Tourism and Poverty Reduction in Mexico: An ARDL Cointegration Approach

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Abstract: The objective of this paper was to investigate, with respect to the case of Mexico, the relationship between international tourism and the magnitude of poverty during the period of 1980–2017, through the use of an autoregressive distributed lags (ARDL) cointegration model with a structural break. The econometric results obtained in this paper indicate that there is a long-term relationship between international tourism and the reduction of poverty. It was found that for every 1% increase in international tourism, household consumption per capita increases 0.46% (and, therefore, poverty decreases). In the short term, it was found that a 1% increase in international tourism leads to a 0.11% increase in household consumption per capita (a decrease in poverty). The coefficient of the error correction model indicates that 23.9% of any movement into disequilibrium is corrected within one year. To corroborate these results, a Toda–Yamamoto Granger causality test was carried out, indicating a unidirectional causality relationship from international tourism towards the reduction of poverty.

Keywords: Mexico; poverty reduction; tourism; ARDL model; cointegration; Granger causality

1. Introduction

Tourism is an increasingly important sector for many economies of the world, especially for developing countries. According to the World Travel and Tourism Council (WTTC), the tourism industry represents 10.4% of the world’s GDP, and almost one in 10 jobs (9.9%) in the world is encompassed in the tourism sector. In 2016, exports from the tourism sector accounted for 6.6% of the world’s exports and almost 30% of the world’s exports of services [1].

Due to the great and growing importance of the tourism sector in the economy and in the generation of jobs, as well as its contribution to the generation of foreign exchange, many developing countries have turned to tourism as an important instrument of growth and development. Various resolutions of the United Nations have recognized the importance of tourism in achieving sustainable development, identifying sustainable tourism as a key component of the achievement of several Sustainable Development Goals and the Agenda for Sustainable Development [2].

In the academic field, the growing importance of tourism in the economy has given rise to the tourism-led growth hypothesis (TLGH), which, in turn, is theoretically based on the export-led growth hypothesis (ELGH), which postulates that the expansion of exports is one of the main determinants of economic growth [3]. According to an extensive review of the literature on the TLGH, the TLGH has been confirmed in studies in the great majority of countries, with very few exceptions [3]. Croes [4] has also pointed out that the empirical evidence shows a strong positive correlation between tourism development and economic growth.

However, while the literature on the relationship between tourism and economic growth is quite broad and diverse in terms of countries, regions, and the econometric methodologies used, very little research has been done on the relationship between tourism and poverty, in part because it was
expected that the economic growth fostered by tourism would automatically trickle down to the poor. While there is a broad consensus among tourism economics scholars with respect to the idea that tourism is generally beneficial to combat poverty and regarding the possible theoretical channels through which this mechanism functions [5], very little is known about the magnitude of these links [6]. To date, the few studies that have been carried out are not conclusive about whether or not there is a relationship between tourism and poverty. For example, Croes and Vanegas [7] found an inverse relationship between tourism and poverty in the case of Nicaragua, as did Croes in [4], but Croes found that in Costa Rica, tourism has no statistically significant effect on poverty in the long term [4].

In a study of Brazil, Blake et al. [8] found that although tourism benefits the deciles with lower incomes, it does so to a lesser degree than the higher deciles. In a result similar to that found by Ravallion [9], who found that the higher the poverty rate, the lower the effects of economic growth on the decrease of poverty, Croes [4] also found that higher levels of poverty in a country diminish the beneficial effect of tourism on poverty.

Quantitative research on tourism and poverty is very scant in general, but in the case of Mexico, it is practically nonexistent. To my knowledge, no such study exists, since the few related studies that have been conducted have been limited to analyzing only the relationship between tourism and economic growth. These investigations have found that there is a positive relationship between spending on tourism and economic growth [10–13]. However, considering that poverty in Mexico affects 44% of the population [14] and that tourism is one of the most important economic sectors in the country (representing 8.7% of the GDP, 5.9% of the total employment, and 77.2% of the exports of services), it becomes necessary to investigate the potential of tourism to reduce poverty in Mexico. Therefore, this article aims to analyze this relationship through the use of a cointegration analysis and an autoregressive distributed lags (ARDL) model.

