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# THE IMPACT OF GROWTH IN THE TOURISM SECTOR ON ECONOMIC DEVELOPMENT: THE EXPERIENCE OF SELECTED CARIBBEAN COUNTRIES

**Dr. Nelson Modeste**
**South Carolina State University**

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# THE IMPACT OF GROWTH IN THE TOURISM SECTOR

# ON

# ECONOMIC DEVELOPMENT:

# THE EXPERIENCE OF SELECTED CARIBBEAN COUNTRIES

by

Nelson C. Modeste*
Department of Agribusiness and Economics
P. O. Box 8084
South Carolina State University
Orangeburg, South Carolina 29117

*This paper was written while the author was Country Economist at the Caribbean Development Bank.

For many Caribbean countries, tourism is the engine of growth and development. According to Bryden (1976), de Kadt (1976), Blackman (1991), Bull (1991) and others, tourism should positively affect economic growth and development for several reasons. First, tourism earns the country foreign exchange which it can use to import not only consumer goods but also capital and intermediate goods. Second, tourism facilitates the use of resources that are in line with the country's factor endowment. Third, tourism provides employment opportunities for workers in the economy. Fourth, tourism promotes improvements in the country's infrastructure that benefits not only tourists but also others in the economy. Fifth, tourism is seen as serving as the conduit for transferring new technology and managerial skills into the economy. Finally, tourism is viewed as possessing the potential for creating positive linkages with other sectors of the economy particularly agriculture, manufacture, and other service industries. Based on these considerations, the notion is commonly advanced that in tourism dependent economies development could be enhanced if more resources are allocated to the tourism sector.

To test the hypothesis that expansion of the tourism sector accelerates economic development, a framework similar to that developed by Feder (1982) and Ram (1986) is utilised. The outline of that model is presented in Section I. Section 2 then tests the model developed in Section 1 by using pooled data for Barbados (1981 - 1992), Antigua and Barbuda (1981-1992), and Anguilla (1985-1992). The nature of the linkage between the tourism sector and the agriculture, manufacture and the other service industries in the long-run and the short-run is explored in Section 3. In Section 4, the main findings of the study are summarised.

## SECTION I: MODEL

Following Feder and Ram, this section develops a model that incorporates the tourism sector as an explanatory variable in the sources of growth equation. As a first step in that direction, it is assumed that the economy is divided into two sectors. The first is the tourism sector (T). The other is the non-tourism sector (N). In the case of the tourism sector, output is dependent upon inputs of labour and capital. While in the non-tourism sector, apart from the usual inputs of labour and capital, the output of the sector is also dependent upon

activity in the tourism sector. For these two sectors, the respective production functions are therefore expressed as follows:

$$(1) \quad T = G(K_T, L_T),$$
$$(2) \quad N = F(K_N, L_N, T)$$

where T = tourism output, N = non-tourism output, $K_N$, $K_T$ = the capital stock of the non-tourism and tourism sectors respectively, and $L_N$, $L_T$ = the labour force for the non-tourism and tourism sectors respectively.

Second, with the total amount of inputs assumed to be given:

$$(3) \quad K_N + K_T = K, \text{ and}$$
$$(4) \quad L_N + L_T = L$$

The third assumption underlying the analysis is that total output (Y) is the sum of the output from the tourism (T) and non-tourism (N) sectors, i.e:

$$(5) \quad Y = N + T$$

Given equation (5), the changes in output can be viewed as reflecting changes in tourism and non-tourism output.

In light of the externalities generated in the tourism sector, assumption four indicates that the relative factor productivities in the two sectors will exceed unity by an added factor, $\delta$, i.e:

$$(6) \quad (G_k/F_k) = (G_\ell/F_\ell) = 1 + \delta$$

where the subscripts denote partial derivatives of the function with respect to the particular input.

By differentiating the production functions and by using equations (3) through (6), along with some further manipulations, the following aggregate growth equation is derived:

$$(7) \quad \dot{Y} = \alpha_o \dot{L} + \alpha_1 \dot{K} + \alpha_2 \dot{T}$$

where the dot over the variable indicates the rate of growth for the particular variable.

