



## National tourism and its role in the Post-COVID economic recovery of the Mexican Regions<sup>1</sup>

### El turismo nacional y su rol en la recuperación económica Post-COVID de las Regiones de México

**Roldán Andrés-Rosales**

Doctor en Economía. Profesor-investigador de Tiempo Completo. Facultad de Estudios Superiores Cuautitlán, Universidad Nacional Autónoma de México, México.  
ORCID <https://orcid.org/0000-0001-5739-159X>

**Leobardo de Jesús-Almonte**

Doctor en Economía. Profesor-investigador de Tiempo Completo. Facultad de Economía, Universidad Autónoma del Estado de México, México.  
ORCID <https://orcid.org/0000-0002-2782-5358>

**Luis Quintana-Romero**

Doctor en Ciencias Políticas y Sociales. Profesor-investigador de Tiempo Completo. Facultad de Estudios Superiores Acatlán, Universidad Nacional Autónoma de México, México.  
ORCID <https://orcid.org/0000-0002-8054-896X>

**José Álvarez-García**

Doctor en Dirección y Planificación del Turismo. Catedrático de Economía Financiera y Contabilidad. Facultad de Empresa Finanzas y Turismo, Universidad de Extremadura, España.  
ORCID <https://orcid.org/0000-0002-0056-5488>

<sup>1</sup> This work was supported by UNAM-PAPIIT IN303821.

#### Información del artículo

Recibido:  
18/08/2022

Aceptado:  
23/02/2023

Publicado:  
10/07/2023

#### \*Autor de correspondencia

-----

#### Páginas:

296 - 315

<http://rperiplo.uaemex.mx/>

DOI <https://doi.org/10.36677/elperioplo.v0i45.19461>

#### Abstract

Tourism is an important activity not only for generating employment in Mexico, but for the growth of those regions focused on this sector. The prevailing insecurity in the different Mexican states influenced the flow of international tourism, which in addition to the pandemic, further complicated the growth of the sector. These two problems, insecurity and the COVID-19 pandemic, affected and aggravated the growth dynamics of the different tourist regions. This research aims to obtain empirical evidence that the recovery of the sector after the COVID-19 Pandemic is found more in national tourism than in international tourism. The methodology used is the approach and estimation of Spatial Autoregressive Vectors (SpVAR) models with quarterly information for the period 2003:01-2020:04. The results show that national tourism served as a buffer against the fluctuations of international tourism in the study period. It is also observed that tourism is one of the sectors that will recover more quickly post-pandemic due to the confidence of the population of origin. In this research, two socio-economic variables of great repercussion in this sector are considered, COVID-19 and citizen insecurity. There are few investigations that consider both variables together. Provides relevant information for decision-making and implementation of economic policies by public managers, managers of the tourism sector and the business sector, to strengthen the growth of the tourism sector in Mexico. Policies that guide tourism recovery in order to overcome the serious crisis in tourism demand caused by COVID-19.

#### Keywords:

*Economic growth, spatial econometrics, national and international tourism, and insecurity.*

#### Resumen

El turismo es una actividad importante no sólo para la generación del empleo en México, sino para el crecimiento de las regiones enfocadas a este sector. La inseguridad prevaleciente en las diferentes entidades federativas mexicanas ha influido en el flujo del turismo internacional que, sumado a la pandemia, han complicado más el crecimiento del sector. Estos dos problemas, la inseguridad y la pandemia del COVID-19, afectaron y agravaron la dinámica de crecimiento de las diferentes regiones turísticas. Esta investigación pretende obtener evidencia empírica de que la recuperación del sector, tras la Pandemia del COVID-19, se encuentra más en el turismo nacional que en el turismo internacional. La metodología utilizada es el planteamiento y estimación de modelos de Vectores Autoregresivos Espaciales (SpVAR) con información trimestral para el periodo 2003:01-2020:04. Los resultados muestran que el turismo nacional sirvió como amortiguador frente a las fluctuaciones del turismo internacional en el periodo de estudio. También se observa que el turismo es uno de los sectores que se recuperará rápidamente postpandemia debido a la confianza de la población de origen. En esta investigación se consideran dos variables socioeconómicas de gran repercusión en este sector, el COVID-19 y la inseguridad. Existen pocas investigaciones que consideren ambas variables en conjunto. Brinda información relevante para la toma de decisiones e instrumentación de políticas económicas por parte de los gestores públicos, directivos del sector turístico y del sector empresarial, para fortalecer el crecimiento del sector turístico en México. Políticas que orienten la recuperación turística para superar la grave crisis de demanda turística provocada por el COVID-19.

#### Palabras clave:

*Crecimiento económico, econometría espacial, turismo nacional e internacional e inseguridad.*

## Introduction

Since the beginning of Felipe Calderón's war with organized crime in 2006, insecurity in Mexico has increased in most states (for more details, see Sánchez-Juárez and Durán-Bustamante, 2021). This greatly influenced the influx of international tourism to Mexico; especially to places, which in that period were considered unsafe. Hence, international tourism in Mexico began to decline in 2006 with the increase in insecurity. The main tourist destinations such as Cancun in Quintana Roo, Ensenada in Baja California, among others, were severely affected.

If the insecurity that currently prevails in Mexico is analysed, the Citizen Council for Public Safety and Criminal Justice (2021) considered that of the 50 most violent cities internationally, 18 of them are in Mexico. The first 6 places are for the following Mexican cities: Celaya in first place, Tijuana in second place, Ciudad Juárez, Ciudad Obregón, Irapuato and Ensenada in sixth place, respectively. This perception directly affects the flow of international tourism, especially in cities that due to their geographical location, have natural resources that are attractive to international visitors.

Although insecurity had influenced the flow of international visitors, with the COVID-19 pandemic the situation became even more complicated because many non-essential activities were closed, including the tourism sector for about a year. Information from National Institute of Statistics and Geography (INEGI, 2020) shows that in the first quarter of 2020, international visitor arrivals decreased by 6%, national tourist arrivals decreased by 6.7%, foreign exchange earnings from international travellers during this first quarter decreased by 14.5% compared to 2019.

The World Travel & Tourism Council, 2021 shows that the travel and tourism sector experienced a loss from almost US \$ 4.5 trillion to US \$ 4.7 trillion in 2020, and the contribution to Gross Domestic Product (GDP) declined by 49.1% compared to 2019, relative to a 3.7% decline in the world economy's GDP in 2020. In 2019, the travel and tourism sector contributed 10.4% to global GDP; a share that fell to 5.5% in 2020 due to continued restrictions on mobility. In 2020, 62 million jobs were lost, representing a drop of 18.5%, leaving only 272 million employees in the entire sector worldwide, compared to 334 million in 2019. The threat regarding job losses persists, as many jobs are currently supported by government retention schemes and reduced hours, which without a full Travel & Tourism recovery could be lost. Spending by domestic visitors decreased by 45%, while spending by international visitors decreased by 69.4%.

The contribution of the tourism sector to the Mexican GDP in 2019 was 15%, in 2020 it was 8.5%, showing a drop of 48.1%. Employment in this sector in Mexico in 2019 was 7 037.9 million (12.8% of total employment), whereas in 2020 it was 5 832.9 million (11.2% of total employment), causing a decrease of 1 202 million workers (-17.1%) (World Travel & Tourism Council, 2021). However, after the confinement, the stress generated by the pandemic made families want to go out to de-stress and visit places that would make them forget the pandemic. Although the flow of international tourists is positive, it is still lower than in 2019, domestic spending by national tourism accounts for 85%, whereas international tourism accounts for 15%. Hence, this paper aims to prove that the recovery of the sector is to be found in national tourism rather than in international tourism; especially for countries like Mexico, where most of its population was not vaccinated during that year, or was not yet vaccinated.

The main objective of this paper is to demonstrate that the impact of national tourism is more important for the growth of the sector than that of international tourism. Therefore, it is argued that the reactivation is possible thanks to the fact that the people who live in this country are more confident in their place of origin, despite the insecurity and pandemic problems that could affect the different tourist destinations, because in some way they have learned to manage this type of insecurity and deal with the pandemic, in addition to the fact that the Mexican population is reluctant to shut itself up and goes out to "tour" despite the restrictions imposed by the health authorities.