The article is organized as follows: the Section 2 describes in general terms the Mexican tourism industry. In Section 3, a brief literature review is carried out. Section 4 describes the database used in the paper. Section 5 explains the econometric model. Section 6 details the econometric results obtained. Section 7 discusses the main results and the limitations of the study. The last section presents the conclusions of the study.

2. The Tourism Industry in Mexico

Tourism is an important sector of the Mexican economy, both in terms of production and income, as well as in the creation of jobs and as a source of foreign exchange. In recent years, foreign exchange from tourism has played an important role in the Mexican economy by offsetting the decline in oil revenues and thus contributing to the stability of the balance of payments. In 2017, Mexico hosted a record 39.3 million international tourists, placing it in sixth place in the world with respect to this metric [15].

In 2017, tourism represented 8.7% of the total GDP in Mexico [16], which is double the Organization for Economic Cooperation and Development (OECD) average and represents one of the largest shares of GDP among the OECD member countries [17]. The tourism sector in Mexico ranks fourth in terms of GDP, behind the commerce, manufacturing, and real estate services sectors but above the construction, mining, financial services, and agriculture sectors [17].

According to Mexico’s National Institute of Statistics and Geography (INEGI, by its acronym in Spanish) [16], tourism contributed 8.7% of the total GDP in 2017. Of this value, accommodation services accounted for 28.3%, followed by transportation at 19.3%; restaurants, bars, and nightclubs at 15.3%; production of handicrafts and other goods at 10.6%; tourism trade at 7.8%; sports and recreational services at 1.1%; cultural services at 1%; travel agencies and other reservation services at 0.8%, and the rest of the services contributing a combined 15.8% of the total.

Regarding the creation of jobs by the tourism sector, around 2.3 million paid occupations were reported in 2017, which represented 5.9% of the total number of paid jobs in the country. Restaurants, bars, and nightclubs were the main generators of employment in the total number of tourist jobs,
representing 28.9% of the total, followed by passenger transportation at 25.3% and “other services” at 24.7%; accommodation services contributed only 9% and handicraft production contributed 3% [16].

The average annual remuneration in the tourism sector during 2017 amounted to 166,944 pesos per employed person, an amount 13% higher than the average annual remuneration for the total economy [16].

Tourism is an important generator of foreign currency in Mexico, contributing 77.2% of the exports of services, an amount that is much higher than the world average (25.6%) and the average of the OECD countries (21.3%) [17].

With regard to the distribution of tourism consumption expenditure within the country, the consumption of tourists residing in Mexico contributed 82% of the total, while the expenditure of tourists from abroad made up the remaining 18%. The main reasons for domestic tourism are visiting friends and family, representing 40.1%, followed by taking a vacation at 30.3%. The main motivation for international tourism to Mexico is to take a vacation (68.4%) [17].

Mexico has a clear model for international tourism development based on important, world-famous, sea–sun–sand destinations, such as Cancun and Los Cabos. Benefitting from its geographical proximity to the second largest outbound market in the world, the United States (US), tourists from the US represent 80% of the total tourists in Mexico, which, on the other hand, makes Mexico very vulnerable to changes in tourist flows from the US [17].

According to the OECD [17], two-thirds of international tourists visited sun–sea–sand destinations, mainly Cancun, the Riviera Maya, and Los Cabos, and the state of Quintana Roo alone hosts almost half of the international arrivals and almost two-thirds of all the international overnight stays. These figures show the great international popularity of these destinations, but also the high dependence of the Mexican international tourism sector on these particular locations.

