

# **THE OPPORTUNITY COSTS OF CRIMINALITY ON TOURISM AND THE OUTCOMES ON THE PRODUCTION CHAIN IN THE STATE OF RIO DE JANEIRO**

**Dayenne Gomes Brandão de Oliveira**

Assessora Parlamentar ALERJ; Pesquisadora do NARSPP/CNPq

**Maria Viviana de Freitas Cabral**

Coordenadora do Programa de Pós-graduação em Economia Regional e Desenvolvimento (PPGER/UFRRJ); Docente do DeCE/UFRRJ; Pesquisadora do NARSPP/CNPq

**Joilson de Assis Cabral**

Docente Permanente do PPGER/UFRRJ; Docente Colaborador do PPGE/UFRRJ; Docente do DeCE/UFRRJ; Pesquisador do NARSPP/CNPq

**Matheus de Andrade Santos**

Mestrando do PPGER/UFRRJ; Assistente da Secretaria de Estado da Casa Civil do Rio de Janeiro; Pesquisador do NARSPP/CNPq

**Abstract:** The objective of this study is to verify the impacts of crime on tourism and its spillovers to other sectors of the economy of the state of Rio de Janeiro. Using the input-output methodology, the results showed that the performance of the tourism sector was 24.6% below its potential, if tourist demand remained at least at the levels of 2014. In addition, the sector's revenue opportunity cost was 23%. Sectors such as manufacturing; electricity, gas, water and sewage treatment; extractive industry and transport had their performance compromised due to the negative shock on the tourism sector. Bearing in mind the potential of the tourism sector, it is necessary to implement public policies aimed at propagating a positive image of Rio de Janeiro as a tourist destination at an international level.

**Keywords:** Tourism, crime, input-output.

**Resumo:** O objetivo deste estudo consiste em verificar os impactos da criminalidade sobre o turismo e seus transbordamentos para os demais setores da economia do estado do Rio de Janeiro. Utilizando a metodologia de insumo-produto, os achados da pesquisa comprovaram que o desempenho do setor de turismo ficou 24,6% aquém do seu potencial, caso a demanda turística se mantivesse, pelo menos, nos patamares de 2014. Ainda, o custo de oportunidade de receitas do setor foi de 23%. Setores como indústria de transformação; eletricidade, gás, tratamento de água e esgoto; indústria extrativa e transportes tiveram seu desempenho comprometido decorrentes do choque negativo sobre o setor de turismo. Tendo em vista as potencialidades do setor de turismo, faz-se necessária a implementação de políticas públicas direcionadas a propagação de uma imagem positiva do Rio de Janeiro como destino turístico a nível internacional.

**Palavras-chave:** Turismo, crime, insumo-produto.

**JEL Classification:** K30. R15. Z32

**Área 10:** Cultura, lazer, turismo e desenvolvimento regional

## Introduction

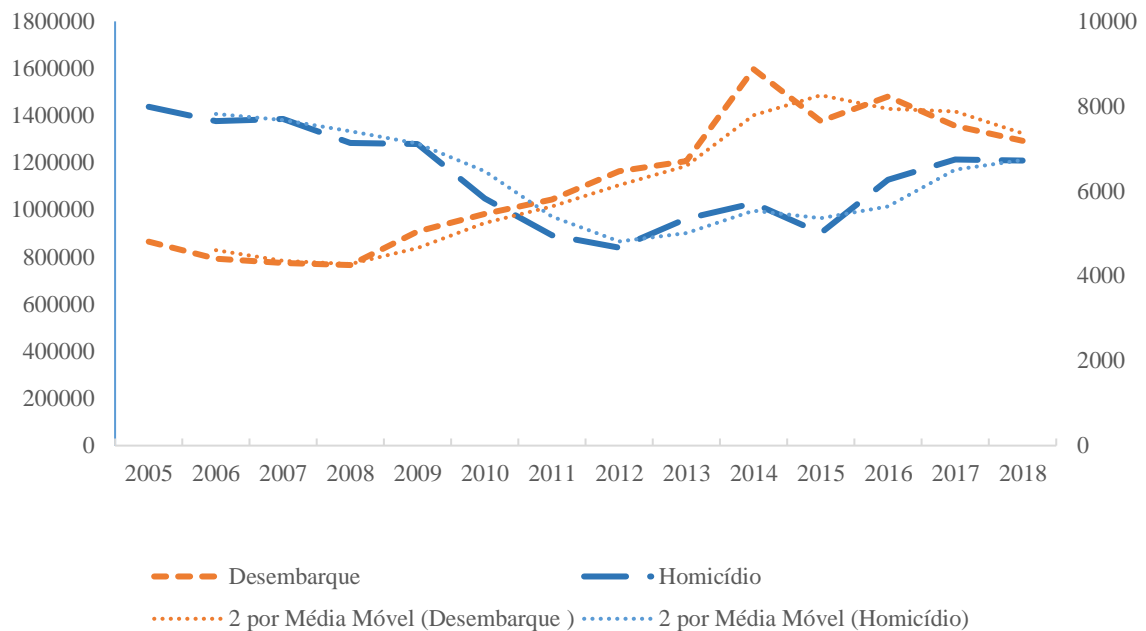
During the 2000s, Brazil found itself in a favorable internal and external environment for its insertion and international projection, so discussing and planning the realization of mega-events would become an instrument to attract greater international protagonism to the country. In 2003, Brazil applied to host the World Cup, which was ratified by the Fédération Internationale de Football Association (FIFA) in 2007. That same year, the country presented two more candidacies to host major events, both in the city of Rio de Janeiro: the 2016 Olympic Games and the 2013 World Youth Day, the latter formalized by the National Conference of Bishops of Brazil (CNBB) with support from the Brazilian government. In this way, several measures in different areas were defined to enable the realization of these events. Among these measures, there were actions in the area of public security (VASCONCELOS, 2018).