Hence, it is hypothesized that despite the drastic fall in tourist activity, both due to the decrease in the flow of international visitors because of insecurity and due to the closure of activities because of the pandemic suffered, tourism is one of the sectors that will recover more quickly because of the confidence of its population of origin. This means that people who were locked down due to the pandemic, in order to de-stress, go to places that were previously unaffordable for them, given that many tourist areas, which usually attract international visitors, now have promotions that the country's residents themselves can afford. As a result, large tourist areas, which focus on international tourism, can remain in operation while economic activity recovers in a generalized way and international visitors flow again. National tourism plays a buffer role against the fluctuations of international visitors and the mainstay of the Mexican tourism sector's recovery in times of insecurity and pandemics.

Using spatial autoregressive vector models (SpVAR), we provide evidence that national visitors are more important than international tourism, and that due to this behavior that tourism activity in Mexico could be reactivated in the short term. The virtue of these type of models is that they allow to quantify both, positive and negative impacts that an entity causes on its neighbors (push-out effect), as well as the impacts caused by other neighbors on a particular entity (push-in effect). The contribution of this research is the quantification of the benefits of touristic and non-touristic stats have due to the flow of nacional and internacional visitors in the 32 federal entities of Mexico. The novelty lies in the use of SpVAR techniques which has not been used in this sector, that has been one of the most affected by insecurity and the pandemic.

This paper is structured in three sections, in addition to the introduction and conclusions. The first section discusses the different approaches to the importance of tourism in the world and in Mexico. The second section shows the behaviour of the different tourist areas in Mexico, analysing the performance of national and international tourism in recent decades. The third section presents a spatial econometric model and the main streamlined facts of the sector. Finally, the main conclusions drawn from the work are presented.

### **Tourism and its importance in economic growth**

Tourism flows to various regions due to the benefits offered by their geographical location, including natural resources, seas, mountains, architecture, historical and cultural ruins, etc., which make them attractive for national and international visitors. Some argue that tourist satisfaction is determined by destination attributes (Rivera and Ortigosa, 2022) and by touristic attraction built around touristic infrastructure (Alvarez *et al.*, 2022).

These flows drive the growth and development of the different regions, which due to their location have not been able to attract investment flows from other sectors, such as the industrial sector. In other words, "it has become a complement to the classic demand-based perspective, which points to the availability of (attractive) resources demanded by tourists as the unique explanation for location decisions of tourism companies" (Luminita and Reveiu, 2018: 1). The natural advantages and concentration of activities absent in the country of origin of national and international visitors is what causes certain tourist destinations to be more attractive than others. These travellers influence the competitiveness of tourism companies directly and indirectly (Ri, Williams, Park & Li, 2021), and therefore, of the regions where these companies are located.

Tourists demand different goods and services in the regions they visit. In this regard, Dahdá (2003) reports that tourists staying less than 24 hours demand services such as restaurants, spas and handicrafts, among others, whereas tourism lasting more than 24 hours requires accommodation, various attractions and complementary services. Therefore, it is expected that the latter will spend large sums of money as they extend their stay in the different Mexican tourist regions. If we compare this activity, which due to endogenous factors attract visitors; international tourism, according to Acerenza (2006) and Álvarez-Icaza (1996) is an export activity. Furthermore, the expenditure that tourists make represents intangible exports that positively impact the foreign trade of the host country. The products that travellers acquire in the region they visit are equivalent to imports for the issuing country (Sánchez & Cruz, 2016). In this way, tourist goods, which despite being consumed in the same locality of origin, could be considered as exports made by the sector.

The World Tourism Organization (2020: 5) states that "tourism consists of trips and stays that people make in places other than their usual environment, for periods of more than one day and less than one year, for leisure, business or other reasons". According to Ascanio (2012) and Boullón (2009), tourists are those travellers who spend at least 24 hours in the host nation, which implies that they stay overnight at least once during their stay, and whose reason for travelling may be business, health or study. In addition to these reasons for travelling, Cárdenas (1990) includes congress or convention tourism, religious and gastronomic tourism, among others. On the other hand, "international excursionists are those travellers whose stay lasts less than 24 hours and, according to the tourism balance, are subdivided into border or cruise travellers" (Loría, Sánchez and Salas, 2017: 5).

The effect that tourism has, not only on the sector but on regional economic growth, is positive. There are studies that consider that this sector contributes to reducing poverty in regions (Ponce *et al.*, 2020), which not only benefits the tourism sector, but also benefits other sectors. Its effects can be classified as direct and indirect. The direct ones are the benefits it makes to activities such as accommodation, food, entertainment and transport; indirect ones such as trade, real estate, agriculture, among others (Nava, Mercado, Vargas & Gómez, 2017). In addition, the spatial effects can be added, since not only the tourist region benefits, but also the neighbours of these regions, which attract national and international tourism.

In this way, tourism becomes a complementary option for development and growth for many entities that concentrate industry or agriculture, but for others, it is the most important sector for generating employment and income that the population needs. Due to its impact on other sectors, it could be a complementary option for the development of regions. This does not imply that it should replace

the other productive sectors, but rather that it should be linked to the other existing sectors in the region, so that the benefits do not remain only in the sector but spill over into a set of sectors. With this action, not only the entities that specialize in the tourism sector benefit, but also the regions that have specialized in other productive sectors.

Through the existing link between sectors and between regions, national and international tourism favours economic growth and the development of regions due to the direct and indirect impacts generated on the productive sectors and on space. Hence, it is considered that "tourism produces important effects on national income by generating foreign exchange for the country in which it takes place and provides significant direct and indirect benefits for people as an important source of employment. Thus, tourism constitutes an important part of the Gross Domestic Product (GDP) of most countries" (Ponce *et al.*, 2020: 1).

The tourism sector not only influences the growth of the region, but also serves as a pivot for the growth of the regions surrounding the tourist centre; furthermore, as mentioned by Loría, Sánchez and Salas (2017), it is a sector that generates jobs in the Mexican economy. The same authors prove, through variance decomposition analysis, that tourism explains a high percentage of the changes in the total national unemployment rate and in the growth rate of the Mexican tourism sector. In short, whether it is the main activity of the region or a complementary one, some authors consider it to be the engine of economic growth. In this regard, "for the International Labour Organization (ILO), tourism-related economic activity is the main source of growth, employment, income and benefits for many developing countries" (Ponce *et al.*, 2020: 2).

The tourism sector benefits from the arrival of international visitors in the different tourist destinations. However, they generate less revenue in the different localities because they act like large cruise ships or the large transnational companies located in Mexico. In other words, cruise ship tourism does not offer or generate economic spillovers in the different regions where they make stops like the tourism that stays in the region. This is because large cruise ships try to keep all the benefits and revenue that these tourists make, and in addition, they provide almost all the services, entertainment and food that the tourist requires. Hence, the revenue that could be made at the different stops is minimal.

The same could happen with most of the regions that attract international tourists, since they come to large hotel chains, which also have all the activities that these types of tourism demand. This could generate few benefits for the population and the region. They operate in the same way as large cruise ships. However, unlike the latter, due to being an activity established within the country and the entity, the income they generate is accounted for by the entity and reflected in national statistics. To further complicate the situation, many hotel chains have agreements with other entrepreneurs to offer complete packages and thus, mutually benefit as large conglomerates, excluding with these actions, small communities and small entrepreneurs that make a living from the sector.

This type of behaviour is more frequent in the most insecure regions, which implies that large hotel chains tend to offer complete packages to visitors with a higher purchasing power; especially international visitors, with the argument of not putting them at risk and that tourists have fun and enjoy the places and amenities that they consider safe for their clients and which they can control. The amenities and

locations that are outside the control of these large consortia, although safe, do not benefit as much from the flow of international tourists as they would expect. This does not imply that this is a generality, but that these actions are more frequent in tourist areas focused on international tourism.