In summary, the tourism sector in Mexico plays a very important role in the Mexican economy and in the generation of jobs and enjoys a very important position in international tourist destinations, but currently, the sun–sea–sand model seems to be reaching its peak and is very concentrated in a few destinations, which limits the potential for more uniform growth in the other regions of the country [17].

3. Literature Review

As noted in Section 1, while there is a wealth of literature about the relationship between tourism and economic growth, the literature on the relationship between tourism and poverty is very scarce, at least at the level of empirical studies that try to determine if there is such a relationship and, in any case, measure the effects of one variable on another, as well as their possible causal relationships.

On a theoretical level, Mitchell and Ashley [5] postulated three channels through which tourism affects poverty: direct, secondary, and dynamic effects, but they did not provide any empirical evidence on the magnitude of these channels. As explained by Winters et al. [6], the direct channel refers to whether the poor benefit directly from tourism activities, either as owners of the companies that sell to tourists or as workers employed by these companies. The secondary channel considers the effects of spending on tourism income received by the sector; thus, its effect on poverty will also depend on the degree to which the poor participate in these linked activities. Finally, the dynamic effects of tourism on poverty have to do with the long-term effects of tourism on economic growth, which, in turn, can contribute to the reduction of poverty. While each of these channels has been studied and even measured in the literature of the TLGH, their impact on poverty has not been measured, because most studies have focused on the effects on specific groups of poor people in local areas [5].

Among the approaches adopted to address the empirical analysis of the relationship between tourism income and poverty are simulation models, such as input–output, social accounting matrices, and computable general equilibrium (CGE); microeconomic studies; case studies; and time series studies at the macroeconomic level, as well as time series studies by economic sectors.
Among the studies based on CGE is the one developed for the case of Brazil by Blake et al. [8], who found that there is a gain of $0.45 for the Brazilian economy for each additional $1 unit of tourism spending, and although the low-income deciles benefit from tourism, those who benefit the most are not the poorest members of society. Njoya and Seetaram [18], also using a CGE, found that tourism spending in Kenya reduces the poverty count only marginally but produces a greater decrease in the poverty gap and in the severity of poverty. A similar result was found by Mahadevan and Suardi [19], who analyzed a sample of 13 tourism-intensive economies and found no evidence that tourism growth leads to a reduction in the poverty rate, but found that it significantly reduces the poverty gap and produces an improvement in income distribution. Mahadevan, Amir, and Nugroho [20], using a CGE model in Indonesia, found that an increase in domestic and foreign tourism reduces poverty but has a deleterious effect on inequality.

With respect to time series studies at the macroeconomic level, Croes and Vanegas [7] used a vector error correction model (VECM) for the case of Nicaragua, in which they found that there is a long-term relationship between tourism development and the reduction of poverty and that tourism causes a decrease in poverty but not the other way around.

Croes [4] estimates that, in Nicaragua, the elasticity of poverty with respect to international tourism equals −1.23, meaning that a 1% increase in revenues from international tourism is associated with a 1.23% drop in the poverty rate. However, in the case of Costa Rica, Croes found no evidence of a long-term relationship between tourism and the reduction of poverty.

Using an autoregressive distributed lags model (ARDL), Vanegas, Gartner, and Senauer [21] found that in Costa Rica and Nicaragua, there is a long-term relationship between poverty, agriculture, manufacturing, and tourism. They estimated the elasticity of poverty with respect to tourism to be −0.64 and −0.58 in Nicaragua and Costa Rica, respectively, and emphasized that these elasticities are greater than the elasticities of poverty with respect to agriculture and manufacturing in both countries, which shows that the potential of tourism to reduce poverty in these countries can be greater than that of agriculture or even manufacturing.

In a panel data study of the five countries of Central America, Vanegas [22] found that tourism exports have a positive effect on the reduction of poverty and that their impact on the reduction of poverty is greater than that of agricultural exports in Costa Rica, Guatemala, and Nicaragua. The greatest effects of tourism on the reduction of poverty take place in Nicaragua and Costa Rica, with a poverty–tourism elasticity of −0.63 and −0.62, respectively. However, Croes and Rivera found that tourism in these countries increases the level of inequality, which causes a negative indirect effect on poverty levels [23].

