Reflections on Economic Growth in Antigua and Barbuda

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Summary

This paper argues that the economic turnaround of Antigua can be accounted for by at least the four following factors: Tourism (the private establishment of millreef tourist resorts, a flagship facility); a land lease program; the policy stance of the Antiguan government regarding Foreign Direct Investment -FDI- (incentives and concessions; a loan guarantee scheme, others); and package tours (routinized in the 1970s to deal with the cyclical nature of tourism). Modern Antigua is characterized by heavy government intervention in the economy which has generally proven productive. However, the island also suffers the effects of deforestation, a condition inherited from the colonial government, but which has worsened as a result of tourism.

> "*I do not see how one can look at figures like these without seeing them as representing possibilities. Is there some action a government of India could take that would lead the Indian economy to grow like Indonesia's or Egypt's? If so, what exactly? If not, what is it about the 'nature of India' that makes it so? The consequences for human welfare involved in questions like these are simply staggering. Once one starts to think about them, it is hard to think about anything else.*"
> (Lucas [1988] p. 5)

I. Introduction

Global output almost tripled in the first half of the 20th century and increased nine fold in the second half, greatly outpacing population growth. Life expectancy, education, and other indicators of well being also improved particularly in poor countries. These improvements have been associated with technological and economic transformation. Rising global prosperity, however, has not benefited all countries and regions, and the global distribution of income measured by average income across countries remains very skewed.

In particular, the relative gap between the richest and poorest countries has continued to widen, despite growth of world income. The progress in raising real incomes in most developing countries has been disappointingly slow.[1] For example in Africa, the level of real *per capita* income today is lower than it was 30 years ago, (IMF [2000]). Some developing countries in the Middle East and the Western Hemisphere have experienced growth in real incomes, but at a much slower pace than that observed in the industrialised countries. For the most part, it is only in parts of East Asia, where there have been sustained and rapid improvements in relative income positions. As a result a vast proportion of the world's population have average incomes well below those in the industrialised world. Within the Western Hemisphere, Antigua and Barbuda has been one of the few countries that has witnessed a sustained rise in *per capita* gross domestic product (GDP) since the 1960s. Indeed, on an overall rating for development in the United Nations human development index, Antigua and Barbuda is 39th in the world and 3rd among Caribbean countries. This is a remarkable achievement for a small island economy, which is also one of the most vulnerable in the world (World Bank [1999]). What are the factors, which account for this remarkable story of sustained improvement in the standard of living?

The objective of this paper is to explain the causes of development in Antigua and Barbuda. Specifically, the paper attempts to identify the impact of the following factors on the long-run rate of growth in Antigua and Barbuda:

- (i) Foreign trade
- (ii) Quality of institutions
- (iii) Investment in human and social capital
- (iv) Management of the environment

These variables are examined over the period 1900 to 1998, to ascertain their impact, if any, on the growth performance of Antigua and Barbuda. Data unavailability and inadequacy, a symptom of underdevelopment, has constrained the measurement and quantitative assessment to the much shorter period of 1977 to 1998. Nevertheless, much of the early history is also provided in a qualitative form, from which an appreciation of the circumstances and prospects at the time can be ascertained. An important issue in this inquiry is what are the factors, which have generated the growth of *per capita* income thus far in Antigua. Is this growth the result of significant productivity growth overtime as a result of a superior social capability? Or has it largely been achieved through significant input growth. Answers to these questions are important, as it is from careful case studies that specific policy lessons can be gleaned.

Antigua and Barbuda is a small open economy, with a total population in 1998 of approximately 65,000 persons. The economy depends largely on trade with the rest of the world for income with tourism being the major source of foreign exchange. Antigua forms part of two important regional organizations of policy and governance. First, the Eastern Caribbean Central Bank (ECCB), which issues the domestic currency, operates a quasi-currency board, maintains a fixed exchange rate regime and manages the foreign asset pool for eight countries, including Antigua, which make up the Eastern Caribbean Currency Union (ECCU). The exchange rate has remained pegged at 2.7 Eastern Caribbean (EC) dollars to one US dollar since 1976. The second institutional arrangement is the Organization of the Eastern Caribbean (OECS), which governs the appeals court and coordinates foreign representation and economic policy. Antigua was also a founding member of the Caribbean Free Trade Area (CARIFTA), the forerunner to the Caribbean Community

(CARICOM) arrangement, which attempts to coordinate economic strategy throughout the wider Caribbean.[2] Importantly, however, as a sovereign state Antigua has command over its fiscal regime and also its choice of development strategy.

Work on explaining economic growth can be grouped into three distinct strands. First are those which focus on explaining world growth over the last 200 years. The models of Lucas [1988]; Romer [1990]; Grossman and Helpman [1991], (i.e. the endogenous growth literature) dominate this group. Second are those theories, which aspire towards explaining country growth. The work in this group is motivated by observed differences in country growth rates, Lucas [1993]. Finally there are models which focus on explaining the dispersion in income levels across countries. These works seek to determine why at any point in time some countries are significantly poorer than others, Mankiw, Romer and Weil [1992].

This paper falls more closely into this last strand of work on growth. It focuses on explaining growth of real GDP *per capita* at the country level. In this strand of work three different hypotheses have been obtained. First are those works, which focus on transitions of country growth back to parallel long-run paths. The second is the technology catch-up hypothesis. Third is the view that countries are very near their long-run growth paths and that these growth paths are not parallel. Accordingly, differences in policies and institutions across countries lead to differences in rates of long-run economic growth. In the main cross-country growth regressions have been employed to test these hypotheses. However, some important studies have also used growth accounting to discriminate between the technological catch-up and accumulation as the cause of long-run growth.

This paper employs the growth accounting methodology to discriminate between the proximate causes of long-run economic growth in Antigua and Barbuda over the period 1978 to 1998. This period of actual quantitative analysis was used precisely because of limitations of data from earlier periods. However, this quantitative framework is buttressed by qualitative evidence on the conditions and improvements, which has characterised the rise in *per capita* income in Antigua and Barbuda over the last century.

The remainder of the paper is organized as follows. In section one, the motivation, institutional background and history of growth in Antigua and Barbuda over the period is discussed. Factors in the growth performance of Antigua and Barbuda are analysed in section two, whilst the methodology of growth accounting is discussed in section three. In section four some data measurement issues are considered, whilst the results of the growth accounting is provided and discussed against the literature in section five. Finally, a summary and conclusion is provided in section six.

II. Motivation, Institutional Background and History

The causes of economic growth are a central concern for all countries, but particularly so for small countries, which have high unemployment, poverty, declining primary industries, on which total economic livelihood hitherto depend and hence with the prospect of sinking further into poverty. The case of Antigua and Barbuda is special as the structural transformation was not only successful, but was achieved within a generation. Indeed, Antigua, was able to transform itself from being one of the poorest countries within the Caribbean to one of the richest on a *per capita* income basis within a period of ten years. This historical event holds out hope for the other countries within the ECCB, which are currently undergoing severe economic strains as they attempt to restructure their economies, sources of employment, government revenue and income from bananas to a new activity. To the extent that these countries share a common currency and other institutional arrangements, it would appear that some of the pre-conditions for transformation already exist. But what has Antigua done in its economic transformation from sugar to services oriented economy, which the other economies within the region can adopt? Are these approaches transferable or were they an accident of history? An important question therefore is what are the factors, which account for the observed long-run growth performance of Antigua and Barbuda?

The large proportion of empirical evidence on the effect of different variables on growth is mainly studies that use data on a cross-section of countries. In general, the results from existing theoretical models and individual empirical studies have often differed on their predictions, for example the impact of human capital on growth. As a result there is no consensus on the overall implications of the results.

Such a state of affairs is not entirely surprising given variations in sample periods, sizes and proxies, coupled with some inherent drawbacks of the cross-sectional methodology as it relates to growth analysis. Cross-sectional analysis has been plagued by the endogenicity problem. A variable that is correlated with growth does not mean that it causes growth. Hence the correlation may be of limited value to policy. Higher investment for example may cause growth or be the result of higher growth or the result of a third factor, which affects both growth and investment. Levine and Renelt [1992] have performed a series of sensitivity analysis on the observed correlations between growth and policy variables in a cross-sectional framework. Their results indicated that most variables are not robust in their explanations of long-run growth.

Cross-country studies may fail to capture important country-specific characteristics that may be crucial to their economic development. This is particularly important for countries with poor economic performance over long periods. It has emerged in the literature that cross-sectional analysis of a large set of countries in different regions has only explained growth in industrialised countries. A number of such studies have had to use dummy variables to explain growth in Africa and Latin America, see (Sala-i-Martin [1997]). Moreover, cross-sectional studies assume that the growth process is the same in rich and poor countries. However, because the factors causing growth in these countries may be different, it may be inappropriate technology. For example growth may be caused by technological processes in the rich country, but by catch-up in the poor, see (Quah [1996]).

Most cross-sectional studies assume a linear relationship between growth and the explanatory variables. However, this is not necessarily the case in practice, as significant interactions between growth and the explanatory variables which reinforces each other may be a large part of the explanation, see (Burnside and Dollar [1997]). An additional issue is the need to compromise on variable accuracy and composition to ensure comparability across countries.

This basic aim of this case study is to develop a rich understanding of the conditions, processes and outcomes that have governed Antigua and Barbuda's growth experience. It is believed that the results from this research would add value to existing cross sectional and other evidence on the growth processes within the region.

There are at least three important periods in the economic development of Antigua and Barbuda, which this study highlights. First, the early period, just after emancipation and extending to 1950, was one of economic decline, caused by volatile sugar prices. The second period starts in 1950 and ends just before independence, marking the era of economic take-off led by tourism. Finally, modern Antigua and Barbuda, 1977 to present, is an era of growth driven by public sector debt accumulation. However, because of the sparcity of data, the quantitative analysis, which comes later in the paper, concentrates on the growth performance of modern Antigua and Barbuda.

The period 1900-1950 witnessed a number of fundamental changes for the British West Indies.[3] First, this period covered the first experience of freed labour, which in some islands led to the development of an active peasantry.[4] However, in Antigua, this was not possible on a large scale given the limited availability of unoccupied crown lands.[5] Hence migration was the safety valve and main entrepreneurial activity. Second there were two world wars fought purportedly to make the world safe for democracy. Third, on account of increased international contacts there was a rise in local consciousness, which led to an emergence of local nationalism in the colonies. Fourthly, this period marked the rise of the US challenge to European hegemonic status in the Western Hemisphere and in particular the Caribbean Basin, which included the British West Indies. A fifth issue was the question of economic development and social improvement in the British West Indies, especially in light of the Puerto Rico experiment. These particular forces therefore, formed the framework for economic development and growth during this era. It was in a very real sense an era of awakening and mobilisation of the popular will. Economic growth in this period was driven by the private sector exporting sugar and sea-island cotton under a system of imperial preferences.

The period 1950-1977 was a watershed for the British West Indies generally and particularly so in Antigua and Barbuda for a number of reasons. First, a number of new political experiments, of local decision making, such as the British West Indies (BWI) federation, were to be tried. Second, 1951 marked the beginning of adult suffrage for Antigua and Barbuda, and the rest of the BWI. Thirdly, King sugar was finally abandoned in Antigua and Barbuda during this era as the financial burden of continued subsidisation proved to be untenable to the fiscal authorities. Fourth, this was to emerge as the period when domestic government policy began to focus on job creation and the economic development of Antigua and Barbuda in particular. Fifth, the first major oil shock (1973) occurred and this pushed Antigua and Barbuda into significant fiscal difficulties, economic recession and inflation. Above all, however, it was a period of great hope and promise. Overall growth generated in this period came primarily from private sector foreign capital inflows to the hotel sector and other tourist activities, with minimal government intervention or protection.

