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## Cointegration and Causality between Tourism and Poverty Reduction

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**COINTEGRATION AND CAUSALITY BETWEEN TOURISM AND POVERTY  
REDUCTION<sup>i</sup>**

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## **ABSTRACT**

This study, using cointegration and causality tests, investigates the relationship between tourism development, economic expansion and poverty reduction in Nicaragua. The results indicate a long-run stable relationship between the three. The causality tests suggest a one-way Granger causal relation between tourism development and economic expansion, between tourism and poverty reduction and a bi-directional causal relation between economic expansion and poverty. The nexus of tourism, economic expansion and poverty reduction is established in the Nicaraguan economy. This result is supported by testing the sensitivity of the Granger causality test under different lag selections along the optimal lag. The empirical evidence points to the potential economic muscle of tourism to seriously tackle Nicaraguan poverty at scale through helping both Nicaragua's public and private sectors allocate resources to tourism development resulting in the overall improvement of the economy.

**Key words:** tourism, economic growth, poverty, co-integration technique, causality.

## INTRODUCTION

The face of poverty has its worst exposure in the most vulnerable developing countries forming the weakest and poorest segment of the international community (De Soto 2000; Chen and Ravallion 2001; Deaton 2002). For many of these developing countries, tourism development represents a good prospect for poverty reduction and economic growth. Historically, international tourism is the economic sector through which developing countries have managed to increase their participation in the global economy.

Many governments, however, either do not take tourism seriously or fail to make the connection between tourism and poverty reduction or both. In fact, this has resulted in a lack of empirical analysis to inform policy decisions. Particularly scarce is data on the impact of tourism on poor people (Markandya *et al* 2003). Ascertaining this relationship and its subsequent effects is, therefore, a relevant empirical question.

The claimed link between tourism development, economic growth and poverty reduction is not new in the literature about economic and tourism development (Elliott-Jones 1971; Bryden 1973; Brohman 1996; Clancy 1999; Page 1999; Sharpley and Telfer 2002; Tohamy and Swinscoe 2000). What is new, however, is the prominence that tourism has received recently in the fight against poverty by the academy, by the practitioners, and by the international agencies, particularly the World Tourism Organization (WTO). Tourism has been catapulted to the

forefront of the tools available to eradicate poverty effectively, relatively quickly and less costly in the developing countries.

The promise of tourism for developing countries both as a vehicle to gain a competitive advantage and as a vehicle to reduce poverty often is based on its potential impact on growth (Elliott-Jones 1971; Durbarry 2002, 2004; WTO 2002; Luvanga and Shitundu 2003). This promise, however, has not been validated empirically by the proponents of this new strategy against poverty.

Using Nicaragua as a test case, this study aims to answer the following four related questions:

First, is there a long-run equilibrium relationship between tourism expansion and economic expansion in Nicaragua? If so, to what extent does economic activity respond to the evolution of tourism activity?

Second, if an inverse relationship exists between economic expansion and poverty, to what extent does poverty reduction respond to the evolution of economic activity?

Third, is there a long-run equilibrium relationship between tourism expansion and poverty in Nicaragua? And if so, to what extent does poverty respond to the evolution of tourism activity?

Fourth, if a stable long-run relationship is established, between economic expansion, tourism, and poverty what is the direction of a causal relationship between these variables? In other words, is causality running, in either direction or both directions?

This study is a contribution to the current debate on the aforementioned questions. At the same time, it is an attempt to establish an empirical nexus between tourism expansion, economic expansion, and poverty reduction. This paper uses the Johansen (1988, 1991) and Johansen and Juselius (1990) Full Information Maximum Likelihood cointegration procedure (CI) to estimate the long-run equilibrium relationships between tourism expansion, economic growth and poverty. In addition, the study uses the Engle and Granger (1987) causality test in order to answer the causality question.

## **TOURISM AS A DEVELOPMENT STRATEGY**

### *The Perils and Potential*

During the 1970s and 1980s, both researchers and international agencies were either indifferent to, or outright critical of, the potential opportunities that tourism could hold for the developing world. Tourism has been criticized as a strategy for economic development because it is associated with dependency upon an external –and often fickle- source of growth (Bryden 1973; de Kadt 1979; Britton 1980). This negative attitude was either a result or a reflection of both the ongoing literature of that time that tourism was an unsound option for economic development and that the focus on poverty should be based on the development of agriculture. In some quarters, however, this critical attitude is still prevalent today (Wilkinson 1987; Pastor and Fletcher 1991; Copeland 1991; Sinclair 1998; Rao 2002).

In the meantime, the majority of developing countries still are faced with extreme poverty— about three billion of world’s inhabitants live on less than US\$ 2 per day, while near 600 million of these live below the poverty line with less than US\$ 1 per day (World Bank, 2001, pp 3-4). In this gloomy portrait, it seems that tourism is one of the only bright spots. Of the 78 low-income countries (per capita gross domestic product of less than US\$ 760), 56 countries designed a poverty reduction strategy document. From this group 45 countries (or 60% of them) identified tourism as a major catalyst of poverty reduction (Hawkins and Mann 2007). Considerable resources seem to be allocated to tourism in the hope of reaping benefits.