The fact that Rio de Janeiro has hosted major events with national and international repercussions contributed to the image of a destination with entertainment characteristics that go beyond its natural factors, such as beach and sun, as a result of the improvement and restructuring of urban infrastructure, bus stations, hotels and tourist areas. As a result, according to the national tourism competitiveness index prepared by the Ministry of Tourism (2015), Rio de Janeiro ranked the highest level of tourism competitiveness. Despite the tourism sector having presented satisfactory results as a competitive productive activity and the great expectations created after the mega-events, the international attractiveness of tourism in the state of Rio de Janeiro has not been consolidated. The Ministry of Tourism (2015) indicates that one of the main weaknesses of the tourist image in Rio de Janeiro is related to public security.

Through the visual inspection of Figure 1, it can be observed that the arrival of international tourists has not shown a growth trajectory in recent years in the state of Rio de Janeiro, including the arrival of international tourists in the Rio de Janeiro State has decreased since 2014. The peaks observed in 2014 and 2016 are due, respectively, to the 2014 FIFA World Cup and the Rio 2016 Olympic and Paralympic Games. The data presented in Figure 1 refer to the number of international arrivals. This series was built from data from the Statistical Yearbook of Tourism for the period 2005 to 2018. Meanwhile the data referring to homicides were extracted from the database of the Rio de Janeiro Public Security Institute (ISP). The historical series of homicides refers to data on violent crime, which corresponds to the sum of the following titles: intentional homicide, robbery followed by death (robbery), bodily injury followed by death and death by State agent intervention.

Based on an analysis of Figure 1, it is possible to point to a possible relationship between the number of international landings and crime in the state of Rio de Janeiro. It is also possible to verify that during the period of the mega sporting events, that is, 2014 and 2016, the state of Rio de Janeiro has its largest flow of international arrivals. It is worth mentioning that during the period when the mega sporting events were held, crime statistics were low, since the public security area received a high amount of investment (VASCONCELOS, 2018). However, in 2015, the period prior to the Olympics, there is an increase in violence rates, which may be a result of the deterioration of Rio de Janeiro's public security policy and the financial and political crisis the state is experiencing. After 2016, there was a reduction in the number of international arrivals in the state, not materializing what was expected by policy makers in the post-mega-events period.

**Figure 1:** Evolution of tourist arrivals and lethal crime in the state of Rio de Janeiro, 2005-2018.



**Source:** Own elaboration.

It was expected that the sporting mega-events could have left as a positive legacy the continued growth in demand for tourism for the city of Rio de Janeiro, for the state of Rio de Janeiro as a whole and, finally, for the country. Considering the successful experience of the Barcelona 1992 Olympic Games, the extensive redevelopment to host the mega-event reinserted Barcelona in the network of major tourist destinations, in addition to building physical legacies that impacted the population's quality of life. As a result, the city was led to the status of one of the main tourists and commercial destinations in Europe, since it expanded the business center, attracting large companies, as well as boosting the development of international tourism (PRONI et al., 2008).

Inspired by the “Barcelona model”, the city of Rio de Janeiro, in addition to implementing the Olympic facilities, sought to expand and modernize the transport infrastructure and transform the port area into a large residential, entertainment, business and tourism district. According to the Brazilian Olympic Committee (COB, 2009), the objective would be to transform Rio de Janeiro into a global city, using the event as an accelerator of transformations to ensure a sustainable legacy for the city. Thus, improvements in urban infrastructure combined with the great international visibility resulting from mega-events would increase the tourist potential in Rio de Janeiro, since, in addition to tourist attractions, there would be conditions to leverage business tourism in the city and state as a whole.

In this sense, “anti-propaganda”, being conceptualized as the generalized increase in the feeling of insecurity in the state, combined with numerous episodes of violence against tourists and the local population itself, may have led to a lack of interest on the part of tourists in the destination 'Rio de Janeiro' due to the city's negative image abroad. According to a study by the National Confederation of Trade in Goods, Services and Tourism (CNC, 2017), although other factors directly related to the conjuncture - economic crisis and political instability - have contributed to the fall in tourist activity in Rio de Janeiro, the increase in crime in Rio de Janeiro is one of the determinants that negatively impacted the sector. The fear of suffering violent experiences is a limiting factor in the choice of a tourist destination (Machado, 2012). The concern with the issue of urban violence, therefore, is a crucial factor in the choice of tourist

destinations. This would explain the drop observed in the arrival of foreign tourists from 2014 onwards, despite the urban improvement and modernization that has recently taken place in Rio de Janeiro.

The choice to use tourism data in a year like 2014, marked by a large event, with international repercussions, is due to a series of policies and a long-term planning to make Rio as an attractive and competitive destination. compared with other destinations. Since hosting mega-events has been used by public managers as a competitive instrument in the world economic market. In this sense, the “[...] ability of a tourist destination to compete with other destinations in the world, generating a higher-than-average income level and maintaining this situation in the long term” (VIGNATI, 2008, p. 113).

According to Brás and Rodrigues (2010), security in tourist destinations and crime in general can affect the decision-making process and influence tourist demand. Thus, in view of the increase in crime rates in the state of Rio de Janeiro and the reduction in tourist demand observed, this work aims to carry out an empirical exercise seeking to measure the opportunity cost that exists in the tourism sector due to crime.

In other words, a simulation of the impact on the tourism sector and its spillovers to the other sectors of the Rio de Janeiro economy will be carried out as a result of the replication of tourism demand at the levels observed in the period of mega sporting events.

Such an analysis becomes feasible, since there is a relationship between tourism and crime, in addition to the tourist demand decreasing at the same time that crime increases in the state. In this sense, the landing gap will be understood as the impact of crime on the demand of the Rio de Janeiro tourism sector. The premise that supports the analysis lies in the fact that the tourist demand of the state of Rio de Janeiro should present, at least, the same levels of the mega-event period as experienced by other cities, such as Barcelona. In order to reach the results, the input-output methodology will be used.

It is noteworthy that the analysis undertaken contributes to the literature by seeking to measure, in a pioneering way, the impacts of crime on the tourism sector through the input-output methodology. The analysis will make it possible to measure the direct and indirect costs of the increase in the perception of violence on the tourism sector in the state of Rio de Janeiro and its spillovers to other sectors of the state's economy.

