

## Economic Potentials of Tourism for Jordan: Input-Output Analysis

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### ABSTRACT

In seeking solutions to the challenges facing the Jordanian economy, most importantly the scarcity of economic resources, decision-makers consider tourism a strategic option that can contribute to economic growth, export diversification, and job creation. This study aims to assess the potential contributions of tourism to the Jordanian economy through its effects on other sectors. Based on the recent 2016 input-output table, several indicators have been deduced: backward and forward linkages, multipliers for output, value-added, taxes, import, and employment. Results of the study show that JD 1 increase in final demand by tourists causes an increase in output by JD 1.55, value-added by JD 0.74, employment by 0.069 jobs, and imports by JD 0.22. Comparing these results with other countries (Turkey, Tanzania, Ireland, Jamaica, and Romania) reveals a weak expected influence of tourism in Jordan. This outcome is enhanced because most of the impact of multipliers occurs within an individual sector, while the effects that spread to other sectors are limited. To strengthen tourism's role, the study recommends developing tourism-related service infrastructure such as transportation, reducing tax burdens on the restaurant and hotel sector, and encouraging local workers to work in tourism.

**Keywords:** Tourism impact, Output multiplier, Input-output analysis, Employment multiplier, Economic linkages.

### 1. Introduction

Tourism growth potential is a topic of interest among researchers, decision-makers, and governments. Tourism generates many economic benefits such as income growth, employment, tax revenues, poverty alleviation, spatial development, and foreign exchange. The benefits of tourism are not limited as they have spillover effects on other sectors. Due to these significant benefits, most countries view tourism as an engine of growth. Thus, countries have identified developing their tourism sector as one of the most important priorities and strategic objectives.

In addition to the benefits above, several factors have encouraged the government and decision-makers in Jordan to consider tourism as the key sector to developing

its economy. These factors include, in part, Jordan's scarcity of natural and financial-economic resources, the absence of a productive base for exports and job creation, the services sector dominating two-thirds of its GDP, and the availability of specific tourist sites at the international level, such as the city of Petra.

The performance indicators of the tourism sector in Jordan indicate a significant increase in recent years. Tourism revenues rose from \$935 million in 2000 to \$6,221 million in 2018. These revenues accounted for 41.2% of exports in 2018 compared to 26.4% in 2000. The number of workers in the sector skyrocketed from 21,000 to about 52,000 between 2000 and 2018. The number of tourists nearly doubled from 2.7 million in

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2000 to 5 million in 2018 (Ministry of Tourism and Antiquities).

However, these are only direct and visible indicators and do not represent a full and comprehensive assessment of the role of tourism in the Jordanian economy as they do not show the impact of tourism on other areas, such as income and employment. Therefore, this study aims to explore the impact of tourism on other sectors and thus assess its potential contribution to the growth and development of Jordan's economy. In doing so, the current study fills a gap in the existing literature as no previous studies have examined tourism's influence on the Jordanian economy.

## 2. Literature Review

Countless studies have been conducted using several approaches to explore the impact of tourism on the economy. Some of these studies focus on applying econometric models, such as VAR, VECM, ARDL, and Granger causality (e.g., Lolos et al., 2021; Suryandaru, 2020; Comerio & Strozzi, 2019; Brida et al., 2016). Other studies apply different approaches, such as the computable general equilibrium model (CGE) (e.g., Blake, 2000; Meng, 2014; Dwyer et al., 2005), tourism satellite accounts (TSA) (e.g., Jones and Munday, 2008; Smeral, 2006; Ahlert, 2008), social accounting matrix (SAM) (e.g., Wagner, 1997; Daniels et al., 2004), and the input-output table (I-O). Input-output analysis is a powerful analytical tool that can be used to identify the economic structure of an economy, explore inter-sectors relationships, analyze the role and economic impact of an activity or sector, determine promising or key sectors and provide several valuable indices that are considered important and useful for policymakers. These indices include forward and backward linkages, output, employment, value-added and imports multiplier.

I-O analysis has been utilized in several studies to assess the impact of the tourism sector on economies at the state and regional levels. It has also been used to analyze the impact of a particular tourism event. Kweka

et al. (2003) employed the 1992 input-output table to examine the significance of tourism to the economy in Tanzania by estimating the output multiplier and backward linkages. The results show that the output multiplier for tourism is 1.8, ranked the third-highest of 23 sectors, and that tourism has a significant backward linkage, ranked the third of 23 sectors. Mazumder et al. (2011) confirmed a strong relationship between the *tourism* sector and other sectors in Malaysia. Using the input-output tables for 2000, they find that the output multiplier for the hotel and restaurant sector is 2.331, which is higher than that of the export-oriented sectors such as palm oil (1.74) and rubber (2.18). Rashid and Bashir (2004) also stressed the relative importance of tourism to the Malaysian economy.