In the case of Mexico, most of the literature focuses on the relationship between tourism and economic growth through the TLGH, but there is practically no literature about the effects of tourism on poverty. Using the methodology of Ivanov and Webster [24], which consists of measuring only the direct effects of tourism spending on the GDP, Rodriguez Brindis [10] estimated that during the period of 2005–2012, tourism spending directly contributed to 9% of GDP growth in Mexico. Using the same methodology, Brida, Pereyra, and Devesa [25] found that compared with Argentina, Brazil, and Uruguay, the contribution of tourism to economic growth is greater in Mexico and that the importance of tourism in the economy is the greatest in Mexico relative to the other countries studied.

Through a cointegration analysis, Brida et al. [11] analyzed the relationship between tourism spending, GDP, and the real exchange rate for Mexico in the period of 1980–2007, finding that there is a long-term relationship between the three variables and that the elasticity of economic growth to tourism spending is 0.7 (i.e., for every 1% tourism spending increase, the GDP increases 0.7%). Similarly, they found a unidirectional relationship of Granger causality from tourism spending towards economic growth but not the other way around.

De la Cruz Gallegos [12], using a vector autoregressive (VAR) model, as well as a Granger causality test, found that there is a unidirectional relationship of causality from international tourism arrivals to economic growth in Mexico. Kido-Cruz et al. [13], through a VAR, found that there is a causal
relationship (in the Granger sense) in the number of international visitors to Mexico towards economic
growth and an elasticity of economic growth to tourism spending of 0.165.

As can be seen, all these findings for the Mexican case refer to the TLGH, and it was not possible
to find any research that directly analyzes the effects of tourism spending on poverty in the case of
Mexico; thus, the present work aimed to address this research problem.

4. Data

Because the measurement of poverty in Mexico is only done every two years, we decided to use a
proxy variable to represent it, because using a variable that is reported every two years (beginning
in 1984) would reduce the sample size to only sixteen observations as opposed to 38 observations,
as is the case if the proxy variable is used. The proxy variable selected is per capita household
consumption, a variable that has already been used by several authors (Garza-Rodriguez [26], Ho and
Iyke [27], Odhiambo [28], and Uddin et al. [29], among others). The source for this variable is the
World Bank [30], and it is expressed in constant national currency units (Mexican constant pesos)
from 1980 to 2017. According to Garza-Rodriguez [26], the correlation coefficient between per capita
household consumption and the intermediate poverty index calculated by the World Bank is 0.81,
which suggests that this variable can be used as a good indicator of poverty in the case of Mexico.
The tourism receipts variable refers to international tourism receipts and was taken from the Bank of
Mexico and is measured in current US dollars, covering the 1980–2017 period.

5. Econometric Model

The objective of this work is to investigate the possible correlation and causal relationship between
international tourism receipts and poverty in Mexico for the period of 1980–2017. Because this is a long
period, we will use the structural break unit root test developed by Banerjee, Lumsdaine, and Stock [31]
in order to determine if the series are stationary even in the presence of a possible structural break.
In order to examine if the series are cointegrated in the long term, we will use the ARDL bound testing
approach to cointegration in the presence of a structural break. In case the variables are cointegrated,
we will estimate an unrestricted error correction model (UECM) to estimate the short- and long-term
elasticities of poverty with respect to international tourism receipts. Finally, we will analyze if there is
a causal relationship between the variables through the Toda–Yamamoto [32] Granger causality test.

