CARIBBEAN CENTRE FOR MONETARY STUDIES

PRESENTATIONS

XXXV ANNUAL CONFERENCE OF MONETARY STUDIES

PUBLIC INVESTMENT AND ECONOMIC GROWTH IN ANGLOPHONE CARIBBEAN COUNTRIES

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24-28 November 2003

Sir Cecil Jacobs Auditorium
Eastern Caribbean Central Bank
Basseterre
St Kitts

THEME:
Economic Reform:
Towards A Programme For The Resuscitation of Economic Growth And Development In The Caribbean

CARIBBEAN DEVELOPMENT BANK

PUBLIC INVESTMENT AND ECONOMIC GROWTH IN ANGLOPHONE CARIBBEAN COUNTRIES

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October 2003

ABSTRACT

A reduced role for the State in economic development and the greater reliance on the market in the allocation and the use of resources is often heralded as essential for developing countries to achieve higher growth rates. Policy prescriptions often include cuts to both recurrent and capital expenditure, and divestment of State assets. The call for the retreat of the State, among other measures, is underpinned by the fundamental underlying assumption that private investment is superior to public investment insofar as the effects on long run economic growth is concerned. In an attempt to explore the relevance of this assertion to Anglophone Caribbean countries, this paper analyses the effects of private investment and public investment on economic growth with an empirical model using data covering the period 1988 to 2000. While the results of the study show that both private investment and public investment has a positive influence on growth in Anglophone Caribbean Countries, there is no strong evidence to suggest superiority of private investment.

Acknowledgement

The preparation of this paper drew on the advice, assistance and comments of several colleagues, to whom I am thankful. In particular, special thanks are due to Mr. Winston Moore of the Central Bank of Barbados for providing support in the conduct of the econometric analysis, and to Miss Julietta Jeffers of the Eastern Caribbean Central Bank for assisting with the gathering of data. Special thanks are also due to my colleagues within the Economics and Programming Department of the Caribbean Development Bank especially Miss Ann-Marie Warner, Mr. Carl Howell, Mr. Elmer Harris and Patrick Kendal for providing invaluable comments.

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1. BACKGROUND

Four decades of economic growth and development since the 1960s have seen the evolution of most Anglophone Caribbean countries[1] from relative underdevelopment to modest prosperity as middle-income nations. Real income per capita, life expectancy, health and education standards have all risen substantially. The performance of these countries compares favourably with many developing countries, but falls well below the success achieved by the Newly Industrialized Countries (NICs). The World Bank Report on the East Asian Miracle (1993) notes that: "East Asia has a remarkable record of high and sustained growth. From 1965 to 1990 the 23 economies of East Asia grew faster than all other regions of the world. Most of this achievement is attributable to seemingly miraculous growth in just eight economies: Japan, the 'Four Tigers'- Hong Kong, the Republic of Korea, Singapore, and Taiwan, and the three newly industrializing economies of South East Asia, Indonesia, Malaysia and Thailand." The level of poverty in these economies has been drastically reduced. In Singapore for example, the percentage of the population below the poverty line declined from 31 per cent in 1972 to 10 percent in 1982, while that in Malaysia fell from 37 per cent in 1973 to 14 percent in 1987.

In contrast, within the Anglophone Caribbean, poverty remains high, and for most countries the percentage of the population falling below the poverty line ranged from 20 per cent to 37 per cent (measured in various years between 1996 and 2000). Stronger economic growth supported by appropriate public distribution policy, will be extremely critical in Anglophone Caribbean countries, if the incidence of poverty is to be reduced more rapidly.

Poverty in the Caribbean has been aggravated by the challenges of the new millennium, including rapid technological changes and trade liberalization. At the same time industrialized countries continue to practice protectionism while concessionary flows have declined, constraining the growth of economic activity. Recently, the various policies that have been adopted in the Caribbean Region do not seem to provide sufficient response to regional decline,

[1] Anglophone Caribbean Countries refers to the english-speaking countries and territories of the Caribbean. Most are former colonies of Great Britain, while a few are still colonies of Great Britain.

while neo-liberal policies have not contributed to substantial and important solution (Karagiannis, 2002).

A reduced role for the State in economic development and the greater reliance on the market in the allocation and the use of resources, is often heralded as essential for developing countries to achieve higher growth rates. Tailor, et, al. (1997) contend that these neo-liberal policy recommendations have often failed to bring about sustained economic growth in countries that have adopted them. Many stabilisation and structural and adjustment programs[2] supported by the IMF and the World Bank and implemented in developing countries, often contain recommendations to reduce trade and fiscal deficits to "sustainable" levels. Policy prescriptions regularly include cuts to both recurrent and capital expenditure, and divestment of state assets. The call for the retreat of the State among other recommendations, is underpinned by the underlying assumption that private investment is superior to public investment insofar as the effects on long run economic growth is concerned.

