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Quality versus quantity: An assessment of the impact of Michelin-starred restaurants on tourism in Spain

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Abstract
The number of internationally recognized Michelin-starred restaurants in a place is a new trend used to measure a tourist destination's culinary standard. The purpose of this study is to close the gap created by the lack of econometric studies on the tourist attraction of Michelin-starred restaurants, especially in Spain. Panel data methodology is applied to 50 Spanish NUTS-3 regions over a broad time period (2000–2016) to assess the impact of Michelin-starred restaurants on tourism demand from both domestic and foreign tourists. The findings show that restaurant quality is more important than quantity in the gastronomy–tourism relationship and that Michelin-starred restaurants are a strong attraction for foreign tourists. Some policies are suggested, such as the development of Culinary Schools and marketing campaigns to promote haute cuisine tourism.

Keywords
gastronomy tourism, Michelin-starred restaurants, NUTS-3 regions, panel data, Spain, tourism demand

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Introduction

One of the most important determinants of tourism demand (Song et al., 2010) is food (Okumus et al., 2018). According to García-Sánchez et al. (2013), the local gastronomy is a major determinant of tourist choice and tourists are willing to pay a high price for quality food (Serra et al., 2015). Measuring gastronomic quality is not easy, so signaling instruments that rank restaurant quality can be used. One of these is the Michelin Guide (Daries et al., 2018).

The Michelin Guide uses homogeneous criteria to rate restaurants and awards up to a maximum of three "Michelin stars" to acknowledge the best chefs around the world. According to the Michelin Guide definition, a one-star restaurant is worth stopping for, a two-star restaurant is worth making a detour for, but for three stars, the restaurant alone is worth making the entire trip.

These days, Michelin-starred restaurants are a symbol of gourmet experiences and are internationally recognized (Kiatkawsin and Hall, 2019). According to Albuquerque et al. (2019), as they attract media attention and large numbers of customers, they are responsible for developing not only a place's gastronomy but also its tourism appeal and economy. So, it is interesting to assess their impact on tourism demand.

While the relationship between gastronomy and tourism has been widely studied (see e.g. Jiménez-Beltrán et al., 2016; Kivela and Crotts, 2006), only a very limited number of studies have included the total number of restaurants or, specifically, Michelin-starred restaurants as a tourism determinant when analyzing the link econometrically (Chen and Haynes, 2012; Provenzano, 2015). However, the few studies that exist differ from this study as they have interpreted the Michelin-starred restaurants variable as a proxy for recreational activities in general and not as an indication of gastronomic quality (Marrocu and Paci, 2013) or have even excluded it from their analyses as they do not consider it to be significant (Pompili et al., 2019). As a result, although Michelin-starred restaurants are internationally recognized, there is a lack of studies addressing their contribution to the tourist appeal of destinations. In addition, there are no previous studies that analyze the impact of Michelin-starred restaurants according to the number of stars that they have been awarded. Lastly, none of these studies analyze the Spanish case, even though Spain is one of the top receivers of tourists in the world and the quality of its gastronomy has been widely recognized, even by UNESCO (2013).

The aim of this article is to cover the existing gap by assessing the impact of Michelin-starred restaurants on tourism demand in the 50 Spanish NUTS-3 regions (provinces) over the 2000–2016 period, differentiating between foreign and domestic tourists and disaggregating three-star restaurants from the group of Michelin-starred restaurants as they are the maximum exponents of culinary quality and excellence. An econometric analysis is carried out using a fixed effects model and panel data methodology, as this has been recognized as a useful tool in tourism (Ramos and Rodrigues, 2013).

Data and methodology

A panel has been constructed with data for the Spanish provinces and the 2000–2016 period using a model that follows expression (1), where i is provinces and t is years:

$$Y_{it} = \alpha + \beta_k X_{it} + \gamma_k W_{it} + \delta_k Z_{it} + \varphi_k Year + \epsilon_{it} \quad (1)$$

Both the dependent and independent variables are based on the previous academic literature, where they have been used in similar generic tourist demand models (Gani and Clemes, 2017; Kuo et al., 2009; Seetaram, 2012). In this specific case, two independent variables Y_{it} (log of numbers of

tourists) differentiate between resident and nonresident tourists, as was done in Garín-Muñoz (2009), since Gil-Alana et al. (2019) suggest that domestic and foreign tourists follow different patterns.

X_{it} is a composite of variables related to Spanish gastronomy, which is the main object of this study. First, we include the number of Michelin-starred restaurants by province (Marrocu and Paci, 2013) to analyze their impact on tourism demand. Second, we disaggregate this variable into the number of restaurants with one–two Michelin stars and the number of restaurants with three Michelin stars. We focus on these two groups—especially the group of restaurants with three stars—as tourist attractions per se, in the same way that, for example, museums are rated. These groups are also proxies for the city's gastronomic quality in general (Kiatkawsin and Hall, 2019) since Michelin-starred restaurants are not usually "gastronomic islands." In fact, the cities with most Michelin-starred restaurants also have the highest number of restaurants and bars without any stars whose quality is recognized in the Michelin guide itself (see https://www.viamichelin.com/). Finally, as has been done in other studies (Benito et al., 2014; Provenzano, 2015), the quantity of the food and beverage (F&B) offer is measured by the restaurant variable, which is the total number of restaurants by province.