To determine the impact of tourism expansion on economic development, as measured by per capita income, this study follows Salvatore and Hatcher and divides equation (7) by the labour force variable. As a result, the following model for estimation is derived:

$$(8) \quad \ddot{Y} = \alpha_0 + \alpha_1 \ddot{K} + \alpha_2 \ddot{T}$$

where $\ddot{Y}$ = the growth in real per capita income; $\ddot{K}$ = the growth in capital, per head; and $\ddot{T}$ = the growth in tourism output, per head.

The explanation of equation (8) is quite straightforward. It simply says that growth in per capita income is driven by the growth in capital, per head and the growth in tourism output, per head.

## SECTION 2: EMPIRICAL ANALYSIS

The engine of growth and development in Barbados, Antigua and Barbuda, and Anguilla for most of the 1980's and the early 1990's has been tourism.

As Table 1 indicates, real tourism output hovered around 14%, 16% and 33% of real GDP in 1992, in Barbados, Antigua and Barbuda, and Anguilla respectively. This compares with 11.5%, 16.7% and 32.8%, respectively in 1985. On a per capita basis, the evidence also indicates that between 1985 and 1992 tourism output has steadily grown. Indeed over the period 1985 - 1992, the level of real tourism output, per head, in Barbados, Antigua and Barbuda and Anguilla has grown at an annual average rate of about 2.8%, 5.3% and 3.5% respectively. Factors reflecting this expansion as shown in Table 1 are the increases in the number of visitors to each country and the rise in visitor expenditures.

For estimation purposes pooled time-series and cross-section data from Barbados, (1981-1992), Antigua and Barbuda (1981-1992), and Anguilla (1985-1992) are utilised. The data are derived from a variety of sources. For Barbados, the data were obtained from various issues of the Central Bank of Barbados, Annual Statistical Digest and the Caribbean Development Bank (CDB), Annual Economic Report, Barbados. For Antigua and Barbuda, the data on population size was obtained from the Census Office, Department of Statistics, Antigua and Barbuda. All of the other data for Antigua and Barbuda are obtained from the Organisation of Eastern Caribbean States, Economic Affairs Secretariat in Antigua and Barbuda. The data for Anguilla are taken from various issues of Caribbean Development Bank, Annual Economic Report, Anguilla.

Prior to estimating equation (8), the data for each variable was tested for stationarity on a country-by-country basis[1]. With all the variables for each country being stationary, equation (8) was then estimated by ordinary least squares with dummy variables (LSDV). Those results are reported in Table 2. They indicate that the estimated coefficient for the tourism variable is equal to 0.25. At the 5% level, the t-statistic indicates that one must reject the null hypothesis that growth in tourism output, per head, does not affect per capita GDP growth. The relatively low value for this coefficient suggests that a high proportion of the value added generated in the tourism sector leaks out of the economy as imports. An F-value of 0.01 moreover suggests that one cannot reject the null hypothesis that there is no variation in the impact of tourism growth on GDP growth across the three countries included in this study. To illustrate this relationship, a scatter plot of the growth in per capita income and the growth in tourism output, per head is shown in Figure 1. With most of the observations falling in the first and third quadrants, respectively, the figure indicates a strong positive relationship between per capita GDP growth and tourism expansion.

For the capital variable, the differential slope coefficient for the multiplicative variable, $(D_3.\ddot{K})$ is statistically significant. This result would suggest that there is some variation in the impact of capital growth on GDP growth in Anguilla relative to Barbados. For Barbados and Antigua and Barbuda,

the impact of capital growth on income apart from being similar is quite small. A 1% growth in capital would, for instance, only generate a 0.06% increase in income. For Anguilla, however, the impact is much stronger. There, a 1% growth in capital would generate a 0.33% increase in income. The relatively low values for the elasticity of per capita income with respect to capital, per head, in Barbados and Antigua and Barbuda could be indicative of a high incremental capital-output ratio.

With the differential intercept for Antigua and Barbuda relative to Barbados also being significant, the results also suggest that Antigua and Barbuda has moved along a higher growth path than that followed by Barbados. For Anguilla and Barbados, however, one cannot reject the null hypothesis that for those two countries there is no difference in the origin of the growth path. The adjusted $R^2$ for equation (8) is 0.84 while the F-statistic is 30.58. For comparison purposes, the growth in per capita income is regressed on the growth in capital per head. In that model, once the inter-country variations in the impact of capital growth on GDP growth is taken into account, the effect of a 1% growth in capital on income in Anguilla is about 0.34% compared with 0.06% for Barbados and Antigua and Barbuda. The adjusted $R^2$ is, meanwhile, equal to 0.70 with the F-statistic being equal to 16.1. Based on these results, it seems that for these three economies, equation (8) would serve as a better predictor of growth than the more traditional growth model.

