the region's ability to preserve its high-end tourism niche. This suggests the need to intensify efforts to increase the value added by tourism through product development and diversification,

and the forging of better forward and backward linkages with tourism. The potential for expanding tourism and tourism services in the ECCU remains vast. For instance, there is scope for further development of niches, merchandise, and product services related to the yachting market, ecotourism, the honeymoon market, sports tourism, and location filming of TV episodes and movies. The region might also want to capitalize on several other positive factors, including the perception of the Caribbean as a relatively safe and stable region, the relatively weak U.S. dollar versus the euro, Canadian dollar and British pound, and recent improvements in economic conditions in major markets, especially the United States.

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12

Integration and Growth in the Eastern Caribbean

MONTFORT MLACHILA, WENDELL SAMUEL, AND PATRICK NJOROGE

This chapter explores the extent and effects of regional and international integration of the Eastern Caribbean Currency Union (ECCU) countries.[1] It reviews their basic integration strategy, achievements, and shortcomings. It focuses on various aspects of integration to show how, despite being fairly open economies, the ECCU countries are not fully integrated into the global economy. The chapter then explores empirically the contribution of integration to growth in the ECCU.

ECCU countries have developed behind a wall of high protection, combined with significant product and factor market rigidities. While this helped increase intraregional trade to a limited extent, real income growth has significantly slowed over the past six years. The ECCU countries have developed uncompetitive production structures, and real wages have tended to increase more than productivity growth. The chapter draws on various aspects of the literature—with particular emphasis on factor market integration—to address one of the major policy challenges facing ECCU countries. The chapter takes a broad view of integration to encompass many aspects of liberalization of trade in goods and ser-

[1]Unless otherwise specified, the ECCU countries referred to in this chapter are those that also are members of the International Monetary Fund: Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines.

vices and of factor markets through regional and multilateral integration arrangements.

Integration and Growth Literature

Traditional Approach

There is general agreement among mainstream economists that international trade promotes growth and development. The general consensus can be characterized as follows. International trade leads to higher growth by reallocating scarce resources to those sectors in which a country has a comparative advantage, thereby increasing output and income levels through gains from specialization. Measures to improve trade, such as integration at the regional and international level, can, therefore, be expected to raise growth rates.

According to Haveman, Lei, and Netz (2002), there are three channels to increase growth through integration and trade. First, integration increases communication, thereby facilitating the transmission of technology. Second, integration leads to an increase in the size of the market, thus increasing gains from economies of scale. Finally, greater competition promotes research and development. Moreover, knowledge spillovers, which reduce duplication of research and development, are an increasing function of the volume of trade between countries.

Among others, Sachs and Warner (1995) document that trade and integration are major determinants of growth in poor countries. Using cross-country indicators of trade openness for more than 100 developed and developing countries over a long period of time (about 40 years), and controlling for other policy variables, they show that the lack of economic convergence in income levels in most developing countries is explained by a closed trade regime. They also show that open economies are usually successful in avoiding balance of payments crises.

Recent Developments and Critique of the Traditional Approach

Much of the debate in recent years has been over whether the mere presence of trade, absent other factors, is a key ingredient in promoting growth. Recent literature (Frankel and Romer, 1999; Dollar and Kraay, 2004) focuses on problems related to the potential endogeneity of trade and integration with other growth-raising reforms. This literature notes that countries with liberal trade policies are likely to be those with other

growth-inducing policies, such as those that promote physical and capital accumulation, as well as technological change. To counter critiques of the traditional approach, these authors have attempted to use instrumental variables techniques to test whether or not trade by itself leads to higher growth.

The research on liberalization of trade in services has generally been less successful in demonstrating the potential benefits of liberalization on growth. In a review of the literature, Whalley (2003) concludes that the studies are confusing and sometimes contradictory, and often fraught with serious methodological problems. Trade in services is typically subject to greater barriers than trade in goods, including rights of establishment, rules of conduct, and competition rules. Whalley concludes that studies that typically find a strong impact on income and welfare suffer from biases resulting from misspecification of models. Models that assume no accompanying liberalization of factor markets typically find a weak impact on income and welfare. On the other hand, if liberalization of services extends to removing impediments to factor flows, especially foreign direct investment (FDI), then gains are usually large, but also uneven across countries.

In a fundamental critique of the trade and growth literature, Rodrik, Subramanian, and Trebbi (2004) argue that it is erroneous to give the "integration view" a central role in fostering economic convergence between poor and rich countries. They argue that this approach focuses on superficial determinants of growth. In their view, it is necessary to answer the question of why some societies manage to accumulate and innovate more rapidly than others. They organize their approach by looking at what they consider to be "deeper" determinants of growth, citing three key ingredients (using various measures): geography, integration, and institutions. In contrast to most of the prevailing literature, they find that the quality of institutions trumps everything else. They show that once institutions are controlled for, integration has no direct effect on incomes, while geography has at best weak direct effects. Their measure of institutional quality—property rights and the rule of law—is statistically significant, and their results are very robust to various statistical tests, including endogeneity between institutions and integration.[2]

[2]Their approach is to use instrumental variables developed by Frankel and Romer (1999) and Acemoglu, Johnson, and Robinson (2001).

Application to the ECCU

By promoting transparency and nondiscriminatory practices, regional integration can promote good institutions. Although Rodrik, Subramanian, and Trebbi (2004) are quick to point out that their study does not offer clear policy implications, it can be argued that effective local and regional institutions foster regional integration and growth. What does the literature tell us about the merits of pursuing regional integration as a way to promote trade, investment and growth, and institution building? Does regional integration indeed lead to more trade in general? What about the evidence for the Caribbean Community and Common Market (CARICOM) and the ECCU?

From a theoretical perspective, the economic effects of integration in the form of a trading bloc are, in fact, ambiguous, and can lead to trade diversion. Gunning (2002) shows that in a South-South trading bloc, poorer members will typically suffer from the loss of revenue, and may well see a shift in the concentration of production into the wealthier and more industrialized members. Wealthier members benefit from protection from imports from the rest of the world through a common external tariff. A simple diagrammatic presentation from Gunning (2002) illustrates this point (Appendix 12.1).

Regional trading arrangements (RTAs) may well be the best way forward in as far as liberalization of services is concerned, according to Stephenson (2002). This has less to do with the intrinsic merits of RTAs, and more to do with the weaknesses of the General Agreement on Trade in Services (GATS). Stephenson shows that RTAs in services, including those of CARICOM, have surpassed those of the GATS in terms of promoting transparency and stability of agreements. While the GATS has a positive list approach for services to be liberalized, RTAs typically assume that all services will be liberalized with some exceptions (negative list). RTAs also usually have an explicit clause precluding the introduction of any new restrictions on services trade. Stephenson concludes that although in general the optimum level of liberalization is at the multilateral level in order to attract and accommodate investment from the most efficient service operators, the regional level may well be the most appropriate and realistic, given the practical limitations.

Most South-South RTAs have been found empirically to promote trade. Using a gravity model, Cernat (2003) shows empirically that RTAs are generally trade creating, with little trade diversion. For CARICOM, Egoumé-Bossogo and Mendis (2002)—using the gravity model framework for 1980–99—find that CARICOM promoted intra-CARICOM trade as well as trade with the rest of the world. In other words, they find little evi-

dence of trade diversion within CARICOM. In a recent study on Vietnam, Tumbarello (2006) finds that RTAs in the Asia and Pacific region have indeed promoted trade among their members, and that this effect has been particularly strong for Vietnam, where little trade diversion has been observed.

ECCU Experience with Regional Integration and Growth

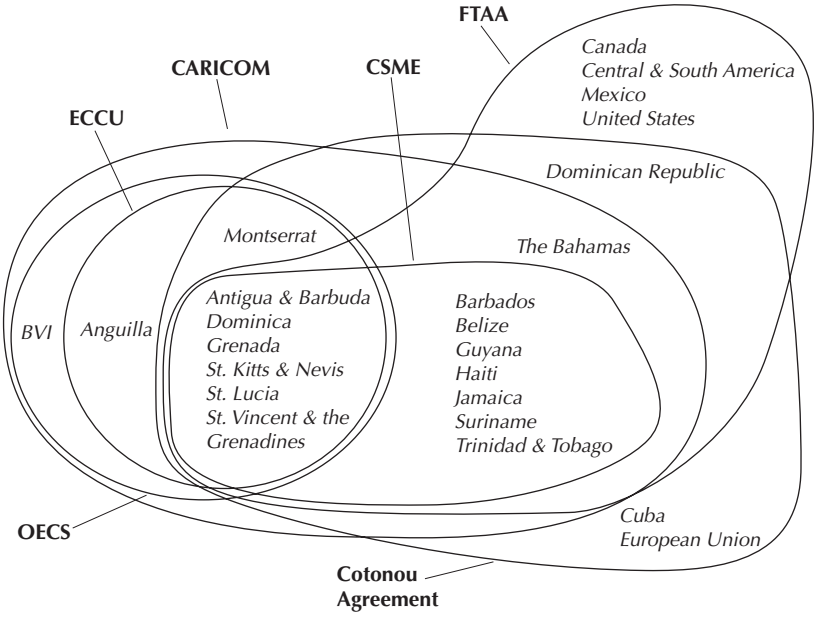
Objectives in the Caribbean

Regional integration in CARICOM was initially viewed as a way to facilitate import substitution and industrialization at the regional level after national opportunities were exhausted. Since the size of individual domestic markets was a major constraint to production (Demas, 1965, 1974), early efforts focused on market integration—removing impediments to regional trade of manufactured and agricultural goods and widening the protected domestic market. The initially-high common external tariff (70 percent) was a deliberate effort to divert trade from third countries, since none of the CARICOM countries would have been the least-cost producer of manufactured goods. The high tariffs were expected to have a secondary effect of encouraging FDI flows, as firms from third countries would establish branches behind the tariff walls to try to retain their markets. A second objective of regional integration was to exploit complementarities in the resources of the region through the integration of production (Brewster and Thomas, 1973; Blake, 1984).

Joint trade negotiations aimed to increase bargaining power and therefore raise the terms of trade, while at the same time CARICOM pursued the provision of common services to benefit from scale economies (Demas, 1974). Andriamananjara and Schiff (1998), using theoretical analysis of bargaining power and high fixed costs of negotiating, have argued that CARICOM has been exceptionally successful in enhancing its bargaining power beyond its size and economic importance by concluding agreements such as the Lomé Convention, Caribbean Basin Initiative, and the Caribbean-Canada Trade Agreement (CARIBCAN). The Lomé Convention and the successor Cotonou Agreement conferred higher export prices for Caribbean products. Similarly, high fixed costs of production have been used to justify the provision of common social services like tertiary education and some health services in CARICOM.

The ECCU countries participate in a series of concentric integration initiatives that cover a variety of areas (Box 12.1 and Figure 12.1).

Figure 12.1. Regional Integration Groupings in the Caribbean



Notes: BVI denotes British Virgin Islands; CARICOM denotes Caribbean Community and Common Market; CSME denotes Caribbean Single Market and Economy; ECCU denotes Eastern Caribbean Currency Union; FTAA denotes Free Trade Area of the Americas; OECS denotes Organization of Eastern Caribbean States.

