The triangle of poverty, economic growth, and inequality in Central America: does tourism matter?

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Abstract

Purpose – The purpose of this paper is to investigate the link between tourism, economic growth, inequality, and poverty reduction in the five countries of Central America (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua).

Design/methodology/approach – The study represents the first application of panel data modeling of poverty, economic growth and inequality as related to Central America. Unbalanced panel data are employed for the five Central America countries for the period 1980-2012.

Findings – The findings reveal three results: the relationship between poverty, inequality and economic growth varies relatively very little for different measures of economic growth; the null hypothesis that economic growth and inequality does not matter is rejected at the 1 percent level, and the coefficients are highly significant and with the expected signs; tourism matters for poverty reduction in Central America.

Originality/value – The paper represents the first application of panel data modeling poverty, economic growth, inequality, and tourism development in the context of Central America. Additionally, the study puts together the largest number of comparable observations on poverty, income, and income distribution for Central America during the period 1980-2012.

Keywords Poverty, Tourism, Inequality, Panel data, Economic growth, Central America

Paper type Research paper

Introduction

The purpose of this paper is to investigate the link between tourism, economic growth, inequality, and poverty reduction in the five countries of Central America (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua). The study is based on two main premises, i.e. tourism development prompts poverty reduction, and the level of economic growth and the degree of inequality in a destination shape the nexus tourism development and poverty reduction. The main reason is that tourism consumes a bundle of services and non-traded goods to create the tourism experience thereby affecting many suppliers at the same time. The experience dimension of travel creates opportunities for the poor and for marginalized people as well as for remote areas (Croes, 2013). The impact of tourism expansion on growth goes via three channels: direct, indirect, and induced effects. These combined effects are integrated in the

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so-called tourism-led growth hypothesis (TLG), which asserts that tourism may have positive effects on development and poverty reduction.

This study builds on the empirical evidence provided by Croes and Vanegas (2008) and Croes (2013) supporting the TLG hypothesis in the case of Central America countries. Growth effects, however, do not automatically transpose into development and poverty reduction. Growth effects on development and poverty reduction could be stifled due to inequality and other country specific conditions. Examining the effects of these conditions has been under-researched in tourism studies. Examining these effects is at the core of the heightened attention to poverty reduction reflected by the United Nations' mission to halve global poverty by 2015. This mission is central to the development of five countries in Central America: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua (Altimir, 2008; Cecchini and Madariaga, 2011; Gasparini et al., 2007; Paes de Barros et al., 2006; Psacharopoulos et al., 1995; Székely, 2003; Vanegas and Croes, 2007a).

The objective of this study is to present, for the first time, new and detailed empirical evidence on the role of the distribution of income in the responsiveness of poverty to income growth and changes in income inequality in Central America through the following related hypotheses: is there an empirical nexus between economic growth, income distribution and poverty reduction in Central America? If there is, to what extent is poverty in Central America a response to a change in economic growth, ceteris paribus, and income distribution, ceteris paribus. And does tourism directly affect poverty reduction?

The study applied an unbalanced panel data analysis for the previously mentioned five Central America countries for the period 1980-2012. The use of panel analysis takes care of model specification uncertainty, unobserved country effects, dynamics, outliers, and endogenous bias. Additionally, the study also combined several aspects from previous studies, such as the role of the distribution of income on the capacity of income growth to reduce poverty (Adams, 2004; Bourguignon, 2003; Epaulard, 2003; Ravallion, 2001).

The rest of this paper is organized as follows. In section II the performance of income, poverty, and distribution of income for Central America and for each country is assessed. Section III presents a selected literature review. In section IV the methodological issues and modeling framework are discussed. Section V presents the empirical results. Section VI discusses selected policy implications and Section VII provides some concluding remarks.