To test the impact of the tourism sector on the Turkish economy, Atan and Arslanturk (2012) calculated output multipliers for four tourism sub-sectors in 2002, mainly: hotels and restaurants (1.896), auxiliary transport (1.845), tourism agents (1.84), and cultural and sports activities (1.642). The results highlighted the strength of the backward linkages and the weakness of the forward linkages, indicating that the tourism sector is dependent on other sectors to produce inputs and stimulate these sectors.

Oosterhaven and Fan (2006) employed the 1997 I-O table and found the insignificant contribution of international tourism to the Chinese economy. Their research showed that foreign tourism contributes to 1.64% of GDP, 1.4% of income, and 1.01% of employment. The same results are produced by Yan and Wall's study (2002), where analyzing the 1992 I-O table revealed a low backward linkage, signifying that tourism does not depend heavily on other sectors. The authors emphasize that this limited role of the tourism sector is due to the size and diversity of the Chinese economy.

Singh et al. (2006) utilized I-O tables for 1974 and 1993 for Jamaica to estimate the impact of the tourism sector on other sectors. The tourism sector ranked second in 1974 with an output multiplier of 1.94. In 1993, it

ranked first, reaching 2.05. These results indicate that growth in the tourism sector will always have a significant impact on the economy.

At a regional level, Tiku and Shimizu (2020) used I-O tables for West Papua in Indonesia for 2013. They proved, through the output multiplier (1.63), the significant contribution of tourism in that region. Using the 2001 I-O tables, Contini et al. (2009) showed that the rural tourism sector in Tuscany, Italy, accounts for 57.88% of the total income generated in the tourism sector, followed by the hotels and restaurants sector with 10.46%, and the trade sector came in third place with 7.34%. Tohmo (2018) demonstrated the significant impact of tourism on output, income, and employment in central Finland and stressed the importance of these results to decision-makers in tourism attraction planning and infrastructure investments in tourism.

Other studies focused on the impact of a particular tourism event on the economy using I-O tables. Wood and Samuel (2021) assessed the impact of the 2018 Winter Olympics on the South Korean economy. The results showed that tourism spending related to the Olympics contributed ₩1.9 trillion to the national product and that the increase in tourism demand benefited tourism sectors and other sectors due to the strength of inter-sectoral relations. Hanly (2012) employed the 2005 Irish I-O table to demonstrate the substantial economic contribution of the international conference market to Ireland's economy. The estimated results of output multipliers highlighted the importance of five sub-sectors in tourism, namely: hotels and restaurants (1.991), water transport services (1.989), telecommunication services (1.966), food and beverages (1.926), and retail trade (1.794).

The research conducted by Kim et al. (2003) estimated the impact of the convention industry on the Korean economy by using the I-O table for 2001. They found that the output multiplier for hotels is 1.59, retail is 1.55, restaurants is 1.74, and transportation is 1.42. For the same industry, comparable results are obtained by

Kim et al. (2010), where the output multiplier for hotels is 1.57, retail is 2.1, and restaurants is 1.72.

### 3. Methodology

Decision-makers and researchers stress the importance of the tourism sector for economic development due to its role in generating direct economic impacts such as providing foreign exchange earnings needed to support the balance of payments and covering imports, especially capital (Nowak et al., 2007). Tourism also causes scope and scale economies (Weng & Wang 2004), generating government tax revenues, creating job opportunities, and contributing to economic growth.

The influence of tourism is not limited to its direct effects on an economy, as it also indirectly impacts other sectors. The extent of the indirect impact of tourism on the economy depends on the degree of interdependence between the tourism sector and other sectors. The input-output tables are the fundamental and predominant tools for examining and analyzing the interrelationships between economic sectors. The following equation can summarize these tables:

$$X_i = \sum X_{ij} + F_i \quad (1)$$

where  $X_i$  is the total output of sector  $i$ ,  $X_{ij}$  is the output of sector  $i$  used as an input in sector  $j$  (it represents the intermediate demand of the other sectors from sector  $j$ ), and  $F_i$  is the final demand in sector  $i$  products.

If we divide the amount of input from sector  $i$  to sector  $j$  ( $X_{ij}$ ) by the total output of sector  $j$  ( $X_j$ ), we obtain

$$a_{ij} = \frac{X_{ij}}{X_j} \quad (2)$$

This represents the direct requirements from sector  $i$  to produce one unit in sector  $j$ .

