

Drivers of Economic Growth: The Case for Tourism in Mexico

ABSTRACT: The main purpose is to test, in the case of the Mexican economy, the tourism-led growth hypothesis and the relationship between private consumption and tourism arrivals. Toda and Yamamoto's (1995) based on the Gunduz and Hatemi-J (2005) proposal and the Liu, Song and Romilly (1997) time series procedures were applied. The findings support the tourism-led growth hypothesis in the Mexican case. Moreover as an additional contribution, a bi-directional and long-run relationship was found between tourism arrivals and private consumption, establishing the notion regarding the possibility to provide economic benefits to the Mexican population.

Keywords: Tourism-led growth hypothesis; Granger causality; Cointegration; Private consumption.

JEL Codes: C32, F41, L83, O40

José L. de la Cruz Gallegos*
Carlos Canfield Rivera**
José Antonio Núñez Mora***

* Tecnológico de Monterrey, campus Estado de Mexico. Email: jldg@itesm.mx.

**Tecnológico de Monterrey, campus Estado de México

Email: carlos.canfield@itesm.mx

***Tecnológico de Monterrey, campus Ciudad de Mexico.

Affiliation: Tecnológico de Monterrey, campus Estado de México.
Postal Address: Carretera Lago de Guadalupe, Km. 3.5
Col: Margarita Maza de Juárez, Estado de México 52926, México
(52) 55 58 65 55 55 ext. 3185

1. Introdução

In the recent past, the tourism industry grew at a faster pace than other service businesses (Clancy 2001). For example worldwide, in 1970, international arrivals registered 165 million and accounted for 18 billion dollars as receipts. In the year 2006, such figure for tourism arrivals soared to 842 million and the world's receipts followed, with 735 billion dollars.

The impressive growth exhibited by this industry has had a deeper impact in some of the third world countries, which in turn have applied a tourism policy in order to promote economic growth. Furthermore, economic reforms oriented towards free trade have allowed, not only a rising exchange of goods and services, but have also supported a continuous and increasing flow of international tourism. According to Eilat and Einav (2004), tourism is the world's largest export earner, mainly because in some points of time, its foreign currency receipts had exceeded those from other relevant industries. Consequently, many developing countries have shown an increasing interest in promoting their tourism destinies as means to achieve higher economic growth.

In that way, the tourism-led growth hypothesis poses that a country's economic growth must benefit from the income derived from the tourism activity (Balaguer and Cantavella-Jorda, 2002). In their empirical studies MacKinnon (1964), Gray (1970), Lea(1988), Hazari y Kaur(1995) Hazari and Sgro (1995), Brohman (1996) and Clancy (1999) conclude that tourism development has a positive relationship with employment generation, foreign currency pick up and increasing government's income.

At the same time, Bhagwati and Srinivasan (1979) and Helpman and Krugman (1985) state the potential benefits of a growing international competition, basically because the domestic tourism enterprises can improve their efficiency through the development of scale economies. Finally, Feder (1982) argues that the tourism sector has a positive relationship on productivity, knowledge, technology and infrastructure.

Notwithstanding, some contradictory results were obtained in recent international studies (Oh, 2005) forcing to test the tourism-led growth hypothesis in each country's particular case. In odd cases, it is even possible to find many economic and social difficulties supporting the idea that the tourism sector can not improve economic growth. In general, some reasons are linked to the market structure [where a monopolistic competition can reduce tourism welfare benefits (Hazari and Ng, 1993; Sinclair, 1998)] and to the great economic influence that developed countries have in strategic issues like transportation, logistic, marketing, hotels management and other services that are relevant in the development of the tourism sector in poor countries (Britton, 1981).

The above mentioned elements are part of the economics' dependency point of view that relevant authors have sustained in previous studies (Clancy, 1999). Clancy summarized some negatives issues around the excessive dependence that developing countries might have about the use of tourism as a way to improve economic growth. Such aspects being: That the multiplier effects are overstated, leakages are extremely high and job creation is seasonal and more capital intensive than once believed (Lea 1988; Nash 1977; Perez 1974; Turner 1976; Wood 1979). Nevertheless, the seasonality of the creation of tourism's related jobs is one among other problems. According to Sinclair (1998), a biggest share of partial-time and lower paid jobs have been occupied by women, negatively influencing over the promotion of equalitarian welfare.

Additionally, Brenner (2005) established that well planned luxury-resorts are, by themselves, not enough to obtain regional development and contribute efficiently to the solution of several of the social problems exhibited by third-world countries. Even more, in some cases there is evidence that international tourism has been accompanied by an

increase in prostitution and other conflicting issues (Lee, 1991; Chant, 1997). Finally, developing countries do not have any sort of influence over economic and political cycles in developed countries, which determine the travel pattern of international tourists.