Amid the plethora of integration initiatives there are two distinct broad processes. The first involves the smaller group of Caribbean Leeward and Windward Islands (the ECCU countries) that have formed the Organization of Eastern Caribbean States (OECS),[3] while the second covers the wider Caribbean region in the form of CARICOM. A description of the features and previous achievements of these regional integration

[3]The members of the ECCU are also engaged in external trade negotiations at the multilateral level (Doha Agenda), interregional level (Economic Partnership Agreement with the European Union), and hemispheric level (Free Trade Area of the Americas). This broader integration agenda is being approached by the countries of the ECCU and CARICOM using a coordination strategy. The OECS members coordinate their joint negotiating position through the OECS Secretariat. In turn, the OECS Secretariat, through the Caribbean Regional Negotiating Machinery (RNM), coordinates these views with those of other CARICOM members, thereby yielding a common position that is presented at trade negotiations by the RNM on behalf of all CARICOM members.

initiatives can be found in the study by Njoroge (2003). Consequently, this section focuses on the recent achievements and agenda of both the OECS and CARICOM.

The Organization of Eastern Caribbean States

The OECS was established by the Treaty of Basseterre signed in June 1981 by seven of the region's governments: Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. Since then, the British Virgin Islands and Anguilla have both been admitted to the OECS as associate members.[4]

The overarching objective of the OECS is the creation of an economic union of its member states. Pursuing an economic union was first agreed to by the OECS Authority in July 2001.

At the January–February 2002 meeting of the OECS Authority, the heads of government agreed on, among others, the following measures for member states:

- Legislative arrangements to facilitate the free movement of OECS nationals should come into effect not later than March 12, 2002.
- Amending of the National Immigration Acts to allow OECS nationals to travel freely within the subregion and remain in another territory for a period of six months.
- Not applying the Alien Landholding Licenses to OECS nationals in Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines; while the licenses remain in the other member states, measures would be contemplated to exempt OECS nationals from payment of the license fees.
- In addition to regular passports and travel permits, accepting photo identification cards, including a driver's license and national identification card, at ports of entry.
- Introduction of a common passport for OECS nationals by January 2003. Persons granted economic citizenship would not be issued an OECS passport.

At its October 2002 meeting, the OECS Authority reiterated its commitment to creating the OECS Economic Union and agreed to appoint a committee that would review the Treaty of Basseterre and recommend

[4]Thus, the OECS comprises the eight member countries and territories of the ECCU and the British Virgin Islands, which was admitted in 1984. Anguilla was admitted in 1995. Unlike a full member, an associate member's rights and obligations do not extend to all aspects of the treaty. This is specified when the associate member is admitted.

Box 12.1. Preferential Trade Arrangements in which ECCU Countries Participate

The countries of the Eastern Caribbean Currency Union (ECCU) participate in a series of concentric and sometimes overlapping trading arrangements that accord them varying degrees of trade preferences (Figure 12.1). These agreements coexist with the negotiations under the World Trade Organization (WTO) for multilateral trade liberalization. The following is a brief description of the major preferential trading agreements of the ECCU countries.

The Organization of Eastern Caribbean States (OECS) is the tightest integration grouping of the ECCU. Created in 1981, it includes all eight members of the ECCU and the British Virgin Islands. The major goals are to promote economic integration, manage a common currency via the Eastern Caribbean Central Bank, set up a common judicial system via a joint supreme court, coordinate civil aviation activities and telecommunication services, and maintain joint overseas missions. Discussions are under way to create an economic union by 2006 with free movement of labor.

The Caribbean Community and Common Market (CARICOM), established in 1973, originally included only English-speaking Caribbean countries, but was recently expanded to include Suriname and Haiti. It is essentially a common market for goods and capital, but without free movement of labor. It also provides a framework for common services in education, health, meteorology, and foreign policy. Goods originating within the region are generally traded duty free (there are only a few exceptions). Although a common external tariff was established in 1975 with a maximum rate of 70 percent, it has not been fully harmonized because of delays in implementation. In 1993, the countries agreed on a three-year program to reduce the common tariff to the range of 0 to 20 percent, but to date some members have not fully complied. The integration process is marred by slow implementation of decisions, because countries have been reluctant to surrender some amount of sovereignty to a regional body (Girvan, 2004).

how it could be aligned with the requirements of an economic union. The OECS Authority also established target dates for the free movement of goods and services (end-2003) and free movement of labor (end-2007), and endorsed the Eastern Caribbean Central Bank's program to develop the financial and capital markets. It was expected that a draft of the revised treaty would be ready for review in the second half of 2005.

While progress has been made in implementing some measures, the countries of the OECS have not been able to meet the implementation schedule that was agreed upon in January 2002. Most progress has been in

The 1973 Lomé Convention between the European Union (EU) and the African, Caribbean, and Pacific countries, provided one-sided, duty-free access into EU markets for goods that meet the rules of origin. Imports of bananas, rice, and sugar were governed by protocols, which conferred higher than world market prices for these products in line with the EU's Common Agricultural Policy. Thus, Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines benefited from higher banana prices, and St. Kitts and Nevis from higher sugar prices. Latin American banana producers successfully challenged the banana regime under the WTO, which has resulted in reforms that reduced the level of protection. A similar challenge to the sugar regime was upheld by the WTO in 2004. The Cotonou Agreement (2000) updated the Lomé Convention to be consistent with WTO policies, but the commodity protocols will continue, subject to periodic review. Negotiations are continuing for the eventual creation of reciprocal economic partnerships, which include reverse reciprocity of any preferences extended to third countries.

The Caribbean Basin Initiative (CBI), which began in 1984, also offers nonreciprocal, duty-free access of some goods to the United States that meet the rules of origin and some other criteria. The CBI has not been as beneficial as Lomé because of the initially narrow range of goods and the advent of the North American Free Trade Agreement (NAFTA), which later eroded the preferences. The list of goods was expanded in 2000 for eight years, and this has partially reversed the erosion.

The benefits of CARIBCAN—which provides nonreciprocal duty-free access into Canada—are also constrained by the range of goods, uncertainty of duration, and NAFTA. The Free Trade Area of the Americas agreement, under negotiation, will allow all countries in the Western Hemisphere (excluding Cuba) to trade freely in goods and services. The ECCU countries have argued for special and differential treatment in order to reduce the adjustment costs.

facilitating travel and freedom of movement in the subregion. For instance, the travel facilitation initiative legislated in 2002 allowed OECS nationals to travel freely within the area and remain in another territory for up to six months. On the matter of removing work permit requirements, the governments of Antigua and Barbuda, Montserrat, and St. Vincent and the Grenadines have agreed, on the basis of reciprocity, to remove those requirements for self-employed professionals and their immediate family, and for self-employed service providers, their technical and managerial staff, and immediate family. The governments of Grenada and St. Kitts

and Nevis, while agreeing in principle, expressed the need to consult further with their respective cabinets. The remaining governments undertook to study the proposals and communicate their positions to the OECS Secretariat as early as possible. Regarding common citizenship, a draft of the Common Citizenship Act is already under review by member states.

Other areas of integration in which OECS countries have made progress are in joint representation at world fora and in providing civil aviation services. The OECS has set up a Technical Mission in Geneva to facilitate more effective representation of OECS interests in the WTO. With the passage in the national parliaments of the Eastern Caribbean Civil Aviation Authority (ECCAA) Agreement and a companion Civil Aviation Act, the ECCAA and the Civil Aviation Authority were established in November 2004. These entities evolved from the former OECS Directorate of Civil Aviation, which had been established in 1957. The ECCAA is an autonomous regional regulatory body that regulates and provides safety oversight over all aspects of civil aviation within the territories of the OECS members except for the British Virgin Islands. It is headquartered in Antigua and Barbuda.

The OECS Authority has also adopted the OECS Development Charter, which provides general guidance on the region's development agenda. Agreement was reached on medium-term targets that included sustained annual real growth of 6 percent, high-quality employment with unemployment of less than 6 percent, poverty levels below 6 percent, Human Development Index targets consistent with international standards, and the establishment of diversified and competitive economies. The agreement also initiated a reform and transformation process that began in January 2003, with the first phase scheduled to end in December 2007. Key priorities of that process include:

- free circulation of goods and services within the OECS by end-2003;
- free movement of labor within the OECS by end-2007;
- maintaining the existing fixed exchange rate system and low inflation;
- strengthening the fiscal situation by implementing adjustment programs that include tax reform in line with the advice from the OECS Tax Commission, public sector reform that establishes an appropriate expenditure system, greater efficiency of expenditures, particularly in the social sector and the Public Sector Investment Program (PSIP), and improved debt management;
- reaching agreement on income policies through tripartite committees representing the government, trade unions and the private sector for an equitable distribution of productivity gains; and

- outlining immediate priorities in tourism, agriculture, manufacturing, and the information technology sectors.

As of mid-2005, progress had been made in each of these areas, especially toward the free movement of labor. Member governments had passed legislation in their national parliaments allowing OECS nationals to travel through the region on a valid photo ID card. A draft Common Citizenship Act is under discussion and agreement has been reached for a common OECS passport. However, the removal of work permit requirements and Alien Land Holding regulations continues to lag. While goods and services move quite freely across the region, there has been little progress toward the removal of remaining barriers.

The OECS governments have agreed to broaden joint international representation to benefit from economies of scale. A joint High Commission has been established in Ottawa, Canada (for OECS members except Anguilla and the British Virgin Islands), and in Brussels, Belgium (for OECS members except Anguilla, Antigua and Barbuda, Montserrat, and Grenada). In June 2005, a technical mission to the World Trade Organization was established in Geneva (for OECS members except Anguilla, Montserrat, and the British Virgin Islands).

Caribbean Community and Common Market

CARICOM was established by the Treaty of Chaguaramas signed in Trinidad in July 1973 by Barbados, Jamaica, Guyana, and Trinidad and Tobago. These countries were joined shortly thereafter by eight other territories, principally from the eastern Caribbean.[5]

In the 1989 Grand Anse Declaration, the Conference of Heads of Government (the highest decision-making body of CARICOM) established a Caribbean Single Market and Economy (CSME) to integrate the CARICOM economies into a unified market with free movement of goods and services, capital, and labor, thus creating a single economy that operates under the same coordinated and harmonized economic policies. The objective was that this would allow the region to exploit economies of scale from a large internal market and strengthen its international

[5]The current 15 members of CARICOM are Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago. Haiti is the newest member, as of July 2002. Anguilla, the British Virgin Islands, Cayman Islands, and Turks and Caicos are associate members.

bargaining position in an effort to deal with globalization, but without establishing a political union.

Progress Toward Stated Integration Objectives

CARICOM does not have a good record of implementing the stated objectives. There has been some success in eliminating tariffs on goods originating within the region, reducing the level of the common external tariff, joint international negotiations, and the provision of common services. However, many of the initiatives remain on the books and have yet to be implemented, including rights of establishment, free movement of capital, a regime for free trade in services, and a common currency (CARICOM, 2004). Meanwhile, free movement of labor is limited to some very restrictive categories, such as university graduates, artists, and media workers. This has precluded firms from obtaining factors of production from lower-cost sources, especially in areas where there is a shortage of skills.