What therefore determines growth? Is there a role for the public sector and if so what is that role? Some Economists and other academics are of the view that public policies can have a strong influence on growth, and in the case of the NICs, many attribute their rapid growth largely to the influence of their public policies. Amsden (1994), in a review of the East Asian Miracle noted: "The East Asian Miracle Report by the World Bank reflects the Bank's internal conflict. On the one hand, the report widens the scope of the debate on the role of the state in economic development, a debate muffled by the neo-liberal 'Washington Consensus'. Most chapters indicate a thorough understanding on the part of the Bank staffers of East Asian institutions and how deviations from the free market model induced development. *Yet* ...all the Bank was capable of doing was seeing the image of its own 'market-friendly' policies in East Asia's Fortunes." Many commentators are of the opinion that most of the conditions deemed to be necessary for a poorer country to embark on a path of sustained growth as accepted by a number of international institutions (commonly referred to as the Washington consensus) are indeed necessary, but not sufficient. Karagiannis, et, al. (2002) are of the view that developing countries need to engage in active public participation that go well beyond the Washington consensus.

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[2] Recent examples include programmes for Dominica, Jamaica, and Venezuela

One channel through which public sector policy is conducted is through public investment. This paper will, therefore, focus on the influence of public investment on growth and in particular on the experience of the Anglophone Caribbean. By splitting gross capital formation into its public and private components, the separate effects of public investment and private investment on economic growth in Anglophone Caribbean countries will be studied within a simple quantitative growth model. Similar studies have been done with respect to developing countries by Khan and Reinhart (1990), and for Latin America, by Ramirez and Nazmi (2003). By studying the investment aspect of public sector policy, the paper seeks to draw lessons and make inferences on the role of the State in promoting economic development in Anglophone Caribbean countries and point the direction towards further research. The following sections of the paper develop the discussion by first considering some theoretical influences on growth and their relevance to the Anglophone Caribbean. This will be followed by a discussion of the empirical findings by other researchers with respect to individual countries or groups of countries, before discussing the empirical results obtained for Anglophone Caribbean countries. The final section raises some policy implications, points the way towards further research and concludes.

2. INFLUENCES ON GROWTH

An appreciation of some of the factors that have been theorized to influence real output growth, and their applicability to the Anglophone Caribbean is essential for the construction of an empirical model for testing. Economic growth in developing countries is not as simple as is implied in neoclassical growth theory. The emergence of a wide range of new growth theories for example those highlighting imperfect information, increasing returns, endogenous technological change and historical lock-ins, suggests that growth has no single explanation.

2.1 Neoclassical View

Under the neoclassical growth model formulated by Solow (1956), it is assumed that for a given state of technology, output is a function of labor and capital; that the labor force growth rate is given exogenously; and that investment and savings are a fixed fraction of output. Under

this model, an economy is expected to tend towards an equilibrium level of capital to labor ratio, associated with an equilibrium output per person ratio and an equilibrium capital to output ratio. This implies that once the economy is at the equilibrium capital to labor ratio, it will grow along a stable long run path in line with the growth rate of the labor force. Equilibrium under the neoclassical model assumes a given savings rate. An increase in this savings rate will therefore cause the economy to move towards a higher equilibrium capital to labor ratio (and output per worker) along which equilibrium growth will resume. Technical progress can be incorporated into this basic neoclassical model by assuming that technical change is labor augmenting. Thus the neoclassical model predicts that along the long run equilibrium growth path a given rate of change in labor will be matched by a proportional change in capital and output, leaving per capita income unchanged, while exogenous changes in the savings rate and in technical progress will raise output per worker and hence per capita income.

While the neoclassical theoretical growth model may provide some explanation of real output growth in industrialized countries, it does not perform as well for developing countries, and worse still for micro-economies like those of the Anglophone Caribbean. However, the model does point to the role of investment and labor in growth and hence these variables are included in our empirical growth model for the Anglophone Caribbean countries.

2.2 Other Influences on Growth

New growth theories point to several other major influences on growth. One theory posits that technological change responds to the price signal making it endogenous to the economic system. While this may be highly relevant to the developed world, endogenous technological change has not been typical for Anglophone Caribbean countries, which lack a tradition of research and development and have largely been importers of technology. There is little or no information on research and development expenditure or other indicators of technical change in the Anglophone Caribbean. Technical change is still therefore largely exogenous to the Caribbean. Some researchers have attempted to measure the impact of imported technology on growth by using the ratio of imports to GDP as a dependent variable. However it is recognised that imported technology is largely embedded within imported capital and it is likely

that the impact of imported technology will be embedded within the impact of capital investments, and hence measuring the separate effect of technological change may be difficult. Given the profound influence that technological change can have on growth, and the absence of significant research and development among the private sector within the Caribbean, a review of the strategies that can be adopted by Caribbean countries to boost the contribution of technological change and innovation to development may be advisable. For example, what would be an appropriate approach to encouraging innovation and the adoption of new technology within the energy sector? Is that served best by the granting of monopoly power to firms, or what tax or subsidies incentive may be useful?

Modern growth theories also stress the importance of knowledge-driven growth. Essentially, the theory postulates that there could be increasing returns to factors over time as a result of new knowledge so that more output can be achieved with given factor inputs. What therefore influences our capacity to acquire and apply new knowledge? The level and quality of education attained by the population is likely to be one of the significant factors. Notwithstanding data limitations, we shall attempt to empirically investigate the influence of education on growth in Anglophone Caribbean countries.