The main purpose is to test, in the case of the Mexican economy, the tourism-led growth hypothesis by means of a time-series approach, fundamentally through the causal relationship in the Granger sense. Specifically the objective is to examine both, relationship and direction between Mexican GDP and tourism arrivals, and further between private consumption and tourism arrivals.

The rest of the paper is organized as follows: Section 2 describes some aspects of the Mexican tourism sector. Section 3 explains the methodologies and data. Section 4 contains empirical results; and last, Section 5 presents the research findings.

2. Some Aspects of the Mexican tourism sector

The economic growth of the Mexican tourism sector, over the last decades, has become a relevant source of financial support to its economy, providing part of the foreign currency required by its balance of payments constraint (Thirlwall, 1979; Thirlwall and Nureldin-Hussein, 1982).

According to Clancy (1999) since the late 1960s, the Mexican government applied some multi-year tourism development strategies. Under the presidential regimes of Luis Echeverría (1970-1976) and José Lopez Portillo (1976-1982) not only 100,000 new rooms were created but five brand new beach resorts, located at Cancun, Loreto, Ixtapa, Huatulco and Los Cabos, were built.

Moreover, the confluence of three elements: Mexico's proximity to the United States, industrial growth and tourism planning activities through FONATUR (The National Fund for Tourism Promotion) supported the growth of international arrivals.

Despite this growth, the Mexican tourism sector had yet some unresolved problems. The economic crisis in the decade of the 1980's, a new market oriented economic policy and a huge public finance constraint limited further planned development in the sector.

Nevertheless, in the period from 1983 to 1988, the government's strategy towards tourism, focused in consolidation of previous infrastructure supporting existing resorts. As a result, both the average annual tourism balance and the average tourist per capita expenditure increased far above the originally projected figures.

Private and public investments, new marketing strategies, charter flights and competitiveness improvements, particularly in the Caribbean cities of Cancun and Cozumel accounted for a great share of the positive performance of the Mexican tourism sector in the decade of the eighties. As an example, in the period of 1983-1988, the Mexican government granted 722 tourism related credit operations by means of which 22,500 rooms were developed and other 14,000 were improved.

In 1990 the United States accounted for nearly 88% of total travelers (54% from California and Texas only), whereas visitors from Europe and Central America decreased in the same time period.

As a counterbalance measure, in 1992, the Mexican government launched a National Tourism Modernization Program (NTMP) aiming to attain better income distribution patterns and higher economic growth by means of more productivity, quality and technological development for both tourism infrastructure and human capital. The NTMP attempted to reduce the dependency from beach destinations by adding colonial cities, Maya world and border cities to the Mexican tourism portfolio.

Again these planning efforts were set-back by a negative economic scenario due to the so-called "Tequila Crisis" and the associated currency depreciation, which in turn

curtailed the government's capacity to support growth. In this period, not only room construction was lowered, but it was also oriented towards the higher income sector.

Private enterprise strategy aimed to capture a higher share of tourism income, yet average per capita expenditure in such activity only increased from 532 to 549 dollars in the 1990-2000 period. Total arrivals reached the figure of 10.6 million, up from the original 6.4 million. A reason for that behavior can be found in the currency depreciation that made Mexican goods cheaper for international tourists yet more expensive for their domestic counterparts.

For the new millennium, the National Tourism Program (2001-2006) tried to overcome some of the problems observed in the previous decades. Among its main objectives were: Increasing competitiveness through better planning efforts, improved regulation and modernization, fostering domestic tourism and strengthening of infrastructure and services throughout the hospitality sector.

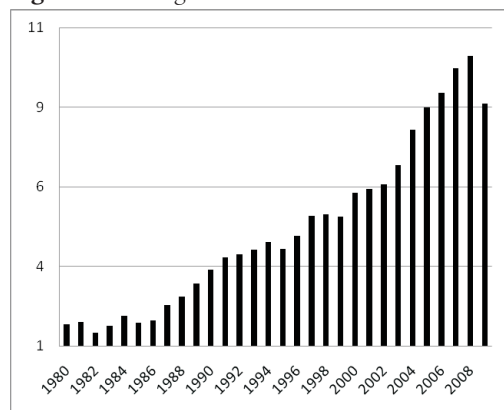
Mexico continued to improve its international position in terms of tourism arrivals, becoming the 10th country in such rank. For that matter in 2007, the country achieved a 2.4 % share of the world's total market. As it was established by Clancy (1999), the growth of this sector was remarkable, mainly because "no other third world country" has had better results in terms of tourist arrivals or tourism dollars.