Poverty, growth, and inequality

Has indigence poverty decreased in Central American countries during the last three decades? The value estimates in Tables I and II suggest that indigence poverty has decreased, but estimates also suggest a remarkable heterogeneity. Table I shows that, at the country level, the indigence poverty figures are startling for Costa Rica which has already achieved the United Nations Millennium poverty reduction target rates ahead of schedule. In contrast, Guatemala and Honduras have made more modest advances. Using different data bases and methodologies Altimir (1996), Gasparini et al. (2007), Gasparini and Lustig (2011), Gindling and Trejos (2004, 2005, 2013), Ravallion and Chen (1997), among others, found similar trend results.
Table II indicates that Central America had a positive performance in terms of per capita GDP growth during the period 1980-2010. Economic growth, however, was not uniform in the region and over time. The Central American economies grew on average nearly 1.57 percent and 3.69 percent in the period 1990-2000, and the period 2000-2010, respectively. Central American countries, with the exception of Costa Rica, also revealed high levels of inequality in the region (see Table III). Table IV shows that Costa Rica with an average Gini of nearly 37.72 was the country with the lowest inequality in Central America. At the other extreme, Nicaragua, with an average Gini at 54.59, had the highest levels of inequality.

There have been, however, important changes in the distribution of income in Central America in the last three decades. Starting in the period 1980-1990, Costa Rica exhibited the lowest Gini coefficient (41.60), followed by Honduras (53.68) and El Salvador (53.97), with Guatemala (55.21), and Nicaragua (56.19) exhibiting the highest inequality in Central America. The Gini coefficient, however, decreased consistently in Costa Rica (36.11) and Nicaragua (51.05) throughout the 1990s and 2000s. In El Salvador (51.23), Guatemala (51.39), and Honduras (51.74), the Gini coefficient slightly decreased.
Literature review

Economic growth has been considered the most influential instrument for poverty reduction. In the context of poverty reduction, economic growth is critical and necessary in providing an initial positive quantitative push. Economic growth and tourism development is linked through the Tourism Led Growth hypothesis. This hypothesis reveals that tourism is a main driver of economic growth. For example, Balaguer and Cantavella-Jorda (2002) and Nowak et al. (2007) found these positive effects on economic growth in Spain; Fayissa et al. (2009) and Vanegas (2012) confirmed the hypothesis in the case of 17 Latin America countries and El Salvador, respectively; Narayan et al. (2010) and Croes (2011) found similar results in a number of small island destinations.

Few studies focused, however, on the tourism-poverty link. Croes and Vanegas (2008) revealed empirical evidence supporting the tourism-poverty link in the case of Nicaragua. In a study assessing the impact of tourism on poverty reduction in Nicaragua and Costa Rica, Croes (2013) found that tourism matters most when there is a high incidence of extreme poverty and tourism development is in its initial stages of development. The link between tourism and poverty reduction can be moderated by economic growth but also by inequality conditions in a country. While the tourism literature has been silent on the impact of inequality on poverty, inequality has received heightened attention in the mainstream development literature (Ali and Tahir, 1999; Ali and Thorbecke, 2000; Cheema and Sial, 2010).

Table III.
Central America evolution of annual average growth rates of per capita income*, 1980-2012

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Costa Rica</td>
<td>0.30</td>
<td>2.57</td>
<td>3.22</td>
<td>3.21</td>
<td>3.69</td>
</tr>
<tr>
<td>El Salvador</td>
<td>0.77</td>
<td>1.49</td>
<td>3.51</td>
<td>4.32</td>
<td>4.11</td>
</tr>
<tr>
<td>Guatemala</td>
<td>-1.28</td>
<td>1.49</td>
<td>3.67</td>
<td>3.52</td>
<td>3.78</td>
</tr>
<tr>
<td>Honduras</td>
<td>-0.80</td>
<td>-0.33</td>
<td>6.16</td>
<td>4.63</td>
<td>4.72</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>-3.80</td>
<td>2.43</td>
<td>1.77</td>
<td>3.07</td>
<td>3.68</td>
</tr>
</tbody>
</table>

Notes: *The growth rate is calculated using the following exponential equation: \( Y = a \cdot \exp^{b \cdot \text{TIME}} \) where \( b \) multiplied by 100 provides the growth rate value.

Source: Own calculations based on each country’s National Accounts.

Table IV.

