

# Policy Article

## The effects of crises on the tourism sector: the case of Greece

### ABSTRACT

**Aim:** This study aims at investigating the contribution of tourism to the economic growth of Greece and how this sector was affected by the two crises (socio-economic crisis that Greece experienced after 2008, as well as the appearance of the COVID-19 pandemic in 2020).

**Methodology:** The study concentrates in Greece for the years 2005, 2010, 2015 and 2020 and the methodological approach is based on Input-Output Analysis that is often used to interpret the function of an economic system and the productive relationships among the sectors of an economy.

**Results:** The data analysis shows that the two crises seem to have affected negatively the dynamism of sectors like 'Accommodation and food services' and 'Rental and leasing activities'. On the other side, sectors like 'Retail trade services' and 'Creative, arts and entertainment services, etc.' appear great resilience during the period of the two major crises. Moreover, the leading role of 'Transport services' sector during the period 2005-2020 should be noted as the intensity of its interindustry exchanges with other sectors of the economy remains high.

**Conclusion:** The two crises that Greece experienced, have affected the sectors related to tourism to a different extent and policy makers should take into account this fact. The resources allocation should focus on the development of the leading sectors as well as on sectors producing the highest multiplier effects. Moreover, the strengthening of the interdependencies of the dominant sectors can contribute to the creation of a more competitive tourism sector that can be resilient to future crises.

*Keywords: tourism; Greece; Input-Output Analysis; economic crisis; COVID-19 pandemic*

### 1. INTRODUCTION

Tourism constitutes one of the most dynamic and growing sectors in many countries worldwide contributing to their economic development. It plays a crucial role in regional development by offering various economic, social, and environmental benefits as well as providing economic revitalization, job opportunities, and income growth. On the other hand, tourism development strategies should have the relationship between tourism and environmental protection as a priority, taking into account crucial issues like optimal use of environmental resources, social and cultural authenticity of local communities, sustainable economic activity of enterprises, etc [18].

Tourism sector often appears high interexchanges with other sectors of an economy. Specifically, tourism enterprises tend to buy intermediate goods and services from other sectors in order to satisfy the needs of visitors, to whom they sell their final goods and services. Moreover, the expenditures made by tourism enterprises, due to the increasing number of visitors, create indirect effects through the creation of jobs and wages for other local enterprises that provide goods and services to tourism enterprises [3, 17].

In Greece, tourism constitutes a dominant sector as its direct economic contribution corresponds to 11,5% of the country's GDP for the year 2022, whereas its indirect contribution is estimated between 25,3% and 30,5% [7]. However, the socio-economic crisis that took place after 2008, as well as the COVID-19 pandemic, which appeared in 2020, seem to have significantly affected the country's productive fabric.

Input-Output Analysis is one of the methods that can be used for the investigation of the interactions among the sectors of an economy. It describes the functioning of an economic system and provides tools for assessing the structural changes in an economy, in terms of the linkages among the sectors. Moreover, Input-Output tables provide information about the status quo of a particular economy by analyzing intersectoral exchanges in goods and services [10,11, 13].

Regarding this article, Input-Output Analysis is used to examine the importance of the tourism sector in the Greek economy and how it was affected by the two major crises (economic crisis and COVID-19 pandemic). For this purpose, product and employment multipliers of the sectors are estimated as well as a linkage analysis is attempted to examine the interdependences among the sectors.

Specifically, multipliers and indices of inter-sectoral linkages can be considered as significant tools, in the context of Input-Output Analysis, for the conduction of sectoral economic analyses in a geographic area. In recent years, various studies have been conducted for estimating the economic impacts of tourism at national or regional level with the use of Input-Output Analysis [15,1,9,8,16,3,17].

The combination of elements such as the time period (2005-2020), the sector (tourism and related sectors), the geographical area (Greece) and the type of methodology (input-output analysis) can allow an in-depth investigation answering to the research question regarding the effects of the two major crises in the Greek economy and especially to the tourism sector.