Current statistics show the ever growing importance of the tourism sector in the Mexican economic scenario. Firstly, between 1996 and 2004, Mexican tourism gross domestic product averaged 8.2 % of the country's total gross domestic product (GDP), and the tourism services consumption was 16.2 % of the total private consumption (CPR) in 2004. Even so the contribution of tourism consumption in hotels, restaurants and cafeterias was higher than the previous average (72.4 %). In the same way, the transportation tourism consumption was a relevant source of the total transportation's consumption, registering a figure of 31.7 %.

The preceding data allow us understand that the evolution of the services consumption is considered to be the most important variable explaining the growth of Mexican tourism, where services represent 87.5 % of the total tourism consumption.

On summary it can be observed that since the decade of the 1970's, the income derived from tourism arrivals has been increasing, reaching, in 2008, the figure of 13.2 billion dollars (Figure 1) becoming the third most important source of foreign financial flows to the country, when only in that year , 21.4 million people visited Mexico.

Figure 1 – Foreign tourism income



Source – Banco of Mexico, Billions of dollars

Employment is the second most significant economic factor to study in these relationships. In 2005 the tourism sector provided employment to 1.7 million people, the second largest source of jobs in the Mexican economy. Moreover, the services sector provided job opportunities for 82.4 % of the total tourism related employees. At the same time, tourism workers exhibited higher education and productivity levels than the national average (SECTUR, 2002)¹ leading to greater profits for the sector, but nevertheless, the tourism related job creation exhibits strong seasonal patterns.

A third factor is the increasing investment. Between 1990 and 2005, public financing to the tourism activity surpassed the amount of 7 billion dollars. In the same period of time, foreign direct investment (FDI) in the tourism sector reached 5.9 billion dollars and the credit of the banking system to the sector was almost 32 billion dollars, where private banks accounted for almost 90 % of the total. Among 2001 and 2006 private investment had increased significantly, in the range of 12 billion dollars.

Following such dynamics, beach-front projects have received a larger amount of investment compared to other tourism projects², mainly because since the decade of the 1970s, the promotion of sun destinations has been an important component in the Mexican tourism policy. Official data shows the significant improvement in Mexican tourism infrastructure. Between 1990 and 2005 the number of hotel rooms increased from 333 to 541 thousand. However, in the same period of time, the high income infrastructure accumulated 70 % of the total new rooms.

According to Brenner and Aguilar (2002) a central characteristic of Mexican tourism development resides in the fact that a significant share of the new tourism projects, are designed for high income people, particularly foreign visitors. In terms of occupation such strategy seems positive, given the fact that in the year 2004, Mexican tourist-class hotels registered a 57.2 % occupation level, where beach hotels exhibited, on average over 61 %. It is a well known fact that the country has seen a continuously growing flow of foreign arrivals. Yet the question remains around: What is the final impact of the tourism sector growing over the Mexican GDP and over the country's welfare?

There are some important studies regarding the development of the Mexican tourism sector. In an attempt to describe some of its relevant characteristics Clancy (1999) analyzes the behavior of both public and private investors, and deals with the Mexican government intervention on financial and planning issues and its positive influence over the sector's performance. Moreover, the author concludes that the government involvement in those activities has clearly encouraged the development of the current Mexican tourism infrastructure, yet his studies also indicate that such intervention has not necessarily promoted more competitive markets or a better income distribution.

Moreover, the well-planned luxury resorts are not enough to ensure that the previous social problems can be solved through an isolated tourism policy (Brenner, 2005). In the same way, Long (1991) describes a relevant failure in job creation in the recently developed resort called Huatulco, in the southern pacific coasts of Mexico, where the population faced both, higher inflation and expropriation of their private property.

For that matter, it seems that public spending in the tourism sector has had limited social impact, mainly because its focus lies on high income tourism projects. Their corresponding infrastructure's planning and development only cover some small geographical areas, generally not inhabited by the poorest population (Brenner and Aguilar, 2002).

The mixture of low wages, unskilled jobs and small profit businesses, as they relate to the Mexican tourism activities are essential to understand the sector's weak contribution on the solution of some of the country's most important social and economic problems (Clancy, 2001), such as an unequal income distribution, for example. The previous issues were relevant in the design of the 2007-2012 National Development Program (NDP), where the Mexican government established the potential social and economic benefits of stronger public policy in the tourism sector however, the question regarding the adequacy of such measures still remains unanswered.