Large hotel chains operate like all Foreign Direct Investment (FDI) established in Mexico; that is, FDI in Mexico buys its inputs, technology and knowledge from abroad. These international investments are not linked to local companies and do not buy inputs from small and medium-sized enterprises (Andrés-Rosales *et al.*, 2021). Large hotel groups operate in the same way as international manufacturing companies, even if they do not bring most of their inputs from abroad, like manufacturing FDI established in our country, but the fact of selling all the services and packages that the tourist requires, limits their linkage with local companies; even, signing agreements with other consortia to benefit each other. The only thing they leave behind in the regions where they settle are the wages they pay, although it is noteworthy that these wages and benefits are higher than in local enterprises (micro and small enterprises) (Andrés-Rosales, Mun and Quintana, 2019). By excluding the population from the spillovers of the international tourism sector, as they behave like bubbles, the productive activities of the sector in the surrounding regions will not benefit, thus limiting the capacity to boost the local economy and, with it, the capacity to create jobs to counteract the growth of insecurity. However, as the population itself participates in and benefits from tourism, insecurity also decreases.

It should be noted that unlike FDI from the industrial sector, at least these hotel conglomerates do buy their inputs locally and inside the region, which benefits small local producers. Hence, the recovery of the tourism sector, due to its links with other productive sectors, will be much faster. This implies that despite the fact that this sector has been one of the most affected by insecurity and the pandemic, it is the sector that is showing the fastest recovery, especially for small entrepreneurs and the self-employed. This is possible because they focus on national tourism and the flow of this type of tourism is greater than international tourism (post-pandemic). On the other hand, it is expected that those that will show a slow recovery will be large hoteliers because they focus more on international tourism, where the flow is still lower, slower and to a lesser extent.

These differences will make the areas preferred by international tourists recover more slowly than the places traditionally visited by Mexicans, unless this sector focuses on attracting, with affordable prices, those visitors who avoid them due to their high costs.

In sum, this paper shows the two factors that cannot be controlled by the State and that have influenced the flow of national and international tourism. One of the factors is insecurity, which is generated by social decomposition, poverty and collusion of previous governments with organized crime. The other one is the pandemic that afflicts not only Mexico, but also international tourism. These factors automatically restrict the flow of tourism, not only national, but also international. Ramírez-Blanco (1994) states that one of the most important factors in attracting travellers is the tourist atmosphere, which should be understood as the environment of security, tranquility and hospitality offered to the traveller in the host region. Although it should be noted that despite the fact that national tourism has decreased, there has not been much of a decrease given that many Mexican families, in order to protect themselves from the pandemic, have the beaches as their destination, although economically it has affected the tourism sector due to the closure of this sector.

**Information used and spatial behaviour of tourism in Mexico**

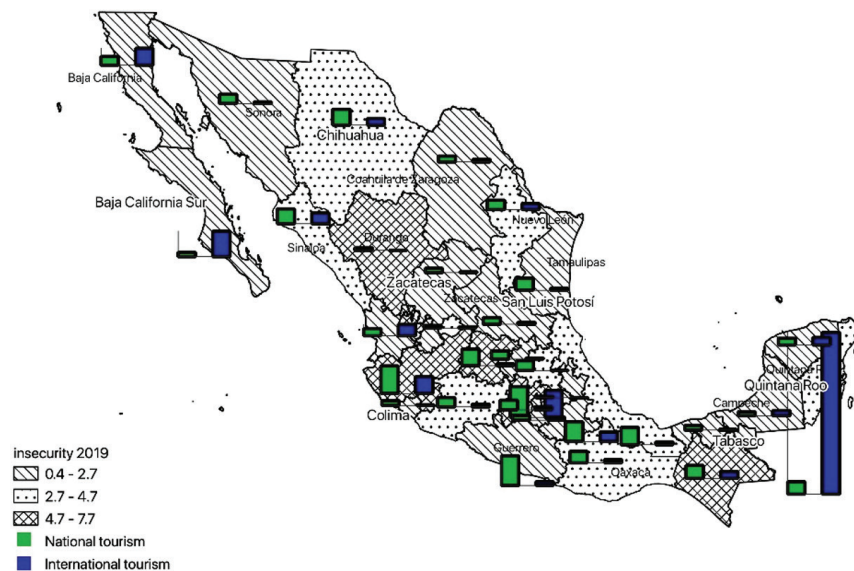
**Data**

The information on tourism GDP used is official information published by the National Institute of Statistics and Geography (INEGI), deflated at 2013 prices. Information on national and international visitors was obtained from the DATATUR<sup>1</sup> of the Mexican Tourism Secretariat. The insecurity variable, which is constructed as a homicide index, is from the Executive Secretariat of the National Security System of Mexico. These are quarterly data for the period 2003-2020.

**Behaviour of national and international tourism in Mexico**

National and international tourism had differential behaviours in the Mexican states. This implies that the destination is chosen based on the recommendations and the behaviour of the sector in the past. The international tourism arrivals that Mexico received in 2019 and 2020 came more from countries such as the United States (81% in 2019 and 89% in 2020) and Canada (5% and 4% respectively), Spain (2% and 0.8% in both years), and the rest of the world (10% and 5%). The places most visited by international tourists in 2019 were: Quintana Roo (Cancun, 47%), Mexico City (8%), Baja California Sur (7%), Baja California and Jalisco (5%). In addition, as shown in figure 1, domestic visitors prefer places located in the following entities: Mexico City (9%), Guerrero (Acapulco 8%), Jalisco (8%), Puebla and Veracruz (5%). In the same figure, the most insecure entities are shown, and the number of homicides in the same year (2019) are shown in the background. The black bars are the entities with the highest homicide rate, including Jalisco (8%), Guanajuato (7.6%), Mexico City (7%) and Chiapas (5%).

**Figure 1.** Spatial distribution of national and international tourism in Mexico 2019

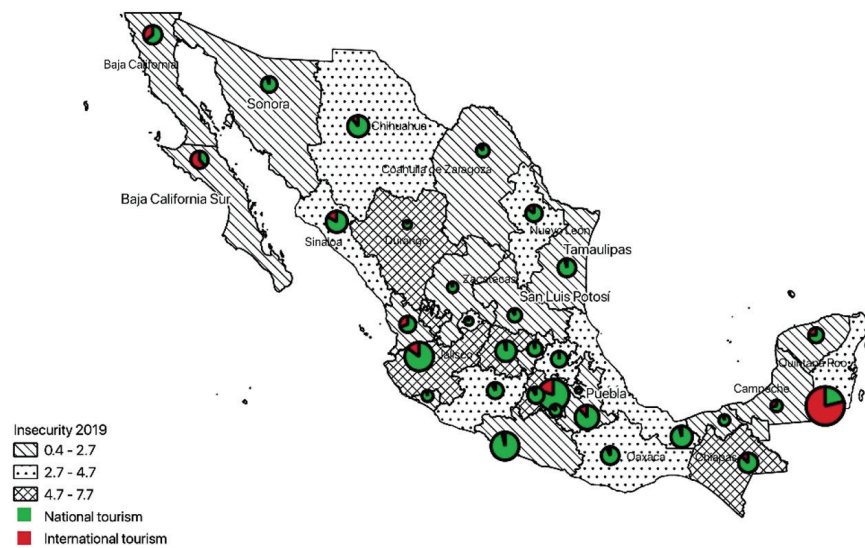


**Source:** Own elaboration with information from Datatur and INEGI.

<sup>1</sup> Datatur is the National Statistical Information System of the Tourism Sector. <http://datatur.sectur.gob.mx/SitePages/Inicio.aspx>.

Figure 2 shows the behaviour of national and international tourism that each entity receives, and only in two entities it is shown that the arrival of international tourism is more important and is shown in red, and that is Quintana Roo. This entity is made up of 79% of international visitors and 21% of national visitors; on the other hand, in Baja California Sur, international visitors make up 63% and 32% are national visitors. Baja California and Nayarit have a component of 35 and 30 percent of the total of international visitors. In the rest of the 32 states that Mexico has, the largest component is national tourists, for example, Hidalgo received 99% of national tourists, and Durango is composed of 98% of national tourists, Guanajuato of 97%, Guerrero, Colima, Tabasco, and Querétaro with 96% of national visitors. These data show that most of the entities receive more national tourism than international tourism.