Proponents of export led growth put forward the view that in a number of developing countries the growth of exports has led to the development of infrastructure, transport and communications among others, which in turn facilitated the production of other goods and services. Historically Anglophone Caribbean countries have been characterised by the exports of a few commodities (and more recently services), while importing to meet most of their needs. While there have been periods of decline and recovery, changes in exports have also been related to changes in the mix of products. Thus, given the long tradition of exports and the extreme openness of the economies, the infrastructure associated with exports has largely been long established and over time has been upgraded and modernized. However, some facilities such as airports have been more recently established. Further, it is commonly thought that trade liberalization (greater openness) would result in higher growth as countries specialize in producing goods and services in which they have a comparative advantage. We shall therefore seek to test the significance of the relationship between exports and growth, and openness and

growth within the Anglophone Caribbean notwithstanding conceptual difficulties that may arise with the use of popular measures of openness with respect to the direction of causality.

In developing countries whose exports are typically specialized in a few products, changes in the terms of trade are likely to strongly influence growth. However, data on the terms of trade measured as the ratio of export prices to import prices is not readily available for Anglophone Caribbean countries.

In addition to the factors identified above, public policy may be an important influence on growth. For instance, investment in an international airport is likely to have a different influence on growth if it is supported by public guarantees of loans for hotel construction in comparison with a policy against loan guarantees and in favor of restricting contingent liabilities. Since it may be difficult to establish a statistical relationship between public policy and growth, policy makers are left to observe the successes of other economies in an attempt to determine how public policy may be made more effective.

One of the necessary conditions advanced under the Washington consensus for developing countries to attain a sustained growth path is that of the "rule of law." This concept includes such things as the enforcement of property rights, the enforcement of contracts, law and order, and guarantees of basic rights of individuals to engage in economic activity, and political corruption. The degree to which rule of law is extended is likely to influence the investment climate, with implications for the growth rate of output. Indices measuring the extent of rule of law are not available for Anglophone Caribbean countries.

Some observers believe that more democracy fosters economic rights and tends to stimulate growth. This thinking is largely in line with neo-liberalism, which not only entails the reorientation of the economy towards free markets, privatization, deregulation, and a reduced role for the state in the economy, but also promotes liberal-democratic political institutions and processes, including more transparent forms of policy making. However, other observers have also stressed the growth-retarding aspects of democracy. A common view, since the 1960's, is that prosperity stimulates democracy. In fact, some observers have noted that most OECD

countries began their modern economic development in systems with limited political rights and became full-fledged representative democracies much later. Governments of Anglophone Caribbean countries have continued with liberal democratic forms of government since they began to attain political independence in the 1960s. Beyond multi-party electoral systems, meaningful participation in the process by which decision are made may have varied. Unfortunately, data is not available to gauge the level of democracy in Anglo Caribbean countries.

Several other variables may impact economic growth including the level of financial development, though there is much disagreement over the direction of causation. It must also be recognised that Anglophone Caribbean countries are extremely vulnerable due in part to their small size, and there have been various random occurrences that have impacted growth in these economies. These include oil price shocks, natural disasters, initiatives by OECD countries such as those regarding harmful taxes, and more recently the terrorist attacks on the USA on September 11th.

2.3 The Separate Effects of Public and Private Investments on Growth

A reduced role for the State as promoted under neo-liberalism, is premised on the belief that public activity contributes less to real output growth than does private activity. This assertion may not necessarily hold, or apply equally well, for all countries or groups of countries. For industrial countries with well-developed markets and operating near full employment, a relatively smaller role for the State in promoting economic growth and development may be necessary compared with that which may be necessary for developing countries.

In an attempt to explore the relevance of the assertion to Anglophone Caribbean countries, that public activity contributes less to real output growth than private activity, the independent effects of private investment and public sector investment will be analyzed within an empirical model, replacing the total investment variable. The results of the empirical investigation must however be interpreted cautiously. It is well known that in developing countries there are complementarities between public investment and private investment. Public

sector investment on infrastructure and for the provision of public goods often serves to make private investment more productive. Investment on social services such as health and education may have similar effects on private sector investment although the time frame over which the initial impact is felt may be longer. Hence, a significant part of the impact of public sector expenditure on growth may be manifested through the impact of private investments.

Barro (1990), in commenting on an insignificant coefficient that he found for the public investment to GDP variable among other variables when regressed on growth (for a wide cross section of countries), noted that the result is consistent with the hypothesis that a typical country comes close to the quantity of public investment that maximizes the real output growth rate. This hypothesis is based on the theory that views public services as an input to private production within a Cobb-Douglas type production function. He noted that if governments optimized their investments, then, output growth and the ratio of government investment to total investment (and government investment to GDP), would show little cross-sectional correlation. On the other hand, the association would be positive (or negative) if governments typically choose too little (or too much) of productive public services.

A related issue is whether public sector investment crowds out private sector investment. Public sector investment may crowd-out private sector investment directly if it utilizes resources that would otherwise be invested by the private sector or if the public sector produces marketable goods that compete with the private sector output. Indirect crowding out could occur if private investors react adversely to expectations of economic performance based on current public investment policy. Indeed, it would be desirable to reduce public sector investment if at the margin it was less efficient (less necessary) and crowded out private investment. This situation could be reflected in a negative relationship (though not necessarily) between economic growth and public sector investment.

