Economic Potentials of Tourism for Jordan: Input-Output Analysis

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ABSTRACT

Objective: This study aims to assess the potential contributions of tourism to the Jordanian economy by examining its effects on other sectors.

Methods: Based on the most recent 2016 input-output table, several indicators have been derived, including backward and forward linkages, as well as multipliers for output, value-added, taxes, imports, and employment.

Results: The study indicates that an increase of JD 1 in final demand by tourists leads to a rise in output by JD 1.55, value added by JD 0.74, employment by 0.069 jobs, and imports by JD 0.22. A comparison of these results with those from other countries-such as Turkey, Tanzania, Ireland, Jamaica, and Romania—reveals a relatively weak expected impact of tourism in Jordan. This outcome is largely due to the fact that most of the multiplier effects are confined to individual sectors, with limited spillover effects to other sectors.

Conclusions: The study recommends the development of tourism-related service infrastructure, such as transportation; reducing tax burdens on the restaurant and hotel sectors; and encouraging local workers to pursue employment in the tourism industry.

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

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1. Introduction

Tourism growth potential is a topic of interest among researchers, decision-makers and governments. Tourism generates several 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 the development of their tourism sector as one of the most important priorities and strategic objectives.

In addition to the aforementioned benefits, 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 distinctive 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, and the number of tourists nearly doubled from 2.7 million in 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 process of growth and development of Jordan's economy. In doing so, the current study fills a gap in the extant literature as there are

no previous studies that have examined the influence of tourism 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 the application of 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 inputoutput table (I-O). Input-output analysis is a significant analytical tool that can be used to identify the economic structure of an economy, explore inter-sectors relationships, analyse 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 utilised in several studies to assess the impact of the tourism sector on economies at the state and regional levels. It has been also used to analyse 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 the existence of 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 in producing inputs and stimulating these sectors.

Oosterhaven and Fan (2006) employed the 1997 I-O table and find 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 that there is a low backward linkage, signifying that tourism does not depend heavily on other sectors. The authors emphasise that this limited role of the tourism sector is due to the size and diversity of the Chinese economy.

Singh et al. (2006) utilised 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 the year 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 the field of 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 not only tourism sectors but also other sectors due to the strength of intersectoral 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 the results reached 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 tax revenues for governments, 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 fundamental and predominant tools for examining and analysing the interrelationships between economic sectors are the input-output tables. These tables can be summarized by the following equation:

$$X_{i} = \sum X_{ij} + F_{i} \tag{1}$$

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 (Xij) by the total output of sector j (Xi) we obtain

$$a_{ij} = \frac{X_{ij}}{X_j} \tag{2}$$

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

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

$$X_{ij} = a_{ij} X_j \tag{3}$$

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

$$X_i = \sum a_{ij} X_i + F_i \tag{4}$$

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

$$X = AX + F \tag{5}$$

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

Solving the above matrices produce

$$X = (I - A)^{-1} F$$
 (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 as a result of 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. Total backward linkages are calculated by the column sum in the (I-A)⁻¹ matrix for the sector concerned. Direct backward linkages are calculated by the column sum 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, valueadded 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:

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

where M is the import multiplier matrix, E is an nxn 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:

$$E_i = M_i / X_i \tag{8}$$

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

4. Application and results

In the current study, we use the I-O table for Jordan in 2016 because it is the most recent 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 the eighth, while the forward linkages amount to 0.027 and rank the thirteenth. For tourism-related sectors, the entertainment sector ranks the third, restaurants the fourth, and transportation the tenth. In terms of forward 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
Tourism	0.36	1.19	1.55	7	0.03	1.01	1.04	13
Restaurants	0.41	1.25	1.66	3	0.013	1.004	1.017	15
Transportation	0.30	1.18	1.48	9	0.49	1.21	1.7	5
Entertainment	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 (intrasector), with 35% of its influence being exerted on other sectors (inter-sector). This reflects the weak linkages of

tourism with other sectors. This result, reflecting tourism's low level of influence on other sectors, 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						
Sector	Intra-sector	Inter-sectors	Total	Rank			
Tourism	1.01	0.54	1.55	7			
Restaurants	1.01	0.65	1.66	3			
Transportation	1.04	0.44	1.48	9			
Entertainment	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 the eighth and is comparable to the average for all sectors (0.231). This multiplier indicates that increasing the final demand in tourism by JD 1 will create JD 0.22 imports. The results of the transportation sector were very similar, and they reached 0.237, while the restaurant sector recorded a high value of 0.31, and the entertainment sector has 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 restaurants 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 the seventh (0.005), in transportation, it ranks first (0.011), in restaurants it ranks the third (0.009), and finally, in entertainment, it ranks the 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, while 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 restaurants 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.

 ${\bf Table~3}$ Value added, imports, employment, tax multipliers for Jordan in 2016

Sector	Value added multiplier				Imports multiplier			
	Intra-sector	Inter-sectors	Total	Rank	Intra-sector	Inter-sectors	Total	Rank
Tourism	0.49	0.25	0.74	11	0.114	0.110	0.224	8
Restaurant	0.38	0.29	067	14	0.180	0.130	0.31	5
Transportation	0.53	0.22	0.75	9	0.149	0.088	0.237	7
Entertainment	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
Tourism	0.060	0.009	0.069	3	0.004	0.001	0.005	7
Restaurant	0.149	0.010	0.159	1	0.007	0.002	0.009	3
Transportation	0.012	0.008	0.020	13	0.010	0.001	0.011	1
Entertainment	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 the 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 labour, and in 2016, the foreign employment in the two sectors reached 32%. The intersector employment multiplier is very weak as it was 0.01 in the restaurants sector and constituted 6% of the total multiplier, and in tourism, it was 0.009 and constituted 13% of the total multiplier. The entertainment sector ranks the sixth with a multiplier of 0.038, and the transportation sector ranks the 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. This interest is spurred by the great economic benefits of tourism. 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, labour, taxes, and imports in Jordan. These tables are used for measuring and analysing the effects that occur within a sector (intrasector) 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 moderate ranks of total backward linkages. A leading sector should have strong forward and backward linkages. Second, the impact on output is limited. Jordon's output multiplier values are lower than other countries, and most importantly, the largest part of the multiplier occurs within the tourism sector itself. 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 سعيد محمود طراونة*

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 امكانات 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 7.74 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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