In addition to this introductory section, the second section presents a review of the literature regarding other studies that relate the effects of crime on tourist activity. The third section presents the input-output methodology that was used as a tool to measure the economic benefits that the economy of Rio de Janeiro has been failing to receive due to the increase in crime rates in the state. The third section also describes the database used. In the fourth section, the results are analyzed and discussed and, finally, final considerations and policy implications are made in the fifth section.

## **Tourism Vs Crime**

From the 20th century onwards, safety criteria were linked to tourism, since both destinations and tourists are directly affected by the perception of safety, protection and risk. Crime, terrorism, and national security events are natural concerns for the tourism industry. Social, environmental and health issues have also become risk criteria for the tourist choice. Consequently, these risks-related concerns will generate negative effects that can influence the tourism system (Hall et al., 2004).

Based on Lancaster's (1966) theory of consumer demand, the tourist consumes certain characteristics of his destination, not a single good. As argued by Lorde and Jackman (2013), tourists may move to another destination when faced with threats to their security, except in the case where the characteristics are unique to the desired tourist destination. Thus, tourism is an

activity that is vulnerable to threats, such as crime, given that tourists can visit other destinations with similar, but safer, characteristics.

As pointed out by Águas and Brás (2007), the choice of a tourist destination, in addition to being related to meeting new people, cultures and places, should also offer security to its tourists at a physical, psychological and material level. Therefore, regardless of the type of crime, the increase in insecurity results in the “non-choice” of a particular tourist destination or even the tourist's lack of interest in returning to the visited place. Along the same lines, Soares Junior (2007) also argued that tourism is affected by criminal practices that keep visitors away from looking for a safe environment as their travel destination.

In this perspective, for Brás and Rodrigues (2010) the relationship between crime and tourist demand can be understood in three ways: i) crime intensity, in which it can have zero effect or totally reduce tourist demand; ii) increase in crime in geographic areas, such that crime committed in a municipality can negatively impact the country's tourist demand; iii) duration of the effect of the crime, something indeterminate, as it may have a short, medium or long duration.

Although it is recognized that crime is a negative determinant for the process of choosing tourist destinations, and this negative theoretical nexus between crime and tourism has been established, the results of the empirical literature on the impact of crime on tourist demand are varied. For authors such as Levantis and Gani (2000), the explanation lies in the existence of a degree of asymmetry of information in relation to the levels of security of tourist destinations resulting from the imprecise dissemination of statistics on violence and crime. For the authors, regions in which crime rates are disclosed, the negative relationship between tourism and crime tends to be evidenced.

The empirical literature uses different methodologies to measure the impacts of criminality on tourism development. Works such as Alleyne and Boxill (2003) analyzed the relationship between tourist arrivals and crime rates in Jamaica and Europe in the period 1962 and 1999. Using a transfer function, the results of the study showed that, although crime negatively impacts the arrival of tourists in both destinations, the greatest impact is on the European market. The authors concluded that it would be necessary to reduce, mainly, the violent crime rate, since it increases the concerns of tourists in the search for tourist destinations.

Authors such as Neumayer (2004) estimated the effects of political violence, human rights violations and other variables on tourism demand through a panel of data using fixed effects estimators. Altindag (2014) also used panel data for European countries to analyze the effect of crime on domestic tourism. The study found that the effect of violent crime on the number of tourists and revenue from international tourism is partially mitigated if the country is attractive. Therefore, the risk of becoming a victim of crime would be partially offset by the country's tourist attractiveness.

Saridakis et al (2013) analyzed the effects of crime on Trinidad and Tobago tourism between 1976 and 2007. The research used official crime data over three decades and used time series techniques to examine whether high rates of crime have a negative impact on tourist arrivals from the UK to Trinidad and Tobago. The study found that both violent and property crime have profound negative impacts on tourist arrivals in Trinidad and Tobago.

Hua and Yang (2017) examined the systematic effects of criminality on hotel performance. Using a sample of 404 Houston hotels from January 2009 to December 2014, the authors concluded that violent and property crimes affect hotel operational performance, *ceteris paribus*. Yang and Hua (2020), continuing their analysis of the performance of hotels in Houston, analyzed 352 hotels in the city from 2010 to 2014, using the crime variable as one of the vulnerability determinants of hotel activity performance. In addition to this factor, the different classes of hotels were also analyzed, divided into groups of budget hotels, middle class and luxury hotels. In order to undertake this study, the panel data method with fixed effects was

applied. The observed results confirm that the increase in crime reduces the operational performance of the hotel activity. However, differentiating the hotel level can mitigate the effects of crime on operational performance, as high-end hotels are less affected by crime incidents compared to other hotel classes.

No studies were found in the empirical literature that analyze the impacts of crime in relation to tourist activity and its unfolding to other productive sectors, using the input-output method. Meanwhile, the input-output matrix is an instrument used to measure the impact of a given sector. In this sense, as highlighted by Fletcher (1989), there are several methods that can be applied to analyze the impact of tourism analyzed economy.

Studies such as Archer and Owen (1971) pioneered the application of the regional tourism multiplier to examine the impact of tourism on the entire economy. Subsequently, new studies were carried out using the input-output matrix for different countries, studying the impacts of the tourism sector on their economies. Thus, works such as de Lin and Sung (1983) have focused their attention on the requirements of factors associated with tourism in Hong Kong; Archer (1995) used the input-output model to translate the importance of tourism to Bermuda's economy; Kweka, Morrissey and Blake (2001) conducted a study in Tanzania using input-output analysis; Albqami (2004) estimated the output, employment and income multipliers of the Saudi economy; Munjal (2013) measured the economic impact of the tourism industry in India using the Tourism Satellite Account; Huang et al (2014) evaluated the economic impact of three major sports events in China; Lamonica and Mattioli (2015) assessed the role and position occupied by the tourism sector in the economic systems of more industrialized countries.

Through previous research of works that use different methods to analyze the impacts of insecurity in different regions on the tourist sector, there is a lack of studies that investigate the impacts of crime on tourist activity and its consequences for the different productive structures. In this way, this work is a pioneer in this type of analysis, contributing to the literature on the regional economy, based on the observation of the implications of crime on the tourism sector in the state of Rio de Janeiro, enabling the identification of the links for the other productive sectors from Rio de Janeiro.