The past couple of decades, based on both its resilience and its alleged positive impacts for generating foreign exchange earnings, economic growth, rapid mass jobs creation, stimulus to consumption, and welfare enhancement, tourism is playing a major role in the formulation of the development strategies of developing countries. This position is supported by empirical evidence that tourism expansion is relevant and significant for growth and economic development (Belisle and Hoy 1980; West 1993; Modeste 1995; Zhou *et al* 1997; Shan and Wilson 2001; Sandler 2001; WTO 2002; Sugiyarto *et al* (2002); Easterly 2002; Balaguer and Cantavelle-Jorda 2002; Durbarry 2002, 2004; Dwyer *et al* 2003; Vanegas and Croes 2003; Dritsakis 2004; Eugenio-Martin *et al* 2004; Croes and Vanegas 2006; Steiner 2006; Kim *et al* 2006).

Strategies for tourism development have been found to be effective in unlocking opportunities for the most vulnerable groups within the tourism sector. More recently, some international organizations have identified tourism as such an engine of economic expansion to assist poor countries in reducing poverty (Hawkins and Mann 2007). The United Nations World Tourism

Organization in its 2003 report on Tourism and Poverty Alleviation released at the Johannesburg Summit on Sustainable Development, incorporated the positive outcome of four studies that demonstrate how tourism can raise incomes, how tourism can encourage and adopt poverty reduction programs, and how tourism can enhance impact of tourism development in reducing poverty.

Furthermore, some international organizations boosted by the positive results of these empirical studies, are looking at tourism as a strategy for getting out of the poverty trap for poor countries. Implicit in the proposition is that growth reduces poverty, and that since tourism generates growth, tourism therefore can alleviate poverty. The only missing link in this approach is the empirical connection between tourism and poverty reduction.

### *Tourism Working for the Poor*

Can tourism work for the poor? This question, whether tourism development can benefit poor people in the Least Developed Countries (LDC), is difficult to address directly because the basic data is absent. It is known, however, that the most important pro-poor impact of tourism results from the enhanced opportunity to generate mass employment and from the creation of the opportunity to allow the most vulnerable groups of the society to participate in the production of tourism goods and services (Ashley *et al* 2000; Encontre 2001).

Over the past several decades, international tourism has been steadily resilient and consistently increasing in the global economy. It has become as well increasingly important for the economy



of many countries worldwide. Tourism constitutes one of the major economic forces of the world. Despite the terrorist attacks on September 11, 2001 in the United States and the modest global economic performance, according to World Tourism Organization, expenditures by approximately 800 million international tourists traveling in 2005 totaled close to US\$ 600 billion, roughly representing US\$ 1.5 billion per day worldwide. In addition, tourism spending has contributed to an ameliorated balance of payments in many countries.

As such, tourism generated foreign exchange earnings have come to represent a significant revenue source, increasing employment, family income, tax revenues and economic growth in both developed and developing countries worldwide (McKinnon 1964; Belisle and Hoy 1980; Khan *et al* 1990; West 1993; Uysal and Gitelson 1994; Hazari and Sgro 1995; Page 1999; Tohamy and Swinscoe 2000; Durbarry 2002; Balaguer and Cantavella-Jorda 2002; Sugiyarto *et al* 2002; Vanegas and Croes 2003; Croes and Vanegas 2006; Kim *et al* 2006). In 2005, for example, international tourism receipts accruing to developing countries amounted to near US\$150 billion, or near 25% of the total world international receipts.

Tourism is the principal export in a third of all developing countries and, among the 49 LDC, it is the primary source of foreign exchange earnings. It confirms that poor countries can capture significant benefits from international tourism at the macro-level. In this sense, tourism development is associated with accelerated increase in foreign exchange earnings, job creation, income generation, increased tax base and enhanced welfare. The studies by Page (1999), Tohamy and Swinscoe (2000), Sugiyarto *et al* (2002), Steiner (2006), and Brau *et al* (2007) indicate that tourism is a determining factor for growth, is significantly more labor intensive than

other non-agricultural sectors and employs a relatively high proportion of female and semi skilled workers. Their findings support the claim that tourism jobs can target the poor in developing countries.

## **TOURISM AND POVERTY NEXUS IN THE MAKING**

### *Constructing the Nexus*

The tourism-poverty reduction nexus can be construed based on two seemingly unrelated paradigms namely the trade economic growth and sustainability. The classical literature about economic growth investigated the impact of several determinants on growth. A large number of empirical studies have focused on the causal relationship between tradable goods and economic growth and development. The review of the literature, however, showed that none of the studies examined a causal relationship between non-traded goods (e.g. tourism) and economic growth.

Recently, a few studies have examined whether tourism can be an engine of economic growth. For example, Tohamy and Swinscoe (2000), Shan and Wilson (2001), Balaguer and Cantavella-Jorda (2002), Vanegas and Croes (2003), Durbarry (2002, 2004), Dritsakis (2004), Oh (2005), Steiner (2006), and Kim *et al* (2006) analyzed the impact of tourism on economic growth in Egypt, China, Spain, Aruba, Mauritius, Greece, South Korea, and Taiwan respectively. All of them, except in the Korean economy, concluded that, there is a positive and significant relationship between the two.

Eugenio-Martin *et al* (2004) based on a panel approach, used a broader sample for 21 Latin American countries and suggested causality between tourism and economic growth. They concluded that tourism expansion is adequate for the economic growth of low-and-medium income countries. Other studies sought to investigate both the empirical relationship between growth, country size and tourism specialization and whether small countries specializing in tourism are more likely to grow faster than other countries (Lanza and Pigliaru 2002; Sachs 2002; Brau *et al* 2007). Their findings suggested that small states are fast growing especially when they are highly specialized in tourism and tourism appears to be an independent determining factor for growth. Moreover, size per se is not relevant with regard to economic growth, but rather functional specialization in tourism is the relevant factor. However, these studies, in general, suggested that growth through tourism is attributed to an increasing terms-of-trade and to endowment of natural resources.