## 2. METHODOLOGY

### 2.1 Output and employment multipliers

In the context of Input - Output Analysis, the multipliers constitute important indicators as they can be used to estimate the impact of changes of final demand on output, income, employment, etc. [13,10].

Specifically, the output multiplier of sector  $j$  is defined as the total value of production in all sectors of the economy which is necessary to satisfy the increase in the final demand of sector  $j$  by one unit. The output multiplier for each sector is estimated by the sum of the corresponding column of the Leontief's inverse matrix (10,12,11):

$$OM_j = \sum_{i=1}^n b_{ij} \quad (1)$$

where  $OM_j$  is the output multiplier of sector  $j$  and  $b_{ij}$  is the element of the Leontief's inverse matrix.

Moreover, the employment multiplier of sector  $j$  shows the overall change in employment that is induced in the economy by a change in final demand of each sector separately. For the estimation of employment multiplier, the direct employment coefficients vector is first estimated by the following formula [10]:

$$DE_j = E_j / X_j \quad (2)$$

where  $E_j$  is the number of employees in each sector and  $X_j$  is the total output of each sector. Then, total employment multipliers are estimated as follows:

$$EM_j = DE_j (I - A)^{-1} \quad (3).$$

## 2.2 Indices of inter-sectoral linkages

The indices of inter-sectoral linkages constitute a useful tool for economic analysis as they can contribute to the importance of each sector in terms of the intensity of its inter-exchanges, and to highlight the key-sectors of the economy. Various vertical and horizontal inter-sectoral linkages indicators have been suggested in several studies [5,6,14,4]. The main disadvantage of these indicators is that they do not reflect the intensity of the dispersion of indirect effect among the sectors of an economy. Specifically, any sector with a high horizontal or vertical linkages index does not necessarily lead to an increase in the gross product of all sectors of the economy under consideration. Trying to overcome this problem, Rasmussen [14] and Hirschman [6] suggested the estimation of indices of power dispersion and sensitivity of dispersion through a normalization process. In particular, these indices are determined in the following way:

$$U_j = \frac{\sum_{i=1}^n b_{ij}}{n} \bigg/ \frac{\sum_{j=1}^n \sum_{i=1}^n b_{ij}}{n^2} \quad \text{και} \quad U_i = \frac{\sum_{j=1}^n b_{ij}}{n} \bigg/ \frac{\sum_{i=1}^n \sum_{j=1}^n b_{ij}}{n^2} \quad (4)$$

where  $U_j$  is the index of power dispersion,  $U_i$  is the index of sensitivity of dispersion,  $b_i$  express cases, and  $n$  is the number of productive sectors. When  $U_j > 1$ , an increase in final demand of sector  $j$  will cause an increase in the productive activity of economy above the average. Moreover, if  $U_i > 1$ , then an increase in the final demand of the sectors by one unit, will cause an increase in sector  $i$  production above the average.

The above indices of Rasmussen [14] and Hirschman [6] have a main disadvantage as they are sensitive to marginal values. For this reason, Allaudin [2] suggested the variability indexes that can be used in addition to the dispersion indexes. These indicators can be estimated as follows:

$$V_j = \sqrt{\frac{\frac{1}{n-1} \sum_{i=1}^n \left( b_{ij} - \frac{\sum_{i=1}^n b_{ij}}{n} \right)^2}{\frac{\sum_{i=1}^n b_{ij}}{n}}} \quad \text{and} \quad V_i = \sqrt{\frac{\frac{1}{n-1} \sum_{j=1}^n \left( b_{ij} - \frac{\sum_{j=1}^n b_{ij}}{n} \right)^2}{\frac{\sum_{j=1}^n b_{ij}}{n}}} \quad (5)$$

where  $b_i$  are cases and  $n$  is the number of productive sectors. Low values of these indicators for a sector show that the indirect results of this sector are evenly distributed to other sectors, while the opposite is the case if the values of these indices are high. According to Allaudin [2], a sector is considered to have a leading role in the economy when (a) the  $U_i$  and  $U_j$  indices have values greater than the unit, and (b) the indices  $V_i$  and  $V_j$  have relatively low values.