Public sector investment can be financed through taxation, domestic debt, foreign debt, grants or money creation. Among Anglophone Caribbean countries, public investment is largely financed through debt and grants, although taxes have also contributed. It would be difficult to make an argument that resources obtained by Caribbean public sector through foreign debt and

grants would have otherwise been available to the private sector. Often these resources are from multilateral institutions and bilateral donors, which do not engage the private sector. In addition, the public sectors in these countries are very small market players and their access to foreign commercial debt does not preclude the private sector's access directly. The picture may be slightly different with respect to domestic debt, which traditionally has taken two forms – commercial bank debt and the issue of government treasury bills and bonds. The nature of the commercial banking system, being dominated by multinational banks, has usually meant that private sector demand for credit has been accommodated, the extent being dependent on the internal cost of accessing funds from head offices abroad. Further, it is likely that the sale of government paper on the domestic market would has also displaced domestic savings in addition to domestic investments. Within some territories, the traditional focus by the locally-owned component of the business sector on trade and commerce, and the domination of the government paper market by institutional investors and captive investors, may have meant that government paper largely displaced commercial bank savings. Besides investment in housing and commercial buildings, a significant share of private sector investment in Anglo Caribbean countries has taken place through foreign direct investment and it is unlikely that such investments could be directly crowded out by public sector investment. Among Anglo Caribbean countries therefore, direct crowding out of private sector investment by the public sector is likely to be relatively small. However, government investment policy can have indirect consequences on private sector investment activity through the impact of debt on foreign currency reserves, business confidence, and expected future tax incidence.

Public sector consumption expenditure may also influence growth. Some public consumption expenditure is necessary for the efficient functioning of an economy. However, public consumption expenditure may crowd out public investment, private investment or private consumption, especially where such consumption expenditure is financed through taxes. The impact of public consumption expenditure on growth will depend on the extent of crowding out of private and public investments. The impact of public consumption expenditure on growth in Anglophone Caribbean countries is included in the empirical analysis.

3. EVIDENCE FOR OTHER COUNTRIES AND GROUPS OF COUNTRIES, AND RELEVANCE TO ANGLOPHONE CARIBBEAN COUNTRIES

In a regression applied to panel data for a wide range of roughly one hundred countries for which data was available, observed from 1960 to 1990, Barro (1997) produced estimates of the influences of various variables on per capita GDP growth. Barro's results among others show:

- A significantly positive effect on growth from the years of schooling at the secondary and higher levels for males aged 25 and over.

- A significantly negative effect on growth from the ratio of consumption (exclusive of spending on education and defense) to GDP. This showed that a greater volume of nonproductive government spending and the associated taxation reduces the growth rate.

- The rule of law variable has a significantly positive coefficient, interpreted as meaning that greater maintenance of the rule of law is favorable to growth.

- The terms of trade variable has a significantly positive coefficient, thus an improvement in the terms of trade stimulates an expansion of domestic production.

- A negative and significant coefficient on the logarithm of the initial level of per capita GDP, which implies that countries converged towards their long run output level.

Barro (1997) also noted that much of the positive estimated effect of the investment ratio on growth in typical cross-country regressions reflects the reverse relation between prospects and investments.

Barro (1990) found that for 98 countries, a regression of the average annual growth rate of real per capita GDP from 1960 to 1985, yielded a significant negative coefficient for the ratio of government consumption to GDP. Further, for the 76 countries for which data on public

investment were available, the regression results showed a positive but insignificant coefficient for the public investment to GDP ratio.

Analyzing 16 OECD countries during the period, 1971 to 1983, Barth and Bradley (1987) found a negative relationship between the growth rate of real GDP and the share of government consumption spending. They also found that the effect of the share of government investment spending to GDP on growth was statistically insignificant although the point estimate was positive. For wide cross-sections of countries (developed and developing) and for OECD countries, several other researchers found either negative or statistically significant relations between the growth rate of real GDP and the share of government consumption spending in GDP.

Khan and Reinhart (1990) investigated the separate effects of private investment and public investment on real growth for a cross section sample of 24 developing countries using average data for the period 1970 to 1979. The dependent variables in the simple econometric linear growth model used by Khan and Reinhart, were limited to private investment to GDP, public investment to GDP, and population growth used as a proxy for labor force growth. The growth of exports or the growth of import was also used as a fourth dependent variable. Khan and Reinhart's results showed a positive and significant (at the 1 per cent level) coefficient for private sector investment to GDP variable. A negative coefficient for the public sector investment to GDP variable was obtained. However, it was not significantly different from zero at the 5 per cent level, and hence the researchers stated that that, "one cannot make too much of the sign of this coefficient." Khan and Reinhart indicated that at best the results suggested that public sector investment in developing countries has no effect on growth. On the basis of these results it appeared that the direct effects of private investment on growth outweighed the effect of public sector investment. Khan and Reinhart also noted that their standard growth model explained the average growth rates of the 24 countries in their sample reasonably well. The coefficient of determination (R^2) of their estimated equations ranged between 0.47 and 0.74. Khan and Reinhart concluded that one could therefore say that the proposition that private sector investment should be favored in development and adjustment strategy has some empirical support. However, they suggested that this conclusion needed to be qualified as the model only

captured the direct effects of public investment on growth. They noted that it is quite possible that public investment has positive indirect effects on growth. Thus the result does not give a true picture of the respective role of private investment and public investment. Considering only the direct effects of private investment and public investment, Khan and Reinhart suggested that the policy implication is, that governments should aim at creating conditions that make private investment attractive.

