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Assessing the economic impact of a cultural heritage site using social accounting matrices: The case of the Mosque-Cathedral of Cordoba*

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Abstract
Heritage sites attract cultural tourists and represent a major source of revenue and employment for the destination's economy. This article assesses a cultural heritage site's economic impact on its environment via linear models based on regionalized social accounting matrices. The proposed methodology is applied to data gathered on the Mosque-Cathedral of Cordoba in the year 2013 to determine the heritage site's contribution to the host economy in terms of production and employment.

Keywords
cultural tourism, economic impact, heritage site, linear models, social accounting matrices

Introduction

Heritage attractions are one of the most important drivers of cultural tourism, providing new information and experiences that satisfy the demand for culture (Richards, 1996). Cultural tourism has become a major sector in most tourist destinations, accounting for an estimated

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430 million cultural trips in 2013 (UNWTO, 2014). Cultural tourism therefore represents a major source of revenue and employment for the destination economies, even during a financial crisis.

The Mosque-Cathedral (MCC) is the most outstanding of Cordoba's cultural heritage offerings, and it plays a key role in the promotion of this Spanish city's image through cultural tourism circuits. The MCC has been and is expected to remain the crux of both cultural tourism and tourism policy in Cordoba (Cordoba City Council, 2014 and 2015). Consequently, identifying and quantifying cultural tourism-related spending and its effects on production and employment levels are necessary for the economic development of the location.

Several methods for conducting an economic impact analysis have been described in the literature (Klijs et al., 2012): export-based models (Archer, 1982), Keynesian models (Sinclair and Sutcliffe, 1982), input-output–based models (Archer, 1982; Llop and Arauzo-Carod, 2011; Milne, 1991; Murillo et al., 2013), and a combination of these models (Murillo et al., 2008). These models differ in how they calculate impact as well as in their data requirements and underlying assumptions. They also have different conditions for reliability and provide different levels of detail in the results. Therefore, selecting the appropriate model is a crucial decision. In this article, the economic impact of the MCC during 2013 is assessed using social accounting matrix (SAM)-based models, which have been previously employed to evaluate the economic impact of tourist inflows or tourist events (Akkemik, 2012; Daniels et al., 2004; Polo and Valle, 2009; Wagner, 1997).

The remainder of this article is organized as follows. The next section briefly describes the data and the empirical approach. This is followed by the presentation of the results and, finally, our conclusions.

Social accounting matrices: Data and methodological approach

Figure 1 shows the structure of the SAM for Cordoba (SAMCOR) in 2013 (Cardenete and Delgado, 2013), which was used to assess the economic impact of the MCC.

On the basis of this SAM, a linear model was developed following the classic endogeneity criteria (Pyatt and Round, 1985). When $\mathrm{d}X$ represents the changes in the exogenous account vector, each element b_{ij} of the multiplier matrix B quantifies the change in total income of each endogenous account i when the vector of the exogenous income directed to account j increases by one unit:

$$\mathrm{d}Y = B\mathrm{d}X. \tag{1}$$

The labour multiplier L_j for each productive sector estimates the necessary change in the number of jobs due to the exogenous injection of income:

$$L_j = \sum_{i=1}^{n} e_{n+1,i} b_{ij}. \tag{2}$$

In this equation, $e_{n+1,i} = E^{ei}/X_i$; E^{ei} and X_i represent employment and the total output of sector i, respectively.

The characteristics of the empirical application allow SAM linear models to be used despite their underlying assumptions (Round, 2003). Cordoba's high unemployment rate indicates the existence of unused resources. In addition, the relatively small size of the demand shock estimates indicate no or small effects on prices and consumption patterns.

Activities		Commodities		Institutions	
1	Agriculture, cattle and fishing	12	Agriculture, cattle and fishing	23	Labour
2	Extractive industries	13	Extractive industries	24	Capital
3	Food and beverage industries	14	Food and beverage industries	25	Households
4	Other manufacturing industries	15	Other manufacturing industries	26	Savings / Investment
5	Electric power, gas and water production and distribution	16	Electric power, gas and water production and distribution	27	Indirect taxes
6	Construction	17	Construction	28	Direct taxes
7	Commerce	18	Commerce	29	Government
8	Tourism	19	Tourism	30	Foreign sector
9	Transport, warehousing and communications	20	Transport, warehousing and communications		
10	Other services	21	Other services		
11	Non-commercial services	22	Non-commercial services		

Figure 1. Social accounting matrix for cordoba. *Source:* Own elaboration.

Empirical application

The first step in the process of assessing the economic impact of the MCC is to determine the demand shock during 2013. The first component of the demand shock is the demand generated by the MCC, which is a factor of the MCC's budget (Cathedral Chapter, 2014). The various budgetary spending headings reflect payments relating to the supply of touristic services and to conservation and valuation expenditures. These monetary flows in turn represent income for household accounts in the form of wages and salaries. They also become income for the productive sectors highlighted in Table 1 whose goods and services are demanded.