## 3. APPLICATION

As referred above, the objective of this study is to analyze the significance of the tourism in the Greek economy during the period 2005-2020 and how this sector was affected due to the two major crises that took place: the socioeconomic crisis (started in 2008) and the COVID-19 pandemic (started in 2020).

This objective is carried out by using output and employment multipliers, as well as linkages analysis, that come from the input-output tables of the Hellenic Statistical Authority for the years 2005, 2010, 2015 and 2020. Specifically, the input-output analysis is used for two main purposes: first, multiplier analysis is used to assess the relative significance of tourism in

creating output and employment. Second, linkages analysis is applied to investigate the interdependence between tourism and the other sectors.

The original I-O tables of 65 sectors were aggregated to 37 sectors. Among the 37 sectors considered by the national Greek I-O tables, the closest tourism-related sector is identified as 'Accommodation and food services'. Moreover, the following four sectors offer tourism-related activities: 'Retail trade services', 'Transport services', 'Creative, arts and entertainment services, etc.' and 'Rental and leasing services'.

Regarding the product multipliers, the results show that 'Accommodation and food services' sector presents a significant reduction of its multiplier values in years 2010 and 2020. The two crises seem to have affected the dynamism of this sector in a significant way. Moreover, 'Rental and leasing activities' sector tends to appear similar trends in its multiplier values but with smaller changes among the years.

On the other side, the product multipliers in 'Transport services' sector have high values and they appear a significant increase during the period 2005-2015. The reduction presented in 2020 may be due to the restriction of movements due to the lockdown of the Greek economy for several months.

**Table 1. Product multipliers**

Sector	2005	Rk	2010	Rk	2015	Rk	2020	Rk
Accommodation and food services	1,902	17	1,499	33	1,938	16	1,832	22
Retail trade services	1,610	28	1,652	25	1,651	28	1,687	28
Transport services	1,904	16	1,997	13	2,227	11	2,175	13
Creative, arts and entertainment services, etc.	1,598	29	1,647	28	1,811	24	1,819	23
Rental and leasing services	1,715	25	1,651	26	1,835	22	1,797	24

By examining the employment multipliers, it should be noted that their values are increased in all sectors related to tourism during the period between the years 2005 and 2020, instead the reductions observed in some cases in 2010. This fact shows that these sectors seem to have recovered from the economic crisis in terms of employment multipliers. Specifically, sectors of 'Retail trade services' and 'Accommodation and food services' rank in high positions among the 37 sectors of the Greek economy.

**Table 2. Employment multipliers**

Sector	2005	Rk	2010	Rk	2015	Rk	2020	Rk
Accommodation and food services	27,52	8	22,19	10	26,98	7	41,04	4
Retail trade services	41,69	3	41,77	3	45,06	3	55,96	1
Transport services	14,99	25	12,52	25	13,81	23	15,83	22
Creative, arts and entertainment services, etc.	15,71	24	13,07	22	18,92	16	24,64	13
Rental and leasing services	13,19	30	9,82	31	14,45	20	16,37	21

The linkages analysis shows that 'Transport services' sector has a leading role during the period 2005-2020. The intensity of its interindustry exchanges with other sectors of the economy has not been affected by the crises that Greece experienced. No other industry can be characterized as a leader in the four years under examination. Furthermore, it is worth noting that the 'Accommodation and food services' sector shows high backward linkages in years 2005 and 2015, where the 'Retail trade' sector appears high forward linkages in years 2010, 2015 and 2020. In general, interindustry exchanges of the sectors related to tourism seem to have low intensity in the four years under examination.