Figure 2. State composition of tourism 2019

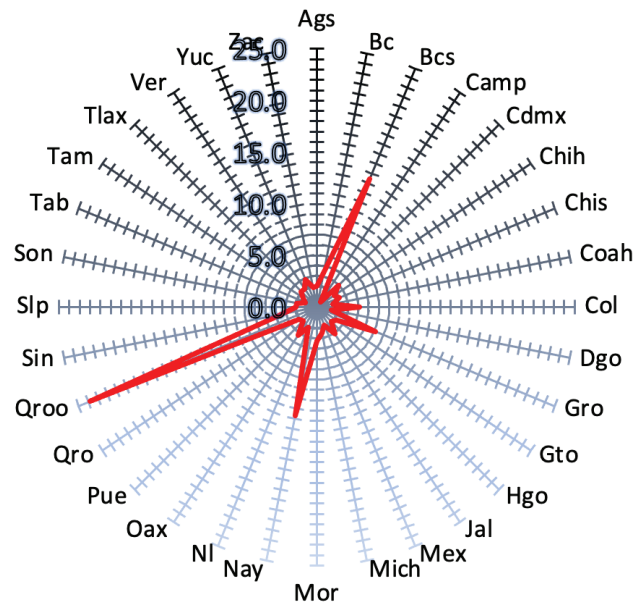


Source: Own elaboration with information from Datatur and INEGI.

If the percentage share of the tourism sector in the Gross Domestic Product (GDP) of each entity is analysed, it is observed that the national average for the period 2003-2019 is 3.7%. Figure 3 shows the entities in which tourism has an important weight in the entity's GDP. Within these entities are the following: Quintana Roo (24%), Baja California Sur (13.4%), Nayarit (10.7%), Guerrero (6%), Colima (4%), Baja California (3.5%), Sinaloa (3.4%) Morelos (3.3), Oaxaca (3.2%), Jalisco (3.1%), Mexico City and Yucatán (3%). There are 12 entities where tourism has had a high participation in the total production of each entity, in the rest of the entities its participation is minimal. They are entities where other productive activities have been developed.



**Figure 3.** Average percentage share of the tourism sector to GDP in the states 2003-2019



Source: Own elaboration with information from Datatur and INEGI.

### The econometric model. An SpVAR

#### The SpVAR model

To capture the past behaviour of the variables on the performance of the Mexican tourism sector, Ashby and Ramos (2009) mention that some enterprises learned to deal with insecurity; especially, natural resource-based enterprises such as oil extraction and mining industries because they are limited in location, which is also the case in the tourism sector given that the existing architecture and natural resources in a region cannot be moved. Increasing insecurity discourages international visitors, but big business has learned to deal with this problem and form large conglomerates to keep visitors safe and offer them places they can control.

By using spatial autoregressive vector models (SpVAR) it is possible to show the importance of national visitors to reactivate national tourism. This technique was used by authors such as Márquez *et al.*, (2015), Lesage and Cashell (2015) and Torres (2017), Andrés-Rosales *et al.* (2021). The first two did so to estimate the growth of the Spanish economy and the last two to forecast the impact of insecurity on employment and economic growth in Mexico. This paper prioritizes the impact of national and international tourism on the growth dynamics of the tourism sector in Mexico's 32 states, so the SpVAR model is presented as follows:

$$TUR_{it} = \alpha_{0i}^1 + \alpha_{1i}^1 TUR_{i,t-1} + \alpha_{2i}^1 WTUR_{i,t-1}^* + \alpha_{3i}^1 TURNAC_{i,t-1} + \alpha_{4i}^1 TURINT_{i,t-1} + \varepsilon_{it}^1 \quad (1)$$

$$WTUR_{i,t}^* = \alpha_{0i}^2 + \alpha_{1i}^2 TUR_{i,t-1} + \alpha_{2i}^2 WTUR_{i,t-1}^* + \alpha_{3i}^2 TURNAC_{i,t-1} + \alpha_{4i}^2 TURINT_{i,t-1} + \varepsilon_{it}^2 \quad (2)$$

$$TURNAC_{it} = \alpha_{0i}^3 + \alpha_{1i}^3 TUR_{i,t-1} + \alpha_{2i}^3 WTUR_{i,t-1}^* + \alpha_{3i}^3 TURNAC_{i,t-1} + \alpha_{4i}^3 TURINT_{i,t-1} + \varepsilon_{it}^3 \quad (3)$$

$$TURINT_{it} = \alpha_{0i}^4 + \alpha_{1i}^4 TUR_{i,t-1} + \alpha_{2i}^4 WTUR_{i,t-1}^* + \alpha_{3i}^4 TURNAC_{i,t-1} + \alpha_{4i}^4 TURINT_{i,t-1} + \varepsilon_{it}^4 \quad (4)$$

Where  $TUR$  is the first logarithmic difference of the tourism sector of each entity;  $WTUR^*$  is the first logarithmic difference of the tourism sector of the neighbouring states of the different entities;  $TURNAC$  and  $TURINT$  is the first logarithmic difference of the arrival of national and international visitors, respectively.

For the purposes of the SpVAR model and in order to measure the structural effect of insecurity, each of the models was estimated by considering  $IHOM_{i,t}$  as an exogenous variable, so it is not included as an endogenous variable in the equations of the VAR model.  $IHOM_{i,t}$  is the number of homicides divided by 100 000, which converts it into an index.

Unlike other works, such as those by Quintana-Romero, Mendoza-González and Álvarez-García (2021), in which a spatial panel is used to obtain direct and indirect impacts, as well as the spillovers that the economic growth of the sector generated in the different states of the country, in this case a spatial VAR model (SpVAR) is used, which due to its benefits, enables to adequately capture the impact that national and international tourism has generated on the sector over time. This econometric technique has not been used in this type of work to analyse the tourism sector in Mexico, and this is precisely, our main contribution.

In the spatial VAR, we can determine whether the past of the tourism sector, that of its neighbours and that of national and international tourism influence the present and future behaviour of this sector. If so, we will have elements to confirm that the past values of  $TUR_{i,t-1}$ ,  $WTUR_{i,t-1}^*$ ,  $TURNAC_{i,t-1}$ ,  $TURINT_{i,t-1}$  help to explain the present values of  $TUR_{it}$ , and added to the fact that the values of the parameters  $\alpha_{1i}^1$ ,  $\alpha_{2i}^1$ ,  $\alpha_{3i}^1$ ,  $\alpha_{4i}^1$  are significant, we can say that the variables, through their behaviour in the past, explain the present behaviour of tourism growth. It should be noted that  $\alpha_{2i}^1$  captures the impact that an entity obtains from its neighbours when this sector changes over time, what Márquez *et al.*, (2015) calls the *push-in effect*. On the other hand, in the second equation we can capture the impact that tourism entities generate on their neighbours when the tourism sector, national and international visitors, are modified. In this case, if the variables  $TUR_{i,t-1}$ ,  $TURNAC_{i,t-1}$ ,  $TURINT_{i,t-1}$  explain the behaviour of the residents of the tourist regions, we can say that the benefit that this sector generates in the different tourist spots that Mexico has, spills over to the neighbours of these regions, which is known as the *push-out effect* and the parameters  $\alpha_{1i}^2$ ,  $\alpha_{3i}^2$ ,  $\alpha_{4i}^2$  should be significant.

The spatial weight matrix, which is the main basis of spatial estimation (Andrés-Rosales *et al.*, 2021; Quintana and Andrés-Rosales, 2014), used in this work, is the normalized contiguity matrix, which means that  $W$  is a square, positive matrix and its dimension depends on the sample size. This normalized matrix describes the interaction of spatial units present between regions. By definition, we have that  $w_{ij} = 1$ , whereas  $w_{ii} = 0$ , this normalized matrix means that the sums of the rows are equal to one and represents a spatial smoothing of the impacts of the neighbouring regions (Anselin, 1988; Quintana and Andrés-Rosales, 2014; Andrés-Rosales *et al.*, 2021).