The second component of the demand shock is determined by both the number of visitors and their average spending per day. No direct data are available for such categories, and it is therefore necessary to employ and reconcile various sources of data at regional and local levels. In 2013, culture was the main motivation for approximately 30% of the tourism in Andalusia (Council of Tourism and Commerce (CTC), 2014): 69.5% of visitors were national tourists and 30.5% were international tourists. Applying these percentages to the 1.3 million tourists who visited the city of Cordoba in 2013 (Institute of Statistics and Cartography of Andalusia (ISCA), 2014), approximately 0.42 million of these tourists were cultural tourists, of which 0.29 million were national tourists and 0.13 were international tourists (Table 2).

It can be assumed that the MCC drew these 0.42 million visitors because (a) the distribution of the visits between the various heritage and artistic attractions shows that the MCC attracted 50.3% of the visits (Table 3) and (b) the difference between the number of visits to the city of Cordoba (1.34 million) and to the MCC (1.42 million) seems to indicate that each tourist who travels to Cordoba also spends time in visiting the MCC (Cordoba Tourism Observatory (CTO), 2014).

Data detailing the average spending of tourists are available only at the regional level (Table 4).On the basis of this declared data, however, it is possible to calculate average spending per day and categorize it. It was assumed that the cultural tourists who visit the MCC exhibit spending patterns similar to those found at the regional level, that is, higher than the average tourist but 9.45% less than at the regional level, resulting in an average spending rate of €62.93 per visitor

Table 1. The Mosque-Cathedral's 2013 budget: expenditures (thousands of euros).

Wages and salaries	3918
Goods and services	4046
Supplies	65
Construction	1030
Commerce	116
Other services	453
Non-commercial services	2381
Total	7964

Source: Cathedral Chapter (2014).

Table 2. Cultural tourists in Cordoba, 2013 (visitors).

Tourists	1,342,648
Cultural tourists	420,701
National	292,387
International	128,314

Source: Own elaboration based on data provided by the Council of Tourism and Commerce (2014) and the Institute of Statistics and Cartography of Andalusia (2014).

Table 3. Ranking of cultural landmarks in Cordoba, 2013 (visitors).

Mosque-Cathedral	1,434,345
Alcazar of the Christian Kings	428,124
Synagogue	344,250
Archaeological Ensemble of Medina Azahara	162,969
Palace of Viana	89,174
Calahorra Tower	72,123
Fine Arts Museum	66,758
Chapel of San Bartolome	59,359
Archaeological Museum	57,859
Julio Romero de Torres Museum	55,124
Botanical Gardens	40,997
Caliphal Baths	39,764
Total	2,850,846

Source: Own elaboration based on data provided by the Cordoba Tourism Observatory (2014).

Table 4. Average daily spending of tourists, 2013 (euros).

	Andalusia	Cordoba
Average tourist	59.36	53.75
Cultural tourist	69.50	62.93
National	68.00	61.57
International	71.00	64.29

Source: Own elaboration based on data provided by the Council of Tourism and Commerce (2014) and the Institute of Statistics and Cartography of Andalusia (2014).

Table 5. Distribution of the average spending of cultural tourists in Cordoba, 2013 (percentage and euros).

	National tourists		International tourists	
	Percentage	Euros	Percentage	Euros
Transport	9.92%	6.11	20.76%	13.35
Accommodation	33.61%	20.70	24.68%	15.87
Food/drink purchases	4.26%	2.62	4.07%	2.62
Purchases of other goods	4.19%	2.58	6.53%	4.20
Tours, leisure and others	8.38%	2.58	4.51%	1.45
Car renting	0.47%	0.29	3.45%	2.22
Restaurants	39.17%	24.12	36.00%	23.14
Total	100.00%	58.99	100.00%	62.84

Source: Own elaboration based on data provided by the Council of Tourism and Commerce (2014).

per day. It was calculated that €61.57 was spent per day by national tourists and €64.29 was spent per day by international tourists.

The average spending rate of the cultural tourists in Cordoba is similar to that of regional visitors (Table 5). It should be noted that the average spending per cultural visitor per day is lower than that calculated above because the expenditure item "Tours, leisure and other" was reduced by 50% to prevent MCC tickets from being accounted for twice. This reduction was based on the aforementioned fact that visits to the MCC comprise approximately 50% of the visits to the city's cultural heritage sites.

It is also necessary to determine the average number of days visitors stay. These data are not available, and working assumptions must therefore be employed. The average stay of tourists visiting Andalusia was 8.65 days; the average stay of visitors to Cordoba was shorter at 3.85 days per visitor (ISCA, 2014). This difference is explained by the variety of tourist destinations in the region, where the average stay in coastal destinations is much higher than in inland destinations. However, the average stay of cultural tourists is lower, approximately 4.6 days per visitor (3.8 and 7.6 days for national and international visitors respectively) (CTC, 2014). Because both inland and cultural stays are shorter and because Cordoba is an inland and primarily cultural tourist destination, 3.85 days was established as the average stay for cultural visitors to Cordoba for both national and international tourists.