W_{it} is a series of attributes considered to be determinants of tourism demand in the previous literature. These include the price level, which is one of the main determinants (Jiao and Chen, 2019); the tourist infrastructure and hotel supply measured by the number of hotels (Roget and González, 2006); the cultural level measured by the number of museums as symbols of the most emblematic movable cultural heritage, as in Herrero-Prieto and Gómez-Vega (2017) and Benito et al. (2014), and the air (Castillo-Manzano et al., 2017; Eugenio-Martin, 2016) and high-speed rail (HSR) (Albalate and Fageda, 2016; Gutiérrez et al., 2019) connectivity and accessibility levels.

Z_{it} is the province climatic and geographic variables: maximum temperature and number of days with precipitation (Taylor and Ortiz, 2009) and a dummy that indicates whether the province is coastal or not.

Year is the time trend.

Table 1 summarizes the variables, their definitions, sources, and descriptive statistics.

Panel-corrected standard errors have been estimated with standard errors robust to heteroscedasticity and assuming an AR (1) correlation in the error term, as has generally been done in other analyses of Spanish provinces (Castillo-Manzano et al., 2020). The variables do not present any significant correlation problems, as demonstrated by the low variance inflation factor (VIF) values: maximum 5.56 and mean 2.56 depending on the model, which is much lower than the standard recommendation (10) in econometrics textbooks (Hair et al., 2013). Neither of the two dependent variables presents any stationarity problems. A linear time trend and province fixed effects are also included, as suggested by the Hausman test, with the latter allowing to control for the characteristics that influence the tourist appeal of each of the provinces. Four models have been estimated (see Table 2).

Results and discussion

Table 2 gives the results of the four estimated models. Quality measured by the number of Michelin-starred restaurants (StarredR) is generally observed to attract more tourists than quantity measured by the total number of restaurants (Resta), which supports Albuquerque et al. (2019). In models 1 and 2 (foreign tourists), the restaurant variable is not significant. We believe that this lack of statistical significance is explained by the fact that an excessive number of restaurants and bars is conducive to market conditions based on low prices and unassuming establishments (regarding

Table 1. Variables and descriptive statistics.

Variable (abbreviation)	Description	Mean	Standard deviation	Min.	Max.	Source
Endogenous variable						
Foreign tourists (Ftou)	Number of nonresident foreigners in Spain spending one or more overnight stays at the same hotel establishment by province (log)	12.210	1.541	9.259	15.976	INE
Domestic tourists (Dtou)	Number of Spanish residents spending one or more overnight stays at the same hotel establishment by province (log)	13.356	0.743	11.704	15.647	
Exogenous variables						
Michelin-starred restaurants (StarredR)	Number of restaurants with one or more Michelin stars by province	2.464	4.142	0.000	30.000	Michelin Guide
Michelin 1 or 2 star restaurants (1–2 Stars)	Number of restaurants with one or two Michelin stars by province	2.351	3.889	0.000	29.000	
Michelin 3 star restaurants (3 Stars)	Number of restaurants with three Michelin stars by province	0.112	0.443	0.000	3.000	
Restaurants (Resta)	Number of active food and beverage establishments by province (in thousands)	5.735	6.068	0.554	32.992	
CPI	Inter-annual variation of the CPI by province (log)	0.024	0.015	−0.016	0.054	INE
Hotels (Hote)	Number of hotel establishments by province (log)	5.462	0.610	4.248	7.097	
Museums (Mus)	Number of museums and museum collections recorded in the census by province (log)	3.164	0.625	1.609	4.875	MECD
Number of airlines (Air)	Number of scheduled airlines by province (log)	2.682	2.138	0	5.935	AENA
Number of HSR connections with other provinces	Number of HSR connections with other provinces by province (log)	0.318	0.644	0	2.995	ADIF
Maximum temperature (Temp)	Mean maximum temperature by province (°C)	20.845	2.631	13.2	29.3	AEMET
Number of days with rain (Rain)	Number of days per year with precipitation equal to or greater than 1 mm (3/64 inch) by province (log)	4.521	0.403	2.197	5.365	
Coast	1 if province is coastal, 0 otherwise.	0.440	0.496	0.000	1.000	

CPI: consumer price index; INE: national institute of statistics; MECD: ministry of education, culture and sports; AENA: spanish airports operator HSR: high-speed rail; ADIF: administrator of railway infrastructures; AEMET: state meteorological agency.