**Granger’s spatial causality test**

The VAR model is used to examine the extent to which the variables in the system are determined by their past values, which is known as Granger causality (Granger, 1969). Within the context of SpVAR, it can be determined how the variable influences other regions and vice versa (Marquez *et al.*, 2015; Andrés-Rosales *et al.*, 2021), which Marquez *et al.* (2015) and Kuethe and Pedde (2011) call Granger’s spatial causality analysis, and it is the new way of demonstrating spatial collateral effects in the context of traditional VAR. Table 1 shows the results of the causality tests.

**Table 1.** Granger’s spatial causality test 2003: 01-2020: 04

Federative entity	1.Fron WTUR to TUR	2.From TUR to WTUR	3.From IHOM to TUR	4.From WIHOM to TUR	5.From TURNAC to TUR	6.From TURINT to TUR
Aguascalientes	2.806 (0.067)	0.833 (0.438)	<b>3.425 (0.038)</b>	<b>3.741 (0.029)</b>	<b>8.911 (0.000)</b>	<b>11.364 (0.000)</b>
Baja California	0.006 (0.993)	<b>11.394 (0.000)</b>	<b>3.097 (0.052)</b>	0.958 (0.389)	<b>32.774 (0.000)</b>	<b>21.746 (0.000)</b>
Baja California Sur	<b>18.638 (0.000)</b>	0.209 (0.811)	1054 (0.220)	<b>5.012 (0.009)</b>	<b>12.976 (0.000)</b>	<b>13.383 (0.000)</b>
Campeche	0.700 (0.500)	0.090 (0.913)	0.150 (0.860)	0.607 (0.547)	<b>9.781 (0.000)</b>	1.883 (0.160)
Ciudad de México	<b>4.535 (0.014)</b>	0.565 (0.570)	1.150 (0.323)	1.866 (0.162)	<b>4.857 (0.010)</b>	<b>3.352 (0.041)</b>
Chihuahua	<b>5.140 (0.008)</b>	1.571 (0.215)	0.538 (0.586)	0.212 (0.809)	<b>15.258 (0.000)</b>	<b>9.149 (0.000)</b>
Chiapas	<b>7.258 (0.001)</b>	0.547 (0.581)	0.216 (0.806)	0.066 (0.935)	<b>21.429 (0.000)</b>	<b>6.737 (0.002)</b>
Coahuila	1.847 (0.162)	0.657 (0.521)	0.247 (0.781)	0.512 (0.601)	<b>4.843 (0.010)</b>	2.698 (0.074)
Colima	1.898 (0.158)	<b>4.406 (0.016)</b>	0.139 (0.869)	0.462 (0.633)	<b>28.811 (0.000)</b>	0.327 (0.722)
Durango	0.427 (0.654)	<b>4.239 (0.019)</b>	0.441 (0.645)	0.147 (0.862)	<b>13.714 (0.000)</b>	2.689 (0.075)
Guerrero	<b>11.533 (0.000)</b>	<b>7.317 (0.001)</b>	<b>3.192 (0.048)</b>	0.005 (0.994)	<b>12.589 (0.000)</b>	1.979 (0.146)
Guanajuato	0.496 (0.611)	0.060 (0.941)	0.294 (0.746)	2.459 (0.093)	<b>27.106 (0.000)</b>	<b>10.440 (0.00)</b>
Hidalgo	0.239 (0.787)	0.746 (0.478)	2.067 (0.135)	0.499 (0.608)	<b>5.904 (0.004)</b>	1.565 (0.216)
Jalisco	1.113 (0.334)	2.069 (0.134)	0.982 (0.379)	0.140 (0.869)	<b>9.207 (0.000)</b>	<b>4.716 (0.012)</b>
Estado de México	1.374 (0.260)	<b>5.226 (0.008)</b>	0.195 (0.823)	0.790 (0.457)	<b>3.988 (0.023)</b>	0.716 (0.492)
Michoacán	<b>4.402 (0.016)</b>	0.423 (0.656)	0.636 (0.533)	0.932 (0.398)	<b>24.071 (0.000)</b>	15.358 (0.00)
Morelos	<b>6.190 (0.003)</b>	1.061 (0.352)	0.142 (0.868)	1.822 (0.170)	<b>5.496 (0.006)</b>	0.485 (0.618)
Nayarit	<b>16.431 (0.000)</b>	0.656 (0.522)	0.069 (0.933)	0.439 (0.646)	1.744 (0.183)	<b>4.515 (0.015)</b>
Nuevo León	0.775 (0.465)	1.982 (0.146)	0.443 (0.644)	1.575 (0.215)	<b>16.28 (0.000)</b>	<b>10.20 (0.000)</b>

Federative entity	1.From WTUR to TUR	2.From TUR to WTUR	3.From IHOM to TUR	4.From WIHOM to TUR	5.From TURNAC to TUR	6.From TURINT to TUR
Oaxaca	2.903 (0.062)	1.251 (0.293)	0.244 (0.784)	0.645 (0.528)	<b>6.139 (0.004)</b>	<b>8.835 (0.000)</b>
Puebla	1.848 (0.166)	0.870 (0.424)	0.434 (0.650)	0.009 (0.991)	<b>11.858 (0.000)</b>	<b>5.798 (0.005)</b>
Querétaro	1.786 (0.176)	2.385 (0.100)	<b>3.555 (0.034)</b>	0.126 (0.882)	<b>30.685 (0.000)</b>	<b>10.404 (0.00)</b>
Quintana Roo	<b>9.028 (0.000)</b>	0.572 (0.567)	0.210 (0.811)	<b>7.952 (0.001)</b>	1.278 (0.285)	<b>13.531 (0.00)</b>
Sinaloa	1.258 (0.291)	1.179 (0.314)	0.202 (0.818)	0.762 (0.471)	<b>11.781 (0.000)</b>	<b>4.409 (0.016)</b>
San Luis Potosí	<b>11.180 (0.000)</b>	<b>6.228 (0.003)</b>	0.504 (0.606)	2.143 (0.126)	<b>28.907 (0.000)</b>	<b>6.006 (0.004)</b>
Sonora	0.240 (0.788)	2.458 (0.094)	0.656 (0.522)	0.173 (0.841)	<b>18.656 (0.000)</b>	1.333 (0.271)
Tabasco	2.528 (0.089)	<b>3.578 (0.034)</b>	0.686 (0.506)	0.950 (0.392)	2.005 (0.143)	0.544 (0.583)
Tamaulipas	<b>3.081 (0.053)</b>	<b>9.606 (0.000)</b>	1.829 (0.169)	0.432 (0.651)	<b>12.707 (0.000)</b>	<b>16.713 (0.00)</b>
Tlaxcala	1.463 (0.239)	0.655 (0.523)	0.076 (0.927)	1.909 (0.156)	<b>11.434 (0.000)</b>	<b>4.511 (0.015)</b>
Veracruz	0.835 (0.438)	0.277 (0.759)	0.333 (0.718)	0.134 (0.875)	<b>8.953 (0.000)</b>	<b>6.371 (0.003)</b>
Yucatán	2.260 (0.113)	<b>6.037 (0.004)</b>	<b>4.408 (0.016)</b>	2.416 (0.097)	<b>16.485 (0.000)</b>	<b>6.647 (0.002)</b>
Zacatecas	<b>2.991 (0.005)</b>	1.710 (0.189)	<b>3.879 (0.026)</b>	0.643 (0.529)	<b>20.025 (0.000)</b>	<b>3.083 (0.053)</b>

Note: Tests with two lags. The probability of the F statistic is reported in parentheses.

Source: Own elaboration with information from Datatur and INEGI.