The final period, just before and after political independence was attained from Britain in November 1981, was one of contrasts, in that there were two distinct development patterns. In the first half of the era there was continued growth in and expansion of the tourism industry and also the development of the offshore financial services sector as an important source of employment and income. This first half also witnessed the period of highest *per capita* GDP growth for Antigua. However, in the second half of the era, as GDP growth rates decelerated, consequent on falling foreign direct investment and moderate growth of tourist arrivals, the past fiscal excesses of the public sector emerged as a key issue in the future sustainability of Antigua's economic performance. Therefore, much of the second half of this era was focused on attempts at fiscal consolidation. Two critical issues in this fiscal consolidation are the sustainability of the public debt and the size of the overall public service. Overall the growth generated in this era was largely driven by the accumulation of public sector debt.

GDP Per Capita Growth

Antigua and Barbuda in the past few decades has been able to transform itself from an agricultural to a services based economy. In addition it has experienced growth accompanied by moderate inflation. Its real GDP *per capita* has increased by more than 2.6

fold since 1978 with an average annual growth rate of 4.5 per cent (see Table 1). The growth performance has not been consistent, as the growth experience of Antigua has been characterised by significant variability as measured by the coefficient of variation. For example, over the 1978 to 1998 period the coefficient of variation was approximately 78 per cent. Moreover, the variability appears to have risen, especially in the last two sub-periods, 1990 to 1994 and 1994 to 1998.

GDP per Worker

The story of labour input growth has been significant (see Table 1). Indeed, the participation rate has increased modestly from 78.4 per cent to 79.8 per cent. The growth in labour input has been faster than population growth. Tourism as measured by the hotels and restaurants sub-sector has grown rapidly over the period, but so too has employment. Therefore, once account is taken of employment growth, output per worker in this sector actually underperforms the aggregate economy.

III. The Factors in the Growth Experience of Antigua and Barbuda

Quality of Institutions [6]

A number of the institutions of the state are based on British tradition and laws. Important institutions such as the judiciary, the public service, police, etc, have very strong foundations in English law and tradition. General elections are held every five years and are generally observed to be free and fair. In its modern political life only on one occasion in 1973 was the government changed. The electorate has generally turned to the Antiguan Labour Party (ALP) entrusting them to develop the required vision for the continued development of Antigua and Barbuda.

From 1871 to 1956 Antigua formed part of the Federation of the Leeward Islands, which also included Montserrat and St. Kitts-Nevis and Anguilla. The system of crown colony government was based on the concept of limited suffrage to the landed and/or propertied classes in society. In this context, economic policy was not always responsive to the legitimate development demands of the vast majority of the population. Economic policy as existed was mainly geared towards the export sector and in particular sugar exports as obtained under the system of preferences.

The disturbances of the 1930's led to the emergence of a class of political leaders, whose base came from the working class. However, given the limited form of representative governments, their effectiveness, beyond agitation in the streets, was limited. In the latter part of this period from about the 1940s Antigua formed an integral part of the discussions leading towards the formation of the British West Indies federation. However, the first indigenous conference on federation was held at Roseau in Dominica in 1932. The implementation of proposals from this conference were shelved for a number of years as leaders had to deal with the more immediate matter of the economic depression of the 1930s. Overall, this period laid the foundation for a number of the events, which transpired thereafter. A main consideration of the Antiguan authorities during the discussions on integration was to lessen their dependence on British financial assistance in the form of grant in aid.

In the period 1950 to 1977 a number of factors shaped the governance framework for Antigua and Barbuda. The first issue was the capture of political power as a result of the award of adult suffrage in 1951 to all Antiguans above a certain age. Following on from the initiatives of the late 1940s and early 1950s, the British West Indies federation was formed in 1958. When this political experiment failed in 1962, new experiments were tried, such as a union of the smaller islands and Barbados, and Antigua was again central to these negotiations. Failure of these attempts opened the period of associated statehood arrangements with the British in 1967. This new political arrangement provided for full internal self-government, with the British government retaining responsibility for external affairs and defense. These developments resulted in economic policy becoming more responsive to the needs of the domestic circumstances and aspirations.

Since 1976 there has only been one political party which has held power in Antigua and Barbuda. As a result there has been a certain constancy of economic policy governed by its stated overriding philosophy of economic management. In general Antigua and Barbuda maintains a relatively open system to private sector activity and foreign investment. Flexible labour regulations complement generous fiscal incentives. The minimum wage legislation proposed in 1989 was not passed. During the 1980s government allowed increasing numbers of mainly skilled worker from abroad to alleviate the tight labour market conditions. However, the procedures and time limits for the approval of work permits were not always predictable. Therefore, a number of problems exist in the administration of some of these policies.

The government has been heavily involved in the overall development of modern Antigua and Barbuda. This involvement is most especially evident as it relates to capital accumulation and to a lesser extent in supporting human capital and social development. However, given its nature as a small open economy, Antigua has also benefited from a favourable external environment on average over the past twenty-three years. The basic philosophy of the Antiguan government to economic management is aptly put in the 1982 budget speech of the Minister of Finance:

> "*The development programme on which the state of Antigua and Barbuda has embarked since 1976, has increased the government's role both as an entrepreneur and as a financial intermediary. We must at this time therefore consider, whether the physical and human resources, currency available, and the existing institutional structure, are adequate for the continued expansion of this effort, and whether the time has come for a comprehensive reassessment of the current development strategy…. For the past fourteen years the government of Antigua and Barbuda has been utilising deficit financing. This deficit was utilised to assist the government in its programme, according to national priorities seen at the time. These were:*
>
> *(i) Reduction of unemployment and the creation of employment opportunities.*
>
> *(ii) Diversification of the economy through the encouragement of labour intensive industries, which offered technology transfers.*
>
> *(iii) Improvement of the total infrastructure of the economy…*
>
> *(iv) Providing social security benefits particularly to the sick and the young.*
>
> *The achievement of these objectives is well underway and it is appropriate at this stage to review the situation.*"

In a sense this single-minded focus on employment generation has led to creation of a massive public sector work force, of approximately 12,000 workers. The essence of the problem lies in fact that Antigua and Barbuda has in name an independent public service (established workers), which is governed by the rules and regulations of the public service. In addition to this the political masters have established a cadre of public servants that are employed outside the terms and conditions of the public service. The difficulty, however, lies in the fact that the public sector work force is twice the number required for effective management of the public sector.

The quality and productivity of the public service have been openly questioned. In particular, in his 1982 budget speech, p. 19, the Minister of Finance said.

> "*The single most important and expensive resource of government's operations is human. A satisfactory level of performance of this resource, is essential, to achieve success in any operation. Unfortunately, this does not appear to be the case in this instance. Four, or at best, five hours productive work daily, has become the norm in the public service, and in some notable instances it is as low as one hour. Saturdays appear to be official holidays, with government offices opened merely to accommodate the storing of officers' packages while they shop around. Some officers appear to be employed to do absolutely nothing. This is especially so -and I may add most embarrassingly so- among certain non-established workers who profess to actively support the government. The morale of the public service is appallingly low.*"

The problem of overstaffing and low morale continues to plague the public sector. Addressing public sector productivity is likely to be a major future challenge in Antigua.

In a bold attempt to improve coordination and management of the public sector, the Antigua Public Utilities Authority (APUA) was established in 1973, to manage water, electricity and telephone services. However, there continue to be coordination problems as there is essentially no public sector economic planning and investment programming in Antigua. Projects are undertaken on an ad hoc basis without reference to a development plan and without appropriate project analysis. A large part of this situation has emerged as a direct result of a weak fiscal situation and resulting low public sector savings, which has constrained capital formation in the public sector. In 1991, in a serious effort to take a firmer grip on the situation, with the ultimate aim of furthering the overall development of the country, a new Ministry called Planning, External Affairs and Trade was created.

Importantly, however, apart from APUA and ownership of a couple hotels, public sector enterprises are few in Antigua. This has emerged largely because the government believes that the private sector should be the basis of economic development in Antigua. As a result the authorities have sought to create the required incentive framework through a plethora of fiscal incentives to both domestic and foreign investors, aimed primarily at the development of tourism, manufacturing and agriculture. These incentives have at times appeared to be overly generous. A critical public sector management issue, which has emerged, is the government's inability to manage its foreign and domestic debt obligations, which has led to a significant arrears problem as mentioned previously. This debt overhang creates a credibility problem for the government, which will affect future private sector development. At a more basic level also this excessive debt accumulation has put a tremendous squeeze on government revenues and thereby its ability to fund such basic services as tourism promotion.

The financial system in Antigua has long been dominated by the commercial banking system. In addition, there exist smaller financial entities such as credit unions, finance companies and offshore banks. In 1990 there were 25 registered insurance companies, the majority of which were agencies. These agencies together in 1990 had gross premiums of approximately EC$40 million. The banking sector expanded from approximately five banks in the 1960s to eight banks by the end of the 1990s. Four of the banks are branches of British and Canadian banks. The other four are locally incorporated, two locally owned and the remainder foreign owned. A number of the banks, including Barclays (Barfincor) and Antigua Commercial Bank (ACB) (ACB mortgage and trust) have established mortgage financing and trust companies.

In general the commercial banking sector is regulated and supervised jointly by the ECCB and the Ministry of Finance, under the Uniform Banking Act No 17 of 1991.[7] The other financial institutions are regulated and supervised by the Ministry of Finance. In 1984 the ECCB imposed a minimum deposit rate on savings deposits at commercial banks of four per cent, precisely because it was felt at the time that savers were not being appropriately rewarded.

The legal framework in Antigua and Barbuda is based on English law with the Privy Council in the UK as the final court of appeal. Antigua shares with the other countries a high court which deals with matters across the ECCU. Whilst the legal system has enjoyed enduring public support as a result of its perceived dispensation of impartial justice to all, there have been some areas of deficiency, which have caused significant delays in the administration of justice. In a study conducted by the legal unit of the ECCB (1998) it revealed a number of deficiencies in the legal and administrative structures, which may hinder further economic development of the ECCU member countries including Antigua. Among the issues identified were (a) inadequate administrative procedures, (b) inadequate administrative structures, (c) a dearth of human capital as it relates to legal drafting and arbitration laws, (d) the need for law reform and (e) the need to print and distribute existing laws.

Human and Social Capital

The human development index (HDI) of the United Nations ranks Antigua and Barbuda at 39th overall for the world and 3rd for the entire Caribbean, surpassed only by Barbados, and The Bahamas. In other words, Antigua and Barbuda is ranked amount the countries with high human development. This achievement reflects the efforts of the policy authorities and the private households in the development of skills, which have enhanced their overall abilities and quality of life. The churches had a heavy influence in the early history of Antigua and Barbuda in issues of education and social development. However, these early efforts were based on philanthropic and religious considerations and not on issues of development. Later on, the rudiments of a public school system, based on the British model, began to emerge. As modern Antigua began to take shape, and with greater local political power, a more balanced approach to education was adopted by promoting universal primary and secondary education. The focus of government's education policy was to remove the gap between primary and grammar schools, which existed in all other islands in the West Indies. Moreover this approach in a sense was consistent with the type of economic activity which was being pursued in Antigua - tourism (Table 2).