Trade-growth theory, however, was mainly involved with ascertaining the efficient allocation of resources, but not on the distributional effects of the allocation. Tourism as an engine of growth was measured based on its efficiency aspects. These aspects were further stressed through tourism economic impact studies. The latter gauged how tourism reverberates through the economy by identifying this impact through several channels, such as jobs, taxes and income (Archer 1973; Zhou *et al* 1997; Mihalic 2002; Mak 2003; Vanhove 2005). Copeland (1991), however, was one of the first observers to pinpoint that tourist spending might have different distributional effects on different social groups.

### *Tourism and Poverty Connection on the Waiting List*

A coherent framework that would link tourism and poverty reduction had to wait to the unfolding debate within the sustainability literature. Basically this perspective advocates keeping tourism development within environmental and social limits (Garcia-Falcon *et al* 1999). The production of tourism output was viewed as a potential source for causing some serious inconvenience to the tourist area through negative externalities (i.e., quality of life, pollution, overcrowding, reducing water resources, litter and solid waste). From this perspective, tourism and sustainability were initially linked through the economic management of scarcity of resources as inputs “upstream” in the value chain and the amelioration of impacts “downstream” (Williams and Shaw 1998; Mazzanti 2002).

In addition, sustainability is taken as a time path for an economy where welfare is non-declining. This implies that sustainability and inter-temporal efficiency could be in immediate conflict because the presumed discounted utilitarianism ignores the long-run and stresses present consumption. Savings in this context will be limited thereby affecting not only the level of natural capital stock but also the lack of savings will hurt investment generating falling aggregate capital stock. This in turn will prevent the preservation of a constant stream of consumption (Hanley 2000).

This “weak” sustainability poses a serious threat to highly vulnerable groups. Poor people are particularly vulnerable to adverse shocks, such as natural and ecological disasters. But at the same time poor people may also cause environmental degradation in order to survive. The

interrelationship between poverty and the environment was thus stressed with poverty being cited as a cause as well as an effect of environmental degradation.

Furthermore, Mak (2003), for example, argued to distinguish the notion of efficiency from equity: an action that might improve everyone's wellbeing may enhance some people's welfare more than others. If those who benefited from this efficiency are the richest, then improved efficiency might be entirely consistent with more inequality. This would be unacceptable in light of the persisting poverty in the world. Combining optimality with reducing individual and social disadvantages would become one of the basic tenets of sustainable tourism development.

In short, tourism expansion and development both need to receive support from, and to give support to the local communities, as tourism activities affect an entire community. This means that the new growth and development strategy should focus on increased economic participation, social equity, and thus poverty reduction.

In this sense, the poverty connections do exist and they are portrayed in Figure 1. The relationship between tourism, economic expansion, and poverty reduction are embedded in what Vanegas and Croes (2003, 2004) called elsewhere, *the democratization of the dollar*: transfer of wealth and income from residents of developed and developing countries to residents of developing and least developed countries, mass generation of employment opportunities, ample participatory opportunities for all sectors of the economy, acting as a catalyst for change, and by promoting conditions in which the poor people are able to participate, increase their incomes and their standards of living.

### *Focus on Nicaragua*

Nicaragua is the second poorest country in the Americas, after Haiti. Nearly 48% of its population lives in poverty as defined by the one dollar per day measure. Two out of every three people live in the rural areas and nearly two thirds of the rural population is poor. Because of rapid population growth, the number of people living in extreme poverty increased from nearly 680,000 in 1993 to nearly 800,000 in 1998. Nicaragua is also one of the High Indebted Poor Countries. In 2002, the Government of Nicaragua announced its policy to propel tourism development as a tool to combat poverty. As such, tourism is a recent phenomenon in the country (Government of Nicaragua 2001,2002; Vanegas 2002; Wayne and Croes 2003).

Overall, in 2004, it is estimated that tourism directly accounts for nearly 5.6% of the Nicaraguan gross domestic product and employs (direct, indirect, and induced) nearly 90 thousand people, or nearly 6.2% of the work force. However the importance of tourism is increasing in real terms. In fact, Vanegas (2002), in his study found that of the three sectors (agriculture, manufacture, and tourism), tourism offered the largest power to generate foreign exchange earnings, generating the largest increases in jobs creation, stimulating the largest increases in economic expansion, and has the largest impact on income distribution.

An analysis of Nicaragua tourism receipts, as a percentage of total exports of goods and services, indicates that whereas in 1990 this percentage was nearly 3.1%, in 2003 it was 15.9%, or nearly 5.13 times higher than in 1990 (Vanegas 2002, 2003). From the balance of payments perspective,

the foreign exchange earnings from tourism have represented an important source of compensation for Nicaragua's current account and more specifically, for its trade imbalances in the last ten years.

Nicaragua, which is categorized as a low-income country offers an interesting case study of economic development. Its economic activities have focused on the exports of agriculture products, manufacture exports, and more recently on tourism. This investigation, however, whether economic expansion (contraction) causes tourism expansion (contraction), whether tourism expansion (contraction) causes economic expansion (contraction), or whether a two way causal relationship exists between the two can only be established empirically.