<table>
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</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>41.60</td>
<td>35.46</td>
<td>36.11</td>
<td>51.47</td>
<td>51.78</td>
</tr>
<tr>
<td>El Salvador</td>
<td>53.97</td>
<td>50.42</td>
<td>51.23</td>
<td>47.88</td>
<td>–</td>
</tr>
<tr>
<td>Guatemala</td>
<td>55.21</td>
<td>54.57</td>
<td>51.39</td>
<td>48.79</td>
<td>–</td>
</tr>
<tr>
<td>Honduras</td>
<td>53.68</td>
<td>51.78</td>
<td>51.74</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>56.19</td>
<td>56.54</td>
<td>51.05</td>
<td>48.24</td>
<td>46.97</td>
</tr>
<tr>
<td>Central America*</td>
<td>52.13</td>
<td>49.75</td>
<td>49.30</td>
<td>47.84</td>
<td>–</td>
</tr>
<tr>
<td>Central America**</td>
<td>50.99</td>
<td>48.62</td>
<td>47.56</td>
<td>49.10</td>
<td>–</td>
</tr>
</tbody>
</table>

Notes: *Un-weighted average. **Weighted average.

Source: Author’s calculations.
Inequality seems a major barrier in the quest of reducing poverty. Five main points of agreement has emerged in the development literature regarding the link poverty and inequality: the ratio of global poverty has steadily decreased over time; the absolute number of poor people has shown little change over time, the income and Gini elasticity values vary significantly across global, regional and country studies, more and improved high quality surveys have become available, worldwide, and researchers, have to move with extremely caution in terms of comparability across studies because most of the time they are simply not comparable.

Mainstream development theory also considered initial conditions in a country as barriers to reducing poverty. A variety of studies have focused on the role of initial conditions arguing that the income-poverty elasticity depends on the ratio of the poverty line to mean income as well as on initial inequality (Gasparini et al., 2007; Kalwij and Verschoor, 2007).

Modeling framework and data

Developing a framework

One of the most direct manners in identifying the income elasticity of poverty, income distribution neutral, is by controlling for changes in inequality, as measured by the Gini coefficient. Bourguignon (2003) called such a model specification, the standard model. This study focuses on three particular linkages to develop the model for Central America. The first component stems from the literature of economic growth and poverty. Collier and Dollar (2001), Kakwani (1993), and Kakwani and Son (2008), among others, show empirically that economic growth can reduce poverty.

The second component is derived from the literature on the poverty-distribution of income relationships. Adams (2004), Bourguignon (2003), Epaulard (2003), Fosu (2009, 2010), Londondo and Székely (2000), and Lundberg and Squire (2003), among others, provide empirical evidence suggesting that income inequalities can affect the economic growth-elasticity of poverty. These two lines of research suggest that economic growth can positively affect poverty even after going through the hurdle of inequality distortions. Finally, the last component, derived from the TLG hypothesis, asserts that tourism propels economic growth.

The empirical analysis consists of two related sections. In the first, following the growth poverty models we estimate the following income, inequality, and poverty transmission equations (1) and (2):

\[
\log POV_{it} = \delta_1 + \delta_2 \log gdp_{it} + \delta_3 \log Gini_{it} + \mu_{it} \quad (1)
\]

Introducing the initial conditions, the type of relationship can be expressed following an expanded version of equation (1), and is depicted in equation (2):

\[
\log POV_{it} = \gamma_0 + \gamma_1 \log gdp_{it} + \gamma_2 \log Gini_{it} + \gamma_3 \log IGini + \gamma_4 \log IGini gdp_{it} \\
+ \gamma_5 \log I_{gdp_{it}} + \gamma_6 \log Gini_{it} I_{Gini} + \gamma_7 D_1 + \gamma_8 D_2 + e_{it} \quad (2)
\]