Only limited data on educational attainment is available. In 1960 approximately 83 per cent of the adult population had only the rudiments of a primary education. Approximately 12 per cent had at least attended a secondary school. Finally only 0.4 per cent had a university education. By 1996, however, 15.8 per cent of the adult population had no formal education, 45 per cent only had primary and 38.9 per cent had attained a secondary or post secondary education. These numbers were likely to have been heavily affected by the significant outward migration, which Antigua has suffered for much of the period of analysis. Available data suggests that pupil/teacher ratio in primary and secondary schools might be on a par with or better than those of comparable countries.

According to Table 3, *per capita* public spending on education is low though it has consistently risen since the decade of the 1960s. Indeed, in the 1960s, the average public expenditure per head was $15.6. However, this had risen by more than fourfold to amount to $70.1 in the decade of the 1990s. It must be pointed out of course that these numbers do not include private spending on education. In 1995 the government introduced a specific levy to pay for education in Antigua and Barbuda. These funds are administered by a separate statutory body (the board of education) and are not included in central government's education budget. In any case these funds are used mainly to maintain the physical plant of schools and provide tertiary level scholarships to Antiguans.

The average rate of population growth over the period 1900 to 1998 has been approximately 0.7 per cent per annum (see Table 4). The standard deviation of population growth was approximately 1.6 per cent, with a coefficient of variation of 2.4 per cent.

As a direct result of the very limited opportunities for employment, the period 1900 to 50 witnessed significant outward migration, which contained total population growth. The first large-scale migration was recorded between 1900 to 1924, when the population declined (see Table 4). The population decline observed during this period, however, had actually started about 1880, with significant migration to Panama and also to the USA. From the 1920s, improvements in health care resulted in significant population growth. However, this was tempered somewhat by the continued migration to places such as Cuba and the Dominican Republic during the "Dance of the Millions" caused by the boom in sugar prices of the 1920s.

Notwithstanding improved economic prospects at home during the era of economic take-off (1950 to 1977) there was a second wave of outward migration between 1955 to 1966 to help with the reconstruction effort in the UK. The mean growth in population (1.88 per cent) during this period was lower compared with the mean population growth (2.2 per cent) in the previous ten years. However, this was only for a short time, as the 1966 United Kingdom (UK) Immigration Act significantly reduced future emigration to the UK. The final migration wave and also a period of significant and prolonged negative population growth was between 1972 to 1980, when the population declined on average by 0.6 per cent per annum.

In recent times due primarily to the superior labour absorption performance of Antigua and Barbuda, relative to other surrounding countries, a large influx of migrants has occurred. This has come in at least three different phases from different parts of the Caribbean. In the 1970s and 1980s, the influx was from other ECCU member countries such as Dominica, and St. Vincent and The Grenadines. In the 1990s, the pattern shifted slightly with migrants from Guyana and Jamaica. In recent times, significant migration has been witnessed from the Dominican Republic as descendents of Antiguans, who migrated during the 1920s to these parts, returned home. In a sense the Antiguan society has become more cosmopolitan than any of the surrounding countries within the ECCU. As a result a number of new ideas and skills have been imported with these migrants. Moreover, as a result of previous migration trends from Antigua -export of human capital- there has emerged a monetary counterpart in terms of inflows of remittances and other transfers to Antigua and Barbuda. These inflows have emerged as an important source of income to some sectors in society.

Economic Transformation

Antigua's economy up to the 1950s was dominated by agricultural production for export. The main economic activity was the cultivation of sugar cane, sea-island cotton and the manufacture of sugar. The cultivation of sugar and cotton were labour-intensive and suffered from severe fluctuations in export prices, uncertainties of the weather and a significant debt overhang. Sugar required significant acreage and cheap labour to be economical. This in essence meant that the vast majority of the population was impoverished. Indeed, Antigua was considered amongst the poorest in the West Indies generally and certainly in the Leeward Islands.

Sugar and in particular its export price was central to the economic fortunes of Antigua over this period. Indeed, during the 1930s the price of sugar fell precipitously after rising to high levels in the 1920s. This fall in sugar prices led to significant hardship in Antigua and the rest of the British West Indies generally and as a direct result proposals were made for increased protection for sugar. The aim of these preferences, of course, was to maintain some minimum welfare in the BWI and thereby prevent social disorder. The depression of the 1930s almost resulted in starvation for vast sections of the population. As a result two opposing practices of land use developed; peasant development and syndication by estate owners. Syndication was a strategic response of the estate owners to severely depressed sugar prices in Europe. In particular, sugar producers attempted to increase scale, increase production and improve efficiency all in a bid to lower per unit costs.

As a direct result of the economic hardships and poor social conditions across the British West Indies, there were riots in some places such as St. Kitts and St. Vincent and the Grenadines (SVG) and spontaneous trade union development which aimed to exercise worker power. In Antigua union membership was put at approximately 25 per cent of the working population at the time. These adverse developments led to the establishment of the Morne Commission (1939) to investigate the social and economic conditions in the British West Indies. In 1945 the commission's report was published in which it made recommendations for economic, social and political reforms in the British West Indies, aimed at preventing a repeat of the riots of the mid 1930s.

With the decline of the sugar and cotton industries, Antigua and Barbuda developed into a service economy, which is highly dependent on tourism.[8] The transformation of the economy is largely a story about the rapid growth and development of the tourist industry. Antigua has natural attractions as a tourist destination, but at least two factors were of significant importance in the take-off/transformation: (O'Loughlin [1968])[9]

(i) The establishment in the 1950s of the Mill Reef tourist resort as a flag ship facility.[10]

(ii) The lend-lease programme of the US and British governments during World War II, which established the basic infrastructure for an international airport.[11]

Other factors in the development of the tourism industry included the following:

(i) The relatively good economic performance in and removal of exchange controls by the USA and European countries during this period. This policy action permitted more optimal vacation planning.

(ii) Also the encouragement given to US citizens to confine travel to the Western Hemisphere, by President Lyndon Johnson, as part of the measures to manage the balance of payments.

(iii) Fiscal and other incentives granted by the Antigua and Barbuda government.

With greater internal self-governance, the policy authorities adopted an outward and accommodating policy stance towards foreign investment generally and that geared towards development of tourism and the hotel industry in particular.[12] Investors in the hotel sector were provided with significant incentives and concessions including the availability of cheap beachfront lands. Moreover, the authorities made arrangements to enable full utilisation of low interest loans available to hotels, under the loan and guarantee fund established under the West Indies Federation of 1958-1962. In 1974 the Antigua and Barbuda Development Bank was created to assist in the development and diversification of the economy. The main purpose of this institution was to provide long-term funding for industrial development, lending for education and small enterprises. In 1955, a local bank, Antigua Commercial Bank, was established as a penny savings bank.

Later on, government pioneered the introduction of package tours on a routine basis to Antigua starting in the 1976-1977 tourist season. Given the rapid growth of hotel rooms in the early part of the transformation, average overall room occupancy was low at approximately 22 per cent. Indeed the tourist industry developed with a distinct pattern of high and low season. In the low season most hotels scaled back their operations by as much as 50 per cent. As a result, starting in 1976-1977 the government organized off-season charters to even out the pattern of activity in the economy

Tourist Arrivals

The growth of the tourism industry as measured by arrivals is shown in Table 5. Overall between 1960 and 1998 total arrivals rose by 9.3 per cent per annum on average.[13] The period of highest growth in the industry was 1960 to 1970, when total arrivals amounted to 12.9 per cent per annum. This period marked the boom years in the tourism and construction industries. Indeed, between 1965 and 1970 there was a boom in hotel construction. By the early 1970s, however, the boom had evaporated as a result of the oil price shock, and the resulting stagflationary conditions in the OECD countries. Also social unrest in Antigua and Barbuda in the form of significant industrial action by public sector workers, in particular teachers, created an atmosphere, which was perceived to be hostile to tourists.

Tourist expenditures increased significantly over the 1960 to 1998 period (see Table 6). Indeed, the mean has consistently risen in every sub-period over the 40-year period. The mean *per capita* tourist expenditures increased by almost 50 fold since the sub-period 1960 to 1970. This is to say that the story of tourism must be regarded as one of the success stories in the development of Antigua. The growth of *per capita* tourist expenditure is also given in table 6. The mean growth in *per capita* tourist expenditures, after initially rising in the 1960s and 70s began to drift downwards in the 1980s and 90s. Overall, *per capita* tourist expenditure growth averaged 15.4 per cent a year, between 1960 to 1998. The sub-period 1970 to 1980 experienced the highest average growth at approximately 20 per cent a year. Henceforth, the *per capita* growth in expenditures has trended downwards. In the sub-period 1990 to 1998 the *per capita* growth in tourist expenditure growth was approximately 7.5 per cent a year, the lowest for the entire period of analysis.

Trade and Terms of Trade

Trade Arrangements

The foreign trade regime of Antigua and Barbuda and indeed the world has undergone significant changes overtime. In particular significant barriers to trade have been removed. At one point in time during the oil crisis of the 1970s and as an overall response to the development challenges of the time, many of the countries within CARICOM, Antigua included, sought to pursue a strategy of import substitution industrialization (ISI). Under this stance some emphasis was placed on producing local products. In a sense for Antigua the ISI strategy focused mostly on food production and therefore on the agricultural sector. However, because of the practical difficulties of implementing such a strategy in Antigua it was never really pursued with vigour.

As a sugar exporter Antigua enjoyed protection on the British market. However, Antigua has since ceased to produce sugar. The trading arrangements are generally free, but there are some trade restrictions that have been imposed.[14] There are also a number of preferential trade arrangements, which recognized the underdeveloped nature of Antigua and Barbuda. Indeed in the initial conceptualization, these preferences were expected to form part of a mechanism by which underdeveloped countries in the Caribbean including Antigua would have lifted themselves out of poverty and underdevelopment, as part of a new economic order. Prominent among these trade arrangements were agreements with the United States (US) under the Caribbean Basin Initiative (CBI), Canada, under CARIBCAN, with the European Union under Lomé, and within CARICOM under article 56. However, all of these are currently under attack in the new spirit of global trade liberalisation with reciprocity.

Given the limited domestic production of food and other products, imports cover almost every product that is consumed or invested. Indeed, this ranges from motor cars and construction materials to water and other basic foodstuffs. The growth of imports *per capita* has averaged 15.5 per cent a year between 1937 and 1960, but only 2.6 per cent a year over the period 1978 to 1998 (see Table 7). A significant surge in the growth of imports *per capita* of 21.9 per cent a year in the period 1937 to 1950 and an 11.8 per cent a year surge was also experienced in the 1978 to 1982 sub-period. Henceforth, import growth *per capita* has fallen off rapidly and has been negative for the last three sub-periods. The growth of imports has been highly variable. The United States is the major supplier of goods to Antigua and Barbuda, averaging approximately 50 per cent annually.