Ramirez and Nazmi (2003) reported that in order to meet prescribed cuts in the fiscal deficit (stemming from IMF and World Bank sponsored stabilisation and adjustment programmes), the governments in Latin America have resorted to the politically expedient policy of disproportionately reducing public investment in economic and social infrastructure. They stated that these policies may be economically foolish in the long run if as a number of investigators have recently shown, there are significant complementarities between public and private investment spending. As part of their investigation of the impact of public sector investment on growth, using panel data on nine Latin American Countries over the period 1983 to 1993, Ramirez and Nazmi estimated an equation for the rate of growth of per capita GDP. The model was based on a modified neoclassical production function. Their results indicated that for a given value of per-capita GDP, both private and public investment has a positive and statistically significant impact on output growth. They therefore concluded that IMF-sponsored policies, which result in a disproportionate reduction in private and public investments, are ceteris paribus, detrimental to long-term economic growth.

Using cointegration analysis, Ramirez's (2002) results from a study on Mexico suggested that (lagged) increases in public investment spending on economic infrastructure – as opposed to overall public investment spending – have a positive and highly significant effect on the rate of labour productivity growth. He noted that this along with the other results of the study suggested that the composition of government spending may also play an important role in determining the rate of labour productivity growth.

Caribbean researchers Lewis and Craigwell (1998), using time series data covering the period 1960 to 1991 for Barbados, sought to explain the pattern of growth in small open

economies. From their econometric analysis the impact of capital and labor on growth were positive and significant. Further, they found that in the long-run, the coefficient on the government to private capital stock ratio was negative, implying that, in the case of Barbados, government investment spending (infrastructure spending) contracted output. They explained that this result may be due to limited financial resources available in a typical small open economy such as Barbados, which would result in government investment crowding out private investment. A negative and statistically significant coefficient on the government consumption to output ratio was found in both the long-run and short-run. The researchers also found that the coefficient on the financial development variable, the degree of openness of the economy variable, the birth rate variable and a number of other measures of the impact of external forces (with the exception of the short-term interest rate) were not significant in the long-run and short-run.

Clearly, the results obtained by Barro (1990) showing an insignificant coefficient of the ratio of public investment to GDP variable, is also consistent with a situation where groups of countries with too little public services coexist with other groups with too much and others with just about the right amount! It would therefore be useful to investigate the relationship for more homogeneous groups of countries such as those of the Anglophone Caribbean to determine whether they are providing too little or too much public sector investment.

Barro (1997) in his investigation of a wide cross section of countries had also shown a conditional rate of convergence of 2.5 per cent. He noted that this rate of convergence is slow in that it would take a country 27 years to get halfway toward its steady state level of output and 89 years to get 90 per cent of the way. Under the neoclassical model the steady state levels of capital and output per worker depends on the propensity to save – which varies across countries. Changes in technology will also affect the steady state level of output. Since Anglo Caribbean countries have largely being importers of technology and there have been continuous technological improvement over the last century, it means that they are likely to often be in a position where they are adjusting towards steady state growth and this adjustment is slow if Barro is correct. Further, given limited domestic savings, governments of Anglophone Caribbean countries have sought to attract foreign investments. Foreign investment has been

very significant but has exhibited much variability. The impact of government investment on growth could differ under conditions such as those characterizing the Anglophone Caribbean compared with conditions typical of developed countries, which may be closer to steady output levels. An empirical investigation with respect to the Anglophone Caribbean would help in studying such impacts.

There are also significant differences between many developing countries and Anglophone Caribbean countries. The most significant difference is perhaps that Anglophone Caribbean countries are extremely small and vulnerable. Therefore the results from Khan and Reinhart's (1990) study on developing countries and Ramirez and Nazmi's (2003) study with respect to Latin America may not be entirely applicable to the Anglophone Caribbean. While there are differences among Anglophone Caribbean countries they are a fairly homogeneous group, due in part to their similar colonial heritage. These countries inherited similar systems and arrangements with respect to production, trade, banking, political organizations and law. Further, since they began to achieve independence from Britain in 1962, these countries have largely upheld well-functioning liberal democratic systems.

4. EMPIRICAL MODEL AND DATA ISSUES

A simple linear model based on a modified neoclassical approach allowing for other influences on growth, was used to estimate the impact of various variables on growth. Using regression analysis, a base equation (1) with the general form shown below was first estimated. Secondly, to test the separate effects of public investments and private investments on economic growth, a second equation (2) was estimated in which the total investment to GDP variable was split into its public and private components.

$$y = \beta_1 + \beta_2 I + \beta_3 L + (\beta_4 Z + \ldots \beta_n Z) \qquad (1)$$

$$y = \beta_1 + \beta_{2p} PI + \beta_{2g} GI + \beta_3 L + (\beta_4 Z + \ldots \beta_n Z) \qquad (2)$$

Where,

β^1 is a constant

β's other than β^1 are the coefficients of the regressors

y is the rate of growth of GDP

I is total investment to GDP ratio

L is the growth in employment,

PI is the private investment to GDP ratio,

GI is public investment to GDP ratio,

I = PI + GI

Z's represents other variables that may influence growth

The equations were estimated from a sample of panel data for 12 Anglophone Caribbean countries[3] over the period 1988 to 2000 and the fixed effects estimator (see Baltagi, 2001). The period and countries was chosen based on the availability of data. Data for Montserrat was excluded on the basis of the island's extreme circumstances, which resulted from the volcanic eruptions that have been affecting the island since 1995.