The second empirical section modifies the poverty reduction analysis by disaggregating growth into its economic sector components as the source of the differential impact of economic sector growth on poverty reduction. This
disaggregation allows the inclusion of tourism as an independent variable impacting poverty reduction directly. The specification in equation (1) changes to:

$$
\log POVi_t = \beta_0 + \beta_1 \log Ai_t + \beta_2 \log MAi_t + \beta_3 \log TOUi_t + \beta_4 \log Gini_{it}
$$

$$
+ + \beta_5 D_1 + \beta_6 D_2 + \xi_{it}
$$

Where \( POVi_t \) is the measure of national indigence or extreme poverty headcount in country \( i \) at time \( t \), \( \delta_1, \gamma_0, \) and \( \beta_0 \) are fixed effect reflecting time differences between countries, \( \delta_2 \) is the elasticity value of poverty with respect to per capita income (gdp\text{it}), \( \delta_3 \) is the elasticity of poverty with respect to income inequality given by the Gini_{it} coefficient expressed in logarithm. The measures of the initial conditions are I\text{Gini}, and I\text{gdp}, expressed in logarithm. In general, less inequality would imply a greater (absolute) value of the elasticity, so that a larger amount of poverty reduction would emanate from a given level of growth. The relationship between poverty and the income variable is therefore expected to be negative and significant, ceteris paribus.

The study classifies the components of the GDP, namely exports of agriculture (A), manufacture (MA), and tourism (TOU) in line with the National Accounts. The study uses these three economic sectors in explaining the variance in the indigence (extreme) poverty index over time and over countries. The study identifies what can be termed the impacts of economic sector pattern of growth. Therefore, \( \beta_1, \beta_2 \) and \( \beta_3 \) are the elasticity values estimates for (A), for (MA), and for (TOU), respectively and \( \mu_{it}, \epsilon_{it}, \) and \( \xi_{it} \) are white-noise error terms.

A relevant clarification is that the analysis relates poverty reduction to the size of exports development structure, and not value of production or income growth. The regression specification weights economic sector growth by its relative export size and in levels. In addition, economic sector growth rates were expressed in per capita terms, and the sector shares were calculated from constant-price magnitude.

Equation (1) in this study represents the standard model of poverty determination used by most researchers. The dummy variable D1 captures the Sandinistas-Contras civil turmoil in Nicaragua, which affected the Central America region, in 1982-1989, and D3 captures the impact of the global crisis, in 2008-2010. The dummy variables take the value of 1 for the year(s) of the occurrence of the special event and the value of zero for all other years.

The data
The income variable used in this study can be measured, at least, in three different ways: per capita income, as measured from National Accounts data, per capita survey mean income (expenditure), as calculated from Household Surveys, and adjusted (scaled or calibrated) per capita income, to correct for errors and omissions, using both the National Accounts and household surveys (Bhalla, 2002; Karshenas, 2008; Sala-i-Martin, 2006). For the purpose of this study, separate regression equations are estimated involving the three measures of income. Equations (1) and (2) are estimated as level equations in logarithm.

The data set used in this study is consistent with national poverty estimates for the five countries of Central America, as carried out by their respective government agencies. To maintain the highest level of comparability, we use estimates from a 1980-2004 series of estimates jointly constructed by Croes and Vanegas (2006, 2008),
from the University of Central Florida and University of Minnesota, respectively, during the period 2002-2005, Vanegas and Croes (2007a, b), and a more recent updated and expanded series of estimates constructed by the Department of Applied Economics, University of Minnesota during the period 2007-2013. Both series use the same sources: Household Surveys and National Accounts.

The data set have been improved in various respects. The study discarded observations due to calibration and comparability, generating 111 unbalanced panel observations over 1980-2012, of which 33 are from Costa Rica, 18 from El Salvador, 16 from Guatemala, 16 from Honduras, and 28 from Nicaragua. The data set of estimates contains three variables: the indigence poverty headcount index, per capita income, and the Gini index of inequality for all the five countries and time periods. Poverty is defined through the poverty lines, and represents lack of sufficient monetary resources in the household to acquiring a basic food basket. Thus the poverty lines values are clearly linked to actual conditions in each country which allow for a relatively better interpretation of results.

Empirical results
The analysis begins with an examination of the stationarity properties of the respective variables using two panel unit root and stationarity tests: Im et al. (2003) and Levin et al. (2002). The Im et al. (2003) panel unit root test allows for heterogeneity in the dynamics of the autoregressive coefficients for all panel units. On the other hand, the Levin et al. (2002) panel-based ADF test assumes homogeneity in the dynamics of the autoregressive coefficients for all panel units with cross-sectional independence. Due to space limitation, the results are not reported but are available from the author’s on request.