To address shortcomings, the original CARICOM treaty was amended by a series of protocols starting in the mid-1990s, but key limitations to integration remain. There are nine protocols, of which the most important deal with organizational structure and administration to help speed up implementation of decisions, rights of establishment and free movement of capital, competition policy, industrial policy, and disadvantaged regions. The full implementation of these protocols as well as the completion of the program for reducing the common external tariff from 5 to 45 percent to a range of 0 to 20 percent was scheduled for 2005 in the context of introducing the CSME (Table 12.1). Free movement of labor would still be confined to limited categories of workers, which have been expanded to include service providers who have to relocate to trade their services.

Mechanisms to address trade imbalances and assist disadvantaged countries have resurfaced as potential stumbling blocks. OECS members have recently reiterated their commitment to the CSME, but issues such as the imbalances of intraregional trade—for example, Trinidad and Tobago supplies about 65 percent of OECS intraregional imports—have been flagged as requiring urgent resolution. OECS members have also advocated that mechanisms be established to assist the disadvantaged nations within the CSME.

Two factors have hindered the adoption of CSME. First, progress has been slow in bringing national laws into line with the tenets of the protocols. The risk that the CSME may eventually lead to a process of political unification has been a source of concern for many countries. Second,

Table 12.1. Status of Implementation of Key Elements of the CARICOM Single Market and Economy[1]

Key Elements	Original Deadline	New Deadline	Status	Action Required
Treaty establishing the single market: To encourage competition	**2000**	**2005**	All 12 countries to which it applies have signed and ratified the revised treaty	All countries except Barbados, Belize, St. Lucia, and Suriname to enact treaty
Free movement of goods: Removal of unauthorized import and export duties on goods of regional origin and removal of discriminatory internal fiscal charges	**1996**	**2005**	Belize, St. Kitts Nevis and Nevis, and St. Vincent and the Grenadines apply duties on a limited range of imported goods;Suriname on export of lumber; environmental taxes apply in some countries	Countries to remove duties and discriminatory charges
Free movement of services: Removal of restrictions on the provision of services	**2002**	**2005**	List of existing restrictions ratified in 2000;none of the countries has removed all restrictions	Legislative and administrative actions to remove remaining restrictions
Free movement of persons: Provides for free movement of university graduates, media workers, musicians, athletes, and self-employed service providers	**2002**	**2005**	10 countries have enacted legislation and put administrative arrangements in place for first three categories; Jamaica andSt. Vincent and the Grenadines for the last category	Antigua and Barbuda and St. Kitts and Nevis to amend legislation; other countries to take necessary action for the last category
Free movement of capital: Removal of restriction on the movement of capital within CARICOM and cross-listing and trading on stock exchanges	**2002**	**2005**	10 countries have liberalized capital account; list of restrictions notified by all members in 2000 and schedule of commitmentsfor removal approved in February 2002	Legislative and administrative action to be taken by all countries
Intraregional double taxation agreement	**1998**	**2005**	11countries have signed and ratified the agreement and nine have enacted the legislation	Montserrat and Suriname to sign and ratify and enact laws; Grenada and St. Kitts and Nevis to enact laws

Table 12.1 ***(concluded)***

Key Elements	Original Deadline	New Deadline	Status	Action Required
Rights of establishment: The removal of restrictions on CARICOM individuals and firms to set up business in other CARICOM countries	**2002**	**2005**	List of restrictions notified in 2002; schedule of commitments for removal approved in February 2002; Jamaica has taken action toward meeting requirement	Legislative and administrative action to be taken by all member states
Common external tariff (CET): Implementation of four phases of the CET, and implementation of revised structure based on 2002 harmonized system (HS) codes	**1998**	**2005**	11 countries have implemented the fourth phase of CET, and Jamaica and Trinidad and Tobago have implemented the revised structure	St. Kitts and Nevis to implement CET; countries except Barbados, Guyana, Jamaica, and Trinidad and Tobago to implement revised structure
Competition Law: To provide a level playing field for doing business		**2005**	Draft law approved; Barbados, Jamaica, andSt. Vincent and the Grenadines have taken action	Other countries to enact legislation
Implementation of harmonized customs legislation, regulation, and forms	**2005**	**2005**	The draft law is being finalized	Enactment of the law
Memorandum item:				
OECS economic union: Initiatives under the Caribbean Single Market and Economy (CSME) plus free movement of labor	**2006**	**2006**	Most countries have passed legislation for movement of persons under the CSME	Action under the CSME; permit free movement of labor

Source: CARICOM Secretariat website: www.caricom.org.

[1]CARICOM consists of 15 member countries, Antigua and Barbuda, Barbados, Belize, The Bahamas, Dominica, Grenada, Guyana, Haiti, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago. However, the revised treaty does not apply to The Bahamas, Haiti, and Montserrat. Montserrat is awaiting entrustment from the U.K. and has been granted a two-year derogation on implementation.

there has been a lack of awareness—and, therefore, ownership—by the public in the member countries.

An important step forward was made in July of 2003 with the signature of four legal instruments related to the establishment and operation of the Caribbean Court of Justice (CCJ). The CCJ was inaugurated in April 2005. When fully constituted, it will replace the Privy Council as the final court of appeal, as well as adjudicate matters related to the interpretation of the CARICOM treaty. While all of the CARICOM members can easily participate in the CCJ, it is uncertain how many members would make it their final court. To switch from the Privy Council, a number of countries require a two-thirds majority in a referendum.

Quantification of Integration Indicators

Trade in Goods

Regional integration resulted in the expansion of intraregional trade in the early years of CARICOM. Intraregional trade expanded rapidly during the late 1970s up to the early 1980s, and then declined significantly following the collapse of the CARICOM Multilateral Clearing Facility in 1981. The facility collapsed after the indebtedness of some countries related to payments for oil imports exceeded the credit limits of the agreement. Although the facility was never revived, trade recovered during the 1990s as payment arrangements improved and foreign exchange constraints were relaxed. As noted earlier, Egoumé-Bossogo and Mendis (2002) showed that tariff reductions, although still incomplete (Table 12.2), had a positive impact in the context of regional integration on total and intraregional trade in the 1990s. By contrast, membership of the WTO has had a negative impact on the total trade of the region, largely through the dismantling of preferential trading arrangements for banana and sugar exports. This evidence prompts a mixed reaction to integration, but this also could be related to slow progress and short-run adjustment costs of dismantling protective trading arrangements.

Average tariff rates in all ECCU countries fell sharply in 1998, and (with the exception of Dominica) increased marginally thereafter. The decline in ECCU tariff rates in 1998 was most likely a reflection of the implementation of the second phase of the common external tariff. In Antigua and Barbuda, effective tariff rates spiked in 2000 before returning to their pre-2000 level.

The expansion of intraregional trade within CARICOM also resulted in some diversification of the region's production base. Petroleum products

Table 12.2. Implementation of Tariff Reductions in CARICOM[1]

	Phase I January–June 1993 0 to 35 percent	Phase II January–June 1995 0 to 30 percent	Phase III January–June 1997 0 to 25 percent	Phase IV January–June 1998 0 to 20 percent
Organization of Eastern Caribbean States				
Antigua & Barbuda	January 2, 1995	Not implemented	Not implemented	Not implemented
Dominica	September 1, 1993	October 1, 1995	January 1, 1999	July 1, 2002
Grenada	July 1, 1993	June 30, 1995	January 1, 1999	January 15, 2000
St. Kitts & Nevis	July 1, 1993	January 1, 1995	Not implemented	Not implemented
St. Lucia	July 1, 1993	July 1, 1997	Not implemented	January 1, 2000
St. Vincent & the Grenadines	April 1, 1993	January 1, 1996	January 1, 1997	January 1, 1998
Barbados	April 1, 1993	April 1, 1995	April 1, 1997	April 1, 1998
Belize[2]	Not implemented	April 1, 1997	April 1, 1998	April 1, 2000
Guyana	January 1, 1994	September 5, 1995	November 1, 1997	April 30, 1999
Haiti[3]	. . .	. . .	. . .	. . .
Jamaica[4]	April 1, 1993	April 1, 1993	January 1, 1995	January 1, 1999
Suriname[5]	. . .	January 1, 1996	July 1, 1997	July 1, 2000
Trinidad & Tobago	January 1, 1993	January 1, 1996	January 1, 1997	July 1, 1998

Source: CARICOM Secretariat.
[1]The common external tariff has a special rate of 40 percent for selected agricultural products.
[2]Belize was allowed to implement the schedule reductions with a two-year lag.
[3]Haiti became a member of CARICOM in 2002.
[4]Jamaica opted for an accelerated implementation schedule.
[5]Suriname joined CARICOM in 1996.

constitute about a third of intraregional trade and hence dominate trade flows. Of the non-oil trade, processed food and agricultural products, which are the most protected, have the largest share, followed by manufactured products. The concentration of non-oil intraregional trade on import-substitution activities would seem to suggest more trade diversion, and would likely result in incentives that go against global integration (Krueger, 1999).

While the CARICOM integration initiative has increased intraregional trade in goods, its impact on ECCU countries has been disappointing, particularly during the 1990s. Although ECCU countries are quite open in terms of trade-to-GDP ratios (Figure 12.2), the level of total exports of goods by ECCU countries remained virtually unchanged in nominal terms during 1991–2003 (Table 12.3 and Figure 12.3), in part due to the increasing international competition in two key export products, bananas and sugar. At the same time, the available evidence seems to suggest the growth of trade-diverting integration, as intra-ECCU exports increased from about 12 to 23 percent of total exports (Figure 12.4), while the overall level of intra-ECCU exports as a percent of GDP remains very low (Figure 12.5).