If we rearrange Equation (2) we get the following:

$$X_{ij} = a_{ij} X_j \quad (3)$$

By substituting (3) in (1), we arrive at the following equation:

$$X_i = \sum a_{ij} X_j + F_i \quad (4)$$

For several sectors, Equation (4) can be represented in the form of matrices:

$$X = AX + F \quad (5)$$

where  $X$  is the output vector,  $F$  is the final demand vector, and  $A$  is the technical coefficient or Leontief matrix.

Solving the above matrices produce

$$X = (I - A)^{-1} F \quad (6)$$

where  $I$  is an identity matrix and  $(I - A)^{-1}$  is a Leontief inverse matrix.

To assess the impact of a particular sector on the economy, several indicators can be derived from the two matrices  $A$  and  $(I - A)^{-1}$ . These indicators include an output multiplier, forward and backward linkages, impact on employment, impact on value-added, and impact on exports.

#### ***Output multiplier***

The output multiplier for sector  $j$  is calculated by the column sum of  $(I - A)^{-1}$  that corresponds to sector  $j$ . This multiplier shows the extent to which GDP changes due to one unit change in the final demand in that sector. This multiplier can be divided into two parts: intra-sector effects that occur within the sector and are represented by the elements on the main diagonal (i.e.  $(I - A)_{ij}^{-1}$  for  $i=j$ ) and inter-sector effects that occur between sectors and are represented by the sum of the elements in the column excluding the main diagonal elements (i.e.,  $(I - A)_{ij}^{-1}$  for  $i \neq j$  in the corresponding column).

#### ***Forward and backward linkages***

Forward linkages indicate the relative importance of the sector as a supplier to other sectors, while backward linkages indicate the relative importance of the sector as a demander. Linkage indices are utile in identifying leading (key) sectors in an economy. For each type of linkage, three linkage indices can be calculated: total, direct, and indirect. The column sum calculates the backward linkages in the  $(I - A)^{-1}$  matrix for the concerned sector. The column sum calculates direct backward linkages in matrix  $A$  for the sector concerned. Indirect backward linkages are calculated by subtracting total linkages from the direct sector. Repeating

the same process for the rows generates forward linkages indices: total, direct and indirect.

#### ***Impact on employment, value-added, and imports***

The impact of the change in final demand by one unit for a particular sector on imports, value-added, and employment for all sectors can be estimated through the following matrices:

$$M = E (I - A)^{-1} \quad (7)$$

where  $M$  is the import multiplier matrix,  $E$  is an  $n \times n$  matrix whose elements on the main diagonal are the import coefficient of each sector, and the other elements in the matrix are zero. The import coefficient can be calculated by dividing the imports for the sector by the total output for that sector, as shown in the following equation:

$$E_i = M_i / X_i \quad (8)$$

Equations (7) and (8) can be applied to similarly estimate the multipliers of value-added, employment, and tax revenue.

### **4. Application and Results**

The current study uses the I-O table for Jordan in 2016 because it is the most recently available one. The table contains 52 sectors, grouped into 17 main sectors. The analysis in this study focuses on the tourism sector represented by the accommodation sector and on sectors closely related to tourism, such as restaurants, transport, and entertainment.

The results from the direct requirements coefficient matrix ( $A$ ) indicate that each Jordanian Dinar (JD) produced in the tourism sector needs JD 0.064 from agriculture, JD 0.073 from food industries, JD 0.031 from beverages and tobacco, JD 0.058 from industry, and JD 0.042 from water and electricity, which in total constitute 75% of the intermediate demand for the tourism sector. The remaining 25% comes from other sectors, the most important of which is the services sector. This highlights the weak influence exerted by tourism owing to its weak relationship with the services sector, which accounts for two-thirds of the national product.

Matrix  $A$  column sum gives direct backward linkages,

while row summing gives direct forward linkages. The results in Table 1 indicate that the backward linkages of tourism amount to 0.35 and rank eighth, while the forward linkages amount to 0.027 and rank thirteenth. For

tourism-related sectors, the entertainment sector ranks third, restaurants fourth, and transportation tenth. Regarding forwarding linkages, tourism-related sectors' ranks are at the bottom.