Using the unbalanced panel data, all the equations are estimated by applying the following four separate procedures: the common constant method of estimation also called the pooled ordinary least squares method (OLS); the fixed effects (FE) estimator also known as the least squares dummy variables (LSDV) estimator; the random effects (RE), and the generalized least squares (GLS) to control for endogeneity. The pooled OLS and the FE results are selected as the most reliable and preferred for Central America, and are reported in the text.

To capture the pattern of economic sector growth as comprehensible as possible equations (1), (2), and (3) were estimated in the most flexible form, with no pooling restrictions, which is equivalent to running a separate regression for each country, except for a common residual variance restriction. Once the pooling restrictions are imposed, the results in Tables V, VI, and VII were obtained.

Income and inequality in the standard model
Table V presents the results of the standard model (equation 1). Three results emerge. First, the relationship between poverty, inequality and economic growth varies relatively very little for different measures of economic growth. Second, the null hypothesis that economic growth and inequality does not matter is rejected at the 1 percent level. Third, the coefficients are highly significant and with the expected signs. Changes in indigence poverty rates are negatively related with income changes, and positively related with changes in income inequality. Overall, the estimates suggest that, on average, a 1 percent increase in income per capita and in inequality would lead
to a nearly 0.79 percent decline in indigence poverty, and nearly 1.4 percent increase in the share of people living on indigence poverty, respectively.

Next, we explore the possibility that country differences exist in the elasticity values of indigence poverty by including a complete set of country dummies (columns 3 and 4). The $F$-test on the equality of the elasticity values across the countries confirms that the five parameters of the elasticity values are different and that there exists
<table>
<thead>
<tr>
<th>Variable</th>
<th>Costa Rica</th>
<th>El Salvador</th>
<th>Guatemala</th>
<th>Honduras</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>error</td>
<td>error</td>
<td>error</td>
<td>error</td>
<td>error</td>
</tr>
<tr>
<td>Agriculture</td>
<td>-0.48 ***</td>
<td>-0.35 **</td>
<td>-0.28 **</td>
<td>-0.31 *</td>
<td>-0.37 **</td>
</tr>
<tr>
<td>Manufacture</td>
<td>0.19 *</td>
<td>0.61 **</td>
<td>0.53 **</td>
<td>0.12 **</td>
<td>0.084</td>
</tr>
<tr>
<td>Tourism</td>
<td>-0.62 ***</td>
<td>-0.29 **</td>
<td>-0.56 ***</td>
<td>-0.29 *</td>
<td>-0.63 **</td>
</tr>
<tr>
<td>Gini</td>
<td>0.86 **</td>
<td>1.31 **</td>
<td>1.22 ***</td>
<td>1.19 ***</td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.246 **</td>
</tr>
<tr>
<td>D2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.124</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.221 **</td>
<td>4.113 *</td>
<td>1.346</td>
<td>2.517</td>
<td>1.668</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.866</td>
<td>0.786</td>
<td>0.767</td>
<td>0.781</td>
<td>0.801</td>
</tr>
<tr>
<td>SEE</td>
<td>0.051</td>
<td>0.053</td>
<td>0.081</td>
<td>0.089</td>
<td>0.077</td>
</tr>
<tr>
<td>F-statistics</td>
<td>86.14</td>
<td>57.28</td>
<td>61.04</td>
<td>63.18</td>
<td>58.21</td>
</tr>
<tr>
<td>D-W</td>
<td>1.93</td>
<td>1.69</td>
<td>1.87</td>
<td>2.03</td>
<td>1.98</td>
</tr>
<tr>
<td>$p$-value</td>
<td>0.046</td>
<td>0.072</td>
<td>0.087</td>
<td>0.089</td>
<td>0.081</td>
</tr>
</tbody>
</table>

Notes: All variables expressed in logs. *, **, and *** significant at the 10%, 5%, and 1% levels.
substantial variation across Central American countries. Indigence poverty in Costa Rica, El Salvador, and Guatemala are more reactive to economic growth than in Nicaragua, and Honduras (column, 4). As expected, Costa Rica, with an income elasticity value of nearly $-1.61$, exhibited the highest response to economic growth, followed by Guatemala ($-1.041$) and El Salvador ($-1.027$), then by Nicaragua, and followed closely by Honduras. The differences in income elasticity values by country seem to be driven by differences in inequalities, but also by disparities in income levels.