¹ Mexican Tourism Ministry SECTUR).

² In the year 2005, nearly 70 % of the private investment was assigned to beach-front project developments.

Consequently, the bottom line of this paper resides in testing the tourism-led growth hypothesis by means of a time series approach, fundamentally through the causal relationship in the Granger sense. Nevertheless, in order to estimate if tourism arrivals contribute to the Mexican people's basic welfare, in a second step this study also investigates the causal relationship between Mexican private consumption and tourism arrivals. The paper's main purpose is the study of the causal relationship between the variables Mexican Gross Domestic Product (GDP) and tourism arrivals (TOUR), where the variable real exchange rate (RER) is incorporated in order to solve the omitted variables problem (Balaguer and Cantavella-Jorda, 2002). In a second step the relationship among CPR and TOUR is tested, also including RER.

3. The prospect theory

Given the purpose of proving the Granger's (1969) causal relationship, this analysis attempts to provide enough confirmatory evidence by using two different time series methodologies. Firstly, it applies Gunduz and Hatemi-J (2005) proposal, which has two relevant aspects: the application of the information criterion introduced by Hatemi-J (2003) to determine the optimal lag order in a vector autoregressive model (VAR), and the Toda and Yamamoto's (1995) procedure to elaborate a VAR in levels, which produces reliable results, when time series are integrated.

In the second approach the Liu, Song and Romilly's (1997) methodology is used to test if any causal relationship between integrated series exists, but using the Hatemi-J lag's test in order to estimate the correct VAR's order. As stated, the first main study's objective is to examine the causal relationship -and its direction- between the Mexican GDP and tourism arrivals. Moreover the second aim is to prove the relationship between private consumption and tourism arrivals.

Causality is understood in the Granger's sense (1969). Gharthey (1993) proposes that in a stationary setting, the null hypothesis "Y does not cause X, given other variables" is tested via a standard F-test. Nevertheless, Toda and Phillips (1993a, 1993b) showed analytically that levels of auto regression are unreliable for estimating any causal relationship. In this way, Sims, Stock and Watson (1990) affirm that asymptotical distributions cannot be used to test restrictions in a VAR model if the variables are integrated. If sets of two or more variables, in a VAR, have common stochastic trends, they are cointegrated and exhibit a long-run economic relationship.

A system of reduced forms with cointegrated variables may be estimated in two different ways: A VAR in levels (for example see Toda and Yamamoto's, 1995 proposal) or as a VECM. According to Engle and Yoo (1987), Lin and Tsay (1996) and Naka and Tufte (1997), there are some long-run advantages of using a VEC, specially because the results of the constrained model fit better to the expectations at longer horizons. Nevertheless Naka and Tufte (1997) also had shown the absence of a statistically relevant difference in the short-run.

In this way, the first proposal follows Toda and Yamamoto's (1995) procedure, which guarantees that the asymptotical distribution theory can be applied. Basically, the authors propose an augmented VAR ($p+d$) model for testing causality, if the variables are integrated (p is the VAR's lag order and d is the integrations order of the variables).

Consequently, the following VAR (p), in levels, is used:

$$y_t = \nu + A_1 y_{t-1} + \dots + A_p y_{t-p} + \varepsilon_t \quad (1)$$

Where: ν is a vector of intercepts, I is the number of variables [$I(d)$] and ε is the vector of errors terms. In the Toda and Yamamoto's proposal, the causal relationship test does not include the additional lag(s), i.e. d , (Gunduz and Hatemi-J, 2005). The authors defined

the Toda and Yamamoto test statistic in a compact way,

$$Y = \hat{D}Z + \hat{\delta} \quad (2)$$

Where

$$Y = (y_1, y_2, \dots, y_T) \text{ (} n \times T \text{) matrix}$$

$$D = (\hat{v}, \hat{A}_1, \dots, \hat{A}_p, \dots, \hat{A}_{p+d}) \text{ (} n \times (1+n(p+d)) \text{) matrix}$$

($\hat{A}$ is the estimated parameters matrix)

$$Z = (Z_0, Z_1, \dots, Z_{T-1}) \text{ ((} 1+n(p+d) \text{) } \times T \text{) matrix}$$

$$Z'_t = \begin{bmatrix} 1 & y_t & y_{t-1} & \cdot & \cdot & \cdot & y_{t-p+1} \end{bmatrix}$$

$$\hat{\delta} = (\hat{\varepsilon}_1, \dots, \hat{\varepsilon}_T) \text{ (} n \times T \text{)}$$