Over the period 1937 to 1960 exports *per capita* grew by approximately 8.4 per cent compared with growth of 14.4 per cent over the 1978 to 1998 period (see Table 8). However, there were three sub-periods, 1937 to 60, 1978 to 82 and 1982 to 86, when the growth rate averaged 19.4, 26.8 and 18.7 per cent per annum respectively. Henceforth, export growth *per capita* has fallen significantly. The exports of Antigua and Barbuda, unlike the other countries in the ECCU, are dominated by services. Of this, tourism is the most important, accounting for approximately 62.8 per cent of total exports of goods and services. The transformation in Antigua and Barbuda can be viewed from the share of tourism services in total exports of goods and services. In particular between 1960 and 1970 earnings from tourism average approximately 44.1 per cent of total goods and services. However, it jumped to 61 per cent in the 1970 to 1980 period and represented 81 per cent of total exports of goods and services in the sub-period 1990 to 1998. The United States is the most important market for Antigua's tourism, averaging well over 50 per cent of total arrivals over the period of analysis. Of growing importance also in the latter part of the period have been the earnings from offshore financial services. For a limited time during the late 1970s and early 1980s Antigua also enjoyed some success as an exporter of light manufactured products. These included textiles, electronic components and the re-exports of petroleum. The growth of these exports was constrained by trade barriers on certain products such as textiles, in the US market and balance of payment problems within the More Developed Countries (MDCs) of CARICOM during the early 1980s. The main destination of these merchandise exports was CARICOM, which averaged approximately 65 per cent between 1983 and 1987.

Terms of Trade

The performance of the terms of trade of Antigua over the period under consideration has been generally favourable. Indeed, over the entire period 1978 to 1998 Antigua experienced a favourable movement (an increase in export prices relative to import prices) of 1.15 per cent per annum (see Table 9). Much of this gain in the terms of trade occurred in the first twelve years of the period, 1978 to 1990. The period of largest gain was 1978 to 1982, when the terms of trade improved by approximately 4.4 per cent per annum.

Investment and Public Debt

The rapid growth of tourism had a direct spillover impact on other sectors, such as the construction sector, which expanded quite rapidly over the period providing significant levels of employment, allowing the economy to transform itself from one based on agriculture to a service oriented entity. For example, in 1950 agriculture represented 43 per cent of GDP. However, by 1963 agriculture's contribution declined to 18 per cent of GDP (see Table 10). The decline in agriculture's contribution to GDP was directly linked to the decline of sugar cane and sea-island cotton production.

Following years of mounting debt, compounded by drought conditions, sugar output fell by 50.7 per cent in 1965 and another 57.2 per cent in 1966.[15] Indeed in 1965, the sugar factory went into receivership. Government stepped in and bought the sugar factory and lands (13,000 acres) for EC$5.4 million. For the next six years, however, the sugar industry proved to be a continuing burden on the public treasury and the factory was closed after the 1971 crop.[16] The story of cotton's decline is not too different.

By 1977, services had risen to represent a ratio of 84.7 per cent of GDP. In this category hotels had risen to 11.7 per cent of GDP. It must be noted that by 1977 direct employment in the tourism industry as measured by hotels and restaurants sector amounted to approximately 10.3 per cent of total employment. Notwithstanding, the growth of other economic activities, the public sector also emerged as a significant source of employment and GDP. In 1977 the public sector accounted for 13.6 per cent of GDP and 28.4 per cent of the total employed.

A significant factor in the economic take-off of Antigua was the sizeable foreign capital inflows it experienced, as a number of hotels such as Curtain Bluff, Blue Waters and Jabberwock were constructed or expanded. These properties provided significant employment opportunities and eventually led to labour shortages.[17] The 1960s also witnessed a major foreign direct investment project in oil refining - an investment of approximately US$40 million.

In later years, especially in the late 1970s, attention was also given to light manufacturing enterprises.[18] This was facilitated through the fiscal incentives Act of 1975 and the establishment of an industrial park at Coolidge to facilitate the sector's growth. These entities were in the main export-oriented industrial enclaves producing garments, textiles and beverages. These industries financed mainly with foreign capital were originally attracted to Antigua by the relatively low cost of labour, the duty free system for imports of raw materials and equipment, subsidised rents of publicly owned factory shells and an 8 to 15 year tax holiday.[19] Moreover, the absence of quota restrictions in the US for textile items produced in the Caribbean area under the Caribbean Basin Initiative was an additional incentive contributing to the development of the garment industry.

Over the entire 1977 to 1998 period, for which verifiable data is available, investment averaged approximately 31 per cent of GDP (see Table 11). The sub-period 1986 to 1990 witnessed the highest investment rate averaging approximately 39 per cent of GDP. Moreover, foreign direct investment accounted for approximately 22 per cent of total investment over the entire period. The most significant inflows were recorded in the 1986 to 1990 sub-period.

The screw driver type industries, which were developed in the period of economic take-off, proved to be directly linked to economic developments in the US and, therefore, with the recessions of the early 1980s a number of these industries were forced to shut down. The manufacturing sector suffered some setbacks during the early 1980s with the closure of several garment and furniture manufacturing plants, precisely because of export barriers in the rest of CARICOM and recession in the US market.

During the early 1980s a number of large private sector investments were undertaken. During the period 1979-1982, foreign savings financed about two thirds of total investment. A large portion of these savings was attributable to private capital flows related to construction of the Jolly Beach Hotel and the refurbishing of the oil refinery in 1982. The refinery was refurbished at a cost of approximately EC$30 million (1980-1981) with a view to exporting to other Eastern Caribbean countries. However, after reopening in 1982, and operating intermittently between 1982 and 1983, it was forced to close after incurring heavy financial losses. At the time the failure of the refinery was attributed to competition from more efficient producers in the area and technical difficulties, which resulted in very high, operating costs.

Investment in the tourism sector continued unabated the early 1980s. In particular, during this period, an additional 400 rooms were added to the total room stock in Antigua and Barbuda.[20] The main hotel projects at this time were Jolly Beach, St. James' Club and the renovation of Halcyon Cove. Halcyon Cove hotel was bought by government and expanded to over 100 rooms. The holiday Inn Hotel, later renamed St. James was also purchased by government. The idea was that the private sector was investing in relatively small properties - up to 50 rooms mainly for the winter season. As a result a distinct seasonal pattern in the industry emerged. The intervention of the government was essentially aimed at smoothing out the seasonality of arrivals. The success of this initiative also meant that employment was year round in the industry. This was especially useful for a government, which interpreted its main concern as job creation. Between 1984 to 1990 approximately 350 rooms were added to the room capacity of Antigua. Another significant investment during this period was the construction of the Heritage Key cruise passenger shopping facility.

The development of the offshore sector by government was also seen as an important pillar of economic diversification efforts, and also with the aim of providing additional fiscal revenues, employment and income. In 1982 government with the aim of both promoting and regulating the sector passed the international Business Corporation Act. Under this Act financial offshore companies, including banks, trusts and insurance companies, require a license. Offshore companies are precluded from engaging in any active trade or business in Antigua, and until recently were all exempt from taxes, reserve requirements and exchange controls. Recent measures require offshore companies to comply with a low tax regime. In 1997 there were approximately 900 international business corporations registered, and 53 offshore banks. Moreover revenues to government from this source between 1990-1997 rose from EC$0.6 million to EC$6.6 million.

Public sector investment during the economic take-off era was mainly related to infrastructure development. In particular, the extension and upgrade of the electricity and water supply in addition to roads and deep water harbour development. Other projects included airport redevelopment, government administrative and parliament buildings, and factory shells. These investments were financed through concessional loans from the Caribbean Development Bank (CDB). Significant emphasis was also placed on agricultural redevelopment following the demise of sugar and cotton industries and the consequential rise in unemployment. Under this plan emphasis was placed on increasing vegetable and livestock production. Efforts were also placed on redevelopment of the cotton industry along with production of corn and sorghum, specifically targeted for export, as a key replacement for sugar.[21] However, precisely because of labour shortages, these activities required significant mechanisation, which increased the operational costs eventually leading to financial difficulties and early closure of the project.

The agricultural sector also received significant public sector investment between 1980 to 1984 period, as another attempt was made to revitalise the sugar industry. In this attempt the government borrowed approximately EC$25 million from CDB with the aim of saving EC$6 million in foreign exchange annually and also providing additional employment opportunities. However, this attempt was beset by significant difficulties, one of which was the high average operational costs. Government also invested heavily in the fisheries sector during this period. In particular, it focused on procurement of boats and development of landing sites.

Between 1986 to 1990 government investment was concentrated on four large projects. These were the Deep Bay hotel,[22] a water desalination and power plant, airport runway resurfacing and a telephone exchange expansion.[23] However, from 1990 to 1998 there was a significant fall off in public sector investment.[24]

The vast majority of resources used for public sector investment projects were external loans. As a result the gross external debt of Antigua and Barbuda rose steadily over the 1977 to 1998 period of analysis. External debt averaged approximately 50 per cent of GDP over the first two sub-periods, 1978-1982 and 1982 to 1986. The period of significant jump in external debt was 1986 to 1990, when the external debt ratio rose by 28.2 percentage points or from 49.5 per cent of GDP in the 1978 to 1982 sub-period to 77.7 per cent of GDP in the sub-period 1986 to 1990. Henceforth, external debt rose less rapidly to amount to 81.3 per cent of GDP in 1994 to 1998 sub-period. Growth of debt in *per capita* terms reveals the same pattern (see Table 12). As shown in Table 12, the growth of debt *per capita* has been lumpy, as evidenced by the mean higher than the median throughout the period.

A significant factor in the accumulation of external debt in Antigua and Barbuda is the accumulation of arrears, which has progressively worsened over the period of analysis. Between 1980 and 1984 the stock of arrears on external debt rose by approximately 9 ½ percentage points, moving from 2 per cent of GDP in 1980 to 11 ½ per cent in 1984. In 1986 it jumped to 16.2 per cent of GDP or 21.9 per cent of total external debt. Indeed, between 1986 and 1991, arrears on external loans averaged approximately 29.7 per cent of GDP or

37.4 per cent of total external debt. Almost one half of outstanding arrears at the end of 1983 were on account of interest obligations. The external debt inclusive of interest arrears almost trebled in 1987 from 31 per cent of GDP in 1985, to 91 per cent of GDP as loans were drawn down to finance some large projects. In 1992, the stock of arrears on external debt amounted to approximately 60 per cent of GDP compared with a ratio of 48 per cent in 1991 and 16.2 per cent of GDP in 1986. Over the remainder of the period under review the stock of external debt drifted downwards, however, arrears went in the opposite direction. Therefore, in 1996, whilst total external debt represented a ratio of 80 per cent of GDP, arrears amounted to approximately 72 per cent of GDP. In addition the fiscal authorities have also incurred large arrears to the social security scheme and medical benefits schemes. The arrears on external debt have on many occasions caused foreign financing to dry up.[25] Beginning in 1993, government stepped up its domestic borrowing, especially from commercial banks and non-bank financial institutions, subject to earmarking of its revenues to service the loans, as its ability to secure external funding diminished rapidly. [26]

The debt problem is in part related to the structure of the external debt of Antigua and Barbuda, with its heavy reliance on commercial type financing. Most of the borrowing during the period under consideration was project related financed on commercial terms. The proportion of loans on commercial terms to total loans rose from 70 1/2 per cent of total in 1980 to 81 per cent in 1982. Indeed, throughout the period the bulk of the external debt contracted by Antigua and Barbuda was on commercial terms, with short maturities and very short grace periods. Another characteristic of the debt profile of Antigua and Barbuda is the general rise in the average interest rate on the external debt over the period of analysis. It rose from approximately 1.7 per cent in 1980 (3.9 per cent in 1985) to approximately 7.4 per cent in 1989, rising slightly in the 1990s to average approximately 7.7 per cent. Given the heavy reliance on commercial loans during this period the proportion of total external debt with short maturities rose from 32 per cent of total debt in 1985 to 75 per cent in 1987. Moreover, debt with maturities in excess of 20 years declined from 18 per cent to an estimated 5 per cent in 1989. The overall average maturities declined from 11.5 years in 1985 to 5.5 years in 1989. In line with these developments debt service obligations rose from an average of 6 1/2 per cent of exports of goods and services in 1980-1981 to 9 per cent in 1982-1983. Measured against public revenues, however, the comparable movement was from 21 1/2 per cent to 26 per cent. Between 1986 and 1990, the scheduled debt service amounted to 57 per cent of government's revenues. As a proportion to exports of goods and services debt service amounted to approximately 10.4 per cent, over the same period. Actual payments made amounted to approximately 19 per cent of government's revenues. In 1991 the scheduled debt service amounted to 62 per cent of government's revenues. The comparable ratio for goods and services was 12.1 per cent.