The results indicate the absence of Granger causality from *WTUR* to *TUR* for most states (in 12 states it is significant, column 1 in black), whereas from *TUR* to *WTUR* there is evidence of causality only in 9 states. From *IHOM* to *TUR* and from *WIHOM* to *TUR*, there is evidence of causality only in 6 and 3 entities, respectively. This is one of the reasons why it was decided to include *IHOM* as an exogenous variable in the model because although there is no evidence of consistent causality, it is a variable that can contribute to the analysis as an indicator of insecurity. For the analysis of causality from *TURNAC* to *TUR* and from *TURINT* to *TUR*, the tests are consistent in the sense that in most of the entities there is evidence of causality. For the causality of *TURNAC* to *TUR*, only Nayarit and Quintana Roo did not show evidence of causality, as shown in the previous section, they focus more on international tourism; from *TURINT* to *TUR*, 9 entities did not show evidence of causality (Campeche, Coahuila, Colima, Guerrero, Hidalgo, State of Mexico, Morelos, Sonora and Tabasco). With this evidence, the SpVar was estimated and the impulse response analysis was conducted.

### Spatial impulse-response of tourism in Mexico

With the impulse-response function, the impacts that tourism generates between the different regions can be obtained (Márquez *et al.*, 2015). It is possible to quantify the impacts that an entity generates towards its neighbours (push-out effect) and the impact that neighbours generate towards a particular entity (push-in effect).

SpVARs were estimated for the federal states, according to the formalization of equations 1-4, estimating with two lags and in first differences of the logarithms. Standard unit root tests (Augmented Dickey-Fuller, ADF, and Phillips-Perron, PP) were applied to the series in order to identify the order of integration of the series. According to the tests, the series in logarithms are series I (1), which when applying first differences are I (0), so the SpVAR can be estimated when working with series of the same order of integration. Table A.1 in the appendix shows the results of the corresponding tests.

Table 2 quantifies the effects generated by the growth of tourism in the different Mexican states, taking into account the contemporary effect. The following effects can be found: i. Push-in effect; ii. Push-out effect and iii. Internal effect. Through the generalized impulse-response, we find within the push-in effect (column 1) that a particular entity is affected when the tourism sector of an entity's neighbours modifies this item positively. We found that Mexico City and Guanajuato are the most benefited (1.60 and 1.50 percent) when their neighbors have a positive growth of the tourism sector. Other entities like Hidalgo, Jalisco, Mexico State, and Michoacan get a 1.40 and 1.30% of benefits, respectively, when their neighbors attract national and international tourism (table 2 column 1).

Within the push-out effect (column 2), it is observed that entities such as Campeche (2%) and Tabasco (2.20%) benefit their neighbors positively when tourism increases in these two entities. If we compare the push-in effect with the push-out effect, it is observed that the impact of the push-out effect is greater, which implies that touristic entities benefit their neighbours more than what they receive in benefit from their close neighbours when referring to tourist activities. While column 2 of table 2 shows the benefits caused by an entity on its adjacent neighbors when the tourism activity increases, in percentage terms.

Within iii) internal-impacts it is found that the tourism sector is affected by both its own past values and the past values of national and international tourism (column 3-5, table 2). It can be observed how Mexico City(3.6%), Nayarit(3.07%), Quintana Roo(4.65%) and Tabasco(3.82%) are influenced by the past behaviour of the tourism sector itself of these entities.

**Table 2.** Impulse-response spatial analysis

Contiguity matrix	i. Push-in-effect	ii. Push-out effect	iii. Internal effects			
			1.From WTUR to TUR	2.From TUR to WTUR	3.From TUR to TUR	4.From TURNAC to TUR
Entidad federativa						
Aguascalientes	0.70***	1.80***	1.50***	0.90***	0.00	6.33 (0.37)
Baja California	0.10	1.50***	1.10***	0.10	0.40***	-0.24 (-0.34)
Baja California Sur	-0.20	1.50***	2.90***	0.20	2.20***	3.43 (0.39)
Campeche	0.40	<b>2.00***</b>	2.50***	0.70***	0.20	-60.6 (-1.14)
Ciudad de México	<b>1.60***</b>	1.50***	3.60***	0.00	0.00	-7.21 (-0.78)
Chihuahua	1.10***	1.30***	1.70***	0.40***	0.20	-0.45 (-0.55)
Chiapas	0.20	1.60***	2.30***	-0.08	0.70***	8.44 (1.61)
Coahuila	1.10***	1.80***	1.70***	0.80***	0.00	0.99 (0.23)
Colima	0.70***	1.40***	1.50***	0.30***	-0.60***	-1.28 (-0.39)
Durango	0.90***	1.00***	1.90***	0.60***	0.40***	0.45 (0.17)
Guerrero	0.60***	1.10***	1.90***	0.60***	0.40***	0.67 (0.47)
Guanajuato	<b>1.50***</b>	1.40***	1.90***	0.80***	0.10	-0.79 (-0.90)
Hidalgo	1.40***	1.40***	2.20***	0.50***	0.10	0.57 (0.09)

Contiguity matrix	i. Push-in-effect	ii. Push-out effect	iii. Internal effects			
			1.From WTUR to TUR	2.From TUR to WTUR	3.From TUR to TUR	4.From TURNAC to TUR
Jalisco	1.20***	1.00***	2.00***	0.00	-0.30	-0.61(-0.31)
Estado de México	1.30***	1.30***	1.90***	0.40***	0.10	0.49(0.56)
Michoacán	1.30***	0.20	0.70***	0.00	0.00	1.35(1.04)
Morelos	0.37**	0.49**	2.13***	6.29***	-0.49	3.35(0.80)
Nayarit	-0.30	-0.6	3.07***	3.76	19.72***	-5.44(-0.60)
Nuevo León	1.19***	1.90***	2.32***	2.46***	2.08	0.84(0.38)
Oaxaca	0.71***	1.02***	1.77***	4.14***	-14.75***	0.61(0.33)
Puebla	0.57***	0.69***	1.39***	1.04	2.18	-0.31(-0.12)
Querétaro	1.04***	1.16***	1.66***	1.72***	-1.81	-4.00(-0.41)
Quintana Roo	0.23	0.67	4.65***	7.22***	12.24***	-3.56(-0.46)
Sinaloa	0.67***	0.96***	1.74***	2.06	-3.41	-2.74(-0.98)
San Luis Potosí	1.03***	1.66***	2.12***	2.24**	1.06	-5.96(-1.23)
Sonora	0.94***	0.80***	1.30***	3.32***	-0.23	-0.12(-0.03)
Tabasco	1.13***	<b>2.20***</b>	3.82***	0.84	-1.51	-8.01(-0.97)
Tamaulipas	0.39	0.44	2.04***	5.84***	4.93	8.43(1.68)
Tlaxcala	0.70***	1.04***	2.17***	8.08***	13.31***	8.72(0.75)
Veracruz	0.91***	1.06***	1.62***	-0.20	5.61	-0.30(-0.19)
Yucatán	1.29***	0.75***	1.39***	2.27***	-2.02	-10.03(-1.01)
Zacatecas	0.51***	0.95***	2.36***	4.27***	1.17	-4.27(-0.68)

\*\*\*level of significance of 1%, \*\*level of significance of 5% and, \*level of significance of 10%.

Note: column 6, indhom, is the SpVar estimation coefficient considering the homicide rate as an exogenous variable. The t statistic is included in parentheses.

Source: Own elaboration with information from Datatur and INEGI.

The entities that benefit when there are changes in national tourism are identified and they are the following in order of importance: Tlaxcala (8.08%), Quintana Roo (7.22%), Morelos (6.29%), Tamaulipas (5.84%), Oaxaca (4.14 %) and Nayarit (3.76%). On the other hand, international tourism tends to affect the following destinations to a greater extent: Nayarit (19.72%), Oaxaca (-14.75%), Tlaxcala (13.31%), Quintana Roo (12.24%) and Baja California Sur (2.20%). The impact of international visitors is greater in regions that attract more international visitors than national ones. However, it is shown that the negative effects also tend to be very large as in the case of Oaxaca, where international tourism affected the performance of the tourism sector by -14.75 percent. In sum, the impact of national tourism on the country’s 32 states affected 21 states positively and significantly, while international tourism affected 8 states positively and affected 2 negatively. These results show that national tourism generates a greater positive impact in most of the entities, than international tourism. Also, that despite the spillover produced by the international tourism is greater, the negative impact is also greater.