From the ARDL model, the following dynamic UECM can be derived, which integrates the
short-term and long-term dynamics of the model simultaneously:

$$\Delta LPOV_t = \alpha_0 + \alpha_1 LPOV_{t-1} + \alpha_2 LTOUR_{t-1} + \sum_{i=1}^{p} \alpha_3 \Delta LPOV_{t-i}$$

$$+ \sum_{j=0}^{q} \alpha_4 \Delta LTOUR_{t-j} + \alpha_5 D2008_t + \mu_t$$

where LPOV is the natural logarithm of per capita household consumption, LTOUR is the natural
logarithm of international tourism receipts, D2008 is the structural break dummy variable, and \( \mu \) is the
disturbance term.

As shown by Pesaran et al. [32], the coefficients \( \alpha_1 \) and \( \alpha_2 \) represent the long-term effects in the
model, while the coefficients \( \alpha_3 \) and \( \alpha_4 \) represent the short-term effects.

6. Empirical Findings

6.1. Stationarity Tests

Because the period considered in the analysis is long, covering 38 years (1980–2017), it was
necessary to use a stationarity test that considers the possibility of the occurrence of a structural
break in the series. The test used is the Banerjee, Lumsdaine, and Stock breakpoint unit root test [31].
The results of this test are shown in Table 1. It can be observed that while the variable LTOUR (the
logarithm of international tourism receipts) is stationary in levels (integrated of order 0), the variable LPOV (logarithm of per capita household consumption, the proxy variable for poverty in this paper) is stationary in differences (integrated of order 1). Because the order of integration is different for the two variables, it is not possible to use Johansen’s test, so we proceeded to apply the autoregressive distributed lag (ARDL) bounds testing approach to cointegration proposed by Pesaran et al. [32], which can be used even if the order of integration of the variables differs, as long as it is not greater than 1 [33].

### Table 1. Banerjee, Lumsdaine, and Stock breakpoint unit root test results.

| Variable | Augmented Dickey-Fuller Test t-Statistic | p-Value | Lags | Unit Root | Stationarity |
|----------|------------------------------------------|---------|------|-----------|--------------|
| LPOV     | −4.19                                    | 0.26    | 2    | Yes       | Not stationary |
| D.LPOV   | −5.98                                    | <0.01 *** | 1    | No        | Stationary    |
| LTOUR    | −7.44                                    | <0.01 *** | 4    | No        | Stationary    |

Notes: (1) D denotes the first difference operator; (2) *** indicates significance at the 1% level.

6.2. Cointegration Tests

In order to determine if the variables of poverty and tourism receipts are cointegrated or not, we carried out the bounds test developed by Pesaran et al. [32], which is applicable even when the variables in a model have a different order of integration, as is the case in this study. According to this test, if the calculated value of the F statistic is greater than the upper critical value (upper critical bound), there is cointegration between the variables. If the calculated value of the F statistic is below the lower limit (lower critical bound), the variables are not cointegrated in the long term. Finally, if the calculated value of the F statistic is between the lower and upper limits (lower and upper critical bounds), we cannot determine if the variables are cointegrated or not. Thus, the hypotheses raised in the Pesaran et al. [32] test are the following:

\[ H_0: \theta_1 = \theta_2 = \ldots = \theta_i = 0 \]  (2)

\[ \theta_1 \neq \theta_2 \neq \ldots \neq \theta_i \neq 0. \]  (3)

We can see in Table 2 that the variables are cointegrated, because the calculated value of F is greater (10.78) than the value of the upper limit of the test (8.96 for a sample of 35 observations, while the sample of our model is 37 observations) at a 99% confidence level.

### Table 2. F-bounds test for cointegration.

| Test Statistic | Value | Signif. | I(0) | I(1) |
|----------------|-------|---------|------|------|
| F-statistic    | 10.78 | 10%     | 4.04 | 4.78 |
| K              | 1     | 5%      | 4.94 | 5.73 |
|                |       | 2.5%    | 5.77 | 6.68 |
|                |       | 1%      | 6.84 | 7.84 |
| Actual Sample Size | 37 | Finite Sample: n = 35 | 10% | 4.23 | 5.05 |
|                |       | 5%      | 5.29 | 6.18 |
|                |       | 1%      | 7.87 | 8.96 |

Null hypothesis: No levels relationship.