ε_t is defined as the estimated error term. Toda and Yamamoto introduced a modified Wald (MWALD) statistic for testing the null hypothesis of non-Granger causality. According to Gunduz and Hatemi-J (2005), the MWALD test is defined as:

$$MWALD = (C\hat{\beta})' [C((Z'Z)^{-1} \otimes S_u)C]^{-1} (C\hat{\beta}) \sim \chi_p^2 \quad (3)$$

Where C is a $(p \times n(1+n(p+d)))$ selection matrix to indicate if a parameter has a zero value as the null hypothesis of non-Granger causality implied. S_u is the estimated variance-covariance matrix of residuals in Equation 2. $\beta = \text{vec}(D)$ where vec means the columnstaking operator

The VECM analysis procedure used in this paper was originally applied by Liu, Song and Romilly (1997), Chandana and Paratab (2002) and Liu, Burridge and Sinclair (2002), in the causality analysis for cointegrated series. Firstly, a univariate Augmented Dickey-Fuller (ADF) and Kwiatkowski, Phillips and Shin (KPSS) (1992) unit root tests were run for each variable in order to determine the existence and number of such roots. In this sense, the decision tree process proposed by Charemza and Deadman (1992) testing for the significance of trend and drift together with non-stationary was applied. Secondly, the Johansen (1988) and Johansen and Juselius (1990) cointegration analysis was implemented. The cointegration test applies maximum likelihood to a VAR model assuming that the errors are Gaussian.

Basically, testing the existence of some long-run relationship requires a p th-order structural and dynamic VAR model. For this purpose, it is important to consider the choice of the optimal lag order (p). To accomplish this, the number of lags was selected using the new Hatemi-J's (2003) information criterion. The Hatemi-J's criterion is successful in finding the optimal lag order, particularly if the variables contain stochastic trends. Next, the Johansen and Juselius' (1990) procedure, testing for number and estimations of cointegrating relations were used.

The proposal leads to two statistics for cointegration: The trace statistic (Ho: there are at most r cointegration vectors) and the maximal-eigenvalue statistic (Ho: there are r cointegrating vectors against the alternative that $r+1$ exists). The cointegration analysis allows the construction of an adequate VECM to prove the existence of a causal relationship among the variables. The VECM avoids the inconsistencies within the findings of causality in a bivariate environment such as: a) the resulting bias of omitting relevant variables, and b) the unreliable result as a consequence of estimation with non-stationary variables. Therefore, the proposed methodology can be resumed in the

construction of a VAR of n variables and p lags.

The main objective here is the study of the statistical significance of the higher-order lagged coefficients in the VECM's. The methodology applied the Wald test over each variable in turn. If those coefficients are significant, the existence of causality is proved and it is possible to obtain the direction of every causal relationship.

Finally, the present paper estimates if the cointegration relationships obtained remains constant during the time period's sample. Hansen (1992), Tanaka (1993), Quintos and Phillips (1993) and Quintos (1997, 1998) developed different tests to study the constancy in the cointegration rank. Basically, the constancy cointegration test shows if the number of the long-run relationships remains stable during the time period's sample. If the cointegration rank remains stable, it is possible to affirm that a structural change does not exist, and the outcomes will be more robust. This paper uses the results obtained by Quintos and Phillips (1993), and Quintos (1997, 1998). To analyze the constancy rank, Quintos applies a Likelihood Ratio (LR) test to compare the possibility of existence of more cointegration relationships and a Lagrange Multipliers (LM) test for fewer relationships. The results obtained must be compared with the tables that present the critical values developed by Quintos (1997) and Mackinnon, Haug, and Michelis (1999).

The real Mexican GDP and CPR data (base year 1993) were obtained directly from National Institute of Statistics, Geography and Informatics, whereas tourism arrivals, the Mexican peso-dollar exchange rate and Mexican Consumer Price Index are available from 1980 to 2006 in the Mexican Central Bank's (Banxico) database, whereas the American Consumer Price Index is obtained from the Bureau of Labor Statistics from 1980 to 2006. Furthermore as Balaguer and Cantavella (2002) suggested, the real exchange rate was used in this study to counter the effect of omitted variables. Following Balaguer and Cantavella (2002) GDP is used to analyze economic growth. In the Mexican case GDP is the best variable to account all the Mexican economic performance: consumption, investment, government spending and international trade. In addition the first difference of natural logarithm obtained in the VECM is an approximation of economic growth. Thus GDP is a right approach to prove if the tourism-led growth hypothesis is valid to Mexican economy.