## **EMPIRICAL RESULTS**

### *The Data*

All models are estimated using annual data from 1980-2004. The base period is 100 = 2000 prices. This period and frequency is chosen because it provides the most consistent data set available to the authors at the time of writing. The financial data for the gross domestic product ( $Y_{gdp}$ ) and tourism receipts ( $X_{tou}$ ) have been reported on a yearly basis by the Central Bank of Nicaragua (CBN): economic indicators, 1960-1999 and several issues of the Economic Indicators and Statistical Bulletin of the CBN. The poverty series, represented by the number of people (headcount) below the poverty line (POV) have been subjected to strict quality control

standards for inclusion in the analysis. The poverty series were supplied by The Technical Secretariat Office of the President of Nicaragua (SECEP), and reconciled with the CBN.

The data comply with the common international definitions set up by the United Nations, the World Bank, the International Monetary Fund and the World Tourism Organization. These agencies generally collect statistics directly from the countries concerned. The countries endeavor to apply standard United Nations procedures, definitions, and classification while using their special country knowledge to fit the data. The variables are then transformed through the use of natural logarithm to ease interpretation of coefficients. These coefficients in logarithmic function are interpreted elasticity values which are a percentage change in a dependent variable given a one % change in an independent variable.

The initial model specifications incorporated two dummy variables. The first, D8290, captures the influence of the Sandinistas-Contras civil strife. This period has been a very volatile political and socio-economic situation in Nicaragua during the time span under review when the Somoza dictatorship was succeeded by a Marxist dictatorship, which in turn, was succeeded by a democratic process by the early 1990s. The second, D8594, was to account for the years of super-high inflation that Nicaragua witnessed between 1985 and 1994. The estimation results show that the dummy variables are insignificant in all specifications. The reason for this could be that the shocks are captured by the explanatory variables, which are also subject to similar shocks. Accordingly, the estimation procedures below are implemented without the dummies.



### *The Order of Integration*

The least-squares regression estimation method used is appropriate for stationary  $I(0)$  time series data, but not for series that are non stationary  $I(1)$ . The consequence of ignoring the requirement for stationarity is that the parameter tests are unreliable and, in particular the standard t-tests and F-tests give misleading results. Therefore, the first step is to test the order of integration of the variables. Integration means that past shocks remaining undiluted affect the realization of the series forever and a series has theoretically infinite variance and a time-dependent mean (Enders 1995).

Since a wrong choice of transformation of the data gives biased results and has consequences for wrong interpretation, it is important to examine the stationarity of time series data to set up an appropriate methodology in the formation of econometric models (Engle and Granger, 1987). Therefore, prior to testing for CI the integration order of each variable should be established. In this analysis, the unit root test is based on both the augmented Dickey-Fuller (1979, 1981) and the Phillips and Perron (1988) tests (hereafter ADF test and PP test). The advantage of the PP test over the ADF test is that the PP test is robust to a wide variety of serial correlation and time dependent heteroscedasticity.

A variable is said to be integrated of order  $I(1)$  if it must be differenced once to become stationary. To test for integration, an analysis of each of the variables was carried out based on the following auxiliary equation (1):

$$(1) \quad \Delta y^t = \alpha + \rho y^{t-1} + \beta t + \sum \tau^i \Delta y^{t-1} + \mu^t$$

Where ( $y^t$ ) is the relevant time series variable, ( $t$ ) is a linear deterministic trend and ( $\mu^t$ ) is an error term with a mean of zero and a variance that is constant. In constructing the co-integration regressions, we first include on the right hand side of all CI equations all the variables. There is a test of the null hypothesis of the presence of a unit root against the alternative that the series is stationary,  $\rho$  being the parameter of interest in equation (1). Ordinary least squares are used in the estimation of these general regressions. The estimated error terms from the final co-integration regressions are then tested for unit roots using the ADF and PP tests.

The ADF is a one sided test of the significance of the estimated ( $\rho$ ), and its critical values are given in Fuller (1976, Table 8.5.2). Lagged terms in ( $\Delta y^t$ ) are added to ensure that the residuals are white noise. Because the ADF test will not detect any structural break, we have followed Perron's (1990) suggestion for the modification of the ADF test by introducing the dummy variables. If we do not reject the null hypothesis, the series is non-stationary in levels. Tests are then performed on the series of first differences. If the null hypothesis of a unit root is rejected, the series in differences is stationary I(0) and thus the series in levels is I(1).

The critical values for the test statistic with 25 observations are -3.24, -3.60, and -4.38 at the 10 %, 5%, and 1% significance levels, respectively (Fuller 1976). The results are presented in Table 1. Judged by these critical values both the ADF and PP tests suggest that for the  $Y_{gdp}$  and the POV variables, the null hypothesis of one unit root cannot be rejected in the log of levels, but is rejected in their first differences. For the tourism ( $X_{tou}$ ) variable, the ADF and PP tests indicate

that the series is stationary in both its levels and its first differences. For the ADF tests, we also considered two more regression equations for the presence of a unit root. The difference between these three equations concerns the presence of deterministic element  $\alpha$  (drift) and  $\beta t$  (linear trend). In the subsequent section we treat the tourism variable as I(1).

### *Cointegration*

Since the appearance of Engle and Granger (1987), the issue of cointegration has attracted an enormous amount of attention. An important reason for this attention, additional to that of striving for parameter reduction, of using the appropriate statistical techniques, and of the opportunity for modeling trending economic variables which obey equilibrium relations, is that co-integration allows us to solve the problem of spurious regressions. If time series variables are non-stationary in their levels they are integrated of order one and their first differences are stationary.