Environmental Management

The soil in Antigua varies almost from patch to patch and as a result in the early period of development there were significant problems in agriculture as it related to drainage and road construction. In addition, Antigua is semi-arid and has always been under a constant threat of drought. It does not provide good conditions for tropical agriculture and at the very best marginal conditions for sugar and cotton. Antigua is primarily a low-lying island, with modest rainfall, and poor soil quality. Barbuda is essentially a coral island. It is precisely this type of environmental characteristic, which has sold the country as a preferred tourist destination in the past. The coastline is characterised by wetlands -marshlands and mangrove swamps, especially important as flood control mechanisms. However, in its quest for rapid economic development and growth a large number of these have been cleared to make way for tourism and other development structures.[27]

There are a number of problems with the management of the environment in Antigua and Barbuda (World Bank [1992]). These include waste disposal; coastal zone management and institutional capacity. The inability to effectively manage these over the long run will impact the sustainability and further growth of the tourism industry. However, it must also be noted that these environmental concerns have been exacerbated by the rapid growth of tourism itself over the past 20 years. The tourism industry developed for a long time without any appropriate regulatory framework, such as zoning, environmental codes, etc. The basic idea was to get investment in the sector and thereby provide jobs. It is only after the negative effects of this benign neglect of the environment over the last 20 years have emerged, that efforts are now being slowly made to address the issue of regulatory controls on development.

It is estimated that approximately 85 tons of garbage is generated each day in Antigua, (*Ibid*.). Antigua does not have the basic infrastructure to dispose its garbage. For example disposal of sewage and other liquid waste is collected through septic tanks, as there is no centralized treatment facility. The large hotels and hospitals possess package treatment plants. There are three official waste disposal sites in Antigua, in addition a number of unofficial dumpsites for old appliances and derelict vehicles are found around the island. All disposal sites operate as free access points, and with no compaction or treatment of the waste. Cooks dump in particular, which handles approximately 80 per cent of the solid waste and most of the septic waste, is situated on wet lands just outside St. John's. As a result of this state of affairs, the inadequately treated and untreated waste water and occasionally raw sewage eventually find their way to the sea, contaminating many of the harbours and beaches in and around St. John's, English and Falmouth Harbours and Dickinson Bay.

A history of poor physical planning and enforcement has left a legacy of coastal stresses and potential threats. A number of the difficulties stem from the destruction of wetlands and sediment rich runoff from the surrounding lands. In particular, in Deep Bay and Jolly Beach coastal runoff has been linked to destruction of coral reefs in the area. In addition wetlands, (mangrove swamps and salt pound) have been dredged for marinas at Jolly Hill Salt Pond and McKinnons Salt Pond and the mangrove swamps at (The Flashes and Fort James) have been used as depositories. This destruction of wetlands can eventually result in significant destruction of the coral reefs and other coastal assets. Indeed, according to a survey conducted in 1989, approximately 50 per cent of the coral reefs in Antigua and Barbuda were dead. In addition to the destruction of wetlands there have been other sources of land based marine pollution, such as untreated industrial waste. Finally, illicit beach sand mining has also emerged as a problem, with the potential to put further stress on the shoreline and to biodiversity. All these activities point to a legacy of uncontrolled and unplanned economic development over the past 10 years.

There is no central agency for the management of the environmental assets. Legislation pertaining to environmental concerns is dispersed among many jurisdictions, and existing laws are often not enforced. Among the agencies responsible for the environment are the Central Board of health of the Ministry of Health, the Antigua Public Utilities Authority, and the Development Control Authority. The government established in 1990 the Historical, Conservation and Environment Commission (HCEC) to assist in the preservation of the environment through sustainable development. The mandate of the HCEC includes: advising the government on national environmental policies; proposing legal and other measures for the protection of the environment and the conservation of natural resources; encouraging and supporting programmes aimed at increasing environmental awareness; and facilitating the coordination of environmental activities among concerned agencies.

From an overall perspective, therefore, it is likely that the exploitation of the environment of Antigua and Barbuda during the initial growth phases of tourism may have resulted in significant growth of *per capita* income. However, it is unlikely that such unsustainable environmental practices can continue and not result in tremendous harm to the long-run viability of the industry, given the core basis of the tourism product in Antigua and Barbuda. This particular issue is likely to emerge as a major challenge for policy in the future.

IV. Estimation of the Influence of the Factors on Growth

The translog index of total factor productivity growth

The growth accounting framework is used merely for assembling quantitative facts and qualified hypothesis about the proximate causes of growth in a coherent and transparent manner (Maddison [1987]). The growth accounting methodology is based on an aggregate production function for the economy, equation (1). The idea is to present the various processes which contribute towards economic growth within a consistent framework. Gollop and Jorgenson [1980] and Jorgenson, Gollop and Fraumeni [1987], Solow [1957], Denison [1962], Young [1995] did the pioneering work in this field.

$$Y = F(K, L, T) \tag{1}$$

Where, Y is output, K is capital stock, L is labour and T is time. The specific form selected is a translog production function

$$\begin{aligned} Y = \exp [\alpha_o + \alpha_k LnK + \alpha_l LnL + \alpha_t T + {}^1/_2 \beta_{kk}(LnK)^2 + \\ + \beta_{kl} LnKLnL + \beta_{kt} TLnK + {}^1/_2 \beta_{ll}(LnL)^2 + \beta_{lt} TLnL + {}^1/_2 \beta_{tt} T^2] \end{aligned} \tag{2}$$

The assumption of constant returns to scale implies that the parameters satisfy the following restrictions,

$$\alpha k + \alpha l = 1$$

$$\text{and } \beta kk + \beta kl = 0;\ \beta kl + \beta ll = 0;\ \beta kt + \beta lt = 0 \tag{3}$$

The shares of primary inputs in output can be defined as

$$Vk = \frac{PkK}{QyY},\ vl = \frac{PlL}{QyY}$$

Where the Pk, Pl and Qy are prices of capital, labour and output respectively. That is, under the assumption of constant returns to scale, the share of value of output that a producer is willing to pay a factor of production is equal to the elasticity of output with respect to that factor. Thus both the elasticities and income shares sum to unity.

First differencing the natural logarithm of the production function in equation (2), gives an expression for the growth of value added in terms of growth of the individual factor inputs between period t-1 and t.

$$Ln\left[Yt - Yt-1\right] = \varepsilon k Ln\left[Kt - Kt-1\right] + \varepsilon l Ln\left[Lt - Lt-1\right] + TFPt-1,t \qquad (4)$$

The translog index of Total Factor Productivity (TFP) growth ($TFP_{t-1,t}$) provides a measure of the amount by which the log of output would have increased had all inputs remained constant between the two discrete time periods. εk, εL are the average elasticities of output with respect to capital input and labour input in year t-1 and in year t.

$$\varepsilon k = \frac{1}{2}\left[\left(\frac{\partial LnY}{\partial LnK(K,L,T)}\right) + \left(\frac{\partial LnY}{\partial LnK(K,L,t-1}\right)\right] \qquad (5)$$

$$= \frac{1}{2}\left[\varepsilon kt + \varepsilon kt - 1\right]$$

$$\varepsilon L = \frac{1}{2}\left[\left(\frac{\partial LnY}{\partial LnL(K,L,T)}\right) + \left(\frac{\partial LnY}{\partial LnL(K,L,t-1}\right)\right] \qquad (6)$$

$$= \frac{1}{2}\left[\varepsilon Lt + \varepsilon Lt - 1\right]$$

The factor shares vk and vl, estimated from the national accounts data are used as approximations for the elasticities (εL and εk) in the estimate of total factor productivity growth. Of course, if the restrictions underlying the methodology described above does not hold, then estimates of productivity growth may be biased in either direction. The results obtained from this analysis should be viewed as benchmark estimates.

$$TFP = \left[\left(Yt - Yt-1\right) - \alpha * (Lt - Lt-1) - (1-\alpha) * (Kt - Kt-1)\right] \qquad (7)$$

This basic framework can be applied in different ways to assess the importance of different factors to the growth process. Indeed, capital and labour (the basic inputs) can be augmented, for quality, etc. In addition, however, it is usually important to assess the impact of supplementary influences additional to augmented joint factor productivity. Following Maddison [1987], the index for this full blooded growth accounting approach is,

$$TFP* = \left[\left(Yt - Yt-1\right) - \alpha * \left(Lt - Lt-1\right) - (1-\alpha) * \left(Kt - Kt-1\right) - \left(St - St-1\right)\right] \qquad (8)$$

Where S_t is an index of supplementary factors, which influence growth. In this case supplementary influence is the terms of trade, structural change, environmental management, and institution quality.

*TFP** is perhaps best referred to as the residual, which is the residue of unmeasured influences, including disembodied technical progress, statistical and other errors. The justification for including supplementary elements is clear because the TFP measure, even in its augmented version, still leaves an important amount of growth unexplained, and particularly in the case of the ECCU countries, with a balance of payment constraint.

V. Data Considerations

Output in this paper is measured by real GDP at factor cost with 1995 prices. The data on national income for Antigua and Barbuda was obtained from the statistical appendix to the article by Victor Bulmer-Thomas in this volume.

The paper uses total population adjusted for participation rates as its measure of labour input. Total population was used precisely because of the unavailability of reliable labour force and or employment numbers. The total population numbers were obtained from the data base constructed by Bulmer-Thomas (see statistical appendix to his article in this volume). The other way of measuring labour input is to use the economically active population (labour force). However, economically active population numbers are not available for Antigua and Barbuda outside of the population census years. The use of the total population measure instead of labour force is common in similar studies using growth accounting. However, the two indices may reveal different stories about labour input growth. In our situation it is almost impossible to know since there is no data on labour force.

In order to distinguish between different categories of labour and thereby measure the influence of these on marginal productivity an adjustment was made to the raw population numbers. The adjustment for human capital usually incorporates detailed adjustments by labour force groupings, including education, age and gender (Denison [1967] and Young [1995]). Others have adopted a much simpler approach and adjust only for education, which has been found to be the most important characteristic (Collins and Bosworth [1996]). In this work, the quantity of labour is adjusted for *per capita* public spending on education and educational attainment. The benefits of education are assumed to be embodied in workers. The basic assumption is that the educational distribution of the population is representative of the educational distribution of the labour force.

The labour quality index used in this study follows Collins and Bosworth [1996] and is given as,

$$H = \Sigma \varpi i * \rho i$$

This index weights the percentage of Antigua's population that has attained level *i* of schooling (ρi, where *i* ranges from 1: no schooling to 3: beyond secondary schooling) by an estimate of the average return to *i* education (years of schooling) (ϖi). Following Collin and Bosworth [1996] we assume a 7 per cent return to schooling in Antigua over the period of analysis. The basic assumption is that relative earnings are constant across countries and for different levels of schooling.