In all Central America countries, indigence poverty changes are very responsive to inequality changes as well, with a 1 percent increase in the Gini (inequality) implying, on average, a 1.04 percent to 1.38 percent (column, 1 and 2) increase in indigence poverty rates. When we allow for country heterogeneity, the inequality coefficients, however, are quite stable (columns, 3 and 4). The introduction of the dummy variables representing the Sandinistas-Contras turmoil in Nicaragua, and the global financial crisis did not improve the estimated results in all cases: extremely low values and statistically non-significant. It is possible that the impact could be already captured by the gross domestic product and distribution of income variables. Consequently, dummies were dropped from the regressions.

Does the level of initial Gini and economic growth matter?
Table VI provides the estimates of the more detailed model (variation of equation, 2). Contrary to Adams (2004), and Fosu (2010), among others, for a worsening of income distribution, the results obtained in this study of positive but low coefficient values and statistically non-significant, imply or suggest that higher level of initial inequality would not have a strong impact on the rate at which economic growth reduces extreme poverty in Central America. These results can be interpreted as an indication that initial inequality cannot make the difference between relatively slow and rapid poverty reduction. In other words, low initial inequality is not a pre or sufficient condition for rapid or high poverty reduction in the case of Central American countries.

Next, the full sample was divided into two groups of countries: Costa Rica as a low income inequality country and the rest of the Central American countries as high income inequality countries and re-estimated the regressions using both measures of economic growth. The results showed that there is no significant differences in the values of the economic growth elasticity between Costa Rica as a low Gini country versus the rest of Central American countries as a high Gini countries. It can be concluded that initial Gini is not the only and rarely the most important variable affecting subsequent growth. The results are not presented here, but can be provided on request from the author.

The previous results confirm that this heterogeneity is due to different degrees of responsiveness of indigence poverty rates to economic growth, and do not depend on the differences in the initial level of development and in the initial level of inequality across countries. Moreover, the estimates in Table VI, columns 1 to 3 do not outperform the estimates in Table V, columns 1 and 2. Next, the detailed model is estimated (columns 4 and 5). In this model the income and the inequality elasticity values of indigence poverty are allowed to differ across countries as a function of their initial conditions. The presence of the interaction terms implies that the income and inequality elasticity values will also reflect the influence of the initial economic growth. As expected, both initial higher (lower) level of economic growth and initial higher
(lower) inequality tend to correct downward (upward) the estimates of the income and the inequality elasticity values of indigence poverty for Central America. However, the values are statistically non-significantly.

**Economic sector growth and poverty: does tourism matter to poverty reduction?**

Table VII presents the results when the GDP is disaggregated into agriculture, manufacture, and tourism. To capture the pattern of growth equation (3) was initially estimated in the most flexible form, with no pooling restrictions, which is equivalent to running a separate regression for each country, except for a common residual variance restriction. Once the pooling restrictions are imposed, the regressions are conducted using both the five countries and the total number of observations. Moreover, the hypothesis that the coefficients are the same is rejected. The presence of individual significance of sector growth rates and the ability to separate their effects indicates that the three major economic sectors are linked differently in their relationships with poverty reduction in Central American countries. This may be interpreted as evidence in favor of the importance of growth composition for poverty alleviation.

The results indicate that growth in tourism's exports had the greatest impact on poverty, with coefficients considerable greater than for growth in agriculture in Costa Rica (0.61), Guatemala (0.56), and Nicaragua (0.63). For El Salvador, growth in the exports of manufacture sector had the greatest impact (−0.61), but in Honduras the impact of agriculture (−0.31) and tourism (−0.29) are not much different. The manufacture sector for Honduras (−0.12) and Nicaragua −0.13, are, in fact, low and only approaching a 10 percent level significant poverty reduction impact during the period in consideration.