Given the results of a unit root in variables cointegration was examined between ( $Y_{gdp}$ ), ( $X_{tou}$ ), and (POV) using a CI methodology proposed by Johansen (1988, 1991, 1995) and Johansen and Juselius (1990, 1992). Since all variables in the regression, except tourism, which is in level form, are cointegrated, then there is an indication of the presence of a stable long-term or equilibrium linear relationship among them. To determine the number of cointegration vectors, six different equations (2) to (7) containing  $\ln Y_{gdp}$ ,  $\ln X_{tou}$ , and  $\ln POV$  as a dependent variable, respectively, were tested separately for CI:

$$(2) \quad \text{LnY}_{\text{gdpt}} = \alpha^0 + \alpha^1 \text{Ln X}_{\text{tout}} + \alpha^2 \text{D8290} + \alpha^3 \text{D8594} + \mu^{1t}$$

$$(3) \quad \text{LnX}_{\text{tout}} = \alpha^4 + \alpha^5 \text{LnY}_{\text{gdpt}} + \alpha^6 \text{D8290} + \alpha^7 \text{D8594} + \mu^{2t}$$

$$(4) \quad \text{LnPOV}_t = \beta^0 + \beta^1 \text{LnY}_{\text{gdpt}} + \beta^2 \text{D8290} + \beta^3 \text{D8594} + \varrho^{1t}$$

$$(5) \quad \text{LnY}_{\text{gdpt}} = \beta^4 + \beta^5 \text{LnPOV}_t + \beta^6 \text{D8290} + \beta^7 \text{D8594} + \varrho^{2t}$$

$$(6) \quad \text{LnPOV}_t = \lambda^0 + \lambda^1 \text{LnX}_{\text{tout}} + \lambda^2 \text{D8290} + \lambda^3 \text{D8594} + e^{1t}$$

$$(7) \quad \text{LnX}_{\text{tout}} = \lambda^4 + \lambda^5 \text{LnPOV}_t + \lambda^6 \text{D8290} + \lambda^7 \text{D8594} + e^{2t}$$

The Johansen procedure considers two statistics to estimate all the CI vectors: a trace test and a maximum eigenvalue test. Both tests have an asymptotic distribution for which critical values have been obtained by Johansen and Juselius (1990). If these variables are cointegrated, then they suggest a stable long-run relationship among them. It should be noted, however, that the CI relationship does not necessarily hold in every case. The application of this method should be subject to strict statistical tests.

In practice, there are three additional CI methods that researchers have used, regularly: the Engle and Granger (1987) two stage approach; the Wickens and Breusch (1988) one stage approach; and the Pesaran and Shin (1995) autoregressive distributed lag model approach. Due to different modeling strategies, all of these approaches have their merits and drawbacks. For example, they

may yield elasticity values with large discrepancies for the same data set. Finally, there has not been clear-cut evidence to show that any one is superior to the others. In this study, however, the Engle-Granger two-step CI test procedure was also utilized in the preliminary analysis. The results were less satisfactory.

In empirical applications, trace statistics and maximum eigenvalue statistics should be computed for different lags. This should be selected as the one corresponding to the model, which provides the minimum value for those statistics. Because the sample we are working is small, however, we took into consideration the argument of Cheung and Lai (1993) and consider only the trace test (Eigenvalue test results are available on request from the authors).

The trace test shows more robustness to both the skewness and excess kurtosis in the residuals than the maximal eigenvalue test. A number of lags for each of the variables were included in order to capture the short-run dynamics of the model. The Akaike (1969, 1974) [AIC], and the Schwartz (1978) Bayesian [SBC], criteria were used to determine the order of the vector autoregressive. Both criteria indicated lag three as the optimal lag for the annual data at hand. Cointegration results were provided by Stata 9 and are presented in Table, 2 and 3.

At the 5% level both tests of the stochastic matrix suggest the existence of at least one cointegration equations between  $(\text{Ln}Y_{\text{gdpt}})$ ,  $(\text{Ln}X_{\text{tout}})$ , and  $(\text{LnPOV}_t)$ . When normalized for a unit coefficient the correct estimates and t-statistics for  $\alpha^1$ ,  $\beta^1$ , and  $\lambda^1$  were 0.7573 ( $t = 5.557$ ), -0.2142 ( $t = 2.703$ ), and -0.5076 ( $t = 4.628$ ), respectively. Since the coefficient in the logarithmic function implies a percentage change in the dependent variable, the results can be further

interpreted as follows: a one % of a sustained growth in tourism receipts would lead to an estimated increase of around 0.76% in economic expansion in the long-run, *ceteris paribus*.

Similar to the results, among others, by Page (1999), Durbarry (2002, 2004), Balaguer and Cantavella-Jorda (2002), and Kim *et al* (2006) using the data in Mauritius, South Africa and Zimbabwe, Mauritius, Spain, and Taiwan, respectively, the evidence of this study suggests the existence of cointegration between tourism development and economic expansion in Nicaragua. The results point in the direction of the current proposition that enhancing tourism development (arrivals, receipts, investment and so on) can have significant multiplier impacts on economic expansion. In addition, the long-run equilibrium relationship between tourism development and poverty reduction was found to be valid.