## **Methodology**

This work will use the input-output model and through simulations to reduce tourist demand in the state of Rio de Janeiro. The input-output model has adherence when studying the interdependencies or interactions between economic sectors in a region or country. The degree of interdependence can be assessed using measures known as sectoral interdependence requirement coefficients. In this way, these coefficients will allow the assessment of the impact of the reduction in tourist demand resulting from the increase in violence in the state of Rio de Janeiro. The key input-output model equation is described as follows<sup>1</sup>:

$$(I) X = (I - A)^{-1}Y$$

Equation (1) will be based on sector x sector production technology, that is, all analyzes undertaken in this work will be analyzed at a sectoral level.  $X$  is a vector denoting the Gross Value of Production (GVP) of the  $n$  sectors of the economy;  $(I - A)^{-1}$  is an  $n \times n$  matrix of interdependence coefficients. This matrix is also known in the literature as matrix  $B$  or inverse Leontief matrix and denotes direct and indirect requirements.  $I$  is an  $n \times n$  identity matrix. In the Leontief Inverse Matrix,  $A$  represents the matrix of technical coefficients or direct

---

<sup>1</sup> A detailed analysis of the input-output methodology can be found in Miller and Blair (2009).

requirement coefficient,  $(A = Z(\hat{X})^{-1})$ .  $Z$  is an  $n \times n$  matrix that represents the coefficients of intra- and inter-sectoral relationships, better known in the literature as intermediate consumption.  $\hat{X}$  is the diagonal matrix of the gross production value.

Finally, vector  $Y$  represents the final demand of the  $n$  sectors of the economy. In the input-output model, the final demand is composed by the vectors  $n \times 1$  of gross fixed capital formation (GFCF), exports (E), government consumption (G) and household consumption (C). In the input-output model  $Y$  is exogenous, known and fixed. Thus, it is possible to determine the variation in  $X$  arising from variations in any component of final demand. Through Equation 1, the input-output model starts from a model of intra-and-inter-sectoral trade flows ( $Z$ ) to a model capable of measuring the direct and indirect impacts on the GVP arising from exogenous shocks in final demand. As the final demand of the tourism sector is a component of the final demand, it is possible to measure the direct and indirect impact of the reduction of tourism demand on the GDP of a given economy by opening Equation 1, as follows:

$$(2) \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} b_{11} & \cdots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{n1} & \cdots & b_{nn} \end{bmatrix} \cdot \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix}$$

$$(3) \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix} = \begin{bmatrix} FBKF_1 E_1 G_1 C_1 \\ \vdots \\ FBKF_n E_n G_n C_n \end{bmatrix}$$

Rewriting Equation 2 using the transformation contained in Equation 3 gives:

$$(4) \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} b_{11} & \cdots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{n1} & \cdots & b_{nn} \end{bmatrix} \cdot \begin{bmatrix} FBKF_1 E_1 G_1 C_1 \\ \vdots \\ FBKF_n E_n G_n C_n \end{bmatrix}$$

From Equation 4, it is possible to verify how the impact of a reduction in the demand of the tourism sector is directly and indirectly distributed among the sectors of an economy. Equation 5 systematizes the point:

$$(5) \begin{bmatrix} \Delta x_1 \\ \vdots \\ \Delta x_n \end{bmatrix} = \begin{bmatrix} b_{11} & \cdots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{n1} & \cdots & b_{nn} \end{bmatrix} \cdot \begin{bmatrix} FBKF_1 E_1 G_1 \Delta C_1 \\ \vdots \\ FBKF_n E_n G_n C_n \end{bmatrix}$$

In Equation 5, sector 1 denotes the tourism sector. Thus, a variation (reduction) in the final demand of the tourism sector ( $\Delta C_1$ ) coeteris paribus, causes a direct and indirect variation in the sectorial GPV of the analyzed economy. The average monetary value arising from the reduction in demand from the tourism sector caused by the increase in violence in the state of Rio de Janeiro will be computed as follows:

$$(6) VMeG = GM_{pc} * PMe * NT$$

Where:  $VMeG$  is the average monetary value;  $GM_{pc}$  refers to average spending per capita;  $PMe$  and  $NT$  refer to the average tourist stay and the total number of tourists, respectively. With  $VMeG$  in hand, it is possible to compute  $\Delta C_1$  as follows:

$$(7) \Delta C_1 = C_1 - VMeG$$

With  $\Delta C_1$ , Equation 5 shows which sectors were most impacted by the reduction in tourist activity in Rio de Janeiro, caused by the increase in violence in the state. As well as Equation 1, Equation 5 can be written in the matrix form as follows:

$$(8) \Delta X = B\Delta Y$$

In order for the results obtained by applying Equation 8 to be easy to interpret, the percentage variation of the sectorial GPV will be computed as follows:

$$(9) \begin{bmatrix} \Delta x_1/x_{1inicial} \\ \vdots \\ \Delta x_n/x_{ninicial} \end{bmatrix} = \begin{bmatrix} \Delta \%x_1 \\ \vdots \\ \Delta \%x_n \end{bmatrix}$$

It is worth noting that as Equation 9 provides a dimensionless measure, this methodology can be used to compare the importance of the variation in tourist activity for different economies.

## Database

In order to achieve the proposed objective, this work used as a database a regionalized input-output matrix for the state of Rio de Janeiro for the year 2015 with sector x sector technology arranged for sixteen productive sectors made available by Cabral and Oliveira (2020). In this matrix, the tourism sector was not disaggregated. Thus, it was necessary to construct a procedure capable of disaggregating the tourism sector. In order to achieve the objective of disaggregating the tourism sector for the economy of Rio de Janeiro, data from alternative sources were used, so that it was possible to perform systemic analyzes of the sector. Data related to the tourist expenditure of visitors to Rio de Janeiro during the mega sporting events were used, more precisely, such data were taken from the 2014 FIFA World Cup Brazil Report, which made it possible to disaggregate the tourism sector in Rio de Janeiro input-output matrix.

Regarding the calculation of the shock applied to the tourism sector, according to equation (6), data from information obtained from the 2014 FIFA World Cup Brazil Report were also used. Table 1 presents the estimation of the average income generated during the 2014 FIFA Cup, which is the shock applied to the tourism sector in Rio de Janeiro.