Product Market Restrictions

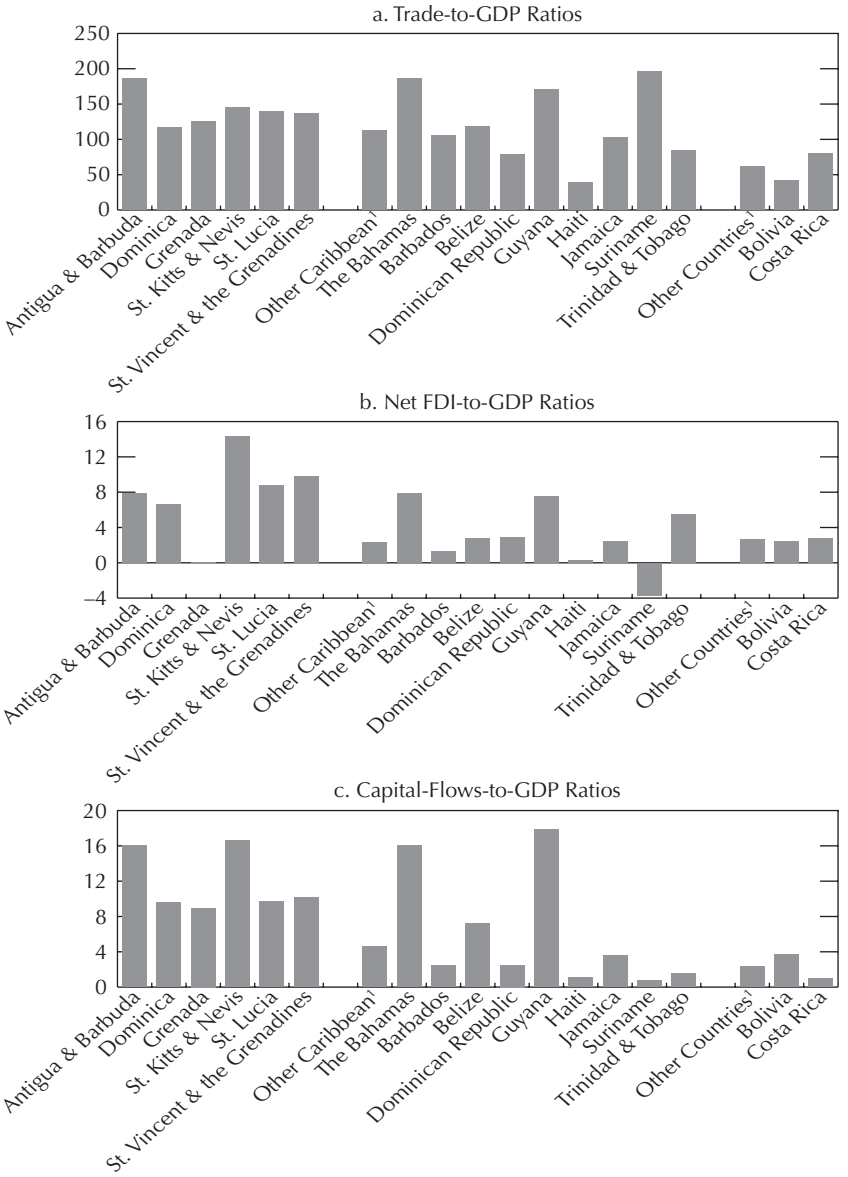
Apart from the common external tariff, major product market distortions in the ECCU arise from nontariff barriers, monopolies, and state-owned enterprises. Some nontariff barriers have been retained in an effort to minimize the short-run impact on real income and unemployment that would otherwise result from the closure of less efficient domestic firms.[6] The special regime for the ECCU countries and Belize has also fostered inefficiencies and distortions.[7] While most utilities are provided by monopolies, the telecommunications sector is currently being liberalized on a regional basis.[8] A number of products, including basic food products

[6]Finger, Ng, and Sloaga (1998) have compiled a list of the countries' trade restrictions, which include import licenses, quantitative restrictions, and imports by state monopolies. Suss, Njoroge, Cashin and Rodriguez (2004) also gives a detailed description of the trade regime.

[7]See Commonwealth Secretariat (1999) for a discussion of the effects of Article 56 of the Treaty of Chaguaramas, which allowed countries to maintain nontariff barriers against specific products from the "more developed (CARICOM) countries."

[8]For many years, telecommunications services in the ECCU were dominated by a single monopoly service provider under long-term exclusive contracts. Five ECCU countries jointly negotiated the termination of these contracts and, starting in 2002, competition was permitted in a number of telecom services, with the sector being jointly regulated by a regional agency, the Eastern Caribbean Telecommunications Authority.

Figure 12.2. Indicators of Economic Integration for Selected Caribbean and Other Countries, 1976–2003
(In percent)



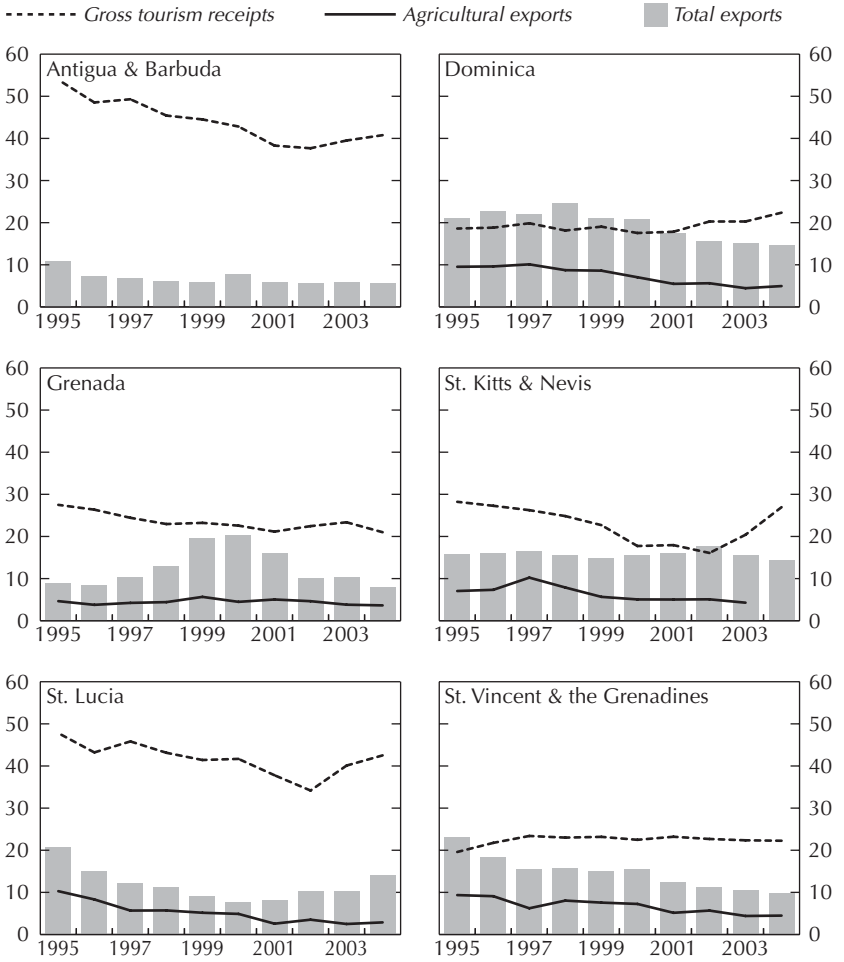
Sources: IMF, World Economic Outlook database; and IMF staff estimates.
[1]For 1980–2003.

Table 12.3. Share of Exports of Goods of Members of the Organization of Eastern Caribbean States
(In millions of U.S. dollars)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total exports to the world	319.4	383.0	337.9	286.2	309.1	313.3	321.8	297.4	283.2	302.0	344.5	321.1	315.6
Growth rate[1]	. . .	19.9	–11.8	–15.3	8.0	1.4	2.7	–7.6	–4.8	6.6	14.0	–6.8	–1.7
Share of intraregional exports in total exports[1]	9.0	9.4	12.1	12.9	12.6	10.6	10.7	12.0	13.1	12.6	11.5	13.4	17.3
Antigua & Barbuda	4.4	1.4	2.0	3.6	1.6	1.4	2.4	3.0	11.0	5.8	6.2	6.7	8.3
Dominica	8.8	9.3	10.7	14.0	15.1	13.4	13.3	15.2	14.6	15.8	17.6	13.3	16.8
Grenada	8.8	5.4	17.5	13.6	16.3	20.5	20.3	14.2	9.0	10.5	12.0	22.4	25.7
St. Kitts & Nevis	2.9	0.9	0.6	2.3	2.1	1.7	0.3	1.3	2.5	4.2	2.2	2.2	2.6
St. Lucia	5.4	6.9	11.3	8.2	8.6	7.1	5.8	8.2	9.7	11.6	7.9	10.8	18.2
St. Vincent & the Grenadines	19.9	23.3	29.7	33.6	38.7	27.3	36.0	27.6	28.4	24.5	30.0	33.8	40.7

Source: IMF, Direction of Trade Statistics.
[1]In percent.

Figure 12.3. Eastern Caribbean Currency Union: Exports of Goods and Tourism Receipts
(In percent of GDP)

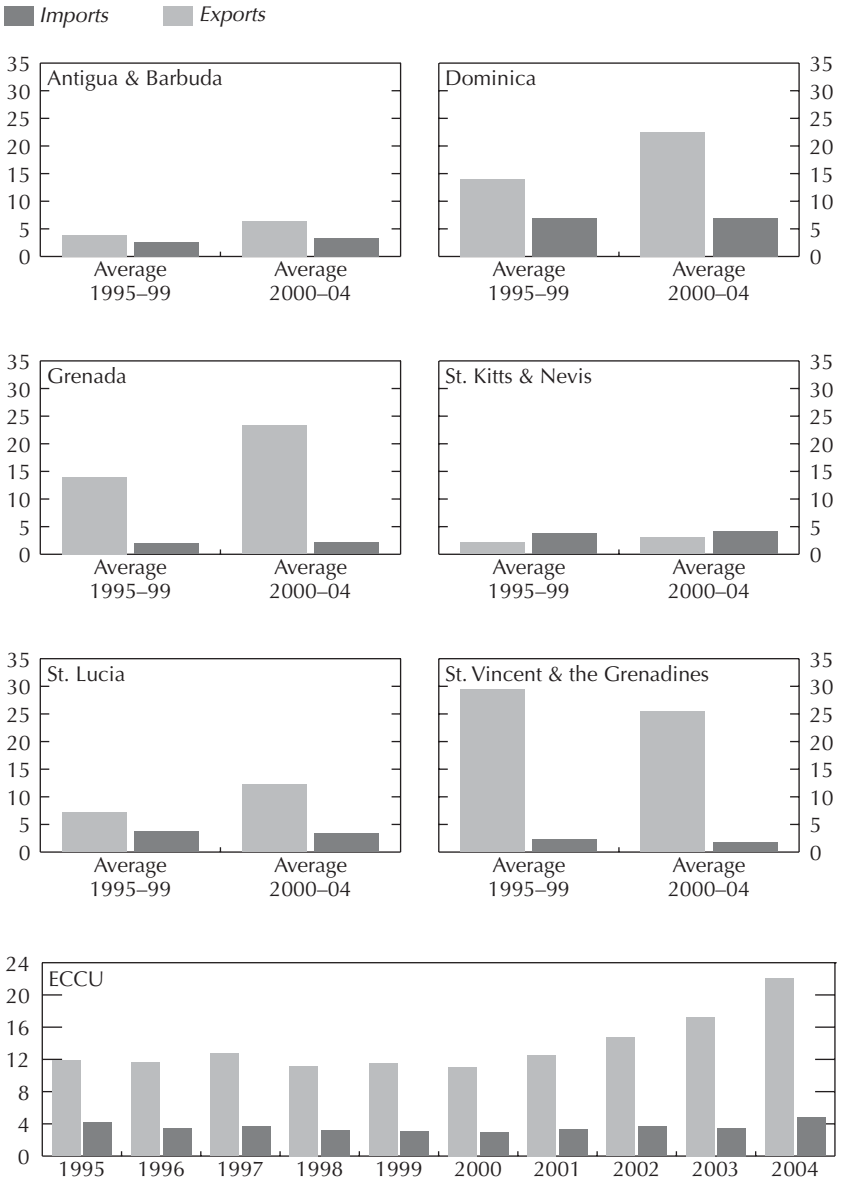


Sources: IMF Direction of Trade and Balance of Payments Statistics; and IMF staff estimates.