The capital stock was estimated to approximate a ratio of 1.15 to real output. The capital stock is estimated using a perpetual inventory framework, with a geometric depreciation rate of five per cent. That is,

$$Kt = It + (1 - \phi)Kt - 1$$

Where, It is investment flow at time t, and Kt-1 is the previous period capital stock and is the depreciation rate of the existing capital stock. Several steps were involved in the estimation of the capital stock. The first step was to identify a base stock of capital. Using data on gross investment from as far back as 1970. It was felt that the longer the time series the less important would be the initial stock.[28] Another issue is the rate of depreciation to apply. In this study a 5 per cent depreciation rate was used. The depreciation rate applied was based on discussion with the national income statistician for Antigua and Barbuda. Also important is the need for an appropriate deflator for the current investment series. Using the deflators for construction, transportation and real estate and housing an investment deflator (rebased to 1995) was estimated and used to deflate the nominal investment series.

In a competitive economy the weights for aggregating factor inputs could be represented by the shares of income earned by capital and labour respectively. Precisely because of the difficulties involved in securing reliable data, on factor share, fixed weights are employed throughout the period.[29] Table 13 provides a breakdown of the composition of the shares of labour and capital in national income over a selected period, 1983 to 1985. The first item is imputed rent including depreciation. There is no enforced rent control policies or subsidies, either to tenants or proprietors in Antigua and Barbuda. Nevertheless, rents and owner occupied dwellings (real estate and housing) are normally governed by private treaty of a reasonably long period. Also important is that approximately half of this income is imputed because the houses are owner occupied.

Depreciation is the second item of capital income, which is derived by the national income accountants using estimates of asset lives and provisions within the tax code. The final item is gross operating surplus on non-residential capital. This is calculated after elimination of incomes from the self-employed. An important point to note is that government-owned assets form a large part of the capital stock figures used. However, no income is imputed in the national accounts for government assets such as roads, bridges or public buildings.

The share of labour has three components. First the imputed share for the self employed, which is based on an estimate of the total self-employed to the total employed. Secondly, there are wages and salaries, which are obtained from the annual national accounts survey. A process of collective bargaining and existing labour laws determines wages and salaries in Antigua and Barbuda. Hence, the labour market is not frictionless. The final component is the employers' contributions to social security and medical benefit schemes.

The total weight of capital derived in table 13 is approximately 43.7 per cent, with a standard deviation and coefficient of variation of approximately 0.81 per cent and 0.01 per cent respectively. Given the scarcity of data, it was not possible to make comparable estimates for other periods, however, this estimate is in keeping with much of the international literature on capital share in national income of developing countries, which tends to be slightly more than that for developed countries.[30]

The growth in the volume of trade was included as a factor, which is likely to have an effect on the overall *per capita* growth. Foreign trade is expected to be important to Antigua especially in respect to overcoming market size and facilitating technological transfers. The foreign trade effect in this paper is measured by the average real growth of exports and imports.

In this work the terms of trade is defined simply as an index of export prices divided by an index of import prices. These indices are not readily available for Antigua and Barbuda and proxies had to be constructed. In this paper the terms of trade is derived by using the data on real and current numbers for export and imports of goods and services from the balance of payments accounts. In particular, dividing the current value of exports of goods and services by the constant price exports of goods and services provides a measure of the price of exports of goods and services, and similarly for imports of goods and services. In this case the terms of trade are obtained by dividing the export price index thus obtained by the import price index. The resulting index is weighted by the ratio of imports of goods and services to GDP.

Structural change of the economy is measured essentially by comparing the outturn under the actual realisations and a scenario, which assumes that the structure did not change. The basic indicator of structural change in this work is the output and employment in the agriculture versus the non-agricultural sectors. Therefore, structural change in the context of this study essentially measures the movement of factors between these two sectors, and the resulting impact on allocative efficiency and thereby overall factor productivity. In a sense structural change can be interpreted as part of institution management. Or, put differently, successful structural change can be a reflection of good institutional qualities and arrangement of an economy. Therefore, in this paper structural change is interpreted in this manner.

Using information on civil liberties in Antigua and Barbuda, along with indicators for financial deepening (M2/GDP), the number of telephone lines and M2 to foreign assets (a currency crisis indicator), an index for institutional quality is derived. The procedure in constructing this index was as follows. The log of each raw data series was taken, these were then normalized on a zero to one scale. For this index a rise in value is reflective of an improvement in institutional quality and conversely. According to Table 14, the mean of the index of institutional quality has consistently risen over the period of analysis.

An index of environmental management was also constructed. The basic components of this index are the level of emissions, the land to population pressures, etc. These raw data were summed together, and logged, then normalized to a scale between zero and one. For this measure, a rise in the index indicates an improvement in the management of the environment and conversely. Indeed, as revealed in Table 15, the mean of the environmental management index has drifted downwards over the period of the analysis. In particular, after peaking in the 1982 to 1986 sub-period at 1.9 it drifted downwards to a mean of 1.19 in the 1994 to 1998 sub-period (see Table 15).

VI. Results of the Empirical Study

Aggregate Productivity Growth

As shown in Table 16 Antigua's real national income grew by 4.5 per cent a year on average over the two decades to 1998. At the same time there was significant input growth. With investment averaging 25.1 per cent of national income, Antigua's real capital stock expanded by 9.5 per cent a year for the period. The capital-output ratio has risen over the period from 1.5 per cent in 1978-1982 sub-period to approximately 2.81 per cent in 1990 to 1994, suggesting that there has been pronounced capital deepening. This suggests that capital accumulation is a large part of the story behind Antigua's economic growth.

Output growth in Antigua for the 1977-1998 period and its various sub-periods was decomposed along the lines indicated by equation 4. From this decomposition it is possible to obtain estimates of the rate of economic growth in TFP, that is the growth of output with respect to time, holding capital and labour input constant. The results are shown in Table 17.

Capital grew for the 1977-1998 period as a whole at 9.5 per cent and raw labour grew at 4.1 per cent, whilst education *per capita* grew by 3.6 per cent. By comparison, TFP growth was 1.53 per cent a year. However, productivity performance improved dramatically in the 1982 to 1990 sub-period. While the average TFP growth rate amounted to negative 1.2 per cent during 1978 to 1982, it rose to 3.7 per cent a year during the 1982 to 1990 period. In the deceleration period, TFP growth fell by an average of approximately 83 per cent. That is for the remaining two sub-periods, TFP growth averaged 0.60 per cent a year.

Sources of Economic Growth

Table 18 shows the relative contributions of capital, labour and productivity to aggregate output growth in 1978 to 1998 and the various sub-periods. The percentage contributions of capital and labour are obtained by weighting the corresponding growth rate by their respective income shares. For the period 1978 to 1998 as a whole, capital is clearly the most important source of growth in Antigua. Over the entire period capital accounted for approximately 44.6 per cent of output growth. The relative importance of capital has increased overtime, since the 1982-1986 sub-period. Initially in the 1978 to 1982 sub-period, capital contributed approximately 69.7 per cent of output growth. However, in the second sub-period capital contribution amounted to only 29.5 per cent of output growth. In the last three sub-periods, on average capital accounted for approximately 41 per cent of output growth. During the period of acceleration the contribution of capital averaged 35.2 per cent of output growth.

Over the entire 1978 to 1998 period labour's contribution to output growth was only 21.7 per cent. The sub-periods of labour's strongest contributions were 1978 to 1982 (55.6 per cent) and 1990 to 1998 (averaged 49.2 per cent of output growth). The contribution of labour averaged negative 6.7 per cent of output growth a year during the 1986 to 1990 sub-period. Adjustments for educational attainment of the population raises the effective growth rate of labour input.

Overall the contribution of TFP has amounted to approximately one third of output growth. After initially falling significantly, the contribution of productivity to growth has drifted upward in the two sub-period, 1982 to 1986 and 1986 to 1990 and trended downwards over 1990 to 1998. In the two sub-periods, 1982 to 1986 and 1986 to 1990 TFP's contribution to growth averaged 60 per cent of output growth.

Table 19 also reveals the contributions of the supplementary factors to output growth. As shown in Table 19 the terms of trade accounted for approximately 24.4 per cent of output growth over the entire 1978 to 1998 period. Apart from a marginal negative contribution in the sub-period 1990-1994, the contribution of the terms of trade has been positive. The largest contribution was in the sub-period 1978 to 1982, when it amounted to 86 per cent of *per capita* output growth. The terms of trade movement accounted for approximately 72.6 per cent of TFP growth over the entire period of analysis.

Growth of *per capita* trade volume averaged 0.03 per cent a year during the entire 1978 to 1998 period. The sub-period of highest growth was 1978 to 1982, when growth of *per capita* trade averaged 0.08 per cent a year. Overall the expansion of *per capita* trade volume accounted for approximately 0.72 per cent of growth in output *per capita*. However, it accounted for approximately 2.1 per cent of TFP over the period of analysis.

The reallocation of resources out of agriculture yields a net gain of 0.3 per cent of GDP a year over the entire 1978 to 1998 period. The sub-period of highest gain was 1982 to 1986, when it amounted to 0.08 per cent a year. Overall, the reallocation of resources from agriculture to other sectors over the period accounted for 6.8 per cent of total *per capita* output growth. In terms of TFP, this amounted to approximately 20.2 per cent a year.

The contribution of environmental management to output growth over the 1978 to 1998 period amounted to approximately 0.98 per cent of output growth. Its period of largest contribution was 1978 to 1982, when it accounted for 18.2 per cent of output growth. The other sub-periods, however, have experienced negative contributions to output growth from this variable. Finally, institutional quality has contributed approximately 3.1 per cent of output growth over the entire period. In general, its contribution has grown over the period of analysis.

The Real Return on Capital

The analysis in this section is concluded with an examination of the real rates of return on capital implied by the analysis. In this work the rate of return on capital is measured as the capital share divided by the capital-output ratio. As shown in Table 20, the real return to capital in Antigua has had a reasonably smooth pattern through time, but falling. Indeed, whilst over the entire period of analysis the real return averaged 18.3 per cent, the average return has fallen overtime. For instance in 1978 to 1982 sub-period it averaged 24.2 per cent. However, by the 1994 to 1998 sub-period it averaged 13.4 per cent. This implies that future sustained growth in GDP *per capita* driven by further massive capital accumulation is unlikely.

VII. Conclusions

This paper has analysed the processes that characterised the growth performance of Antigua and Barbuda over the period 1900 to 1998. First, the importance of capital accumulation to the growth processes in Antigua especially over the 1978 to 1998 period was highlighted. Initially this was in the form of foreign private capital inflows, especially in the early 1900s and also the economic take-off era. Since then government has borrowed heavily to prop up *per capita* GDP growth. Second, the growing importance of TFP growth to overall output growth, particularly in the two last sub-periods, 1990 to 1994 and 1994 to 1998, has been shown. Growth in the importance of TFP may be as a direct result of the diffusion of improved techniques introduced to Antigua by foreign investment. Third, the significant contribution of the terms of trade to the growth of national income in Antigua and Barbuda was highlighted. As a small open economy the balance of payments is critical to the standard of living. Therefore, without increasing output, national income can rise because of favourable changes in relative prices. The improvements in the terms of trade, which Antigua and Barbuda enjoyed over the period largely emerged from its transformation to tourism, an income elastic activity. Fourth, the importance of inter-sectoral labour movements in accounting for the growth performance was also highlighted. This result of course is not surprising given the rapid shift out of agriculture to tourism, which the economy experienced.