Regarding the homicide rate as an insecurity variable (*indhom*), what is reported is that there is no consistent evidence that an increase in this index generates an adverse effect on the economic activity of tourism in Mexican states, measured by the sector's GDP. This implies that the Mexican population, in some way, has learned to coexist with the existing insecurity in the different Mexican regions. As shown in the results of column 6 of table 2, in 18 states the coefficient sign is negative, which would imply that an increase in the growth of *indhom* implies a fall in the GDP growth rate of the tourism sector; however, as shown, the coefficients are not statistically significant, so no conclusive results can be obtained from this coefficient.

This evidence is of foremost importance, since according to Costa and González (2020), there are dangerous cities in terms of violent crimes against their local population. However, that violence has no quantitative impact on their visitors. The authors comment: "in these cities, the delinquency phenomenon does not affect in structural terms to the local tourism" (Costa y González, 2020: 22), and there are cities in which "they only need a small change in the local peace dynamic in order to the tourism to exclude themselves from it".

### Conclusions

The most important contribution of this paper is that it quantifies the effects of national and international tourism on the Mexican entities, whether they are of a touristic or non-touristic nature, they get positive benefits from their neighbors. Given the positive impact of national tourism on the touristic sector, this work shows the importance of national tourism for the recovery of the tourism sector and of the entities that have this sector as their primary activity. Among the main results, it was found that the impact of international tourism is much greater than that of national tourism, but concentrated in very few entities. For example, the impact of international tourism on the tourism sector of Nayarit is almost 20%, but it also shows sharp falls when there is some disturbance that affects the flow of international visitors (as in the case of the COVID-19 pandemic), which is observed in Oaxaca, where this sector was affected by -14.75%.

In addition to the above, it was also found that the impact of national tourism on the growth of the sector was more significant in most of the 32 states, the highest impact was 8.08% in Tlaxcala, although almost 12% below the impact that international tourism generates on Nayarit; however, it should be noted that national tourism influences almost all the states (21 of the 32) of the country, while international tourism does so only in 10 states (2 of them negatively). In average, the impact of national tourism on the 32 entities is 1.92%, whereas the average impact of international tourism on the sector is only 1.31%, which is 0.6% below the national impact.

The empirical evidence presented here provides evidence that national tourism plays a relevant role in the recovery of the sector and, consequently, the recovery of jobs lost due to the pandemic. It is a fact that people learn to deal with adversity, just as they did with the insecurity that prevails in Mexico. Although these two problems tend to directly affect the arrival of international visitors, the insecurity or at least the homicide rate was not significant for the tourism sector.

Even though the homicide rate, as an indicator of insecurity, was not significant for the tourism sector in any part of the country, the issue of insecurity in Mexico is one of the problems that tends to directly affect the arrival of international visitors, so it remains pending on the research agenda to elaborate on the most appropriate indicators to measure the impact of insecurity on tourism. This result in no way implies that it has no direct effect on this activity; instead, it may be an indicator that Mexican residents have learned to cope with this problem, which is not the case for international visitors. In this regard, economic policies should be aimed at solving this problem of insecurity that prevails in the different tourist regions of the country, so that international visitors, especially those from the United States, may be able to visit Mexico.

Finally, it is important to highlight that the arrival of international visitors not only generates economic spillovers in Mexico's different tourist destinations, but also makes it possible for this sector to increase its competitiveness in this area. This increases exports and favours Mexico's trade balance. However, it would be a good strategy not only to attract visitors from the United States, Canada and Spain, but also to attract tourists from other countries, thus avoiding the country's existing dependence in this area.

The main limitation of this study is the lack of information to disaggregate the information at least at the municipal level, which would surely allow obtaining more conclusive results on the way in which national tourism is operating in the recovery of tourist areas. However, sectoral information with this level of disaggregation is not yet available. Another limitation is that we do not include any COVID-19 related variables to analyze their impact, since there are no variables in the same period of study. This flaw should be addressed in future work.



---

## References

- Acerenza M. A. (2006). *Efectos económicos, socioculturales y ambientales del turismo*. México: Trillas.
- Alvarez Meneses, T., Murcia Casas, N. M. y Vega Puertas, J. A. (2022). Corredor Esmeraldífero de Colombia. Un punto de partida para el desarrollo del turismo. *El Periplo Sustentable*, (42), 429-462. Available online <http://rperiplo.uaemex.mx/>, [05 de agosto 2022].
- Álvarez-Icaza, P. (1996). La relación de los servicios y el turismo con el sector externo en México. *Comercio Exterior*, 46(2), 148-157.
- Andrés-Rosales, R., Czarnecki, L. & Mendoza-González, M. Á. (2019). A spatial analysis of precariousness and the gender wage gap in Mexico, 2005-2018. *The Journal of Chinese Sociology*, 6(13), 1-21.
- Andrés-Rosales, R., Mun, N. & Quintana-Romero, L. (2019). SME's productivity in the Mexican regions: A spatial panel data approach, 1999-2014. *Latin American and Caribbean Studies*, (31), 35-68.
- Andrés-Rosales, R., Quintana-Romero, L., de Jesús-Almonte, L. & del Río-Rama, M. de la C. (2021). Spatial spillovers of economic growth and public spending in Mexico: Evidence from a SpVAR model, 1999-2019. *Economic Analysis and Policy*, (71), 660-673.
- Anselin, L. (1988). *Spatial econometrics, methods and models*. California: Kluwer.
- Ascanio, A. (2012). *Teoría del turismo*. México, Trillas.
- Ashby, N.J. & Ramos, M.A. (2013). Foreign direct investment and industry response to organized crime: The Mexican case. *European Journal of Political Economy*, (30), 80-91.
- Boullón, R. C. (2009). *Las actividades turísticas y recreacionales. El hombre como protagonista*. 4a ed. México: Trillas.
- Cárdenas, F. (1990). *Comercialización del turismo: determinación y análisis de mercados*. Mexico: Trillas.
- Costa, J. H. & González Herrera, M. R. (2020). Criminalidad, seguridad pública y turismo en la zona fronteriza de Ciudad Juárez, México. *Estudios Fronterizos*, 21, e046. <https://doi.org/10.21670/ref.2004046>.
- Dahdá, J. (2003). *Elementos de turismo. Economía, comunicación, alimentos y bebidas, líneas áreas, hotelería, relaciones públicas*. 2a. ed. México: Trillas.
- DATATUR. Integral analysis of tourism. Available online: <https://datatur.sectur.gob.mx/SitePages/Inicio.aspx>, [20 de enero de 2022].
- Granger, C. (1969). Investigating causal relation by econometrics models and cross-spectral methods. *Econometrica*, (37), 424-438.
- INEGI (National Institute of Statistic and Geography) (2020). National Institute of Statistic and Geography. Available online: <https://www.inegi.org.mx/>, [18 de mayo de 2022].
- Kuethe, T. & Pede, V. (2011). Regional Housing price cycles: A spatio-temporal analysis using US state-level data. *Regional Studies*, (45), 563-574.