and fuel, are imported by state-owned or licensed monopolies. The participation of the public sector in the economy varies across the countries and is most widespread in St. Kitts and Nevis, where the sugar industry,[9]

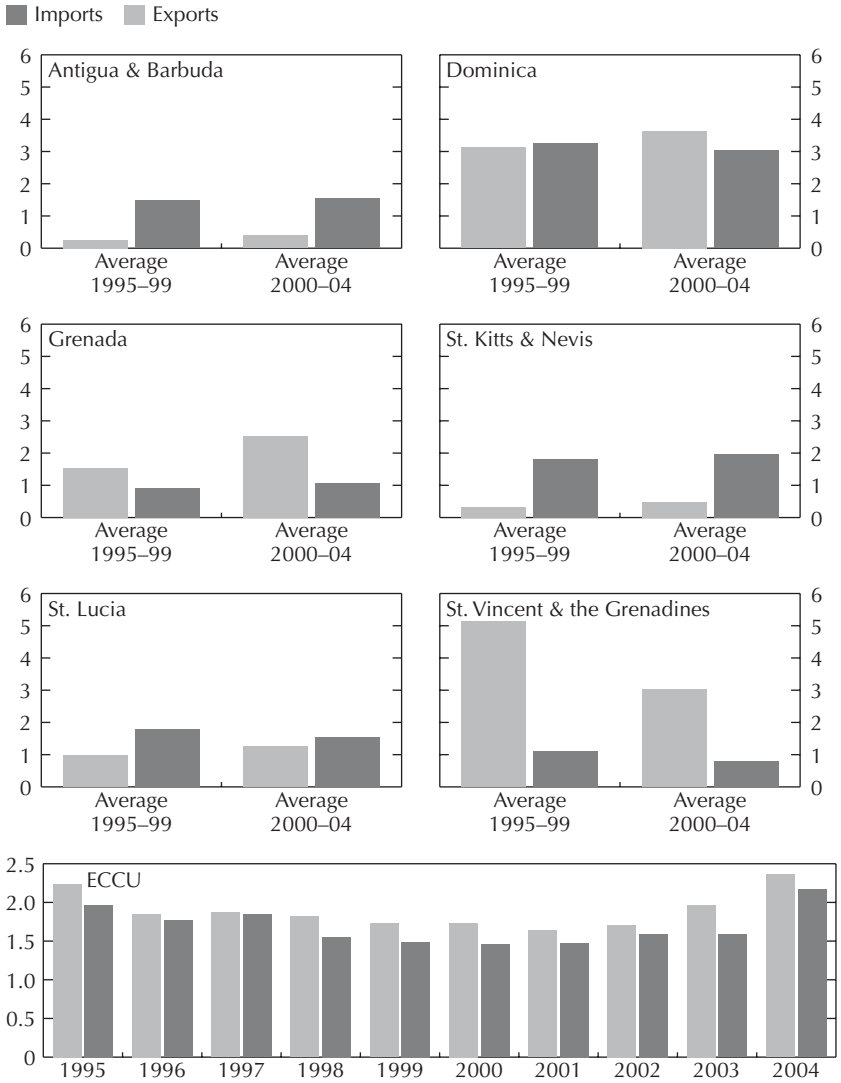
[9]Until its closure in July 2005.

Figure 12.4. Trade Flows Among Eastern Caribbean Currency Union (ECCU) Members as a Share of Total Trade Flows
(In percent)



Sources: ECCU country authorities; and IMF staff estimates.

Figure 12.5. Trade Flows Among Eastern Caribbean Currency Union (ECCU) Members as a Share of GDP
(In percent)



Sources: ECCU country authorities; and IMF staff estimates.

electricity, and imports of some basic foods are controlled by public enterprises. There also is public sector participation in banking and telecommunications. As a result, there is some evidence that the average level of

Table 12.4. Interest Rates in Selected Countries of the Organization of Eastern Caribbean States, end-2004
(In percent)

	Prime Lending Rate	Other Lending Rates	Six-Month Time Deposits	Savings Deposits
Antigua & Barbuda	10 to 11.5	3 to 23.61	1 to 5	3 to 5
Dominica	8.5 to 10	7.5 to 20	1 to 3.25	3 to 3.5
Grenada	8.5 to 9.5	3 to 16	1 to 4	3 to 4
St. Kitts & Nevis	8.5 to 9	7.5 to 22	1 to 5.5	3 to 5.5
St. Lucia	9.5 to 10	6 to 23.5	1 to 5.5	3 to 4.75
St. Vincent & the Grenadines	9 to 11	3 to 21.64	1 to 3.75	3 to 4.5

Source: Eastern Caribbean Central Bank.

product mark-up and prices is quite high in the ECCU. While there are no data available for the ECCU countries, given their similarities to Barbados (McLean, 1981), a mark-up of 33 to 45 percent in the distributive sector seems likely.

In a number of ECCU countries, state monopolies import key products and there are nontariff barriers (such as quantitative restrictions) on some imports. In contrast, non-ECCU countries generally have licensing systems. Further liberalization of trade regimes in ECCU countries has been constrained in part by a lack of trained personnel and by high administration costs.

Other charges on traded goods also confirm that that ECCU countries are typically more restrictive than other Caribbean countries. ECCU countries impose a flat rate customs charge on imports (ranging from 4 to 10 percent), while two countries (St. Kitts and Nevis and St. Lucia) impose a consumption tax on imports. This is more restrictive than in non-ECCU countries, where stamp taxes or surcharges on a small number of imports are generally imposed. The higher customs duties in the ECCU partly reflect these countries' dependence on revenues from trade and their lack of administrative capacity to implement other revenue measures to substitute for any lowered tariff revenues. In other non-ECCU Caribbean countries, a value-added tax or an income tax serve as alternate sources of revenue.[10]

Financial Market Segmentation

Despite sharing a common currency for most of their recent history, monetary and financial integration is far from complete in the ECCU.

[10]Several ECCU countries plan to introduce value-added taxes in 2006 and 2007.

Legal and regulatory restrictions that deter the free flow of capital have led to fragmentation of the financial sector, as evidenced by large interest rate differentials between the countries (Table 12.4). Regulatory barriers like alien landholding licenses and differential tax polices such as withholding taxes on nonresidents, as well as limits to the enforceability of contracts across territories, have essentially created a collection of mini financial systems within the currency union (World Bank, 1998). Prime lending rates can differ by more than 300 basis points, with greater variance between other lending rates. Such differentials in interest rates as well as asymmetric liquidity across countries and institutions imply that financial resources are not efficiently utilized, thereby dampening growth potential.

The fragmentation of the financial system results in higher operating costs because of the absence of economies of scale, and it also diminishes the capacity of the financial system to help spread risks. The Eastern Caribbean Central Bank has, in recent years, created a number of regional institutions to reduce that fragmentation. A regional government securities market (RGSM) has been established to facilitate the issuance of and secondary market trading in government securities, as well as an over-the-counter exchange for equities (Eastern Caribbean Securities Exchange). However, as of end-2005, the RGSM still does not cover all territories (Antigua and Barbuda and Dominica have not met the criteria), and only five of a possible 30 public companies are listed on the stock exchange.

The external capital account has been progressively liberalized. Current transactions were free of restrictions since the 1970s, and an already-liberal regime of capital controls was reformed in 1996, requiring authorization only for transactions of more than US$90,000.[11] The limit was progressively raised until it was eliminated in 2003. However, the legal and regulatory barriers identified above also curtail the benefits of a more open capital account, even while they spare the countries some of the negative effects of volatile short-term capital flows.

Intraregional capital flows have been facilitated mainly through Trinidad-based financial groups and, to a lesser extent, through cross-listing on the national stock exchanges. Trinidadian financial institutions have engaged in regional financial intermediation, mobilizing significant financial resources across the region through their insurance and investment arms, as well as recycling oil surpluses to finance significant investments in these economies (Table 12.5).

[11]Although capital outflows required exchange control authorization, the de facto regime was very liberal. Registered FDI inflows could be withdrawn without the need for approval, and other applications were routinely approved.

Table 12.5. Trinidad and Tobago: Geographic Exposure of Financial System Loans and Investments, end-2004

	In millions of U.S. dollars	Percent
Total	10,600	100.0
Domestic	8,088	76.3
Caribbean	2,173	20.5
Of which		
Barbados	378	3.6
Dominican Republic	117	1.1
Grenada	118	1.1
Jamaica	413	3.9
St. Lucia	614	5.8
St. Maarten	141	1.3
Rest of Western Hemisphere	339	3.2
Of which		
United States	259	2.4

Source: Central Bank of Trinidad and Tobago.

Notes: Geographical allocation of equity, and investment portfolio of commercial, merchant, and investment banks, finance companies and trusts licensed by the Central Bank of Trinidad and Tobago.

ECCU Labor Markets

There is a relatively high level of wage inflexibility in ECCU countries for several reasons. First, wages are determined mainly by collective bargaining agreements. With strong unions, wages are determined more by bargaining strength and political pressures, rather than productivity growth. These wage settlements result in relatively higher production costs, which affect the international competitiveness of production (ABT Associates, 1998). The level of unionization ranges from 12 percent in St. Vincent and the Grenadines to 33 percent in St. Kitts and Nevis (Table 12.6). Second, public sector wage agreements exert a very strong influence on wages in the private sector, given the relative size of government employment, which averages about 21 percent of the work force in the ECCU. Thus, the wage determination process in the private sector results in a distribution of rents between employers and workers similar to that described in Blanchard and Giavazzi (2003). Third, minimum wage laws and high reservation wages add to wage inflexibility. All ECCU countries have enacted minimum wage laws for different categories of workers (Table 12.6). Finally, migration of high-skilled workers and inflows of remittances push up the reservation wage of the relatively lower-skilled workers who remain in the region, and who may prefer to remain unemployed because they receive significant income from remittances (Mishra, 2006).