**Table 1:** Estimated Average Income generated 2014 FIFA World Cup

	<b>FIFA World Cup 2014</b>
Average monetary value ( <b>VMeG</b> )	BRL 4,929.55
Average spending <i>per capita</i> ( <b>GM<sub>pc</sub></b> )	BRL 639.52
Average length of stay ( <b>PMe</b> )	8.7
Total number of tourists ( <b>NT</b> )	886,000

**Source:** Own elaboration.

Note: **VMeG** is in millions of reais.



## Discussion of results

The successful case of the city of Barcelona after the 1992 Olympic Games, which still manages to benefit from urban infrastructure and a perennial tourist demand, serves as a model for other cities and countries (QUEIRÓZ, 2010). Taking into account that each country has different productive, economic and social structures, Oliveira and Gaffney (2010) argue that, even though Rio de Janeiro adopted strategic planning based on the Catalan model with regulatory flexibility, public-private partnerships, urban interventions, in areas with high potential for valorization, projects to revitalize central and port areas and the construction of a consensual pact around the pursuit of economic development, there was a high degree of optimism regarding the gains that would be achieved with the realization of mega-events, particularly with regard to the promotion of tourism.

In this way, Oliveira and Gaffney (2010) emphasize that there are structural differences between the two cities, ranging from their territorial extension, geographic location, population size, economic scenario, productive structure and also the issue of security. and level of crime in cities. Therefore, the difficulty in maintaining the growth of the tourism sector in Rio de Janeiro after the mega sporting events can be understood in the context of the absence of an efficient public security structure.

By establishing the negative theoretical relationship between tourism and crime, it is plausible to argue that the recent upsurge in crime rates in Rio de Janeiro has negatively impacted the choice of the state as a possible tourist destination, generating negative impacts for the tourism sector and other related productive activities. As a consequence, there would be an opportunity cost for the economy of Rio de Janeiro with regard to the repressed tourist potential due to the rise in crime rates observed in recent years. Opportunity cost is understood as the cost generated by the economic agent not choosing, as well as the benefits that could be obtained from this renounced choice. Therefore, if Rio de Janeiro had maintained the same levels of tourists during the mega-events period, it could, at least, generate the same amount of income that year for tourism and avoid problems with idle capacity in its economy.

In order to measure the impact of the increase in crime on the repressed potential of the tourism sector, the difference in average income spent by tourists was estimated in 2015 and 2014, the year in which the peak of international arrivals of tourists in Rio de Janeiro during the World Cup in Brazil (Figure 1). This income differential can be understood as the opportunity cost of crime on tourism, since it was expected, as in Barcelona or Sydney, that tourist demand would be at least equal to that observed in the mega-event period. Cities such as Barcelona and Sydney are examples of host cities, in which having the function of promoting a mega event was a catalyst to insert them as competitive destinations in the international tourist route. Fernandes (2019) argues that the renovation in these cities brought the tourist consolidation of these cities, which, until today, enjoy a large tourist flow. The Sydney Olympics brought to Australia an increase of 1.7 million visitors (Ministry of Tourism, 2011), as well as Barcelona, which has become one of the most visited destinations in Europe (BARCELONA TURISME, 2015).

In view of the above, with the difference in average income spent by tourists, it was possible to define the amount of the negative shock applied to the tourist activity to measure the impacts on the sector itself, in addition to the chained effects on the other sectors of the economy of Rio de Janeiro. Thus, the results of this shock can be understood as how much the economy of the state of Rio de Janeiro has been failing to gain, that is, the opportunity cost arising from the idle tourist capacity generated with the underlying lack of perception of revenue from tourism due to the increase in violence rates in the state.

The results of the analysis can be seen in Table 2. In general, it is noticeable that the greatest economic loss from the negative shock on the tourism sector falls on the tourist activity

itself, followed by activities intrinsically related to it, among which, the Manufacturing sector; Electricity and gas, water, sewage, waste management and decontamination activities; Extractive Industry and Transport.

As a result of the negative shock applied to the final demand of the tourism sector, there was a reduction of 13% in this sector and, consequently, resulted in the reduction of other sectors, especially those linked to tourism. When calculating the amount of income that the tourism sector could generate for the Rio de Janeiro economy, if tourist demand remained at least at the level of 2014, it is possible to verify an additional revenue of 23%, which was not collected by the state of Rio de Janeiro as a result of the reduction of tourist activity. Due to this loss of dynamism in tourist activity, some sectors with greater connection to tourism also had reductions in their added value. It seems that the underused potential of the tourism sector combined with the consequences on other sectors resulted in an increase in the idle capacity of the economy as a whole.

**Table 2:** Opportunity cost of the productive sectors of the Rio de Janeiro economy resulting from the resurgence of crime

Sector	VBP		Variation (%)
	Final	Original	
agriculture	4186.72	4202.8	-0.38%
<b>Extractive Industry</b>	<b>114090.84</b>	<b>114574.76</b>	<b>-0.42%</b>
<b>Transformation industry</b>	<b>183015.86</b>	<b>184876.90</b>	<b>-1.01%</b>
<b>Electricity and gas, water, sewage, waste management and decontamination activities</b>	<b>37365.23</b>	<b>37556.06</b>	<b>-0.51%</b>
Construction	67991.63	68100.66	-0.16%
Business	82257.86	82559.24	-0.37%
<b>Transport</b>	<b>58317.94</b>	<b>58549.42</b>	<b>-0.40%</b>
Accommodation and Food	11787.00	11809.65	-0.19%
<b>Tourism</b>	<b>32269.63</b>	<b>37298.30</b>	<b>-13.48%</b>
Information and Communication	54354.21	54460.83	-0.20%
Financial, insurance and related services activities	45421.60	45513.61	-0.20%
Real Estate Activities	57319.23	57383.71	-0.11%
Professional, scientific and technical, administrative activities and complementary services	97954.31	98225.66	-0.28%
Public administration, defense and social security	150099.54	150368.75	-0.18%
Private education and health	38767.59	38828.07	-0.16%
Arts, culture, sport and recreation and other service activities	23990.40	24056.33	-0.27%
Domestic services	7391.14	7391.14	0.00%
Total VBP	1066580.73	1075755.92	-0.85%