## SECTION 3: THE NATURE OF THE LINKAGE BETWEEN THE TOURISM SECTOR AND THE OTHER SECTORS OF THE ECONOMY

As a further test of the model, the paper looks at the impact of growth in the tourism sector on the other sectors of the economy. From studies by Bryden, de Kadt, Bull and others, the view emerges that growth in the tourism sector leads to growth in the other sectors of the economy such as agriculture, manufacture and the other service industries. Output in these sectors is expected to rise as a result of the expenditure by tourists on domestic goods and services. In the 'Dutch Disease' literature, however, an alternative view of the relationship is expressed. In that literature, the outcome depends upon the relative strength of two factors, the resource pull effect and the expenditure

effect. For goods produced in the tradable sector, such as agriculture and manufacture, the fundamental force at work according to Corden (1982) and others is the resource pull effect. When this effect is operative, one expects the tourism sector to expand at the expense of the agriculture and manufacture sectors. For the non-tradable, service sector, the outcome is uncertain, in an a priori sense, since the impact on the sector depends upon the relative strength of the expenditure effect, which is positive and the resource pull effect which exerts a negative impact on the sector.

To empirically assess the strength of the relationship between tourism development and sectoral development, Table 3 presents the simple correlation coefficients and the corresponding t-statistic in parentheses beneath the correlation coefficient on a country-by-country basis. According to those results, all of the correlation coefficients except three are statistically significant as well as possess a negative sign. For the other three coefficients, the correlation coefficient carries a positive sign but the t-statistic suggests that one cannot reject the null hypothesis that the correlation coefficient is zero.

Given the limitations of correlation analysis, the study further explores the nature of the relationship between expansion in the tourism sector and the size of the other sectors in the economy, in the long-run and the short-run, by utilising the following error correction model (ECM):

$$(9) \quad Y_t = a_0 + a_1 X_t + U_t$$

$$(10) \quad \Delta Y_t = b_0 + b_1 \Delta X_t + b_2 \Delta X_{t-1} + b_3 \Delta Y_{t-1} + b_4 U_{t-1} + e_t$$

where Y is the log of the sector share in GDP, X is the log of the share of tourism output in GDP, "$\Delta$" is the change, and $U_t$ and $e_t$ are the random disturbance term.

In light of the rejection of the hypothesis that the variables in the sector equation for manufacture and other service industries are co-integrated, only estimates for the agriculture sector are reported. For this exercise, the

X and Y series for each country achieves stationarity when expressed in first difference form. Given this, it is concluded that the series are I(1). To estimate the parameters in the error-correction model, the Engle-Granger two-step procedure is applied. In the first step, equation (9) is estimated by LSDV. The residuals are calculated and tested for stationarity[2]. Second, the short-run sector output equation (10) is estimated with the residuals from step one being substituted for $U_{t-1}$. The estimates for both the long-run and the short-run sector output equations are reported in Table 4. Those estimates show that in the long-run as well as in the short-run, expansion in the tourism sector is accompanied by contraction in the relative size of the agriculture sector. In addition to that, they show that the error-correction term is not only significant but also possess a negative sign. This result suggests that when the actual size of the agricultural sector exceeds the expected or desired size, output in the sector over the short-run contracts. This adjustment helps to restore equilibrium in the sector over the long-run.

## SECTION 4: SUMMARY

This paper makes two points. The first is that economic development is positively affected by growth in the tourism sector. The second point is that the growth in the tourism sector is accompanied by contraction in the agricultural sector as the latter sector loses resources to the expanding sector. The results moreover suggest that some of the short-run changes in the size of the agricultural sector are designed to restore long-run equilibrium in the agricultural sector.

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## ENDNOTES

1. To check for stationarity each variable for each country was regressed against a time variable. The associated t-statistic was then used to test for the presence or absence of a trend. This approach was used by Love (1994).

2. To check for stationarity of the residual produced by equation (9), the residuals were regressed on a time variable on a country basis. The associated t-statistic was then used to test for the presence or absence of a trend.