Wage rigidities are further reinforced by employment rigidities resulting from limited labor mobility and high severance costs. However, despite

Table 12.6. Labor Market Policies and Institutions in Selected Caribbean Countries

	ILO Conventions Ratified	Annual Leave with Pay (days)	Maternity Leave (days)	Social Security Contributions (% of wage)	Government Employment (% of labor force)	Minimum Wage/Avg. Wage (%)	Severance Pay (days)	Unionization of Labor Force (%)	Index of Labor Market Rigidity[1]
Organization of Eastern Caribbean States									
Antigua & Barbuda	15	12	55	10.6	27.5	49.6	240	24	0.380
Dominica	20	10	50	8.9	17.7	18.8	245	25	0.223
Grenada	25	. . .	50	8.0	26.2	. . .	0	47	0.328
St. Kitts & Nevis	. . .	. . .	64	10.5	. . .	. . .	260	33	0.476
St. Lucia	25	. . .	57	10.0	14.1	. . .	245	20	0.306
St. Vincent & the Grenadines	. . .	. . .	55	7.8	20.7	49.5	200	12	0.251
Other Caribbean									
Bahamas, The	. . .	. . .	. . .	. . .	21.0	. . .	0	25	. . .
Barbados	35	15	84	12.0	38.0	. . .	112.5	31	0.580
Belize	27	6	50	7.0	16.0	21.9	100	13	0.182
Dominican Republic	26	11	42	12.0	. . .	. . .	. . .	12	0.227
Guyana	. . .	12	59	12.5	25.0	. . .	0	32	0.415
Haiti	23	13	84	15.3	. . .	37.2	. . .	2	0.393
Jamaica	25	10	56	5.0	9.7	. . .	250	24	0.278
Suriname	26	12	. . .	2.0	45.0	. . .	0	42	0.283
Trinidad & Tobago	13	14	55	8.4	29.8	30.8	275	28	0.354
Other Countries									
Bolivia	42	15	74	21.3	. . .	25.4	. . .	29	0.480
Costa Rica	47	10	45	27.0	. . .	57.7	. . .	25	0.223

Sources: Rama (1995); International Labor Organization (ILO); and IMF staff estimates.

[1]The LMR index, sometimes called the worker protection index, is a numerical measure based on a number of labor market polices that protect workers, such as restrictions on hiring and firing, paid leave, maternity leave, and severance payments.

shortages in many skills, there is rigorous implementation of work permit requirements. Thus, while there is significant migration of workers from the ECCU to third countries, there is relatively limited movement of labor among them (Guengant, 1993). In the absence of unemployment insurance, severance regulations provide the only redundancy benefits. Nonetheless, they create barriers to hiring and firing workers, resulting in limited employer flexibility, the replacement of permanent workers with casual or contract workers, increased labor costs, and lower employment (ABT Associates, 1998). Other nonwage costs that increase labor market rigidity include social security payments in all ECCU countries introduced during the 1970s, and education and social services levies in Antigua and Barbuda and St. Kitts and Nevis (Table 12.6).

ECCU wage levels are consequently quite high, denoting the presence of considerable wage premia. Using the only detailed data for an ECCU country (St. Lucia, available only for 2001), it is evident that the wage levels are much higher than in comparable Caribbean and Latin American countries (Table 12.7). Indeed, in one category—hotels and restaurants—the average wage was even higher than in Canada. A different metric, comparing the wage levels with the per capita gross national income, confirms this pattern. Unlike in most developing countries but similar to North America, wages in the ECCU countries are much higher than the average per capita national income level. Moreover, wage growth accelerated during the period when GDP growth was low, indicating a rising wage-productivity gap (Figure 12.6). At the same time, the regional unemployment rate has remained high, at over 20 percent. The high rate of migration to the United States, Canada, and the United Kingdom has somewhat reduced the pressures on the labor market.[12]

Modeling the Contribution of Integration to Growth in the ECCU

Basic Model and Data

The main objective of the model developed here is to analyze the relative contribution of various measures of integration to real GDP growth over time in ECCU countries, as well as in other Caribbean states. The model does not attempt to answer the question whether integration *causes*

[12]According to U.S. Census data, about 20 percent of the ECCU labor force emigrated to the United States between 1970 and 2000 (Mishra, 2006).

Table 12.7. International Wage Comparisons, 2001

	Per capita GDP[1]		Per capita GNI[1]									
	Annual	Monthly	Annual	Monthly	Agriculture	Manufacturing	Construction	Hotels and Restaurants	Public Administration	Education	Average	All Categories
						(In U.S. dollars per month)						
Eastern Caribbean Currency Union												
St. Lucia[2]	5,590	466	5,910	493	528	601	754	851	1,709	587	838	. . .
Caribbean	6,315	526	6,110	509	. . .	262	254	216	. . .	. . .	. . .	302
Jamaica[3]	3,670	306	3,510	293	. . .	124	140	111	. . .	. . .	. . .	170
Trinidad & Tobago	8,960	747	8,710	726	225	401	369	321	. . .	. . .	. . .	433
Latin America	6,946	579	6,720	560	161	392	347	254	492	481	367	. . .
Brazil	7,640	637	7,350	613	169	358	255	166	461	462	312	352
Costa Rica	8,790	733	8,360	697	206	390	361	309	639	570	413	. . .
El Salvador[4]	4,590	383	4,480	373	92	200	218	232	386	357	247	. . .
Mexico	8,940	745	8,740	728	177	360	324	262	483	503	352	. . .
Peru	4,770	398	4,670	389	. . .	652	576	301	. . .	515	511	. . .
North America	31,655	2,638	31,580	2,632	. . .	2,520	2,835	1,157	. . .	1,793	2,253	2,315
Canada	28,570	2,381	27,940	2,328	2,146	2,087	2,069	739	1,943	1,793	1,796	1,724
United States	34,740	2,895	35,220	2,935	. . .	2,952	3,600	1,576	. . .	. . .	2,709	2,906

(Ratio of monthly wage to monthly per capita GNI, in percent)

Eastern Caribbean Currency Union								
St. Lucia[2]	107.2	122.0	153.1	172.8	347.1	119.3	170.2	. . .
Caribbean	. . .	51.5	49.9	42.4	. . .	. . .	. . .	59.3
Jamaica[3]	. . .	42.3	47.7	37.8	. . .	. . .	. . .	58.3
Trinidad & Tobago	30.9	55.3	50.8	44.2	. . .	. . .	. . .	59.7
Latin America	28.7	70.0	61.9	45.4	87.8	86.0	65.5	. . .
Brazil	27.5	58.5	41.6	27.1	75.2	75.4	50.9	57.5
Costa Rica	29.6	56.0	51.8	44.4	91.7	81.9	59.2	. . .
El Salvado[4]	24.5	53.5	58.5	62.2	103.3	95.6	66.3	. . .
Mexico	24.3	49.4	44.5	36.0	66.2	69.1	48.3	. . .
Peru	. . .	167.6	148.0	77.4	. . .	132.4	131.3	. . .
North America	. . .	95.7	107.7	44.0	. . .	68.1	85.6	88.0
Canada	92.2	89.6	88.9	31.7	83.5	77.0	77.1	74.0
United States	. . .	100.6	122.7	53.7	. . .	. . .	92.3	99.0

Source: International Labor Organization; World Bank, World Development Indicators database; Statistical Institute of Jamaica; Central Statistical Office, Trinidad and Tobago; and authors' calculations.

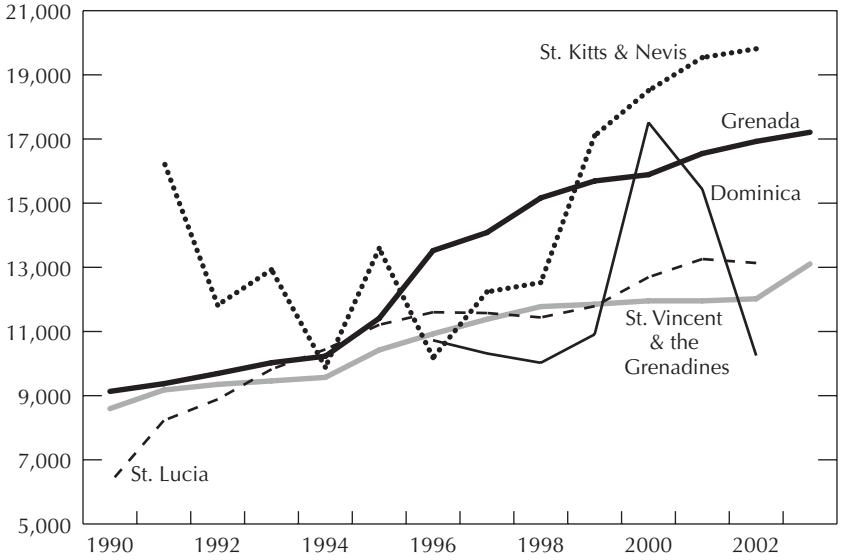
[1]Purchasing power parity (PPP), in current international U.S. dollars.

[2]For St. Lucia, gross national disposal income data (GNP plus remittances transfers) figures are used. GNP number computed on basis of ratio of GDP to GNP provided in Penn World Tables 6.1.

[3]Data for 2000.

[4]Data for 1999.

Figure 12.6. Eastern Caribbean Currency Union: Average Annual Wage per Worker
(Eastern Caribbean dollars)



Source: Country authorities.

growth; to do this, a much wider cross-section of data and a robust set of instrumental variables would be required, which have not been possible to construct for this exercise. Given the preponderance of trade in services such as tourism for the countries in the sample (Table 12.8), for which there is no direction of trade data, the traditional gravity model cannot be used to analyze this question.[13] Even if the direction of trade in services data were available, it is still problematic to use a gravity model for tourism, which is driven more by factors such as "sea, sun, and sand" and less by distance and relative size.[14]

The aim of this section, therefore, is simply to explore the contribution of integration to growth over time, controlling for exogenous factors and domestic policy changes.[15] The following general equation is estimated:

[13]The gravity model is usually used to construct a "trade instrument," i.e., the amount of trade that would be expected between any pair of countries given their relative size and distance. See Anderson (1979) for a detailed exposition on the gravity model.

[14]See Egoumé-Bossogo and Mendis (2002) for an elaboration of this point.

[15]The methodology is drawn, in part, from Mattoo, Rathindran, and Subramanian (2001).