The paper also revealed the importance of a favourable social, political and international economic background, which facilitated the economic transformation of Antigua and Barbuda. Foreign capital inflows played a critical role to Antigua's economic performance over the period of analysis. The growth of foreign capital during the take-off and to some extent in modern Antigua appears to have been a rational response of investors to relatively high rates of return on capital, especially in the late 1970s to mid 1980s.

Finally, the paper uncovered three basic patterns of growth in Antigua and Barbuda. The first pattern 1900 to 1950, driven by the export of sugar and sea-island cotton, was based largely on private sector activity depending on protective preferences in Europe. The second pattern 1950 to 1977 was driven by private foreign investment in hotels and other tourist infrastructure, with minimal assistance from government. The third pattern is from 1977 to the present where the growth was driven mainly by significant debt accumulation by the public sector. To a large extent the pattern of growth experienced from the 1950s up to the mid 1980s represented a type of leap frogging from one activity to another. However, the process has been interrupted by the massive accumulation of public debt, just as the *per capita* GDP growth began to trend downwards. That is, in the mid-1980s the economy leap frogged into massive public debt, instead of a new high income generating activity.

The policy implications of the research rests largely with the lesson that in order to sustain gains in real income growth and achieve further advances a number of new policy initiatives would be required. The first such policy initiative is the need to pursue activities, which result in a secular improvement in the terms of trade. Second, a realisation that further improvements in productivity are required. This may involve technological catch-up with the industrialised world. To facilitate this a number of initiatives, which have been shown to enhance social capability, must be addressed. These would include:

(i) Improvements in management capability of the public and domestic private sector.
(ii) Improvements in the financial management of the public sector finances, which would by necessity, include reducing the debt overhang of the public sector. This ought to remove the credibility problem for government, which the debt overhang creates, depressing private investment.
(iii) Further liberalisation of the economy.

Third, further growth through capital accumulation may be unlikely given the measured trend decline in the real rates of return on capital. This finding reinforces the need for measures to increase future productivity growth.

The research can be extended in at least two areas. First, it is possible to examine the precise long-run impact of the public sector debt accumulation on economic growth. Second, the paper can be extended to an analysis of the balance of payments constraint on long-run economic growth in Antigua. This can be a critical area for any future inquiry given that Antigua is a small open economy, which participates in a currency union. Such an investigation may seek to uncover the system properties of the currency union, and thereby determine whether growth is demand or supply constrained.

Finally, a project to extend and develop consistency among the various bits and pieces of available economic data, especially on GDP, labour force, government finance and balance of payments, for Antigua and Barbuda, can go a long way to providing a comprehensive set of data on Antigua as it relates to its economic development and performance.

Notes

[1] Throughout the paper I will use Antigua interchangeably with Antigua and Barbuda.

[2] Two important aspects of the 20th century economic growth are the following. First, the long-run experience has mostly been of divergence rather than convergence. Secondly, achieving rapid catch-up growth is relatively rare and has required social capability that derives from appropriate policies and institutions. Two kinds of societies appear to have been especially disadvantaged, colonies and communist countries.

[3] This era can be described as the story of agriculture and sugar in particular.

[4] The slaves were fully emancipated in 1838, at which time they were free to seek employment wherever it could be found.

[5] Antigua is relatively flat and, therefore, the majority of the lands was under sugar cane cultivation and therefore fell under the ownership of the planter class.

[6] Economic historians have always stressed the importance of institutions to growth outcomes. In particular its role in containing rent-seeking and enforcing well-defined property rights, which promoted market-based activities and innovations on an increasingly wide scale. North [1990] has argued that well-defined, enforceable property rights that ensure strong but limited government is the central underpinnings of growth capability. Transaction costs are seen as still much greater in the third world than in the earlier history of the Organisation for Economic Cooperation and Development (OECD). North also points out, however, that what is much less well understood is the political economy of successful institutional reform.

[7] The uniform banking act is harmonized legislation in force throughout the ECCB countries.

[8] The government also took other initiatives, such as the establishment of enclave manufacturing industries and the revitalisation of the agricultural sector.

[9] The agricultural production which remains is principally for domestic use with very little for export. In addition it has shifted dramatically from sugar and cotton to foodstuff. In particular the government has implemented several initiatives to increase production of vegetables, etc. The government's involvement is these schemes are in the area of providing seeds, fertilizers, technical assistance and setting up of marketing arrangements with local distributors for sale of produce.

[10] Antigua has a number of attractions as a tourist destination. Among these are the historic sites such as the old naval (Nelson's) dockyard at English Harbour, which serves as a perfect anchorage for yachts. Also the Parham church, which is one of the oldest in the West Indies.

[11] A Jumbo jet service was introduced to Antigua in 1978 by British Airways.

[12] This policy stance of the Antiguan authorities must be seen in the context of local ambivalence in other CARICOM countries by both government and the general public to tourism and foreign investment around this time.

[13] The development of special events such as Antigua sailing week, which opened in 1968, was a major factor in the growth of arrivals.

[14] During the Apartheid era in South Africa all imports from that country were prohibited. Otherwise all goods were freely imported under open general license granted by the Ministry of Finance. Some commodities, however, required individual license, unless imported from CARICOM countries -CARICOM rules of Origin regulations- implemented in June 1981 in Antigua. Payments for authorized imports were permitted upon application with supporting documentary evidence. Authority was delegated to the commercial banks to approve application forms for the purchase of foreign currency after confirming sight of documents. A number of imports are exempted from duties. These include basic foods and agricultural imports. Other exemptions for machinery and equipment and raw materials are done under the fiscal incentives law and the Hotel Incentives Act. However, a number of exemptions are also granted on an ad hoc basis. The import duties in 1980 to 85 were subjected to a 35 per cent CARICOM common external tariff. In respect of exports and export proceeds, no surrender of export proceeds is required and re-exports are not subject to any tax if they take place within the bonded area.

[15] It can be argued in this context that the environmental conditions played a significant role in the demise of the sugar industry and the rise of the tourism industry. The arid climate of Antigua and Barbuda is considered ideal for tourism in the context of the Caribbean.

[16] The cumulative losses amounted to EC$3.4 million over the 1967 to 1973 period.

[17] The focus on tourism at the time was not without its critics, who highlighted the social ills and likely cyclical nature of the industry.

[18] On account of the significant capital inflows and tourist arrivals during this period, GDP *per capita* growth averaged approximately 6.4 per cent per annum in the period 1960 to 1970. Private foreign capital inflows were particularly high in the mid to late 1960s.

[19] A number of incentives were also offered to the hotels and restaurant sector under this act. This included generous tax holidays; losses incurred during the holidays can be accumulated and carried forward for a maximum of 6 years after the end of the holiday. A hotel training school was also established.

[20] The tourism development cooperation was established in 1997 to better manage and plan the tourism industry.

[21] Approximately 6,000 acres of land were leased to a US company in 1976.

[22] Approximately DM120 million was borrowed to construct this hotel. The main consideration of the government in undertaking this project were; job creation; increase room capacity and providing facilities for conferences in Antigua.

[23] The country suffered a severe drought in 1984 and had to import approximately 500,000 gallons of water per day from Dominica. On this account US$49 million was secured in the form of export credits from a Japanese company for a desalination plant and another US$22 million from Foster Wheeler, a British company, for construction.

[24] Much of the investment during this period related to capital stock maintenance. That is resurfacing and rebuilding roads after several years of neglect.

[25] In recent times the government has adopted a bilateral approach to the external arrears problem. For example the government cleared its arrears to the Caribbean Development Bank with cash payments in 1996-1997, after which lending from that institution resumed.

[26] In recent times the authorities have also used innovative financial arrangements for a number of capital projects. In addition, bon financing arranged by Banks in Trinidad is becoming popular throughout the ECCU, including Antigua.

[27] The Antiguan economy suffered a severe disruption as a result of the damage caused by Hurricanes Luis and Marilyn in September 1995, which led to a 5 per cent decline in real GDP that year. Direct hurricane related losses were estimated at US$300 million (60 per cent of GDP) of which approximately half was covered by insurance. Output growth subsequently rebounded to 5.1 per cent in 1996 owing to stronger tourism and construction activity. However, tourist activity as measured by air arrivals have not yet fully recovered from 1995 hurricane, despite the reopening of most hotels by the end of 1995.

[28] In deriving the initial capital stock (K^*), a depreciation rate of 0.04 per cent was used. The initial stock of capital was estimated using the following relationship. $I_{gt}=(\lambda+\phi)K_{t-1}$, where I_{gt} is the gross investment in machinery at time t and λ is the rate of economic growth of output in period t. This assumes that in the base period the capital stock was growing at the same rate as output.

[29] Fixed weights is consistent with a much more limited set of production functions; but existing studies provide surprisingly little evidence of major changes in factor share over time. Instead most of the debate has been about the absolute level of capital share. Within the industrial countries, the disagreements are largely reconcilable by relating them to differences in the breath of the definition of capital and the specific sector of the economy that are included in the studies.

[30] For developed countries the share of capital in national income tend to range from 25 to 35 per cent, whilst for developing countries the range is usually 35 to 45 per cent.

Table 1

Growth Rates: 1978-1998 (Percentages)			
Category	GDP	Population	GDP per head
GDP (population)	4.9	0.4	4.5
GDP (labour force)	4.9	1.7	3.2
Excluding agriculture	6.3	2.8	3.5
Manufacturing	3.0	-0.3	3.3
Construction	7.4	2.8	4.6
Hotels & Restaurants	5.4	3.7	1.7
Participation rate	78.4	79.8	

Source: Author's calculations.

Table 2

Educational Attainment of the Adult Population (As per cent of total population)		
Category	1960	1996
None	5.2	15.8
Primary	83.1	45.0
Secondary plus	11.7	38.9

Source: Population censuses, labour department.

Table 3

Summary Statistics on Per Capita Public Expenditure on Education (US dollars)					
Period	Mean	SD	CV	Median	Mean/Median
1960-1998	*47.59*	*23.86*	0.50	49.00	0.971
1960-1970	15.55	8.45	0.54	13.00	1.196
1970-1980	42.27	5.87	0.14	42.00	1.006
1980-1990	67.09	5.99	0.09	68.00	0.987
1990-1998	70.11	6.72	0.10	71.00	0.987

Notes: SD= Standard Deviation.
CV= Coefficiency Variation.

Source: Author's calculations.

Table 4

Summary Statistics on Population Growth					
Period	Mean	SD	CV	Median	Mean/Median
1900-1998	*0.67*	*1.63*	2.4	0.6	1.094
1900-1910	-0.83	0.01	0.0	-0.8	0.995
1910-1920	-0.45	0.59	-1.3	-0.3	1.787
1920-1930	-0.02	2.40	-127.9	0.5	-0.040
1930-1940	1.96	0.98	0.5	1.9	1.011
1940-1950	2.21	0.88	0.4	2.2	1.009
1950-1960	1.88	2.37	1.3	2.9	0.648
1960-1970	1.47	1.55	1.0	1.9	0.784
1970-1980	-0.60	0.71	-1.2	-0.7	0.858
1980-1990	0.41	0.27	0.7	0.3	1.262
1990-1998	0.56	0.24	0.4	0.4	1.487

Source: Author's calculations.

Table 5

Summary Statistics on Tourist Arrivals, 1960-1998					
Period	Mean	SD	CV	Median	Mean/Median
1960-1998	9.29	14.71	1.58	6.13	1.52
1960-1970	12.86	17.04	1.32	6.13	2.10
1970-1980	9.99	18.27	1.83	17.18	0.58
1980-1990	9.61	13.27	1.38	15.32	0.63
1990-1998	4.60	6.95	1.51	4.08	1.13

Source: Author's calculations.