Table 2. Models and estimations.

	Endogenous variable: Ftou		Endogenous variable: Dtou	
Exogenous variables	(1)	(2)	(3)	(4)
StarredR	0.013 (0.003)***	—	0.006 (0.003)*	—
1-2 Stars	—	0.011 (0.004)***	—	0.003 (0.003)
3 Stars	—	0.041 (0.013)***	—	0.039 (0.013)***
Resta	−0.012 (0.010)	−0.011 (0.010)	0.054 (0.009)***	0.056 (0.009)***
CPI	−1.607 (0.275)***	−1.610 (0.276)***	−0.771 (0.189)***	−0.768 (0.190)***
Hote	0.394 (0.056)***	0.397 (0.056)***	0.358 (0.043)***	0.359 (0.043)***
Mus	−0.025 (0.023)	−0.024 (0.023)	0.006 (0.016)	0.007 (0.016)
Air	0.016 (0.009)*	0.017 (0.009)*	−0.003 (0.007)	−0.003 (0.007)
HSR	−0.030 (0.019)	−0.031 (0.019)	−0.021 (0.015)	−0.023 (0.014)
Temp	0.003 (0.004)	0.003 (0.005)	0.005 (0.003)*	0.005 (0.003)*
Rain	0.015 (0.018)	0.015 (0.018)	−0.013 (0.013)	−0.012 (0.013)*
Coast	2.269 (0.135)***	2.251 (0.134)***	0.716 (0.115)***	0.703 (0.114)***
Time	0.028 (0.001)***	0.028 (0.001)***	0.015 (2.589)***	0.014 (0.001)***
Intercept	−46.752 (3.379)***	−46.655 (3.353)***	−18.893 (2.589)***	−18.843 (2.568)***
Province fixed effects	YES	YES	YES	YES
AR(1)	YES	YES	YES	YES
Hausman test	12.29***	13.47***	23.27***	53.49***
Wald test (joint significance)	54546.07***	56695.24***	14378.88***	15359.38***
Modified Wald test—heteroscedasticity	3141.82***	3026.19***	2232.16***	2203.86***
Wooldridge test-autocorrelation	169.272***	168.003***	284.499***	276.775***
Doornik–Hansen test for multivariate normality	2892.845***	10,729.534***	2968.655***	10,802.474 ***
LLC test for nonstationarity	−0.201***	−0.201***	−0.269***	−0.269***
VIF (mean|max)	2.46|5.15	2.62|5.56	2.46|5.15	2.62|5.56
Number of observations	850			
Number of provinces	50			

CPI: consumer price index; HSR: high-speed rail; LLC: levin, lin and chu test; VIF: variance inflation factor .

***Statistical significance at 1%.

**Statistical significance at 5%.

*Statistical significance at 10%.

both the food and the premises). These establishments are specifically designed for residents—who know and better understand the local cuisine and restaurant model—and are clearly not attractive for international tourists. In Spain, this model coincides with the traditional neighborhood tapas bar. In fact, according to Seville City Hall (2006), this gastronomic model "is precisely the main cause of the lack of development of quality and luxury F&B such as Michelin-starred restaurants," which our results show to be much more attractive for international tourists.

Another important result is that the appeal of Michelin-starred restaurants is greater for foreign tourists than for domestic tourists, which is explained by their international reputation. Also, the impact of three Michelin star restaurants (3 Stars) is greater than that of one or two-star restaurants (1–2 Stars), as they may evoke the Michelin definition alluded to in the introduction: "exceptional cuisine that is worth a special journey."

The remaining control variables perform as expected and in line with the previous literature. The price level (Consumer Price Index) negatively affects tourism demand (Rey et al., 2011); in line with Roget and González (2006), the number of hotels in the province (Hote) has a positive effect on arrivals as it reflects the importance of tourism infrastructure; the number of museums (Mus) is not significant, as found in Campa et al. (2016) for Spain; flight connections and airport infrastructure have a positive impact for foreign tourists only (Eugenio-Martin, 2016; Rey et al., 2011), while HSR is not significant (Albalate and Fageda, 2016; Castillo-Manzano et al., 2018). Finally, regarding the climatic variables, the temperature (Temp) and the number of days with precipitation (Rain) are significant for domestic tourists, although only at 10%, and the high significance of the coastal dummy reflects the importance of sun and sand tourism and high seasonality in Spain (Duro, 2018).

A priori, these results would justify regional and local development policies that promote gastronomic excellence, such as support for the creation and development of Culinary Schools (Santich, 2004) and staff training (Romero et al., 2019). A posteriori, once gastronomic excellence has been achieved, the results would justify the development of excellence-based marketing campaigns to promote a destination's image and brand (Martin et al., 2016). Indeed, the chefs themselves could act as travel agents to boost tourism (Albuquerque et al., 2019).

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