Table 12.8. Eastern Caribbean Currency Union: External Services Receipts and Payments

	1996	1997	1998	1999	2000	2001	2002	2003	2004
				(In millions of Eastern Caribbean dollars)					
Receipts									
Total	2,873	3,127	3,393	3,533	3,476	3,240	3,132	3,427	3,871
Transportation	285	310	307	288	313	337	333	344	356
Travel	2,184	2,336	2,447	2,462	2,473	2,311	2,254	2,624	2,958
Insurance services	39	37	87	113	86	74	68	58	140
Other business services	347	410	473	596	535	457	429	359	376
Government services	19	35	79	74	69	61	48	41	42
				(In percent of GDP)					
Memorandum items:									
Total	49.0	50.5	51.0	50.3	47.5	44.1	41.8	43.5	46.6
Transportation	4.9	5.0	4.6	4.1	4.3	4.6	4.4	4.4	4.3
Travel	37.3	37.7	36.8	35.0	33.8	31.5	30.1	33.3	35.6
Insurance services	0.7	0.6	1.3	1.6	1.2	1.0	0.9	0.7	1.7
Other business services	5.9	6.6	7.1	8.5	7.3	6.2	5.7	4.6	4.5
Government services	0.3	0.6	1.2	1.1	0.9	0.8	0.6	0.5	0.5
				(Annual percentage change)					
Total	. . .	8.8	8.5	4.1	–1.6	–6.8	–3.3	9.4	13.0
Transportation	. . .	8.7	–1.0	–6.2	8.6	7.7	–1.1	3.4	3.5
Travel	. . .	7.0	4.8	0.6	0.5	–6.5	–2.5	16.5	12.7
Insurance services	. . .	–5.0	135.7	30.8	–23.8	–14.5	–7.8	–14.2	139.7
Other business services	. . .	18.2	15.4	26.0	–10.2	–14.5	–6.1	–16.4	4.7
Government services	. . .	84.2	127.3	–6.1	–6.9	–11.8	–21.3	–14.5	2.7
				(In millions of Eastern Caribbean dollars)					
Payments									
Total	1,453	1,570	1,694	1,766	1,691	1,697	1,708	1,771	1,882
Transportation	550	581	614	647	648	639	616	703	754
Travel	241	245	263	285	295	293	301	317	342
Insuranceservices	128	127	129	168	146	177	191	198	210
Other business services	440	529	543	555	474	471	496	449	466
Government services	94	89	144	111	126	117	103	104	111
				(In percent of GDP)					
Memorandum items:									
Total	24.8	25.4	25.4	25.1	23.1	23.1	22.8	22.5	22.7
Transportation	9.4	9.4	9.2	9.2	8.9	8.7	8.2	8.9	9.1
Travel	4.1	4.0	3.9	4.1	4.0	4.0	4.0	4.0	4.1
Insurance services	2.2	2.1	1.9	2.4	2.0	2.4	2.6	2.5	2.5
Other business services	7.5	8.5	8.2	7.9	6.5	6.4	6.6	5.7	5.6
Government services	1.6	1.4	2.2	1.6	1.7	1.6	1.4	1.3	1.3
				(Annual percentage change)					
Total	. . .	8.1	7.8	4.3	–4.3	0.4	0.6	3.7	6.3
Transportation	. . .	5.6	5.8	5.3	0.3	–1.4	–3.7	14.0	7.3
Travel	. . .	1.4	7.4	8.4	3.6	–0.7	2.8	5.2	7.9
Insurance services	. . .	–1.1	1.6	30.6	–13.2	20.8	8.2	3.8	6.0
Other business services	. . .	20.4	2.6	2.2	–14.5	–0.7	5.4	–9.5	3.7
Government services	. . .	–5.6	62.6	–23.4	14.1	–7.2	–12.1	1.3	6.3

Sources: Eastern Caribbean Central Bank; and IMF staff estimates.

Box 12.2. Estimated Model and Data

The model estimated for the Eastern Caribbean Currency Union countries, and then for 14 Caribbean countries, Bolivia, and Costa Rica, is the following:

$$g_{it} = \alpha_0 + \beta_1\tau_{it} + \beta_2 OPEN_{it} + \beta_3 FDI_{it} + \gamma_1(\Delta TOT)_{it} + \gamma_2(\Delta FDEM)_{it} + \gamma_3\, XGRO_{it} + \theta_1 GCB_{it} + \theta_2 PINV_{it} + \varepsilon_{it}$$

The data used in the model are annual observations for the 16 countries in the sample for 1980–2003 (see Figure 12.7 for a scatter plot). The data are largely derived from the IMF's World Economic Outlook database and *International Financial Statistics*. In several instances with missing data, secondary sources such as IMF country reports are also used. The following is a description of the various variables:

Growth

g: the real growth rate of the GDP (in domestic currency terms).

Integration Variables (*T*)

- τ: the effective duty rate, calculated as the ratio between customs duties and surcharges, and imports of goods. This variable is a good proxy of what the countries have effectively done to reduce barriers to trade (Senhadji and Ginting, 2004).[1] It is expected that the sign of the coefficient for this vari-

[1]A more satisfactory approach would be to construct a trade liberalization index over time, which could also comprise nontariff barriers, and also cover services. However, it is extremely difficult to construct such an index, given the lack of time series data.

$$g_{it} = \alpha_0 + \beta T_{it} + \gamma E_{it} + \theta P_{it} + \varepsilon_{it} \qquad (1)$$

where: g_{it} is real GDP growth for country *i* during time *t*; T_{it} is a vector of international integration variables; E_{it} is a vector of exogenous variables; P_{it} is a vector of domestic policy variables; and ε_{it} is the random disturbance term. Box 12.2 gives a more detailed description of the model and data used.

Empirical Results

The basic regression results suggest that while some integration effort variables are important, the international economic environment plays a

able would be negative, i.e., the higher the effective trade taxes, the lower will be the growth.

- *OPEN:* the openness index is calculated as the ratio of (exports plus imports of goods and services) to current nominal GDP. Openness is expected to have a positive impact on growth.
- *FDI:* the ratio of foreign direct investment (in U.S. dollars) to GDP (converted at current exchange rates). FDI is expected to have a positive impact on growth.

Exogenous Variables (*E*)

- *TOT:* terms of trade index. Changes in terms of trade could have either a positive or negative impact on growth.
- *FDEM*: index of final demand in industrial countries. Changes in this variable are expected to be positively correlated with growth in our sample.
- *XGRO*: growth of exports of good and services (in U.S. dollars).

Domestic Policy Variables (*P*)

- *GCB:* central government overall balance-to-GDP ratio. The sign of the coefficient is a matter of empirical investigation. In the short run, a deficit may increase growth if it results from an expansionary fiscal policy; in the long run, deficits probably have a negative impact.
- *PINV:* public-investment-to-GDP ratio. The sign of the coefficient could be positive or negative, i.e., investment in infrastructure (for example) could be growth inducing. On the other hand, public investment, to the extent that it leads to crowding out of the private sector or if the quality of investment is inferior, could also have a negative impact on growth.

greater role in explaining growth in the ECCU (Table 12.9).[16] The latter is consistent with the findings in Cashin and Wang (2005). The main integration effort variable, the effective tariff rate, is highly significant with the correct sign, but openness is insignificant. Openness is possibly insignificant due to threshold effects, i.e., because of the initial very high level of openness among ECCU countries, the marginal gain from further openness is negligible. Of the three international economic variables, proxied by income in the industrial countries, growth in exports, and

[16]Ordinary least squares, panel fixed effects, and random effects models were estimated for both groups. In the case of the ECCU, the random effects model was rejected by the Hausman and Breush-Pagan tests, but the fixed-effects model could not be rejected.

Table 12.9. Regression Results for Real GDP Growth Equation (OECS)[1]

Estimated equation: $g_{it} = \alpha_0 + \beta T_{it} + \gamma E_{it} + \theta P_{it} + \varepsilon_{it}$

Variables		OLS[2]	Panel Fixed Effects	Panel Random Effects[3]	Panel IV2SLS[3,4]	Panel SUR[5]
Constant	*C*	0.193***	0.01**	0.104***	0.100***	0.062*
		(3.56)	(2.95)	(3.56)	(3.13)	(1.88)
Integration variables (*T*)						
Openness	OPEN	–0.012	–0.009	–0.012	–0.013	–0.002
		(–1.16)	(–0.61)	(–1.16)	(–1.12)	(–0.15)
Effective tariff rate	τ	–0.304***	–0.303***	–0.304***	–0.293***	–0.255***
		(–4.77)	(–4.19)	(–4.77)	(–4.29)	(–3.01)
Exogenous variables (*E*)						
Foreign demand	ΔFDEM	0.936***	0.955***	0.937***	1.05***	0.988***
		(4.30)	(4.27)	(4.30)	(4.35)	(4.40)
Export of goods and services	XGRO	0.103***	0.102***	0.103***	0.096***	0.095***
		(4.94)	(4.69)	(4.94)	(3.90)	(5.31)
Terms of trade	ΔTOT	–0.102***	–0.102***	–0.102***	–0.096***	–0.104***
		(–3.92)	(–3.77)	(–3.92)	(–3.38)	(–3.31)
Foreign direct investment	FDI	–0.523	–0.059	–0.523	–0.053	–0.050
		(–1.51)	(–1.58)	(–1.51)	(–1.45)	(–1.55)
Domestic policy variables (*P*)						
Government investment	PINV	–0.669	–0.073	–0.669	–0.068	–0.049
		(–1.79)*	(–1.57)	(–1.79)*	(–1.56)	(–1.13)
Central government balance	GCB	0.041	0.018	0.041	0.044	0.037
		(0.80)	(0.30)	(0.80)	(0.80)	(0.82)
Summary statistics	R^2	0.426	0.425	0.426	0.409	0.513
Adjusted R^2		0.391	0.385	0.386	0.365	0.483
F-statistic		11.98***	10.91***	95.85***	85.03***	16.98***
Cross sections		0	6	6	6	6
Sample		1981–03	1981–03	1981–03	1981–03	1981–03
Observations		138	138	138	132	138

Source: Authors' calculations.

Notes: OECS denotes Organization of Eastern Caribbean States; * significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level.

[1]Bracketed numbers are the *t*-statistics.

[2]OLS denotes ordinary least squares estimation.

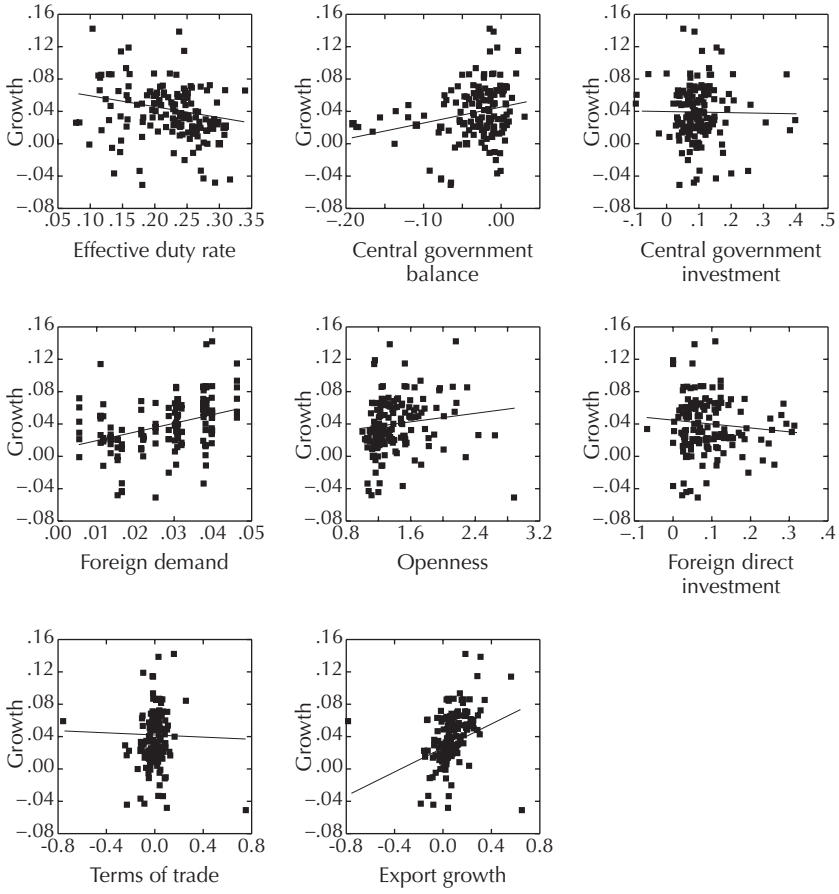
[3]Wald statistic is reported in the row for the *F*-statistic.