There were data limitations and other issues, which influenced the number and quality of variables and proxies used in the estimates. Statistics on GDP, gross capital formation, exports of goods and services, imports of goods, central government capital expenditure and public consumption expenditure were largely available. Other data required was not as readily available.

Data on public investment was not readily available. Central government capital expenditure was thus substituted. It should be noted that there may be some variations in central government activity across the countries and central government capital expenditure is often under-recorded due to the fact that some projects are not implemented through normal channels.

[3] Countries included in the panel are Barbados, Guyana, Jamaica, Trinidad and Tobago, Belize, Antigua and Barbuda, Dominica, Grenada, St.kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Anguilla.

Private investment was represented as the difference between gross capital formation and central government capital expenditure. Thus, this measure includes some level of public sector activity conducted through non-central government public enterprises. Many of these public sector enterprises engage in private sector type activities.

Data on the growth in employment was not readily available. The growth rate of the population was used as a proxy. However, the link between population and employment may not be a tight one, particularly where a high level of unemployment exists.

Data on the level of educational attainment of the population such as the percentage of the population with tertiary training, school enrolment ratios or the number of years of secondary and tertiary schooling achieved by adults 25 years of age and older, was not readily available. An attempt was made to use the expenditure by the ministry of education (reported in budget estimates) to GDP ratio as a proxy for the level of education.

Data on the terms of trade was not available. The ratio of the index of consumer price in the USA (the major trading partner) to the domestic consumer price index adjusted for changes in the nominal exchange rated, was uses as a proxy.

5. EMPIRICAL RESULTS

The results of the empirical tests are set out in this subsection. The coefficient on the import of goods to GDP ratio was not significantly different from zero. Similarly, when this variable was replaced with the ratio of import of goods plus export of goods and services to GDP variable (a measure of openness), the coefficient found was not significantly different from zero. Explanations of these finding may be related to the way in which trade liberalization has been progressing. Where trade liberalization may have had an impact, developing economies may not yet have fully adjusted their production, partly due to continuing protection among industrialized nations in areas where developing countries are more efficient, and also due to relatively slow diffusion of technology. Thus the impact of openness on growth in developing countries such as those of the Anglophone Caribbean is unlikely to be significantly positive. Further, the use of

imports as an indicator of the level of imported technology is probably too crude to yield useful results, and as noted earlier, imported technological improvements may be embedded in new investment.

The proposition of a positive coefficient for the export of goods and services to GDP variable was not acceptable at the 5 per cent level of significance. However, the proposition was acceptable at the 10 per cent level of significance. This weak result, i.e. rejection at the 5 per cent level of significance, may be related to the fact that Caribbean economies have been extremely open for hundreds of years (i.e. in some sense have approached maximum exports to GDP ratios and openness ratio), and therefore changes in the exports to GDP ratio may have been largely random or based on product decline and recovery cycles. Changes in the types of products produced and exported by an economy are important in determining growth, but for extremely open countries like those of the Anglophone Caribbean, shifts in the product mix would not necessarily be reflected in changes in the exports to GDP ratio. Further, even if the results are interpreted as showing some evidence of a relationship between output growth and exports of goods and services to GDP, the direction of causality may still be doubtful.

The coefficient on the terms of trade variable was not significantly different from zero. This outturn probably reflected the inappropriateness of the proxy variable used.

A negative coefficient on recurrent expenditure by the Ministry of Education to GDP ratio variable was obtained, and was significant. The unexpected sign on this variable if it is taken as an indication of the level and quality of education is probably due to the inappropriateness of the proxy. Further, the impact of higher level of education on growth would be more readily seen over much longer periods than 13 years. The result may, however, point to the possibility that higher spending on education have not been achieving desired ends and therefore a search for explanations that would lead to more appropriate policy would be desirable. For instance, if too many trained and educated persons migrate from Anglophone Caribbean countries, or if the areas of education and training provided are not relevant to the economic realities of the countries, then higher spending on education will reduce growth by crowding out investment spending – both public and private. With respect to East Asia, Amsden

(1994) noted: "Without an investment policy, expenditures on primary and secondary schooling might simply have led to unemployment and tertiary school leavers might merely have added to the 'brain drain.' The presumption of the Bank's (World Bank) 'market-friendly' approach is that investment in education obeys a kind of 'Say's law,' with the supply of educated people creating the demand necessary to employ it. Instead, investments in education may behave in accordance with Keynesian 'ineffective demand.' Sub-Saharan African Governments, for example, invest more than East Asian Governments in education – 4.1 per cent versus 3.7 per cent of GDP – but unemployment of primary and secondary school leavers in Africa is rampant."

The negative coefficient on the expenditure by the ministry of education to GDP variable hinted at a possible overall negative impact of overall public consumption expenditure on growth. When the expenditure by the ministry of education to GDP variable was replaced with the public consumption expenditure to GDP variable, a negative and significant coefficient was obtained. This could be interpreted as suggesting that higher non-productive spending (beyond some unknown level) and the taxes used to finance such spending, have negatively impacted growth in Anglophone Caribbean countries by crowding out private and public investments.