The bounds t-test (shown in Table 3) confirms these results as the calculated t-value is −3.74, which is higher (in absolute value) than the upper bound of the test (−3.5) at a 97.5% confidence level.
Therefore, we can conclude that there is a long-term inverse relationship between international tourism receipts and poverty (as measured by the per capita consumption of the household).

**Table 3. t-bounds test for cointegration.**

| Test Statistic | Value | Signif. | I (0)  | I (1)  |
|----------------|-------|---------|--------|--------|
| t-statistic    | −3.74 | 10%     | −2.57  | −2.91  |
|                |       | 5%      | −2.86  | −3.22  |
|                |       | 2.5%    | −3.13  | −3.5   |
|                |       | 1%      | −3.43  | −3.82  |

Null hypothesis: No levels relationship.

**6.3. Short- and Long-Term Elasticities**

Once it was determined through the Pesaran et al. [32] test that there exists cointegration between the variables, we estimated a UECM to investigate the dynamics of the short- and long-term relationship between poverty and tourism receipts. In addition, given that the variables are expressed in logarithms, it is possible to interpret the estimates of the parameters as elasticities. Thus, it was found (Table 4) that the elasticity of poverty reduction (increase in household per capita consumption) to tourism receipts is −0.46 (i.e., a 1% increase in tourism receipts causes a 0.46% increase in per capita consumption (decrease in poverty)). This result is similar to the one obtained by Vanegas (2015), who also used an ARDL model and estimated the elasticity of poverty reduction to be −0.58 for Costa Rica and -0.64 for Nicaragua. In the short term, an inverse relationship was also observed between international tourism revenues and poverty reduction, with a short-term elasticity equal to −0.11.

**Table 4. Short- and long-term elasticities.**

| Elasticity  | Estimate       | Std. Error |
|-------------|----------------|------------|
| Long term   | 0.456 ***      | (0.067)    |
| Short term  | 0.109 ***      | (0.024)    |

Notes: (1) Standard errors in parenthesis; (2) *** indicates significance at the 1% level.

In Table 5, we can see that the coefficient of the error correction term is negative and statistically significant at a 99% confidence level, which confirms that there is a long-term cointegration between poverty and tourism receipts. The coefficient’s value of −0.2394 indicates that 23.94% of any movement into disequilibrium is corrected within a period (one year). This same table shows that the dummy variable created to account for the structural break detected by the Banerjee, Lumsdaine, and Stock breakpoint unit root test [31] in 2008 is negative (a decrease in household consumption and therefore an increase in poverty during that year) and statistically significant.

**Table 5. Error correction model regression.**

| Variable | Coefficient | Std. Error | t-Statistic |
|----------|-------------|------------|-------------|
| C        | 0.974551    | 0.203541   | 4.787995    |
| D2008    | −0.047315   | 0.014001   | −3.379414   |
| CointEq(-1) | −0.239364 | 0.050789   | −4.712942   |

**6.4. Granger Causality Test**

Because one of the variables in the model (LPOV) is not stationary in levels, it was necessary to carry out the Toda–Yamamoto [32] Granger causality test, which is valid even if the variables are not
stationary. The results of the test (shown in Table 6) indicate that the tourism receipts variable Granger causes household consumption per capita (LPOV) but not the other way around. This finding confirms the cointegration results obtained in the Pesaran et al. [32] test, as well as the negative and statistically significant sign of the error correction term found in the UECM model.