### *Causality*

In order to answer the causality question, the Engle and Granger (1987) causality test is applied. Engle and Granger (1987) and Granger (1988) noted that if two time-series variables are cointegrated then at least one-directional Granger-causation is present. The existence of a stable long-run relationship between economic growth and tourism expansion means that the two variables are causally related at least in one direction. Then, another important issue to be addressed is how the long run relationship between these two variables is causally related. In other words, is tourism causing growth or is growth causing tourism? To answer the question regarding the direction of causation, the Granger causality tests were performed.

Since economic growth and tourism expansion are co-integrated, a VAR model can be constructed in terms of the levels of the data involving estimating the following equations (8) and (9):

$$(8) \quad \text{Ln}Y_{\text{gdpt}} = \varphi^1 + \sum v^{1m} \text{Ln}Y_{\text{gdpt-m}} + \sum \pi^{1m} \text{Ln}X_{\text{tout-m}} + \epsilon^{1t}$$

$$(9) \quad \text{Ln}X_{\text{tout}} = \varphi^2 + \sum v^{2m} \text{Ln}X_{\text{tout-m}} + \sum \pi^{2m} \text{Ln}Y_{\text{gdpt-m}} + \epsilon^{2t}$$

Symbolizations include  $\varphi$  as the deterministic component and  $\epsilon^t$  satisfies all the assumptions of the standard regression model. As a further step, similar VAR models were estimated for poverty vis-à-vis gross domestic product and tourism development. Both hypotheses were tested by a standard F-test. According to Granger, a variable, for example,  $X_{\text{tou}}$  causes another variable  $Y_{\text{gdp}}$  with respect to a given information set that includes  $Y_{\text{gdp}}$  and  $X_{\text{tou}}$  if current  $Y_{\text{gdp}}$  can be better predicted by using past values of  $X_{\text{tou}}$  than by not doing so.

Table 4 reports the empirical results of the Granger tests. Focusing first, on the gross domestic product equation (8), the growth of real tourism receipts ( $X_{\text{tout}}$ ) indicates a Granger-causal running from tourism to economic growth exists for Nicaragua. This provides strong evidence in supporting the tourism development-driven gross domestic product expansion hypothesis. The other aspects of the causality results are also interesting. Specifically, these results indicate that the null hypothesis regarding no causation of economic expansion/reduction ( $Y_{\text{gdp}}$ ) to poverty reduction/increasing (POV) is rejected at the five % significance level; the null concerning no causation of reduction/increasing poverty, to economic expansion/reduction is also rejected at the

five % significance level. The coexistence of the economic expansion/reduction and poverty reduction/increasing nexus, indicate an inverse reciprocal (bi-directional) relationship between the two variables, thereby supporting the hypotheses of this study.

A final step was to examine the direct nexus between tourism development and poverty. The hypothesis of tourism expansion/reduction-led poverty reduction/increasing was accepted based on the statistical test to find causation of tourism development to poverty reduction. The coefficient value in Table 3 denoted that one % increase of  $X_{\text{tou}}$  would produce 0.51% decrease of poverty in Nicaraguan economy. The results were consistent with different lag selections. On the other hand, the statistical test for the reciprocal hypothesis of poverty and tourism was not accepted based on the failure to find causation of poverty reduction/increasing to tourism expansion/reduction. The combination of these results suggest the existence of one way causality in the Granger sense for tourism development-leading poverty reduction in the Nicaraguan economy. That is tourism development leads to poverty reduction and not the other way around.

## **POLICY MANAGEMENT IMPLICATIONS**

The findings support the common proposition. The proposition of tourism, as a source of economic growth and development and as one of the most important worldwide industry, offers a convincing case for the use of policy instruments, such as targeted investment policy, marketing and promotion, and the support of tourism organizations focused to drive a tourism-based economy or tourism programs and projects (Barry and O'Hagan 1971; Archer 1973, 1984, 1985, 1995; Belisle and Hoy 1980; Fletcher 1985, 1987; Lea 1988; Khan *et al* 1990; Khan *et al*



1995; Modeste 1995; Tohamy and Swinscoe 2000; Balaguer and Cantavella-Jorda 2002; Dwyer *et al* 2003; Smeral 2003; Durbarry 2002, 2004; Mak 2003; Dritsakis 2004; Vanhove 2005; Steiner 2006; Kim *et al* 2006; Brau *et al* 2003).

From the above estimates it can be interpreted that the presence of multiplier impacts on income are important for the Nicaraguan economy. Moreover, considering that all international tourism demand generates foreign exchange earnings in contrast to other sectors, then, it is the equivalent of Nicaragua exporting tourism goods and services to be consumed by foreigners in their countries. This is a particularly valuable argument in the context of a poor country with a growing trade account deficit.

For Nicaragua, the knowledge of this piece of information could play an important role in determining the appropriate development strategy to realize more benefits from tourism expansion and development. In addition, tourism, as any other sector, has strong linkages with other sectors in the economy. These linkages, for example, create employment in other sectors and demand by the workforce employed in the tourism sector goes toward generating other cycles of spending, consumption, and investment.

The simultaneity of production and consumption of the tourism product and services provides an important opportunity to include all sectors -- including poor sectors and marginal areas -- into the production process. Therefore, the poor can benefit through jobs including business sale such as handicrafts and souvenirs, the provision of transport and other direct and indirect services to tourists. Tourism, therefore, can become a powerful development device in alleviating poverty.