The coefficients on agriculture exports varies considerably across countries ranging from −0.28 in Guatemala to −0.48 in Costa Rica, but it was only significant in Costa Rica, El Salvador, and Nicaragua. For example, a 1 percent increase in agriculture exports would bring nearly a 0.48 percent, 0.35 percent, and 0.40 percent decrease in the indigence poverty headcount rates, in Costa Rica, El Salvador, and Nicaragua, respectively. The elasticity values present a similar pattern in tourism exports ranging from −0.29 in El Salvador and Honduras (statistically significant at the 5 percent level) to −0.64, −0.61, and −0.56 in Nicaragua, Costa Rica, and Guatemala, (statistically significant at the 1 percent level), respectively.

For Nicaragua and Guatemala, the coefficients on agriculture exports were 0.59 percent and 0.50 percent of that for tourism exports, respectively. The poverty impact of inequality (Gini coefficient) remains significantly positive, with a lot of degree of stability across El Salvador, Guatemala, Honduras, and Nicaragua, and somewhat larger in absolute values. Meanwhile, for Costa Rica the coefficient is less pronounced, and barely approaching the 5 percent significant level.

For Nicaragua, there is a notable change in the agriculture coefficient before and after 1989. The agriculture coefficient was low and not-significant during the period before 1989. It improved from 1990 onwards and was statistically significant. On the other hand, for Costa Rica there is a notable change in the tourism coefficient before and after 1985. The tourism coefficient was negative, relatively low, and non-significant before the change on economic policy development from agriculture based economy to an eco-tourism based economy, implying that growth in the tourism
Conclusions
This set of data estimates for Central America is both broader in terms of including more observations and are more selective in terms of quality controls. This study finds that the actual extent of indigence poverty reduction does not depend very much on how economic growth is defined. Both economic growth and inequality have a strong, statistically significant impact on poverty in Central American countries.

The null hypothesis that economic growth and inequality does not matter is rejected at the 1 percent level. The coefficients are highly significant and with the expected signs. Changes in indigence poverty rates are negatively related with income changes and positively with changes in income inequality. The results further suggest that tourism development matters to the poor. However, tourism development is not necessary the fastest way to reduce poverty in Central America. Given that empirical evidence suggests that tourism sector growth has directly reduced poverty in all Central American countries, a trade-off between a tourism-led-growth-poverty reduction versus the other sectors may arise.

With respect to inequality, its negative impact on poverty reduction makes the policy question of managing or focusing on inequality reduction of greater importance in Central America. This is so because the potential for achieving better income distribution via the tax system and social transfers is limited in Central America. Therefore, other measures such as job creation programs, increasing access to credit and production composition adjustments do hold a promise.

Some relevant policy implications may be deduced from the results. In El Salvador and Nicaragua, for example, the trend of poverty reduction and falling income inequality may be related to the role of targeted public social programs and macroeconomic improvements. It suggests that there would be substantial potential benefits to the poor in Central America if more attention is focused on economic regimes adjustment which generate more jobs, enable a better distribution of economic growth and a greater impact on poverty reduction.

For Costa Rica, Guatemala, Nicaragua, and to a lesser extent for El Salvador and Honduras as the newcomers in tourism development, the findings support the proposition that tourism development, as a source of economic growth and poverty reduction, offer a convincing case, and under certain circumstances as an exceptional case, for the use of policy instruments such as targeted investment, marketing, and the support of tourism organizations focused to drive a tourism-led-based-economy and/or tourism programs and projects. The results for Costa Rica and Nicaragua are particularly interesting in light of the fact that tourism development could offer a better path to advance in the fight against poverty.
References


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**Further reading**


**About the author**
Dr Manuel Vanegas is an Adjunct Professor, University of Minnesota. He is breaking ground on the hypothesis that tourism development democratizes the dollar and offers a well structured road through which developing countries can both effectively reduce poverty and at the same time enhance the level of economic growth. His main research activities are in the areas of tourism economics and quantitative analysis with applications in poverty reduction, economic growth, marketing effectiveness, and demand analysis. Dr Manuel Vanegas can be contacted at: mavanegas@yahoo.com

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