A positive and significant coefficient was found with respect to the total investment (gross capital formation) to GDP variable as was expected. A positive and significant coefficient was also obtained for the population growth variable, notwithstanding the crude nature of this measure, which was used as a proxy for labour input. Table 1 provides summary statistics on the estimated coefficient of variables used in a base real output growth equation (1) after eliminating the variables which were highly statistically insignificant. The base equation provides the standard against which to compare results from the estimated equation (2) in which the gross capital formation is split into its private and public components.

TABLE 1: BASE EQUATION RESULTS

	Coefficient	Standard Error	t-probabilities
I (Gross Capital Formation to GDP)	0.1757	0.0382	0.000
L (Population Growth)	0.0800	0.0312	0.011
Public Consumption Expenditure to GDP	-0.2635	0.0909	0.004
Export of Goods and Services to GDP	0.1040	0.0600	0.085

TABLE 2: RESULT WHEN I IS SPLIT INTO IG AND IP

Variable	Coefficient	Standard Error	t-probabilities
IG (Central Government Capital Expenditure to GDP)	0.2426	0.1159	0.038
IP (Private Sector Investment to GDP)	0.1663	0.0391	0.000
L (Population Growth)	0.0758	0.0347	0.030
Public Consumption Expenditure to GDP	-0.2590	0.0929	0.006
Export of Goods and Services to GDP	0.1069	0.0605	0.079

The four variables - total investments (gross capital formation) to GDP, population growth, public sector consumption expenditure to GDP, and export of goods and services to GDP, explain approximately 29 per cent (R^2 = 28.7) of the variation in growth based on the sample data. This result suggests that real output growth in Anglophone Caribbean countries may have been impacted by a number of random occurrences. This suggestion is consistent with the fact that Anglophone Caribbean countries are highly vulnerable. One policy response in an attempt to achieve higher consistent long-term growth is for the public sector to seek to reduce vulnerability. In this regard, strategies to reduce vulnerability to natural disasters, to reduce crude oil dependency, and to create a larger market (through initiatives such as CSME) may be useful, among other strategies.

Table 2 provides summary statistics on the estimated coefficients of the variables for the estimated output growth equation (2) in which the total investment to GDP variable is replaced by the public investment to GDP variable and the private investment to GDP variable. These results show that the coefficients on the population growth variable, the public sector consumption to GDP variable, and the export of goods and services to GDP variable remain almost the same as the corresponding coefficient in the base equation. The coefficients on the public investment to GDP variable and the private investment to GDP variable are both positive, the former acceptable at the 5 per cent level of significance, while the later is acceptable at the 1 per cent level of significance. While the estimated coefficient for the public investment to GDP variable is larger than the coefficient for the private investment to GDP variable, a conclusive statement regarding which category of investment has the largest impact on growth cannot be made, due to the differences in the standard error, although the positive coefficient on the private investment variable is acceptable at a higher level of significance. Equation (2), which splits the gross capital formation to GDP variable into its public and private components, accounts for a similar level of variation in growth – approximately 29 per cent as does base equation (1). Based on these results it appears that both private investment and public investment have a positive impact on economic growth in Anglophone Caribbean countries. These results are similar to those found for Latin America by Ramirez and Nazmi (2003), but differ from that found by Khan and Reinhart for a broad cross-section of developing countries.

It must, however, be noted that that Caribbean governments often engage in investment spending, which while impacting positively on output, may not be proportionately correlated with output growth. For instance, public spending to replace infrastructure damage by a hurricane would not necessarily coincide with output growth in the economy, but in the absence of such public spending output growth might be lower. Additionally, where counter-cyclical spending policies may have been pursued by Caribbean governments, higher levels of public capital expenditure occurring at times of lower levels of output growth, is not unlikely. Justification for counter-cyclical policies would be on the assumption that in its absence long-term growth might be lower. The higher level of significance for the acceptance of a positive impact of private investment compared with public investments is therefore not surprising. Further, as discussed before, public investment may make private sector investment more

productive and hence the impact of central government investment may influence the economy indirectly through private sector investment.

If public investment is as efficient as private sector investment (in terms of their contribution to economic growth), then the impact on growth from a switch between private and public investment would be neutral. If public investment is less efficient than private investment, then a switch from private investment to public investment would result in slower economic growth. As noted earlier, the extent of the direct substitution between public and private investments would depend on the source of financing. Since the results in this study do not strongly suggest a difference in efficiency between public investment and private investment one cannot conclude that public investment adversely crowds-out private investment in Anglophone Caribbean countries, based on the analysis in this study. Subsequent investigation of the nature of crowding out of private investment by public investment would be desirable, through for instance, the estimating of a private investment equation. This investigation could also consider the extent to which governments of Anglophone Caribbean countries have engaged in investments which could have been undertaken by the private sector.

Notwithstanding the positive and significant relationship obtained between public investment and real output growth, it should be noted that some categories of public investment may not be growth enhancing and may have unequal influence on growth. Such an investigation would be desirable in which public capital expenditure (as well as public consumption expenditure) is categorized into major groups such as infrastructure spending, education and health spending, and private sector type spending. Further, it should be appreciated that governments may have objectives for investment spending besides output growth. Understanding the relationship between various spending categories and growth would, however, contribute to more optimal decision-making.