Another policy implication relates to where tourism should be positioned on Nicaraguan policy makers priority directory. We argue that, tourism with its capacity to contribute to government policy goals such as generating foreign exchange earnings, mass and rapid employment, reducing poverty, and contributing to other sectors' economic growth can only earn itself a higher place on Nicaragua's economic and development policies. Once tourism's priority position is established, we foresee a combined effort by both the private and the public sectors to develop Nicaragua's tourism to capitalize on its considerable tourism potential and the growing magnitude of the tourism industry worldwide.

## **RESEARCH IMPLICATIONS**

These results point to several research directions in the future. First, theoretically, more precision and more consistency could be attained if other variables such as exchange rates and international trade are incorporated in the specification of the cointegration and causal analysis. This also holds for other non-economic variables. Statistical results based on multivariate models are nearing completion and are promising, and statistical results will hopefully be presented in the near future.

Second, if the policy maker is to choose among several alternative sets of estimates, he/she needs assurance that all the estimates are consistent. Without a complete model, it may be difficult to test for consistency among estimates. However, while the complete model may give a set of

consistent answers to the assumptions and functions formulated, it does not necessarily follow that they will be the best set of estimates.

Third, a striking feature regarding the scarcity of empirical analysis on the extent to which tourism development impact the economy of a country, gives us a call to continue investigating the hypotheses in numerous tourism destinations in order to test for support of the generalization of our premise to other LDCs.

## **STUDY LIMITATIONS**

Building an empirical nexus between tourism development, economic expansion, and poverty is not without problems. The chief deterrent to this type of analysis is data availability and the quality of the data which is available, especially related to the level of poverty (Londoño and Székely 2000; Chen and Ravallion 2001; Besley and Burgess 2003).

In addition, the choice of the appropriate definition of the tourism variable, or of the poverty variable or of any other economic variable is a difficult one. It is undoubtedly true that there is no wholly satisfactory solution to this problem. In most cases, the researcher is limited to a choice between available data series. Obviously, the choice of which variables are to be included and which variables excluded from the equation will have a marked effect on the results.

Time series have some well recognized disadvantages including relatively few observations, handling of structural changes, inter-correlation of independent variables, and serial correlation. Other limitations relate to simultaneous solutions determined by production, consumption, and

exports, and too high a degree of aggregation. Furthermore, important variables such as exports, exchange rates, and capital were not considered in this study.

Although the models to pay attention to the empirical estimation of possible contribution of tourism to the Nicaragua's economy are relatively simple, the estimates obtained in this study, however, are consistent with the relationships and values obtained by other researchers.

Comparison of estimates from different studies, however, must be made with some caution since different studies involve different purposes, assumptions, models, estimation methods, data bases, level of data aggregation and relevant time periods.

## **CONCLUSIONS**

As in the export-led economic expansion literature, the study set out to detect the link between tourism development, economic expansion, and poverty reduction. In order to accomplish this goal, the study determined the stationarity level of the variables and found, with the exception of the tourism variable, that all the other variables had a unit root. Then, the methodology by Johansen and Juselius has allowed us to obtain a cointegration relationship among the variables. These variables represent indicators of Nicaragua's economic expansion, international tourism receipts, and poverty.

The cointegration results provide essential arguments to support the tourism development-led economic expansion and poverty reduction hypotheses. The analysis shows, that a long-run stable relationship between tourism development, economic expansion, and poverty reduction

exists for Nicaragua. Causality testing confirms the existence of that relationship in Granger sense. As expected, the foreign exchange earnings from international tourism positively impact the Nicaraguan economic expansion and reduce poverty. The significant impact of tourism development, according to the magnitudes of the estimated parameters for economic expansion (0.76) and poverty reduction (-0.51) would expose the existence of key long-run multiplier impacts.

The relevance of our findings suggested the need for public and private intervention in the development strategy of tourism expansion. Systematic allocation of resources to stimulate and promote tourism is necessary in order to sustain tourism as an engine of growth for development. On the other hand, the mixed economic configuration of scarce natural and cultural resources, which jointly provide private and public services, makes it necessary that both sectors engage in the optimal economic management of these resources, including the environment, image building and branding, marketing, commercialization and promotion, and so on.