On the basis of these calculations of the number of cultural visitors, their average spending per day and their average stay, the demand shock generated in Cordoba by cultural tourism to the MCC can be obtained (Table 6). The results show that €97.3 million were generated during 2013, of which €66.3 million were generated by national visitors and €31 million were generated by international visitors.

Finally, the total demand shock was obtained by summing the demand generated by the MCC and the demand generated by the tourists attracted by the MCC. Table 7 shows the estimates for the total demand shock during 2013.

Results

The demand shock, which is estimated above, can be understood as a vector of income received by the corresponding (endogenous) accounts of the SAMCOR. Table 8 presents the effect of this injection of revenue on the provincial economy in terms of total production, gross domestic

Table 6. Total spending of cultural tourists in Cordoba, 2013 (thousands of euros).

	National tourists	International tourists
Transport	6867.75	6585.59
Accommodation	23,270.03	7829.11
Food/drink purchases	2949.25	1291.10
Purchases of other goods	2900.79	2071.48
Tours, leisure and other	2900.10	715.34
Car rental	325.39	1094.43
Restaurants	27,117.91	11,420.09
Total	66,331.23	31,007.14

Source: Own elaboration.

Table 7. Estimates of the total demand shock on Cordoba's economy, 2013 (thousands of euros).

Wage and salaries	3918
Goods and services	101,384
Supplies	65
Construction	1030
Commerce	9329
Tourism	73,253
Transport	13,453
Other services	1873
Noncommercial services	2381
Total	105,302

Source: Own elaboration.

Table 8. Economic impact on Cordoba's economy, 2013 (thousands of euros).

	Variation	Percentage
Total production	272,111	0.89%
Gross domestic product	104,188	0.96%
Change in job availability	508	

Source: Own elaboration.

product (GDP) and changes in job availability after the shock. The latter category accounts for the number of jobs generated after the impact. The shock increased production by 0.89% and increased the GDP by 0.96%, which reached €272.11 and €104.18 million, respectively. The changes in job availability were also positive, and 508 jobs were generated due to the demand shock. In other words, the production of goods and services increased by €2.72 for each €1 spent by the MCC or by cultural tourists visiting the monument, and it was necessary to create 4.8 jobs for each €1 million spent.

Table 9 disaggregates the needed increases of production in the various productive sectors. The results of the disaggregation show that production did not increase to the same degree in

Table 9. Economic impact by sector, 2013 (thousands of euros)

#Account	Sector	Variation	Percentage
1	Agriculture, cattle and fishing	9889	0.57%
2	Extractive industries	545	0.50%
3	Food and beverage industries	22,563	0.98%
4	Other manufacturing industries	26,890	0.46%
5	Electric power, gas and water production and distribution	5505	0.92%
6	Construction	14,245	0.25%
7	Commerce	25,837	0.99%
8	Tourism	82,232	4.51%
9	Transport, warehousing and communications	24,120	1.98%
10	Other services	36,930	0.88%
11	Noncommercial services	23,356	0.52%

Source: Own elaboration.

every sector. *Tourism* and *Transport*, which experienced the greatest demand shock, exhibited increases significantly above the average at the provincial level: 4.51% and 1.98%, respectively. Notably, the performance of the *Food and beverage* sector increased slightly above the provincial average (0.98%). This increase is higher even than that of other sectors that were directly impacted, including *Electric power, gas and water production and distribution* and *Other services*, in which outcomes increased 0.92% and 0.88%, respectively. These results clearly reflect the relationship among the sectors in Cordoba's productive structure and their varying responses to the final demand.

The remaining sectors, both those with and without a direct impact on their performance, exhibit modest variations. This was the case for *Agriculture, cattle and fishing*; *Non-commercial services*; *Extractive industries*; and *Other manufacturing industries*. The increases in these sectors ranged between 0.57% and 0.46%, which is far below the provincial average. Finally, the *Construction* sector showed the lowest variation in production despite receiving a direct impact. The increase was only 0.25%, although its received impact was relatively higher than in sectors such as *Electric power* and *gas and water production and distribution*. This again emphasizes the importance of the relationships captured by the SAMCOR.

Conclusions

The MCC is the most visited cultural heritage in Cordoba by a substantial margin, resulting in positive impacts on the city's economic structure and employment level, as demonstrated by the results of the SAM linear model. However, the socioeconomic benefits derived from the MCC's renown as a cultural heritage destination must remain compatible with the conservation of its physical value, which can be damaged by the continuous visits of an increasing number of tourists. Cordoba's current tourist policy relies primarily on its cultural heritage for tourist inflows, and the MCC is its core cultural offering. Most of the city's initiatives centre on the MCC and channel tourist inflows from the MCC to other heritage sites to extend tourist stays. However, the city lacks proposals for collaborating on the protection of this cultural heritage, which is owned by the Catholic Church. Such proposals are needed to ensure its long-term sustainability and its ability to contribute to the local economy.

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