6. POLICY IMPLICATIONS, FURTHER RESEARCH AND CONCLUSION

The econometric analysis undertaken in this research has only been able to account for less than 30 per cent of the variation in growth Anglophone Caribbean countries. To some

extent this result reflects the extreme vulnerability of these economies as they have been exposed to various random shocks. In that regard reducing economic vulnerability should be a critical area for public policy focus. Additionally however, data weakness may have contributed to the relatively weak explanation of growth by the model. In addition to the unavailability of data to test for some influences identified by theory, the quality of data and the appropriateness of proxies used may have adversely impacted the explanatory power of the model. In the further development of this research, attempts will be made to improve the quality of the variables and proxies used in the model. The econometric results however contain some useful information, and it may be particularly useful for exploring the separate impacts of private and public sector investment on economic growth. The results can be taken as a useful starting point that should be followed by further research – both quantitative and qualitative. The results must therefore be interpreted cautiously.

In seeking to adjust to a higher growth path, cuts in public consumption expenditure in favour of increased public capital spending may be desirable in Anglophone Caribbean economies. This is based on the econometric results obtained, which showed that public consumption expenditure had a significantly negative impact on growth, while public investment impacted growth positively. Barro, et, al. (1997) found negative relationships between public consumption expenditure and output growth for various countries surveyed – developed and developing. In contrast, results obtained by other researchers vary with respect to the direct impact of public investment expenditure on growth. Further investigation of the significant positive impact obtained for Anglophone Caribbean countries, in contrast to some other studies for developing countries would be useful. If one were to be guided by Barro's (1990) neoclassical approach regarding the role of government spending seen as an input into private production, then the results for Anglophone Caribbean countries suggest that these economies are characterised by too little productive public investment, and as a result, an increase in spending is likely to impact private investment and hence growth positively. Further, differences in the composition of public investment may result in differing impacts on growth among countries or groups of countries. In subsequent work, the impact of various categories of investment spending by Anglophone Caribbean countries will be investigated. Clearly in

seeking higher growth, a focus of capital expenditure on growth enhancing investment and programmes would be desirable.

A strong conclusion on the relative importance of public versus private investments in Anglophone Caribbean countries in influencing growth could not be reached based on the econometric results of the study, although the positive impact of private investment on growth was acceptable at a higher level of significance than was the acceptance of the positive impact of public capital expenditure. It is worth reiterating, however, that Caribbean Governments have often engaged in investment spending aimed at forestalling economic decline. Consequently, the measured influences of public investment spending on real output growth, does not show the full influence of public spending. Further, public sector investment has a positive indirect effect on growth through its influence on the rate and productivity of private capital formation. As Khan and Reinhart et al. (1990) acknowledged, if it were possible to capture both the direct and indirect effects of the public-private components of investment, and take into account the relationship between the two, one would get a true picture of the respective roles of private and public investment. It thus appears that among Anglophone Caribbean countries public sector investment has an important direct and indirect role in influencing growth. Thus in seeking to stabilize and adjust their economies, disproportionate cuts in public capital spending should be avoided. Further, there was no evidence to suggest adverse crowding out of private investment by public investment.

Clearly, given the complementarities between private and public investment that are widely acknowledged, and the strong result obtained in this paper that private investment has a positive influence on growth, Anglophone Caribbean governments should also aim at creating an appropriate framework through which private investments may be more productive and attractive. In that regard, further investigation (quantitative and qualitative) of the determinants of private sector investment in Anglophone Caribbean countries would be useful in seeking to inform the design of an appropriate framework.

The promotion of private investment should form an important part of public policy, since having an appropriate environment may not guarantee private investments due to perceived

higher risk and information asymmetries. Yet, the question has to be asked whether there will be sufficient and reliable private capital investment in the long run in Anglophone Caribbean countries that would have a sufficiently large impact on growth, the standard of living and poverty reduction under current government policy approaches. Further, despite the positive direct impact of central government capital spending on real output growth reported in this paper, one would have to ask whether the policy environment was conducive to maximizing the direct and indirect impact of the given investments on real output growth. Lewis and Craigwell (1998) reported that between 1980 and 1990 Barbados per capita income grew by 2.34 per cent. However, they noted that this was still below that for the successful East Asian Economies (most of which recorded real per capita income growth for the same period of over 10.0 per cent), in spite of engaging in similar large public sector investments and heavy human and capital accumulation. The question of the impact of government policy on growth therefore comes into focus. This issue will be investigated more thoroughly in subsequent work and will include consideration of the virtues of neo-liberal policy approaches (which have been pursued by most Caribbean governments since independence) versus interventionist or developmental state approaches and their suitability to Anglophone Caribbean countries.

It is noted, however, that the econometric results obtained in this paper do not support a call for a retreat of the State from economic activity in Anglophone Caribbean countries, since it shows a significant positive direct influence of public sector investments on growth, and there is no evidence to suggest that private sector investment should be preferred to public investment. However, further research is needed to help define the categories of government spending that may have positive or negative influences on growth or which may yield inferior results where private activity can be substituted. On the basis of such evidence, governments may be able to tailor the services they provide to match their objectives for growth subject to other legitimate objectives.

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