Table 6. Toda–Yamamoto Granger causality test.

| Dependent variable: | Chi-sq | df. | Prob. |
|---------------------|--------|-----|-------|
| LPOV                | 8.334  | 3   | 0.040 |
| Excluded:           |        |     |       |
| LTOUR               | 8.334  | 3   | 0.040 |
| All                 | 8.334  | 3   | 0.040 |
| Dependent variable: |        |     |       |
| LTOUR               | 2.386  | 3   | 0.496 |
| Excluded:           |        |     |       |
| LPOV                | 2.386  | 3   | 0.496 |
| All                 | 2.386  | 3   | 0.496 |

7. Discussion

The findings obtained in this research confirm the existence of a positive effect of international tourism on the reduction of poverty in both the short and long terms in the case of Mexico. The long-term effect is significant, with an elasticity of poverty to international tourism receipts of 0.46, which indicates the potential of international tourism to reduce poverty in this country. The size of this parameter is similar to that found by other authors in the scarce empirical literature of time series analysis regarding the relationship between tourism and poverty [21–23]. However, it has to be said that these studies were carried out in countries with characteristics very different from those of Mexico (particularly in countries much smaller than Mexico), so it is difficult to compare our results with those from countries similar to Mexico. Even so, the results are, to a certain extent, congruent when compared with those obtained for the case of Mexico regarding the relationship between tourism and economic growth [3] and economic growth and poverty [26], as these authors found that larger tourism receipts lead to a higher rate of economic growth, and, in turn, as Garza-Rodriguez [26] found, higher economic growth leads to a lower poverty rate. Therefore, we could expect tourism to lead to a lower poverty rate through a higher rate of economic growth, as we found in this paper.

Of course, it remains to be analyzed whether the growth of other economic sectors besides tourism can have a greater impact on the reduction of poverty—an issue that has already been analyzed through other methodologies different than the methodology used in this paper (5, 8, 18–20), and it would be interesting to extend the present study with representative variables of the evolution of these other economic sectors, in addition to tourism, with the use of a time series methodology, such as the one used in this paper.

Another limitation of the present study is that it was not possible to take into account the effects of the different types of international tourism on poverty, although this would be quite difficult to carry out given the strong limitations of the data for Mexico at this level of disaggregation of tourism activities, which unfortunately are not currently available for the country [17].

Perhaps the most important limitation of this paper is that it only took into account the effects of international tourism (international arrivals) on poverty, but not domestic tourism, which is much more important, because it represents 82% of the total tourism spending in Mexico. However, it is argued that estimating the effects of international tourism by itself is also important because of its very important role as a source of foreign exchange and as an exogenous growth driver for the Mexican economy.

Another very important limitation is the lack of data on the poverty variable measured directly, not through a proxy variable as was done in this work, but directly through the measurement of
household income or through the use of a multidimensional poverty measure. However, as explained above, it is not possible to carry out a time series analysis using these variables, because they are only measured every two years, which would reduce the sample size, making it impossible to carry out the time series econometric analysis developed in this paper.

8. Conclusions

The econometric results obtained in this paper indicate that there is a long-term relationship between international tourism receipts and the reduction of poverty in Mexico. It was found that the elasticity of poverty reduction with respect to international tourism receipts is $-0.46$ (i.e., for every $1\%$ that international tourism receipts increase, poverty decreases $0.46\%$). In the short term, an inverse relationship was also observed between these variables, with a short-term elasticity equal to $-0.11$. The coefficient of the error correction model estimated in the paper indicated that $23.9\%$ of any movement into disequilibrium is corrected within one year. These results are very similar to those found by Croes and Rivera [20] in the cases of Nicaragua and Costa Rica and by Vanegas et al. [18] and Vanegas [19] in the same countries.

To corroborate these results, the Toda–Yamamoto [28] Granger causality test was carried out, which indicated a unidirectional causality relationship, going from international tourism receipts towards the reduction of poverty but not the other way around.

The findings of this research indicate that international tourism has an important effect in reducing poverty, at least in the case of Mexico, which suggests that Mexico and other developing countries with characteristics similar to those of Mexico should consider including the promotion of international tourism in their development strategies for poverty reduction.

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