[4]IV2SLS denotes instrumental varible, two-stage least squares estimations.

[5]SUR denotes seemingly unrelated regression estimation.

changes in the terms of trade, the first two have the strongest effects. Changes in the terms of trade have a negative effect on growth, while foreign direct investment is statistically insignificant. The domestic policy variables are generally insignificant—except in two specifications at the 10 percent significance level. The government capital expenditure variable

Figure 12.7. Eastern Caribbean Currency Union: Real GDP Growth and Its Determinants, 1980–2003



Source: Authors' calculations.

has a negative sign, suggesting that government expenditure was either counter cyclical or ineffective.

When the basic regressions were augmented by including the remaining Caribbean countries in the sample, the results were broadly similar to the ECCU, but, in addition, openness, foreign direct investment, and the domestic policy variables become statistically significant in most cases (Table 12.10). Growth in industrial countries, export growth, and changes in the terms of trade remain the most significant variables,

Table 12.10. Regression Results for Real GDP Growth Equation (Caribbean, Bolivia, and Costa Rica)[1]

Estimated equation: $g_{it} = \alpha_0 + \beta T_{it} + \gamma E_{it} + \theta P_{it} + \varepsilon_{it}$

Variables		OLS[2]	Panel Fixed Effects	Panel Random Effects[3]	Panel IV2SLS[3,4]	Panel SUR[5]
Constant	*C*	–0.010	0.031**	–0.002	–0.011	–0.001
		(–1.43)	(2.43)	(–0.23)	(–1.46)	(–0.40)
Integration variables (*T*)						
Openness	OPEN	0.013***	0.008	0.013***	0.013***	0.005*
		(3.15)	(1.07)	(2.40)	(3.14)	(1.65)
Effective tariff rate	τ	–0.026	–0.214***	–0.065**	–0.301	–0.051***
		(–1.11)	(–4.64)	(–2.16)	(–1.26)	(–3.49)
Exogenous variables (*E*)						
Foreign demand	ΔFDEM	0.560***	0.62***	0.57***	0.600***	0.507***
		(3.17)	(3.73)	(3.63)	(3.20)	(7.91)
Export of goods and services	XGRO	0.107***	0.094***	0.101***	0.100***	0.116***
		(7.11)	(6.42)	(6.91)	(6.25)	(14.13)
Terms of trade	ΔTOT	–0.060***	–0.066***	–0.062***	–0.057***	–0.037**
		(–2.84)	(–3.29)	(–3.05)	(–2.63)	(–2.69)
Foreign direct investment	FDI	0.087***	0.007	0.062**	0.086***	0.111***
		(2.97)	(0.18)	(1.96)	(2.83)	(6.88)
Domestic policy variables (*P*)						
Government investment	PINV	0.101***	0.027	0.085**	0.115***	0.171***
		(2.89)	(0.64)	(2.23)	(2.93)	(11.95)
Central government balance	GCB	0.156***	0.137***	0.151**	0.173***	0.136***
		(3.75)	(3.21)	(3.58)	(4.06)	(6.47)
Summary statistics	R^2	0.286	0.101	0.274	0.283	0.877
Adjusted R^2		0.269	0.076	0.254	0.262	0.873
F-statistic		16.18***	14.76***	111.4***	120.93***	296.961***
Cross sections		0	15	15	15	15
Sample		1981–03	1981–03	1981–03	1982–03	1981–03
Observations		331	331	331	317	331

Source: Authors' calculations.

Notes: * significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level

[1]Bracketed numbers are the *t*-statistics.

[2]OLS denotes ordinary least squares estimation.

[3]Wald statistic is reported in the row for the *F*-statistic.

[4]IV2SLS denotes instrumental varible, two-stage least squares estimations.

[5]SUR denotes seemingly unrelated regression estimation.

while FDI becomes a significant explanatory variable for the region as a whole. Openness and the effective tariff rate are both significant in the random effects model, the relevant model for the Caribbean panel. The domestic policy variables also become significant in the augmented panel.

Reestimating the growth equation to take account of spillover effects of integration yields a dramatically better fit with largely stable coefficients.

The panel generalized least squares estimator, using cross-section weights along the lines of seemingly unrelated regression model, takes account of spillovers in the context of an integration movement. The method also corrects for cross-section heteroscedasticity. In the case of the ECCU, the parameter estimates remain largely the same, but the adjusted R-squared rises from about 0.40 to 0.48. Similarly, for the Caribbean panel, the coefficients of growth in industrial countries, export growth, and terms of trade are very stable, but the R-squared rises from about 0.30 to about 0.88. The increase in the explanatory power of the equation seems to suggest that there are some contemporaneous spillover effects that may be due to regional integration, and that such effects are larger for the wider Caribbean than for the ECCU.

Concluding Remarks

Efforts at regional integration in the ECCU have met with limited success in promoting trade and growth in recent years, but the potential for leveraging regional initiatives to do so remains high. ECCU countries currently face considerable challenges: economic growth has slowed dramatically since the 1990s, and public debt has risen to very high levels in most countries. Unemployment and wage levels are high compared to countries at a similar level of development. Given the currency board arrangement, exchange rate policy cannot be used to increase competitiveness or to respond to real shocks such as natural disasters.[17] There have been many regional initiatives, particularly in the provision of common services, that have been relatively successful, including a common judiciary, joint external representation in the OECS, university education, and epidemiological services in CARICOM. However, more can be done even in this area, for example, through better coordination of security and customs services and the granting of tax incentives.

The theoretical and empirical work reviewed in this chapter suggests that integration has a positive effect on growth. Increases in market size, the transmission of technology, and greater competition, all of which raise the efficiency of the economy, are among the key benefits of integration. For trade in services, in which the Caribbean has some competitive advantage, regional trading arrangements are more likely to facilitate liberalization. In the case of CARICOM, the positive effects of integration may

[17]According to Rasmussen (2004) and Chapter 7, ECCU countries are among the most vulnerable countries in the world, judging by the number of disasters and the cost of damage.

have been limited by the slow progress in implementing the agreements, including the reduction in the common external tariff and the adoption of initiatives to complete the single market and economy, particularly those related to trade in services and free movement of labor.

The empirical investigation finds that growth in the Caribbean is strongly influenced by growth in industrial countries, export growth, and changes in the terms of trade. The openness of the economies is also an important factor, but there are probably threshold effects, given the region's already high level of openness. At the same time there is strong evidence that a reduction in the overall effective tariff rate (a proxy for trade reforms and international integration) is good for growth.[18] Foreign direct investment and domestic policy variables (government capital spending and the central government balance) also appear to be statistically significant determinants of growth in the Caribbean.

Given the current trend in the erosion of preferential access to European Union markets under the sugar and banana regimes, further integration of the ECCU economies into the global economy is inevitable. The theoretical literature and empirical evidence reviewed suggest that product and labor market deregulation would have a positive impact on employment and growth in the long run. However, there could be short-run costs related to lower nominal wages resulting from the elimination of protection-induced rents, which could be partially mitigated by possible declines in product prices.[19] Since net benefits of integration are likely to be positive, particularly if integration is carried out effectively, the ECCU countries should move quickly toward implementing the required reforms. Delaying this process will only postpone the benefits and make it harder to achieve a consensus for reform (DeRosa, 2000). The countries should also press forward with liberalization of the regime of trade in services under the CARICOM agreement and the free movement of labor and other labor market reforms under the initiative for economic union among the ECCU countries. They should use integration at the regional level as a stepping stone to greater international integration, which would yield significantly more benefits given the dependence of growth rates of ECCU countries on demand in industrial countries.

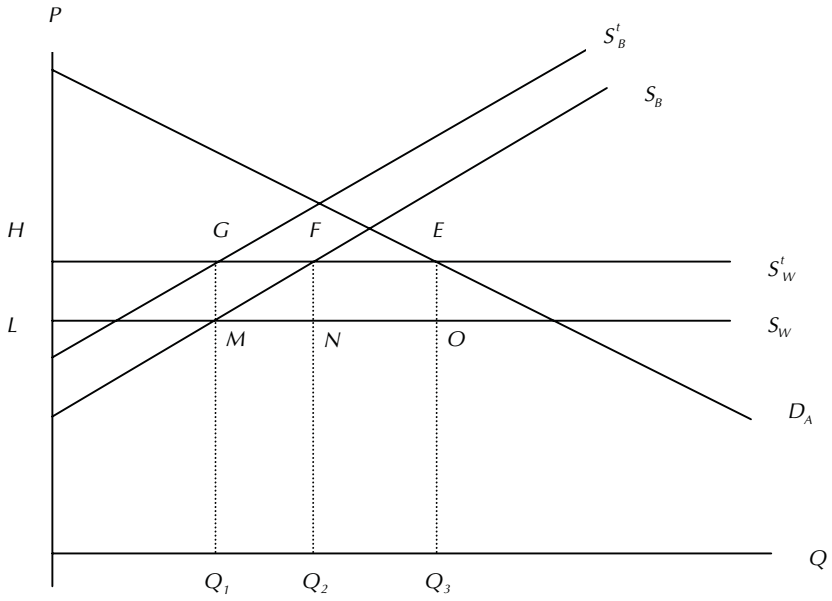
[18]Ideally, it would have been interesting to test whether a reduction in intra-CARICOM effective tariff rates has been beneficial for growth. Unfortunately, the relevant data are not available.

[19]For example, it has been shown that in the context of the European Community, the long-run benefits vastly exceed the short-run cost (Bayoumi, Laxton, and Pesenti, 2004).

Appendix 12.1. Economic Effects of Creating a Trading Bloc

Suppose two countries—*A* (poorer) and *B* (richer)—form a trade bloc. They can import from the rest of the world (*W*), which faces zero marginal costs to supply the bloc, i.e., a horizontal supply curve, S_W. Country *B* has an upward-sloping supply curve, S_B. If *A* imposes import tariff *t* on all countries, this has the effect of moving the supply curves upward for both suppliers by the amount of the tax. At the equilibrium point *E*, the supply is *HG* from *B* and *GE* from *W*. If the tariff is removed for *B*, *B* can supply an additional *GF* (or Q_1Q_2), thereby leading to a trade diversion. Under constant marginal costs for *W*, country *A* suffers from tariff loss, without a commensurate gain in consumer surplus (Figure A12.1). Gunning (2002) argues that most trade blocs, such as those in Africa, are pursued mostly for political reasons, and that it is usually more economically beneficial to undertake a unilateral lowering of tariffs.

Figure A12.1. Effects of Creating a Trade Bloc



Source: Gunning (2002).

The question that arises is whether there is a case for a South-South regional trading arrangement (RTA). Are RTAs a distraction from the more economically desirable multilateral trade agreements? Schiff (2002) argues that, in general, it is best for RTA participants to sign agreements with bigger countries or blocs in order to fully benefit from the benefits of integration. He does point to a number of advantages of RTAs. First, in the area of regional public goods (security, transportation, the environment), it makes sense to have regional cooperation. Second, an RTA is better able to negotiate with bigger countries or other RTAs by pooling the resources of its regional participants.

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