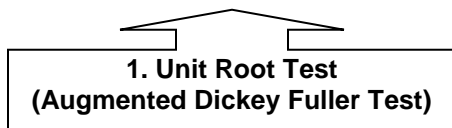
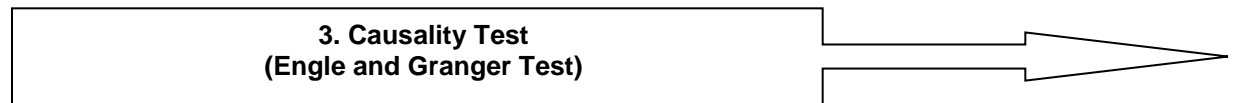
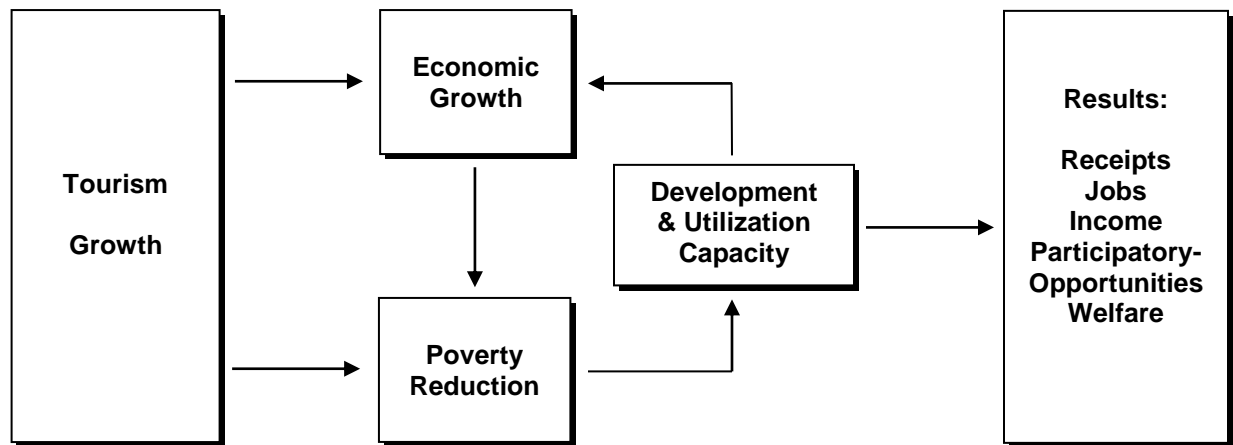
The statistical results presented in this study are preliminary in nature. Therefore, their implications should be considered with certain caveats. These caveats include a high degree of aggregation, the non-inclusion of other macroeconomic variables, the lack of attention to simultaneous determination of economic variables, and the omission of the distributional effects of tourism both among individuals as well as among geographical units. The latter is a result of the assumption that the study took with regard to the relevant unit of measurement. Finally, the study did not control for factors like income inequality and population growth in the regressions, which might affect how growth in national income maps onto poverty reduction.

Based on the results in this study, enthusiastic tourism development policies as a means of economic expansion and poverty reduction may be fully effective in that tourism development leads to poverty reduction, rather than the other way around. This may further suggest redirecting appropriate resources in support of focused tourism development and marketing policies.

Nicaragua being a poor country, an open society, and a small economy, therefore, would benefit more by stimulating international tourism visitors, which in turn boost economic expansion.

Furthermore, world demand for tourism would have a favorable impact on the long-run economic expansion of this small economy.

**Figure 1 Tourism-Growth-Poverty Reduction Nexus**



**Table 1. Unit root tests on  $Y_{gdp}$ ,  $X_{tou}$ , and POV**

Variables	ADF	ADF first	PP	PP first
	Levels	Differences	Levels	Differences
$\text{Ln}Y_{gdp}$	-1.809	-----	-1.681	-----
$\text{Ln}X_{tou}$	-4.006*	-----	-4.162*	-----
$\text{LnPOV}$	-1.979	-----	-2.353	-----
$\Delta\text{Ln}Y_{gdp}$	-----	-4.569*	-----	-4.726*
$\Delta\text{Ln}X_{tou}$	-----	-4.833*	-----	-5.398*
$\Delta\text{LnPOV}$	-----	-5.457*	-----	-6.035*

**Note:** Estimates are obtained from STATA version 9 and correspond to 25 observations.  $\Delta$  indicates the first differencing of the variables. The ADF and PP tests should be compared to the critical values of -3.24, -3.60 and -4.38 at the 10%, 5%, and 1% levels of significance, respectively.



**Table 2. Results of Cointegration Tests**

Relationships	Trace	Trace	Critical Values	Critical Values
	R = 0	R = 1	Trace (5%)	Trace (1%)
LnY <sub>gdp</sub> and LnX <sub>tou</sub>	69.81	57.52	62.99	70.05
LnPOV and LnY <sub>gdp</sub>	59.93	52.98	42.44	48.45
LnPOV and LnX <sub>tou</sub>	77.04	67.02	25.32	30.45

**Note:** Trace is likelihood ratio statistic for the number of cointegration vectors. Each equation contains linear trends but not quadratic trending; and parameters for the trends are restricted. Estimation has been performed with STATA

9.

**Table 3. Normalized Parameter Estimates**

Dependent Variable	Independent Variable	Coefficients	t-statistic	Adjusted R <sup>2</sup>	DW
LnY <sub>gdp</sub>	LnX <sub>tou</sub>	0.7573	5.557	0.703	1.97
LnPOV	LnY <sub>gdp</sub>	-0.2141	-2.703	0.891	1.91
LnPOV	LnX <sub>tou</sub>	-0.5076	-4.628	0.894	2.01

**Note:** Parameter estimates express the corresponding elasticity values.

**Table 4. Granger Causality Tests for Nicaragua with annual data (1980-2004)**

Null hypothesis	Wald test	
	F-statistic	p-value
$\text{LnX}_{\text{tou}}$ does not cause $\text{LnY}_{\text{gdp}}$	5.5857	0.061
$\text{LnY}_{\text{gdp}}$ does not cause $\text{LnX}_{\text{tou}}$	3.6855	0.158
$\text{LnY}_{\text{gdp}}$ does not cause $\text{LnPOV}$	4.9483	0.126
$\text{LnPOV}$ does not cause $\text{LnY}_{\text{gdp}}$	15.013	0.001
$\text{LnX}_{\text{tou}}$ does not cause $\text{LnPOV}$	8.7261	0.057
$\text{LnPOV}$ does not cause $\text{LnX}_{\text{tou}}$	2.2611	0.119

**Note:** The critical value is 4.6051 for two degrees of freedom.

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