4. Results

In order to determine the time series integration's order, the Augmented Dickey-Fuller (ADF) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) unit root test were applied to each variable, and the estimations were reported in table 1. In order to obtain the optimal lag, the Schwartz Information Criteria was applied in the ADF unit root test. Nevertheless, as well-known weakness of the ADF unit root tests is their potential confusion of structural breaks in the series as evidence of non-stationarity, because they may fail to reject the unit root hypothesis if the series have a structural break. Following Baum (2004), the Perron-Vogelsang (1992) unit root tests provide evidence of significant additive or innovational outliers in the time series, the results derived from ADF tests are doubtful. Consequently, Perron-Vogelsang (1992) unit root test was included to prove the right integration order of each variable (Table 2). As Perron-Vogelsang (1992) applied for their unit root test, the optimal lag was chosen following Dickey-Said (1984) empirical procedure to data-dependent method. The outcomes indicated that all series have one unit root, for that matter they are defined as integrated process $I(1)$.

Table 1 – Unit root test

Variable	ADF	Critical value (5%)	Variable	KPSS	Critical value (5 %)
L(GDP, 8*)	-3.37	-3.45	L(GDP)	0.198	0.146
L(CPR, 9*)	-2.82	-3.45	L(CPR)	0.146	0.146
L(TURIS, 4*)	-1.56	-3.45	L(TURIS)	0.159	0.146
DL(GDP, 7*)	-3.62	-3.45	DL(GDP)	0.041	0.146
DL(CPR, 8*)	-4.15	-3.45	DL(CPR)	0.038	0.146
DL(TURIS, 2*)	-10.81	-3.45	DL(TURIS)	0.051	0.146

*Optimal lag to each variable.

Table 2 – Structural unit root test

Variable	Perron and Vogelsang	Critical value (5%)
L(GDP, 5*)	-3.69	-4.31
L(CPR, 4*)	-2.42	-4.31
L(TURIS, 4*)	-1.95	-4.31
DL(GDP, 4*)	-4.92	-4.31
DL(CPR, 6*)	-4.53	-4.31
DL(TURIS, 1*)	-4.36	-4.31

*Optimal lag to each variable.

As next step this study applies two different alternatives to prove if a causal relationship between Mexican GDP and tourism arrivals exists: Toda and Yamamoto's methodology and the procedure prescribed by Liu, et al. (1997). Both methodologies are designed to work with non-stationary time series, but the first method is applied to the level of the series whereas the second one works with differentiated time series.

Nevertheless, in order to build a proper VAR, both techniques must determine the correct number of lags to be used in the VAR's elaboration. In the current research the Hatemi's test was applied and its optimization was found in three lags. According to Toda and Yamamoto (1995), the first model is a VAR (p+d), where p corresponds to the Hatemi's test result and d is the series integration's order (in this case p is three and d is equal to one).

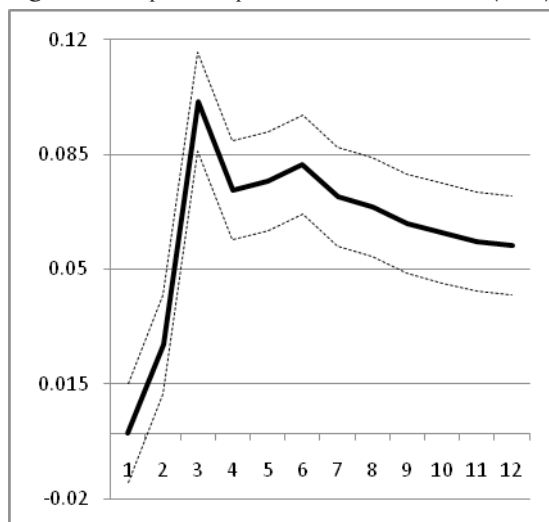
Therefore, a VAR (4) was developed to prove if any causal relationship between Mexican GDP and tourism arrivals exists. Table 3 contains the outcomes of the study and show an important economic fact: tourism arrivals have a positive causal relationship over Mexican GDP. The previous result allows us to consider that the tourism-led growth hypothesis is valid for the Mexican case.

Table 3 – Causality test results (p-values)

	L(GDP)	L(TOUR)	Causality
L(GDP) ⁴	-	0.0009	TOUR→GDP(+) ⁵
L(TOUR)	0.0927	-	

Even more, there is additional statistical evidence claiming the impossibility to assure the opposite way. A preliminary conclusion about the preceding result is clear: Tourism arrivals can improve the Mexican GDP, but its dynamic is exogenous to the Mexican economic cycle. The application of the impulse-response function allows us to confirm the above causal test result, that is, tourism arrivals have a positive an increasing effect over the Mexican GDP (see Figure 2), however the opposite's way effect is not significant.