- Lesage, J. & Cashell, B. (2015). A comparison of vector autorregresive forecasting performance: spatial versus non-spatial Bayesian priors. *The Annals of Regional Science*, (54), 533-560.
- Loría, E., Salas, E. & Sánchez, F. (2017). Efectos de la llegada de viajeros internacionales en el desempleo y el crecimiento económico en México, 2000.2-2015.2. *El Periplo Sustentable*, (32), 1-23.
- Luminita, C. D. & Reveiu, A. (2018). A spatial analysis of tourism infracture in Romania: Spotlight on accommodation and food service companies. *Region*, 5(1), 1-16.
- Márquez, M. A., Ramajo, J. & Hewings, J. (2015). Regional growth and spatial spillovers: Evidence from an SpVAR for the Spanish regions. *Papers in Regional Science*, 94(1), 1-19.
- Nava, R., Mercado, S. P., Vargas, M. E. & Gómez, D. M. (2017). El valor explicativo del turismo en las actividades con mayor contribución en el crecimiento económico de los municipios del Estado de México. *El Periplo Sustentable*, (33), 132-158.
- Ponce, P., Aguirre-Padilla, N., Oliveira, C., Álvarez-García, J. & Río-Rama, M. (2020). The spatial externalities of tourism activities in poverty reduction, *Sustainability*, 12(15), 1-17.
- Quintana-Romero, L. & Andrés-Rosales, R. (2014). *Técnicas modernas de análisis regional*, Plaza y Valdés, México, D.F.
- Quintana-Romero, L., Mendoza-González, M.A. & Álvarez-García, J. (2021). COVID-19 and tourism in Mexico: economics impact and prospect. In C. Seabra, O. Paiva & J. L. Abrantes (editors). *Pandemics and Travel: COVID-19 impacts in the tourism industry*, Emerald Publishing.
- Ramírez-Blanco, M. (1994). *Deontología y conciencia turística*. México: Diana.
- Ri, K., Williams, A., Park, S. & Li, C. J. (2021). Spatial spillovers of agglomeration economies and productivity in the tourism industry: The case of the UK. *Tourism Management*, (82), 1-13.
- Rivera Lozano, R. R. y Ortigosa Hernández, M. (2022). Impacto de los atributos emotivos de un destino en la satisfacción de los turistas. *El Periplo Sustentable*, (42), 247-278 Disponible en <http://rperiplo.uaemex.mx/>, [05 de agosto de 2022].
- Sánchez-Juárez, I. & Durán-Bustamante, M. (2021). Guerra contra el narcotráfico y desempeño económico regional en México. In L. De Jesús, Y. Carbajal V. H. Torres (editors) *Actividad Económica en México. Un análisis sectorial*. Eón-UAEM: Mexico, 123-141.
- Sánchez, L. F. & Cruz, M. J. (2016). Determinantes económicos de los flujos de viajeros a México. *Revista de Análisis Económico*, 31(2), 3-36.
- Torres, P.V. (2017). Desempleo y criminalidad en los estados de la frontera norte de México: un enfoque espacial bayesiano de vectores autoregresivos. *Ensayos Revista de Economía*, 36(1), 25-58.
- World Travel & Tourism Council (30 de junio de 2021). World Travel & Tourism Council. Available online <https://wttc.org/Research/Economic-Impact>, [30 de junio de 2021].

Appendix

Table A.1. Unit root tests

Aguascalientes					Durango						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	0.53	-0.44	-0.79	-0.97	-3.15	ADF	-1.01	-0.26	-1.01	-4.93	-1.30
PP	0.55	-0.72	-1.81	-0.97	-5.36	PP	-1.12	-0.47	-2.21	-4.97	-1.62
Baja California					Guerrero						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.45	-1.64	-1.13	-0.96	0.08	ADF	-0.89	-0.32	-1.97	-3.77	-1.33
PP	-0.72	-1.76	-3.10	-3.06	-0.49	PP	-0.97	-0.56	-4.16	-6.19	-1.68
Baja California Sur					Guanajuato						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-1.87	-0.45	-3.02	-3.11	-2.78	ADF	-0.75	-0.81	-0.44	-1.74	0.23
PP	-1.66	-0.72	-2.96	-2.56	-2.55	PP	-0.81	-1.22	-1.31	-3.05	0.33
Campeche					Hidalgo						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-2.41	-0.72	-1.88	-1.99	-7.10	ADF	-0.63	-1.67	-1.52	-3.64	-2.15
PP	-2.67	-0.95	-2.69	-2.88	-7.14	PP	-0.95	-1.65	-1.41	-3.68	-2.45
Chiapas					Jalisco						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-1.28	-1.27	-1.31	-4.22	-3.20	ADF	-0.10	-0.18	-0.41	-2.45	-0.28
PP	-1.81	-1.56	-2.52	-4.47	-3.00	PP	-0.42	-0.38	-2.62	-6.05	-0.65
Chihuahua					Estado de México						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.37	-0.48	-2.67	-2.18	-1.66	ADF	-0.51	-0.73	-3.27	-2.73	-2.56
PP	-0.24	-0.73	-2.66	-2.18	-1.66	PP	-0.52	-0.87	-3.26	-2.72	-2.48
Coahuila					Michoacán						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.58	-0.57	-0.37	-1.82	-1.47	ADF	0.06	-0.81	-1.26	-1.94	-1.06
PP	-0.68	-0.67	-1.43	-1.80	-1.68	PP	0.15	-1.16	-2.66	-1.86	-1.68
Colima					Morelos						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.24	0.09	-4.29	-3.56	-0.81	ADF	-0.18	-0.28	-4.21	-4.02	-2.31
PP	-0.55	-0.14	-4.29	-7.32	-0.76	PP	-0.10	-0.42	-4.19	-3.91	-2.14
Ciudad de México					Nayarit						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.06	-0.02	-1.21	-1.93	-2.32	ADF	-0.63	-0.34	-1.25	-1.37	-2.16
PP	-0.72	0.07	-2.39	-2.64	-3.69	PP	-0.72	-0.67	-3.32	-4.19	-2.23
Nuevo León					Sonora						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.23	-0.59	-0.17	-1.77	-1.75	ADF	-0.82	-0.04	-1.27	-1.48	-1.20
PP	-0.46	-0.93	-0.93	-1.65	-1.81	PP	-1.22	-0.34	-2.08	-1.42	-2.65
Oaxaca					Tabasco						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.96	-1.12	-0.50	-10.25	-4.02	ADF	-1.57	-1.82	-3.87	-2.27	-2.33
PP	-1.63	-1.38	-2.08	-7.77	-4.02	PP	-2.20	-1.98	-3.73	-2.11	-2.25
Puebla					Tamaulipas						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM

ADF	-1.09	-1.02	0.10	-1.62	-2.18	ADF	0.05	-0.67	-1.62	-1.66	-2.44
PP	-1.32	-1.09	-0.63	-1.51	-3.30	PP	-0.57	-0.87	-1.48	-1.78	-2.21
Querétaro					Tlaxcala						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-2.04	-0.59	-0.68	-2.09	-4.38	ADF	-2.33	-0.72	-4.39	-4.17	-1.19
PP	-2.88	-0.78	-1.20	-2.09	-4.23	PP	-2.30	-1.01	-4.45	-4.20	-2.38
Quintana Roo					Veracruz						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.79	-1.79	-2.02	-1.81	-1.83	ADF	-1.10	-1.01	-1.96	-2.81	-2.02
PP	-0.76	-1.99	-4.54	-3.81	-1.72	PP	-1.08	-1.43	-3.46	-2.78	-1.96
Sinaloa					Yucatán						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC <sup>3</sup>	OCUPINT <sup>3</sup>	IHOM
ADF	0.23	-0.69	-0.98	-2.96	-2.96	ADF	-0.22	-1.48	-1.44	-1.51	-1.89
PP	-0.16	-0.77	-4.60	-6.56	-2.97	PP	-0.42	-1.60	-2.26	-4.10	-2.58
San Luis Potosí					Zacatecas						
	ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM		ITAETUR	WITAETUR	OCUPNAC	OCUPINT	IHOM
ADF	-0.91	-0.86	-0.36	-2.39	-2.13	ADF	-0.92	-0.68	-1.73	-5.28	-0.90
PP	-1.26	-1.22	-1.42	-2.28	-3.46	PP	-0.99	-0.59	-4.73	-5.29	-1.28

Note: ADF = Augmented Dickey-Fuller, PP = Phillips-Perron. <sup>1</sup>tests for the period 2008.1-2019.04, <sup>2</sup>tests for the period 2006.1-2019.4, <sup>3</sup>tests for the period 2004.1-2019.4.

Source: Estimates made with EViews, ver 10.