TABLE 1: SELECTED MACROECONOMIC INDICATORS FOR BARBADOS, ANTIGUA AND BARBUDA AND ANGUILLA

| | Per Capita Income in ('000) US Dollars | | Real Tourism Output as a % of Real GDP | | Real Tourism Output per head in US Dollars | | Total Visitors to Country Figures in ('000) | | Total Visitor Expenditure in (mn) of US Dollars | |
|---|---|---|---|---|---|---|---|---|---|---|
| COUNTRY | 1985 | 1992 | 1985 | 1992 | 1985 | 1992 | 1985 | 1992 | 1985 | 1992 |
| BARBADOS | 4,688 | 6,029 | 11.5 | 14.3 | 176.3 | 215.8 | 309 | 462 | 309 | 462 |
| ANTIGUA AND BARBUDA | 2,710 | 5,788 | 16.7 | 15.8 | 244.0 | 348.0 | 133 | 332 | 133 | 332 |
| ANGUILLA | 4,100 | 5,182 | 32.8 | 33.3 | 1,347.6 | 1,728.8 | 56 | 93 | 12 | 36 |

TABLE 2: ESTIMATED COEFFICIENTS FOR GROWTH IN INCOME EQUATION

| Variables | Growth Equation (8) | A Conventional Growth Equation |
|---|---|---|
| Constant Term | -0.001<br>(-0.210) | 0.0003<br>(0.0416) |
| $\ddot{T}$ | 0.25<br>(5.32) | - |
| $\ddot{K}$ | 0.06<br>(2.65) | 0.09<br>(2.92) |
| Multiplicative and Additive Dummies | | |
| $(D_2.\ddot{K})$ | -0.01<br>(-0.58) | -0.06<br>(-1.41) |
| $(D_3.\ddot{K})$ | 0.27<br>(5.70) | 0.25<br>(3.73) |
| $D_2$ | 0.04<br>(4.60) | 0.06<br>(5.09) |
| $D_3$ | -0.005<br>(-0.537) | 0.003<br>(0.289) |
| Adjusted $R^2$ | 0.85 | 0.70 |
| F-statistic | 31.58 | 16.01 |

Notes: $D_2$ is dummy variable for Antigua and Barbuda; $D_3$ is dummy variable for Anguilla; the figures in parentheses below the coefficient are the t-statistics. The other variables have been defined in the text.

TABLE 3: SIMPLE CORRELATION COEFFICIENTS FOR THE MAJOR SECTORS OF THE ECONOMY

| Correlation Between: | Barbados | Barbuda | Anguilla |
|---|---|---|---|
| Agricultural Output and Tourism Output | -0.76* | -0.89* | -0.73* |
| | (-3.87) | (6.47) | (-2.74) |
| Manufacturing Output and Tourism Output | -0.52* | -0.51* | 0.07 |
| | (-2.01) | (-1.96) | (0.18) |
| Non-traded Output and Tourism Output | 0.09 | 0.09 | -0.94* |
| | (0.29) | 0.29 | (-7.28) |

The figures in parentheses below the correlation coefficient are the t-statistics. The asterisk indicates that the value is statistically significant at the 5% level.

TABLE 4: ESTIMATED COEFFICIENTS FOR THE ERROR CORRECTION MODEL

| Variables | Estimated Coefficients |
|---|---|
| | A: Long-Run Relation (Equation 9) |
| Constant Term | 7.363 |
| $X_t$ | -1.645 |
| Adjusted $R^2$ | 0.938 |
| | B: Short-Run Relation (Equation 10) |
| Constant Term | -0.028<br>(-2.034) |
| $\Delta X_t$ | -1.063<br>(5.061) |
| $\Delta X_{t-1}$ | 0.325<br>(1.525) |
| $\Delta Y_{t-1}$ | 0.106<br>(0.523) |
| $U_{t-1}$ | -0.843<br>(-4.065) |

The numbers in parentheses are the values of the t-statistics. In cases where no number was provided the t-statistic was not available. Instrumental variables were used to estimate the short-run relation, equation (10). To see if the residuals produced by equation (9) were stationary, the residuals for each country were regressed on a trend variable. The t-statistic was then used to test for the presence or absence of trend.

# Figure 1:Tourism & Economic Development