**Table 3. Dispersion Indexes**

Sector	Index Uj								Index Ui							
	2005	Rk	2010	Rk	2015	Rk	2020	Rk	2005	Rk	2010	Rk	2015	Rk	2020	Rk
Accommo	1,025	17	0,802	33	1,017	16	0,938	22	0,735	24	0,739	22	0,632	27	0,564	31

Accommodation and food services	0,868	28	0,884	25	0,866	28	0,864	28	1,355	9	1,228	10	1,255	11	1,122	11
Retail trade services	1,027	16	1,068	13	1,169	11	1,113	13	1,257	10	1,323	7	1,820	4	2,136	3
Transport services	0,861	29	0,881	28	0,950	24	0,931	23	0,808	19	0,850	17	0,711	23	0,704	23
Creative, arts and entertainment services, etc.	0,924	25	0,883	26	0,963	22	0,920	24	0,687	25	0,672	25	0,644	26	0,707	22
Rental and leasing services																

**Table 4. Variability Indexes**

Sector	Index Vj								Index Vi							
	2005	Rk	2010	Rk	2015	Rk	2020	Rk	2005	Rk	2010	Rk	2015	Rk	2020	Rk
Accommodation and food services	0,725	36	0,812	19	0,717	35	0,738	31	0,853	25	0,844	24	0,908	18	0,950	14
Retail trade services	0,795	23	0,784	28	0,794	22	0,783	24	0,620	33	0,650	33	0,639	34	0,669	33
Transport services	0,906	5	0,897	8	0,938	4	0,983	3	0,807	29	0,793	27	0,734	30	0,689	31
Creative, arts and entertainment services, etc.	0,917	4	0,905	7	0,876	9	0,873	10	0,944	15	0,916	16	1,013	6	1,001	7
Rental and leasing services	0,790	25	0,800	23	0,768	27	0,798	21	0,914	18	0,911	19	0,938	15	0,903	21

#### 4. CONCLUSIONS

Tourism constitutes one of the most growing sectors in many countries worldwide. The tourism industry has a multiplier effect as it can lead to induced, direct, and indirect effects that contribute to the growth of related sectors and the socio-economic development of an economy. In Greece, tourism contributes the country's GDP in a significant way. However, the socio-economic crisis as well as the COVID-19 pandemic have caused structural changes in the country's productive fabric.

This article examined the effects of the two crises, that Greece experienced, in sectors related to tourism with techniques based on Input-Output Analysis, which is an important methodological tool used to interpret the functionality of an economic system.

Multiplier analysis was used to indicate how the tourism sector either strengthened, weakened or maintained its dynamism during the period of the two crises in Greece. Specifically, according to analysis of product multipliers, the dynamism of sectors like 'Accommodation and food services' and 'Rental and leasing activities' seems to have been affected by the two crises. On the other side, sectors like 'Retail trade services' and 'Creative, arts and entertainment services, etc.' appear a steady increase and this fact shows their resilience in the two major crises. The sector of 'Transport services' presents the highest values of product multipliers in the 4 reference years. Moreover, it should be noted that all sectors related to tourism show an increase in employment multipliers during the period 2005-2020.

Linkages analysis was used to quantify backward and forward linkages for the sectors of Greek economy identifying "key" or "leading" sectors and examining the evolution of their interconnections during the period 2005-2020. The linkages analysis shows that 'Transport services' sector appears high backward and forward linkages in the 4 reference years, having a leading role in the economy structure.

Overall, the two crises have affected the sectors related to tourism to a different extent and this fact should be taken into account by policy makers. Specifically, policies for the development of tourism should focus on the enhancement of the leading sectors and on the sectors producing the highest multiplier effects. The strengthening of the interdependencies of the dominant sectors can contribute to the creation of a more competitive tourism sector that can be resilient to future crises. Fields that can contribute to the achievement of a balanced

and sustainable tourism development, which can strengthen the competitiveness of Greece as a tourist destination are the following: infrastructure development, promotion of alternative tourism forms, digital transformation, support of small and medium enterprises (SMEs), highlighting of cultural heritage etc.

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