³ In levels and natural logarithms.⁴ L(GDP) = Natural logarithm of GDP.
L(TOUR) = Natural logarithm of TOUR.⁵ The symbol (+) implied a positive causal relationship from X to Y. The (-) symbol is for the negative case.

Figure 2 – Impulse response of GDP to TOUR (VAR)

In order to have a robust conclusion, the second methodological approach was also applied. To prove if the non stationary series have some cointegration relationship, the Johansen's test was used. Table 4 exhibits the statistical results. According to the results shown in Table 4 it is not possible to reject the absence of the cointegration's null hypothesis, therefore a first difference VAR(3) was developed.

Table 4 – Cointegration Test

Unrestricted Cointegration Rank Test				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None	0.192391	27.85651	29.68	35.65
At most 1	0.052481	5.634104	15.41	20.04
At most 2	0.000265	0.027609	3.76	6.65

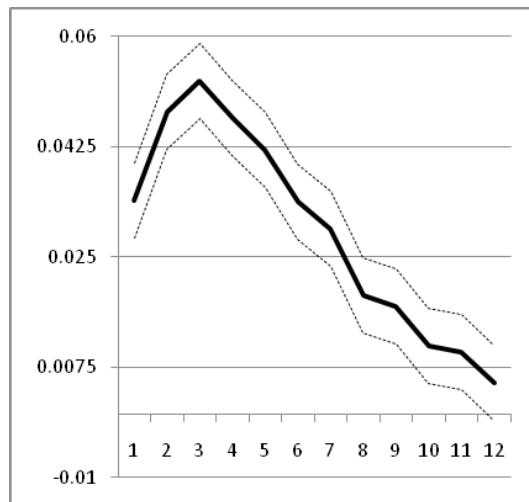
*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates no cointegration at both 5% and 1% levels

The results in the second method were similar as those of VAR (4): Only one way positive causal relationship exists and goes from tourism arrivals to Mexican GDP (see Table 5 and Figure 3, last one in the appendix). Thus, both procedures reinforce the tourism-led growth hypothesis in the Mexican case, and indicate the positive impact of this variable over Mexico's economic growth.

Table 5 – Causality test results (p-values)

	DL(GDP) ⁵	DL(TOUR)	Causality
DL(GDP)	-	0.0003	TOUR→GDP (+)
DL(TOUR)	0.1277	-	

⁵ DL(GDP) = First difference of natural logarithm of GDP. DL(TOUR) = First difference of natural logarithm of TOUR.

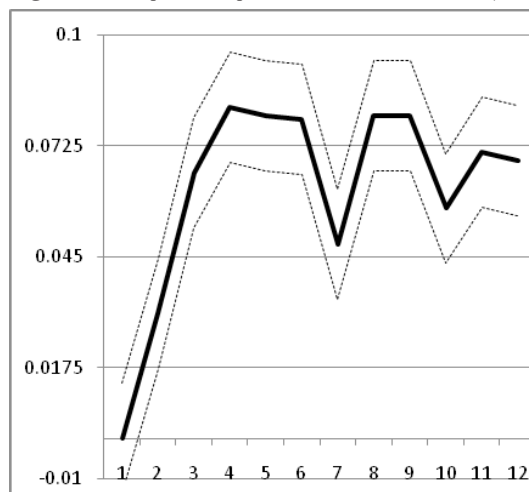
Figure 3 – Impulse response of GDP to TOUR D(VAR)

In the second step, a vector model was developed in order to test the causal relationship between CPR and tourism arrivals. Firstly, the unit root test was also applied on CPR series, and both test validate that consumption is an integrated $I(1)$ series (see Table 1). In order to establish the appropriate lag order, the Hatemi-J information criterion was applied and optimized in five lags. Following Toda and Yamamoto's procedure, a VAR (6) is applied in order to prove if a causal relationship exists. According to Table 6 it is possible to establish that tourism arrivals have a positive influence over CPR.

Table 6 – Causality test results (p-values)

	L(CPR) ⁶	L(TOUR)	Causality
L(CPR)	-	0.0446	TOUR→CPR (+)
L(TOUR)	0.0067	-	CPR→TOUR (+)

The impulse response function allows the confirmation of the previous result (see Figure 4).