Table 6

SUMMARY STATISTICS ON TOURIST EXPENDITURE PER CAPITA, 1960-1998					
Period	Mean	SD	CV	Median	Mean/Median
1960-1998	4,832.8	5,646.3	1.2	1,787.8	2.7
1960-1970	280.7	76.2	0.3	282.4	1.0
1970-1980	986.4	464.4	0.5	811.5	1.2
1980-1990	5,157.7	2,693.1	0.5	4,387.4	1.2
1990-1998	13,931.0	2,265.1	0.2	14,939.7	0.9
Growth					
1960-1998	15.4	22.0	1.4	13.6	1.1
1960-1970	12.8	16.3	1.3	7.5	1.7
1970-1980	20.3	36.3	1.8	17.2	1.2
1980-1990	18.2	7.7	0.4	19.1	0.9
1990-1998	7.5	11.2	1.5	12.0	0.6

Source: Author's calculations.

Table 7

SUMMARY STATISTICS TRADE PER CAPITA: GROWTH OF IMPORTS					
Period	Mean	SD	CV	Median	Mean/Median
1937-1960	15.50	28.10	1.80	9.50	1.60
1937-1950	21.90	36.50	1.70	18.60	1.20
1950-1960	9.10	7.70	0.90	8.50	1.10
1960-1978					
1978-1998	*2.59*	*16.45*	6.36	-1.34	-1.93
1978-1982	11.77	21.63	1.84	-0.89	-13.21
1982-1986	3.12	23.82	7.63	1.69	1.85
1986-1990	-2.38	13.98	-5.87	-3.59	0.66
1990-1994	-0.48	4.13	-8.56	-2.42	0.20
1994-1998	-1.49	3.55	-2.39	-2.50	0.59

Source: Author's calculations.

Table 8

Summary Statistics Trade per capita: Growth of Exports					
Period	Mean	SD	CV	Median	Mean/Median
1937-1960	8.40	44.90	5.30	8.50	1.00
1937-1950	19.40	48.90	2.50	22.50	0.90
1950-1960	0.60	40.70	72.40	8.50	0.10
1960-1978					
1978-1998	*14.42*	*18.02*	1.25	9.52	1.51
1978-1982	26.97	28.47	1.06	22.63	1.19
1982-1986	18.42	17.69	0.96	16.58	1.11
1986-1990	17.68	10.28	0.58	14.45	1.22
1990-1994	7.48	5.32	0.71	7.48	1.00
1994-1998	0.46	5.79	12.63	1.66	0.28

Source: Author's calculations.

Table 9

Summary Statistics on Terms of Trade					
Period	Mean	SD	CV	Median	Mean/Median
1978-1998	*1.16*	*9.33*	8.06	0.001	1,297.30
1978-1982	4.39	15.64	3.56	10.062	0.44
1982-1986	1.54	14.23	9.25	0.899	1.70
1986-1990	2.60	7.32	2.81	0.899	2.90
1990-1994	0.00	0.01	-19.44	0.000	28.90
1994-1998	0.40	0.91	2.24	0.000	88,591.50

Source: Author's calculations.

Table 10

SECTORAL ORIGIN OF GDP, IN PERCENTAGE OF GDP AT FACTOR COST						
Category	1950	1963	1973	1977	1987	1998
Agriculture	43.00	18.17	6.64	10.96	4.52	4.08
Manufacture	1.67	2.67	9.91	4.35	3.56	2.21
Services	54.30	79.16	83.45	84.69	91.92	93.71
Less Government Services	43.51	63.40	73.00	71.10	77.90	76.40

Source: National Accounts.

Table 11

INVESTMENT INDICATORS, IN PERCENTAGE OF GDP			
Period	Investment/GDP	FDI/GDP	FDI/Investment
1977-1982	30.07	9.30	23.77
1982-1986	29.40	7.88	24.50
1986-1990	39.00	11.88	31.06
1990-1994	32.15	8.33	25.45
1994-1998	31.40	4.62	15.07
1977-1998	30.90	7.87	22.13

Source: Balance of Payments Digest, various issues.

Table 12

SUMMARY STATISTICS ON GROWTH OF PER CAPITA EXTERNAL PUBLIC DEBT					
Period	Mean	SD	CV	Median	Mean/Median
1978-1998	*18.7*	*51.8*	2.8	6.0	3.1
1978-1982	26.2	34.7	1.3	6.2	4.2
1982-1986	37.8	100.6	2.7	1.2	31.9
1986-1990	56.0	90.6	1.6	16.2	3.5
1990-1994	7.1	14.8	2.1	5.4	1.3
1994-1998	6.7	15.6	2.3	6.3	1.1

Source: Author's calculations.

Table 13

Derivation of Capital and Labour Shares in GDP at Factor Cost for Antigua (In percentage of GDP)				
Year	Imputed rent	Depreciation	Operating Surplus	Total Capital Share
1983	11.65	7.60	24.05	43.30
1984	11.35	8.20	23.45	43.00
1985	10.45	8.10	23.25	41.80
Mean	11.15	7.96	23.58	42.70
SD	0.62	0.29	0.42	0.82
CV	0.06	0.04	0.02	0.02
Median	11.35	8.10	23.45	43.00
Year	Self-employed	Wages & Salaries	Employer Contributions	Total Labour Share
1983	5.70	48.20	2.80	56.70
1984	5.70	48.40	2.80	56.90
1985	5.80	49.50	2.90	58.20
Mean	5.73	48.70	2.83	57.30
SD	0.06	0.70	0.06	0.81
CV	0.01	0.01	0.02	0.01
Median	5.70	48.40	2.80	56.90

Source: National Accounts data.

Table 14

Summary Statistics on Institutional Quality					
Period	Mean	SD	CV	Median	Mean/Median
1978-1998	*5.35*	*0.58*	0.11	5.40	0.99
1978-1982	4.59	0.13	0.03	4.61	1.00
1982-1986	4.94	0.17	0.03	5.05	0.98
1986-1990	5.35	0.20	0.04	5.45	0.98
1990-1994	5.74	0.17	0.03	5.80	0.99
1994-1998	6.11	0.07	0.01	6.17	0.99

Source: Author's calculations.

Table 15

Summary Statistics on the Environmental Management Index					
Period	Mean	SD	CV	Median	Mean/Median
1978-1998	*1.36*	*0.46*	0.34	1.26	1.08
1978-1982	1.23	0.65	0.53	1.32	0.93
1982-1986	1.90	0.59	0.31	1.38	1.38
1986-1990	1.31	0.06	0.05	1.26	1.04
1990-1994	1.25	0.03	0.02	1.22	1.02
1994-1998	1.19	0.01	0.01	1.18	1.01

Source: Author's calculations.

Table 16

Capital Formation and Labour Force Growth in Selected Periods (Average annual percentage change, unless otherwise indicated)						
Variables	1978 to 98	1978 to 82	1982 to 86	1986 to 90	1990 to 94	1994 to 98
Output	4.50	4.90	6.40	6.00	3.00	2.70
Real Capital Stock Growth	9.50	15.88	8.79	11.74	6.25	4.60
Investment-Output ratio (%)	25.14	14.69	17.67	30.89	29.54	14.58
Capital-output ratio (%)	2.34	1.53	1.95	2.26	2.81	1.49
Population	0.37	-0.14	0.38	0.38	0.63	0.41

Source: Author's calculations.

Table 17

AGGREGATE PRODUCTIVITY GROWTH IN SELECTED PERIODS: AVERAGE ANNUAL PERCENTAGE CHANGE						
Variables	1978 to 98	1978 to 82	1982 to 86	1986 to 90	1990 to 94	1994 to 98
Output	4.5439	4.8597	6.3593	6.0287	2.9641	2.6726
Capital stock	9.5000	15.8818	8.7941	11.7383	6.2537	4.6015
Raw labour (partial) productivity	4.0831	4.9103	5.8887	5.3053	2.4621	1.9281
Weighted Labour (partial) productivity	3.5592	2.1557	5.4415	6.4328	2.1768	1.3590
Weighted Capital (partial) productivity	2.5156	1.4689	4.4818	3.5225	1.6289	1.6902
Augmented TFP [1]	1.5310	-1.2351	3.5640	3.9267	0.8417	0.3766

Note: TFP: Total Factor Productivity.
[1] This takes account of quality adjustments to the raw factor inputs. In this case the adjusted factor is labour, quality adjusted to take account of its education and training.

Source: Author's calculations.

Table 18

SOURCES OF ECONOMIC GROWTH						
Variables	1978 to 98	1978-1982	1982-1986	1986-1990	1990-1994	1994-1998
Growth						
Output Growth	4.5439	4.8597	6.3593	6.0287	2.9641	2.6726
Capital Input growth	9.5000	15.8818	8.7941	11.7383	6.2537	4.6015
Labour Input growth	3.4369	9.4383	3.2036	-1.4105	2.7478	4.5850
Total Factor Productivity (TFP)	1.5310	-1.2351	3.5640	3.9267	0.8417	0.3766
Contributions						
Contribution of capital per capita	44.6368	69.7730	29.5241	41.5702	45.0450	36.7587
Contribution of education per capita	21.6706	55.6424	14.4329	-6.7033	26.5597	49.1504
Contribution of TFP	33.6926	-25.4154	56.0430	65.1331	28.3953	14.0909

Source: Author's calculations.

Table 19

IMPACT OF SUPPLEMENTARY FACTORS ON GROWTH

Variables	1978 to 98	1978-1982	1982-1986	1986-1990	1990-1994	1994-1998
Growth						
Total factor productivity (TFP)	1.3592	-1.9051	4.3700	3.9840	0.9492	0.6167
Terms of Trade	1.1077	4.2001	1.4723	2.4894	-0.0005	0.3873
Trade volume	0.0328	0.0793	0.0426	0.0335	0.0157	0.0157
Structural change	0.3093	0.0605	0.0184	0.0007	0.0006	0.0059
Environmental management	0.0444	0.8833	-0.3652	-0.4324	-0.0262	-0.0541
Institutional quality	0.1430	0.3860	0.0895	0.0617	0.0699	0.0479
Residual	-0.1063	-6.8444	2.3063	1.7737	0.7820	-0.0072
Contributions						
Contribution of the terms of trade	24.3787	86.4261	23.1522	41.2928	-0.0165	14.4918
Contribution of trade volume	0.7226	1.6315	0.6703	0.5563	0.5308	-0.1187
Structural change	6.8074	1.2458	0.2891	0.0113	0.0207	0.2197
Environmental management	0.9764	18.1769	-5.7425	-7.1718	-0.8829	-2.0242
Institutional quality	3.1478	7.9438	1.4077	1.0233	2.3595	1.7936
Residual	-2.3404	-140.8394	36.2663	29.4212	26.3837	-0.2712

Source: Author's calculations.

Table 20

RETURN TO CAPITAL

Period	Mean	SD	CV	Median	Mean/median
1978-1998	*18.25*	*4.08*	0.22	17.45	1.05
1978-1982	24.20	3.34	0.14	21.94	1.10
1982-1986	20.13	0.64	0.03	20.45	0.98
1986-1990	18.19	1.60	0.09	16.93	1.07
1990-1994	14.86	0.70	0.05	14.26	1.04
1994-1998	13.44	0.11	0.01	13.20	1.02

Source: Author's calculations.

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