**Source:** own elaboration.

A noteworthy result is the impact on the manufacturing industry, which presented the highest intersectoral percentage. Mapping the tourism production chain, it is possible to point out that the sector uses products from the manufacturing industry of food, beverages, machinery and equipment, vehicles, furniture, among others. As evidenced, the Manufacturing Industry sector is an important supplier of inputs for the tourism sector. In this way, a reduction in the dynamism of the tourism sector generates deleterious impacts on the manufacturing industry. Another sector heavily impacted by the drop-in tourist demand is the Electricity, Gas and Water and Sewage Treatment sector. By reducing tourist demand, additional idle capacity is generated in services related to accommodation, food, cultural and recreational activities that depend both

on the supply of electricity and on water treatment for the full development of their activities. In view of this, it is possible to observe the impact relationship between tourism activity and a key sector for the tourist service infrastructure.

With the results presented in Table 2, it is also possible to observe a reduction in the GPVs in the Transport sector and in the Extractive Industry sector due to the shock in tourist demand. Knowing that 26.5% of tourist spending is concentrated on transport (MINISTÉRIO DO TURISMO, 2010), the loss of dynamism in tourist activity implies a lower demand for transport services, and as a consequence, reduces the demand for oil derivatives. In addition, considering that Rio de Janeiro is responsible for about 80% of oil and gas production in Brazil (ANP, 2016), the practices inherent to oil activities significantly demand business tourism. In view of this, the reduction of business tourism implies losses for the economy of Rio de Janeiro, as it reduces the demand for accommodation, food, entertainment, services in general, in addition to restricting the generation of employment and income.

In numerical terms, tourism represents about 3.57% of participation in the GDP of the state of Rio de Janeiro and, given the opportunity cost of tourist activity caused by crime, the sector no longer receives 23% of additional revenue, restricting the growth of its own GDP by 24.6%. Therefore, although the state of Rio de Janeiro has recognized natural and/or architectural tourist attractions, the number of arrivals shows a reduction in tourist demand in the state of Rio de Janeiro, in such a way that it can be inferred that tourists are not prone to the risk of exposure to crime, as argued by Altindag (2014).

Despite the small share of the tourism sector in the state's GDP (3.57%), the negative shock on the sector inhibited the growth of Rio de Janeiro's GDP by 0.85%. The reduction in tourist activities, in addition to inhibiting GDP growth, results in lower job creation for the Rio de Janeiro economy, as the sector has a high capacity to generate jobs. According to the Intelligence Report of the Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (SEBRAE, 2017), the state of Rio de Janeiro has around 350,429 companies in the food, accommodation, transportation, travel agencies, culture and leisure sectors, counting with 10,888 providers of formal services and receives, on average, 1.5 to 2 million tourists per year. In view of this, the tourist activity plays an important role in promoting economic growth, through the generation of employment and income. For CNC (2018), the tourism sector is an economic activity that generates employment on a large scale: 255 million people worked in the sector, about 8.7% of direct and indirect jobs, in the world until 2011.

However, it should be noted that due to a crisis experienced in the state caused by factors such as corruption and problems with inefficient public management, it led Rio de Janeiro to declare a state of public calamity, which also makes tourism management very weakened (FERNANDES, 2019). In addition to these factors, in July 2016, Palácio do Planalto decided that it would no longer promote Brazil abroad, due to the change of presidents at EMBRATUR, in addition to the lack of funds and political uncertainties caused by the removal of then President Dilma Rousseff in May of the same year (AMADO, 2016).

In this way, the effects of a crisis at the state and national level, led to an erosion in planning for the development of tourism in Rio de Janeiro, as well as a critical scenario for the public security of the state. As pointed out by Renata Neder, Amnesty International's research coordinator: "not only has the promise of a safe city not been fulfilled, but the situation in Rio de Janeiro has deteriorated dramatically". Therefore, the political and economic context, explain the fragility of the development of policies both for public security and to achieve the goals proposed in the Strategic Plans for tourism (PESTRE, 2017).

In this way, it is verified that the economy of Rio de Janeiro no longer receives revenue from tourist activity motivated by the increase in violence in the state. An improvement in the performance of this activity could minimize unemployment levels in the state, given the sector's potential for job creation, since this activity, classified as services, is considered labor intensive.

## **Final considerations and policy implications**

Understanding the productive structure of the tourism sector in Rio de Janeiro and its interdependencies with other sectors of the economy becomes relevant for the formulation and implementation of public policies aimed at densifying the tourism sector, given that it corresponds to about 3.57% of the state's GDP, with the capacity and potential for an even greater participation in the state's economy. In this way, measuring the impact of crime on tourism is essential in the context of Rio de Janeiro's high international visibility resulting from the mega-events, since likely public policies aimed at tourism may not achieve the expected results in terms of generating employment and income due to the state's sense of insecurity.

Since the increase in crime, understood as an “anti-propaganda” for tourism, makes the visit or return of international tourists to the state of Rio de Janeiro less attractive, resulting in negative impacts on the performance of the tourist activity, greatly affecting activities that have productive interrelationships with the sector. Even with the realization of sports mega-events in 2014 and 2016, years in which there was a greater influx of international tourists in the state, in addition to the creation and improvement of urban, logistics and tourist infrastructure, these factors were not enough for the attractiveness of Rio de Janeiro to maintain itself after such mega-events. As pointed out by Carvelhedo (2008), tourism in host cities for events of this size cannot be sustained in the long term, if there is no strategy to promote tourist activities. Therefore, just the infrastructure created to attend such events is not enough to continue the tourism progress. It is necessary to elaborate a plan beyond the demands of such events with a view to the continuity of tourist attraction.

In the case of Rio de Janeiro, the tourism sector has constantly reduced its potential demand in the years following the mega-events, which resulted in an increase in the idle capacity of the Rio de Janeiro economy. The effect of this loss of the tourist sector had an impact on the state's GDP growth in the order of 0.85%. In a scenario of crisis and high unemployment rates, tourist activity and other activities related to the sector no longer contribute to the generation of jobs and income, which contributes to the worsening of unemployment numbers in the Rio de Janeiro economy. Despite all the potential in the tourism sector, the increase in crime rates recently observed in the state of Rio de Janeiro has made the state less attractive from a tourist point of view.