Figure 4 – Impulse response of CPR to TOUR (VAR)

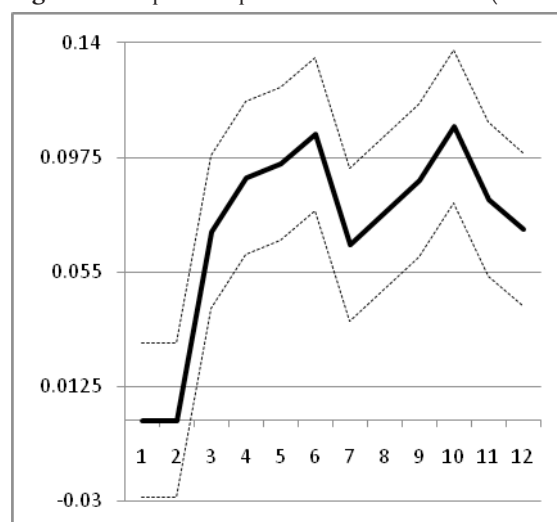
⁶ L(CPR) = Natural logarithm of CPR.

The same result was accomplished when the second methodology was used but in a VECM. There is a positive causal relationship that goes from tourism arrivals to CPR (compare Table 7 and Figure 5)⁷.

Table 7 – Causality test results (p-values)

	DL(CPR) ⁸	DL(TOUR)	Causality
DL(CPR)	-	0.0074	TOUR→CPR (+)
DL(TOUR)	0.0118	-	CPR→TOUR (+)

Figure 5 – Impulse response of CPR to TOUR (VECM)



Finally, Table 8 indicates the existence of stability in the cointegration rank. To test for stability of the rank, $r = 1$, of the cointegrating relationship, we first apply the test with the null hypothesis stating that the rank r is constant at 1 over the whole sample period. The alternative hypothesis is that the rank is greater than 1. The test statistic takes on a value of 11.3. The 5% critical value from MacKinnon et al. (1999) is 15.28. The null hypothesis is therefore accepted. The test for stability of the rank, $r = 1$, against the alternative hypothesis that $r < 1$ leads to a test statistic of 1.02. According to the critical values presented in Quintos (1997), the null hypothesis of rank constancy against the alternative of a rank less than 1 cannot be rejected even at a 5% level of significance (see Table 8). In other words, the long-run links remain stable during the period of sample.

Table 8 – Constancy in cointegration rank

Variable	Statistic	Critical Value (5%)
LR Q ⁺	11.3	15.28
LM Q ⁻	1.02	2.04

Consequently, in the consumption analysis there is a relevant difference: CPR has a positive causal relationship on tourism arrivals. This result is economically significant, because shows a long-run positive and bidirectional relationship among CPR and tourism arrivals. The previous outcome enables us to consider that if the Mexican government develops a successful public policy, aimed at improving its national tourism sector, the final effect on Mexican private consumption should be positive.

⁷ See cointegration results in appendix, Table A.3.

⁸ DL(CPR) = First difference of natural logarithm of CPR.

5. Conclusions

In the last decades Mexico's tourism arrivals have substantially increased. In 2006, Mexico received almost 21.4 millions of international tourists and more than 12 billion dollars. For that matter, Tourism is considered as the third most important foreign financial flow to the country. In this research, the statistical results allow us to assert that the tourism arrivals have a positive causal relationship over GDP but, there is an important fact: the estimations had shown only one way positive relationship from tourism to GDP. In this way, empirical data and the two models applied provide enough evidence to support the tourism-led growth hypothesis for the Mexican case. Therefore, these results support the idea about the potential benefits for the economic growth of an expansive policy in the tourism sector.

For that matter the Mexican National Program of Development 2007-2012 correctly assumes that tourism arrivals have a relevant positive relationship over economic growth; however the empirical evidence is not enough in order to assure that a deeper and bidirectional relationship between the variables exists. Moreover, tourism arrivals have a positive final effect on private consumption, which is a basic approach to understand that the Mexican population receives some benefits derived from the economic growth in the tourism sector.

The present estimations do not reject Clancy's (1999) point of view about the necessity to consider the negative impact that hotel industry ownership (especially the monopolistic control in the tourist sector), corruption or the Mexican inequality income distribution have over variables such as employment, wages or poverty.

In future studies these variables must be included in a structural model in order to examine the magnitude and direction of such relationships over the welfare of the Mexican population. Nevertheless, at the macroeconomic level, the estimations allow us to think that the net final effect it is positive.

In this sense, if Mexican economic policymakers wish to promote the tourism sector in order to contribute to the solution of some important social and economic problems, it will be necessary to conduct a complete analysis, basically attempting to understand why precedent government's policies were not enough to encourage a deeper linkage between GDP and tourism arrivals, and contribute to the reduction of some problems such as corruption and the existence of non-competitive markets.

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