**Table 1**  
**Backward and forward linkages for Jordan in 2016**

Sector	Backward linkages				Forward linkages			
	Direct	Indirect	Total	Rank	Direct	Indirect	Total	Rank
<b>Tourism</b>	0.36	1.19	1.55	7	0.03	1.01	1.04	13
<b>Restaurants</b>	0.41	1.25	1.66	3	0.013	1.004	1.017	15
<b>Transportation</b>	0.30	1.18	1.48	9	0.49	1.21	1.7	5
<b>Entertainment</b>	0.47	1.17	1.64	5	0.004	1.001	1.005	17

Estimates of output multipliers (total backward linkages) are listed in Table 2 below. The total output multiplier for tourism is 1.55, ranked seventh among 17 sectors. This implies that an increase of JD 1 in the final demand in tourism causes a JD 1.55 increase in gross product for all sectors. Approximately 65% of tourism's effect is felt within the accommodation sector (intra-sector), with 35% of its influence being exerted on other sectors (inter-sector). This reflects the weak linkages of tourism with another sector result, reflecting tourism's low influence on other sectors, which is supported by extant studies done in other countries. In Tanzania, for

example, Kweka et al. (2003) point out that tourism's total output multiplier equals 1.8. For the Romanian economy, Surugiu (2009) finds that the output multiplier of tourism equals 1.74, and in Turkey, Atan and Arslanturk (2012) estimate this multiplier at 1.9. Hanly's results (2012) reveal a 1.9 for Ireland, and the study done by Singh et al. (2006) shows 2.03 for Jamaica.

For tourism-related sectors, the results of the output multiplier indicate that three sectors record significant results, namely: restaurants (1.66) ranked third, entertainment (1.64) ranked fifth, and transportation (1.48) ranked ninth.

**Table 2**  
**Output multiplier for tourism and related sectors in Jordan 2016**

Sector	Output multiplier			
	Intra-sector	Inter-sectors	Total	Rank
<b>Tourism</b>	1.01	0.54	1.55	7
<b>Restaurants</b>	1.01	0.65	1.66	3
<b>Transportation</b>	1.04	0.44	1.48	9
<b>Entertainment</b>	1.02	0.62	1.64	5

Table 3 below presents the estimated multipliers for imports, tax, value-added, and employment. The multiplier for imports is 0.225, and it ranks eighth and is comparable to the average for all sectors (0.231). This

multiplier indicates that increasing the final demand in the tourism field by JD 1 will create JD 0.22 imports. The results of the transportation sector were very similar, reaching 0.237, while the restaurant sector recorded a

high value of 0.31, and the entertainment sector had a low value of 0.139.

The results show that 51% of the effects of the import multiplier in tourism are in the sector itself, and 49% are in the rest of the sectors, and the restaurant sector displays similar results. In contrast, in the transport sector, 67% of the impacts were felt within the sector itself, with the remaining 37% being felt in the entertainment sector.

Although estimates for the tax multiplier reveal low values, it ranks at the top of the sectors. In tourism, it ranks seventh (0.005), in transportation, it ranks first (0.011), in restaurants, it ranks third (0.009); and finally, in entertainment, it ranks tenth (0.003). The average for all sectors is 0.005. The high ranking of tourism and associated sectors is due to the ease of collecting taxes

from their sales.

The value-added multiplier illustrates that the increase in the final demand in tourism by JD 1 results in JD 0.74 value added in the economy and that two-thirds of these effects occur within the sector itself. At the same time, the remaining third happens in other sectors. This implies a weak impact of tourism on the value-added generation in other sectors. In addition, 60% of the value added is treated as compensation to workers, and one-third of these workers are foreigners.

The value-added multiplier for the transportation sector is similar at 0.75, while in the restaurant sector, it decreases slightly to 0.67, and in the entertainment sector, it rises to 0.83. The average for all sectors is 0.78.

**Table 3**  
**Value-added, imports, employment, and tax multipliers for Jordan in 2016**

Sector	Value-added multiplier				Imports multiplier			
	Intra-sector	Inter-sectors	Total	Rank	Intra-sector	Inter-sectors	Total	Rank
<b>Tourism</b>	0.49	0.25	0.74	11	0.114	0.110	0.224	8
<b>Restaurant</b>	0.38	0.29	0.67	14	0.180	0.130	0.31	5
<b>Transportation</b>	0.53	0.22	0.75	9	0.149	0.088	0.237	7
<b>Entertainment</b>	0.83	0.39	0.83	5	0.051	0.088	0.139	12