In this scenario of high unemployment rates, high crime rates and a reduction in international tourists in the state of Rio de Janeiro, it is important to promote policies that involve building a positive image of Rio de Janeiro, therefore, through solid marketing campaigns, which have the objective of distancing the negative image resulting from the lack of security, they can be instruments used to move the tourist demand to the state of Rio de Janeiro. However, just investments in an image campaign for the state will not be enough if it is not linked to improvement actions to reduce Rio de Janeiro's crime rates.

Thus, thinking about the development of the tourism sector for the RIO DE JANEIRO STATE is also thinking about how to guarantee the safety of tourists as well as the safety of its citizens (PIZAM, 1999). Therefore, both the public and private sectors must come together to discuss security measures and maintenance of this activity. Sharing its resources to solve possible problems for tourists, improving communication with the tourist service structure, such as, for example, informing tourists about the well-known hot spot areas.

The formulation of a policy with these characteristics is capable of promoting the state of Rio de Janeiro as an international tourist destination. A tourism sector with a positive image at the international level is capable of attracting new tourists and providing the return of those who already know the attraction, which, therefore, stimulates intra and inter-sectoral growth. The dynamism of the tourism sector will contribute to the attraction of missing links in the

sector's production chain, generating employment and income and, with this, tourism will be able to become an important sector for the economy of Rio de Janeiro.

Finally, the development of this work found some limitations due to the use of the analysis method carried out by the input-output model, this instrument allows some results of the impact of the demand of a given sector and its spillovers to the other sectors of the economy. However, the model does not allow the calculation of the determinants of the flow of tourist demand in the state, that is, because it is not an econometric model, we cannot say that the crime factor is the only variable that is affecting the reduction of tourist flow for the Rio de Janeiro State. Thus, the objective of this research is not to deal with these possible variables, but to make an empirical exercise to verify the economic losses of the tourism sector and its implications for the Rio de Janeiro production chain, due to the specific factor of the resurgence of violence rates of the state, implying a negative image for the development of tourism in Rio de Janeiro.

### Referências bibliográficas

Agência Nacional do Petróleo, Gás Natural e Biocombustíveis – ANP (2008) *Anuário estatístico brasileiro do petróleo, gás natural e biocombustíveis: 2016*. Rio de Janeiro: ANP.

Águas, P. and Brás, M (2007) Percepção de Segurança Pública dos Turistas Estrangeiros no Algarve. *Tourism & Management Studies*, 3: 97-108.

Albqami, R (2004) Economic Impact of Tourism Sector on Saudi Arabian Economy. Available at: <http://www.iioa.org/pdf/Intermediate-2004/501.pdf> (accessed 27 Nov 2020).

Alleyne, D and Boxill, I (2003) The impact of crime on tourist arrivals in Jamaica. *International Journal of Tourism Research*, 5(5): 381-391.

Altindag, DT (2014) Crime and international tourism. *Journal of Labor Research*, 35 (1): 1-14.

Amado, G (2016) *Brasil não terá mais campanha para atrair turistas durante Olimpíada*. O Globo. Associação dos Embaixadores de Turismo do Rio de Janeiro. Available at: <https://www.facebook.com/Associacao-Dos-embaixadores-de-turismo-do-Rio-de-JaneiroAbemtur-RJ-827314160666263> > (accessed 20 Jul 2020).

Archer, BH, and Owen, C (1971). Towards a tourist regional multiplier. *Regional Studies*, 5: 289-294.

Archer, BH (1995) Importance of tourism for the economy of Bermuda. *Annals of Tourism Research*, 22(4): 918-930.

Barcelona Turisme (2015) Estadístiques de turisme a barcelona i comarques. *Ayuntamiento de Barcelona*.

Brás, M and Rodrigues, V (2010) Turismo e crime: Efeitos da criminalidade na procura turística. *Tourism & Management Studies*, 6: 59-68.

Cabral, JA, Cabral, MVF, Montibeler, EE and Silva, TMK (2018) La importancia de los mega eventos deportivos para la generación de empleo el caso de Rio de Janeiro (Brasil). *Estudios y Perspectivas en Turismo*, 27: 679 - 698.

Cabral, JA and Oliveira, DGB (2020) Uma Análise da Estrutura Produtiva Fluminense sob a abordagem de Insumo-Produto. Working paper, *PPGER/UFRRJ*.

Carvalho, A (2008) Megaeventos e turismo: Uma breve revisão. In: Rodrigues, R, Pinto, L, Terra, R and Costa, L (Eds). *Legados dos Megaeventos Esportivos*, Brasília: Ministério do Esporte.

- Comitê de Candidatura Rio 2016 - COB (2009) *Dossiê de candidatura do Rio de Janeiro a sede dos Jogos Olímpicos e Paraolímpicos de 2016*. Rio de Janeiro: COB, (3 vols.).
- Confederação Nacional do Comércio de Bens, Serviços e Turismo – CNC (2017) Violência provoca perda de R\$ 657 milhões no turismo do RJ. Available at: <http://emkt.cnc.org.br/emkt/tracer/?2,4542520,6cab3e55,d825,1>. (accessed 20 Mar 2019).
- Confederação Nacional do Comércio de Bens, Serviços e Turismo – CNC (2018) Turismo: mais desenvolvimento mais emprego mais sustentabilidade. Available at: <http://www.cnc.org.br/editorias/turismo/livros/turismo-mais-desenvolvimento-mais-emprego-mais-sustentabilidade> (accessed 02 Sep 2019).
- Empresa de Turismo do Município do Rio de Janeiro S.A. – RIOTUR (2015) *Relatório da Copa do Mundo da FIFA Brasil 2014*. Available at: <http://www.rio.rj.gov.br/dlstatic/10112/7145888/4196121/RELATORIODACOPADOMUND02014PESQUISADERECEPTIVOTURISTICO.pdf> (accessed 30 Jun 2020).
- Fernandes, AMV (2019) Megaeventos e turismo no Rio de Janeiro: um olhar sobre o planejamento estratégico e promoção da imagem da cidade. *Caderno Virtual de Turismo*, 19(1).
- Fletcher, JE (1989) Input-Output Analysis and Tourism Impact Studies. *Annals of Tourism Research*, 16(4):514-529.
- Hua, N and Yang, Y (2017) Systematic effects of crime on hotel operating performance. *Tourism Management*, 60: 257-269.
- Huang, H, Mao, LL, Kim, S-K and Zhang, JJ (2014). Assessing the Economic Impact of Three Major Sport Events in China: The Perspective of Attendees. *Tourism Economics*, 20(6): 1277 - 1296
- Gaffney, C (2015) Segurança Pública e os Megaeventos no Brasil. In: Junior, OAS, Gaffney, C, Ribeiro, LCQ. (Eds.). *Brasil: os impactos da Copa do Mundo 2014 e das Olimpíadas 2016*. Rio de Janeiro: e-papers e Observatório das Metrôpoles, pp. 165–184.
- Hall, MC, Duval, DT and Timothy, D (2004) Security and tourism: Towards a new understanding? *Journal of Travel and Tourism Marketing*, 15:1-18.
- Kweka, J, Morrissey, O and Blake, A (2001) Is tourism a key sector in Tanzania? Input-output analysis of income, output, employment and tax revenue. Nottingham University TTRI *Discussion Paper*, 1001/1.
- Lamonica, GR, and Mattioli, E (2015) Research Note: The Impact of the Tourism Industry on the World's Largest Economies - An Input-Output Analysis. *Tourism Economics*, 21(2): 419 - 426.
- Lancaster, K (1966) A new approach to consumer theory. *Journal of Political Economy*, 74: 132-157.
- Levantis, T and Gani, A (2000) Tourism demand and the nuisance of crime. *International Journal of Social Economics*, 27 (7/8/9/10):959-967.
- Lin, TB and Sung, YW (1983) Hong Kong. In: Pye, E A and Lin, T (Eds.) *Tourism in Asia: The Economic Impact*. Singapore: Singapore University Press, pp. 1-100.
- Lorde, T and Jackman, M (2013) Evaluating the Impact of Crime on Tourism in Barbados: A Transfer Function Approach. *Tourism Analysis*. 18:193-191.
- Machado, MBT (2012) Medo social e turismo no Rio de Janeiro. *Tourism & Management*

*Studies*, 8:48-54.

Miller, RE and Blair, PD (2009) *Input-output analysis: foundations and extensions*. Cambridge: Cambridge University Press, 2ed, pp.750.

Ministério do Turismo (2010) *Anuário Estatístico de Turismo*. Brasília: Ministério do Turismo/Departamento de Estudos e Pesquisas, 37: 225. Dados de 2009. 2010.

Ministério do Turismo (2011) *Relatório Eventos Internacionais no Brasil (2003-2009)*. Brasília, DF: Ministério do Turismo.

Ministério do Turismo (2015) *Índice de Competitividade do Turismo Nacional. Rio de Janeiro, 2015*. Available at: <http://www.turismo.gov.br/assuntos/6038-relat%C3%B3rio-individual-por-destino-tur%C3%ADstico-2015.html> (accessed 10 May 2020).

Munjal, P (2013) Measuring the Economic Impact of the Tourism Industry in India Using the Tourism Satellite Account and Input-Output. *Analysis. Tourism Economics*, 19(6): 1345–1359

Neumayer, E (2004) The impact of political violence on tourism: Dynamic cross-national estimation. *Journal of conflict resolution*, 48(2): 259-281.

Oliveira, N and Gaffney, C (2010) Rio de Janeiro e Barcelona: Os limites do paradigma olímpico. *Revista Bibliográfica de Geografia y Ciencias Sociales*, 895 (17).

Pestre, MC (2017) *Um ano após Olimpíada, Rio encara retorno da violência e promessas não cumpridas*. Extra. Available at: <https://extra.globo.com/economia/um-ano-apos-olimpiada-rio-encara-retorno-da-violencia-promessas-nao-cumpridas-21668959.html> (accessed 20 Jul 2020).

Pizam, AA (1999) Comprehensive approach to classifying acts of crime and violence at tourism destinations. *Journal of Travel Research*, 8:5–12.

Proni, MW, Araujo, LS and Amorim, RLC (2008) *Leitura Econômica dos Jogos Olímpicos: Financiamento, Organização e Resultados*. IPEA (Instituto de Pesquisa Econômica Aplicada) *Texto Para Discussão N° 1356*. Rio de Janeiro. Available at: [http://repositorio.ipea.gov.br/bitstream/11058/1533/1/TD\\_1356.pdf](http://repositorio.ipea.gov.br/bitstream/11058/1533/1/TD_1356.pdf) (accessed 20 Jul 2020).

Queiróz, M (2010) Barcelona(s) cidade dos projectos ou projectos das cidades? *Finisterra*.

Saridakis, G, Sookram, S, and Mohammed, A-M (2013) Research Note: Does Crime Deter UK Tourists from Visiting Trinidad and Tobago? *Tourism Economics*, 19(4): 959.

Serviço Brasileiro de Apoio às Micro e Pequenas Empresas – SEBRAE (2017) *Geração de emprego e renda com o turismo no Rio de Janeiro*. Available at: <https://sebraeinteligenciasetorial.com.br/setores/turismo/relatorios-de-inteligencia> (Accessed 2 Set 2019).

Soares Junior, NA (2007) *Turismo urbano e criminalidade: uma correlação curitibana no século XXI*. Dissertação de Mestrado. Curitiba: UFPR.

Vasconcelos, ACDA (2018) *O legado dos grandes eventos para a segurança pública no Brasil*. Dissertação de Mestrado. Instituto de Pesquisa Econômica Aplicada.

Vignati, F (2008) *Gestão de destinos turísticos: como atrair pessoas para polos, cidades e países*. Rio de Janeiro: Ed. Senac Rio.

Yang, Y and Hua, N. (2020) Does hotel class moderate the impact of crime on operating performance? *Tourism Economics*.