Sector	Employment multiplier				Tax multiplier			
	Intra-sector	Inter-sectors	Total	Rank	Intra-sector	Inter-sectors	Total	Rank
<b>Tourism</b>	0.060	0.009	0.069	3	0.004	0.001	0.005	7
<b>Restaurant</b>	0.149	0.010	0.159	1	0.007	0.002	0.009	3
<b>Transportation</b>	0.012	0.008	0.020	13	0.010	0.001	0.011	1
<b>Entertainment</b>	0.029	0.010	0.039	6	0.0017	0.0015	0.0032	10

Finally, the average employment multiplier for all sectors is 0.045. The tourism sector ranks third and is above the average at 0.069, indicating that the increase in the final demand in the tourism sector by JD results in 0.069 jobs. The restaurant sector ranks first with an employment multiplier of 0.159. It's worth mentioning here that a large part of the employment in these two

sectors is foreign labor, and in 2016, the foreign employment in the two sectors reached 32%. The inter-sector employment multiplier is very weak as it was 0.01 in the restaurant sector and constituted 6% of the total multiplier. In tourism, it was 0.009 and constituted 13% of the total multiplier. The entertainment sector ranks sixth with a multiplier of 0.038, and the transportation

sector ranks thirteenth with a multiplier of 0.02.

### 5. Conclusion

The importance of tourism for an economy's growth and development is an issue that has attracted the attention of researchers and decision-makers. The great economic benefits of tourism spur this interest. In Jordan, due to the scarcity of economic resources, tourism is considered a strategic option, and decision-makers expect tourism to play a crucial role in Jordan's economy.

In this study, input-output tables are used to assess the role of tourism in output, income, labor, taxes, and imports in Jordan. These tables are used for measuring and analyzing the effects within a sector (intra-sector) and those that spread to other sectors (inter-sectors).

The results show that, first, the tourism sector and its related sectors are not key sectors, as evidenced by the low ranks of total forward linkages and average ranks of total

backward linkages. A leading sector should have strong forward and backward linkages. Second, the impact on output is limited. Jordan's output multiplier values are lower than other countries, and most importantly, the largest part of the multiplier occurs within the tourism sector. The intra-sector multiplier for tourism accounts for 65% of the total output multiplier, whereas the inter-sector multiplier accounts for 35%. Tourism-related sectors do not give different results in this context. Third, the results of the other multipliers are similar to the output multiplier in terms of the low value and the weak spread of the impact to other sectors; 71% of the value-added multiplier for tourism is inter-sector. The overall result is that the desired potentials from the tourism sector and its related sectors will not be realized as they are not key sectors as indicated by the calculated indicators.

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## الإمكانات الاقتصادية للسياحة في الاردن: تحليل جداول المستخدم - المنتج

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### ملخص

لمواجهة التحديات التي تواجه الاقتصاد الاردني وفي مقدمتها ندرة الموارد الاقتصادية، ركز صناع القرار على اعتبار القطاع السياحي خيارا استراتيجيا يمكن أن يساهم في النمو الاقتصادي وتنويع الصادرات واستحداث فرص العمل. تهدف هذه الدراسة الى تقييم إمكانات مساهمة السياحة في الاقتصاد الاردني من خلال حجم تأثيرها على القطاعات الاخرى. وباستخدام أحدث جدول مستخدم- منتج لعام 2016، تم تقدير عدة مؤشرات اشتملت على الروابط الخلفية والامامية ومضاعفات الانتاج والقيمة المضافة والعمالة والمستوردات والضرائب. دلت النتائج على أن زيادة الانفاق السياحي بمقدار دينار واحد ينتج عنه زيادة الناتج في الاقتصاد بمقدار 1.55 دينار، القيمة المضافة بـ 0.74 دينار، العمالة 0.069 فرصة عمل، والمستوردات بـ 0.22 دينار. وبعد اجراء مقارنة بين هذه النتائج مع دول اخرى (تركيا، تانزانيا، ورومانيا)، كشفت النتائج عن دور محدود وضعيف للسياحة في الاقتصاد الاردني، حيث يتعزز هذا الضعف لأن الجزء الأكبر من أثر المضاعف يحدث داخل القطاع السياحي نفسه بينما تعتبر تأثيراته على القطاعات الاخرى محدودة جدا . ولتعزيز دور السياحة في الاقتصاد الاردني توصي الدراسة بالاهتمام بتطوير البنية التحتية المرتبطة بالسياحة خاصة قطاع النقل وتخفيف الأعباء الضريبية على قطاع المطاعم والفنادق وتشجيع الايدي العاملة المحلية للعمل في مجالات السياحة .

**الكلمات الدالة:** أثر السياحة، مضاعف الانتاج، جداول المستخدم-المنتج، مضاعف العمالة، الروابط الاقتصادية.

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