

# Intermediaries and quality uncertainty: evidence from the hotel industry<sup>1</sup>

Aleix Calveras\*

Universitat de les Illes Balears

Francina Orfila<sup>+</sup>

Universitat de les Illes Balears

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Abstract.

In this paper we test the intermediaries' role in the resolution of quality uncertainty between buyers and final sellers. Specifically, we focus our analysis on the distribution of the accommodation capacity in the Balearic Islands. The empirical results support our theoretical hypotheses by showing that reliance on an intermediary (a tour operator, a travel agency) in the distribution of the accommodation capacity of a hotel establishment is: (i) higher for high quality hotels (that face more acute problems from asymmetric information), (ii) lower for establishments belonging to large and reputable hotel chains (that themselves are capable of building their own reputation and brand name); and (iii) lower for hotels with a high amount of repeat visitors (who already enjoy reliable information about the hotel characteristics).

Keywords: asymmetric information, reputation, tourism.

JEL codes: L14, L15, L83.

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\* Corresponding author: Department of Business Economics, Universitat de les Illes Balears. Cra Valldemossa Km 7 07122 Palma de Mallorca, Spain. E-mail: aleix.calveras@uib.es.

<sup>+</sup> Department of Business Economics, Universitat de les Illes Balears. Cra Valldemossa Km 7 07122 Palma de Mallorca, Spain. E-mail: francina.orfila@uib.es.

## 1. Introduction

Asymmetric information between buyers and final sellers is pervasive in many industries and sectors of the economy. As it is well known, a consequence of such asymmetric information might be some form of market failure (see, e.g., Akerloff, 1974). In this paper we study and test one of the organisational solutions to the problem of asymmetric information: the intermediation by a third party as a provider of credible information to potential buyers. More specifically, we test the role of intermediaries in the tourism industry (tour operators, travel agencies) as certifiers of the true quality of a hotel establishment.

An intermediary is an economic agent that purchases from suppliers for resale to buyers or that helps buyers and sellers meet and transact. Its role in markets has been reviewed by Spulber (1996, 1999) with a thorough analysis of the different functions that an intermediary may play. One such theory of intermediation arises because for many products the seller is better informed than the buyer about the characteristics of the product, whose quality can only be known by consumers after or during consumption. To the extent that an intermediary may provide a solution to the problems caused by this asymmetry of information between a seller and a buyer, its existence might be justified.<sup>2</sup>

The role of intermediaries in the resolution of asymmetric information between a seller and a buyer has been studied by Biglaiser (1993), Chu and Chu (1994), Biglaiser and Friedman (1999) and Lizzeri (1999). The basic idea behind these papers is that an intermediary reduces the transaction costs due to asymmetric information by means of guaranteeing to the buyer the quality of the product. An intermediary may have higher incentives to invest to become an expert (and be able to screen adequately the quality of the product) because it buys a larger quantity than individual buyers (Biglaiser, 1993). Also, an intermediary may have an incentive to maintain a sound reputation with the buyer because it is also doing other business with him, either in the future (Biglaiser and Friedman, 1999) or, as in Chu and Chu (1994), because it is a retailer and it is also selling other products. In any case, the intermediary is interested in maintaining a

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<sup>2</sup> Possible mechanisms or strategies to solve the problem of asymmetric information between sellers and buyers are (i) advertising (Nelson, 1974); (ii) establishment of quality standards by either industry groups or by the government; (iii) using price as a signal for quality (Wolinsky, 1983); and the one we study in this paper, (iv) using intermediaries as a channel to provide credible information. Here, we focus on this last mechanism, intermediation.

sound reputation with the final buyer, and it can credibly guarantee the quality of the product.

In this paper we test whether intermediaries in the tourism industry (basically, tour operators and travel agencies) do play such a role in the resolution of the quality uncertainty between sellers (hotel establishments) and buyers (potential tourists). Our theoretical framework yields our main theoretical hypothesis; namely, that the reliance on intermediation should be higher for high quality hotels than for low quality hotel establishments. Intermediaries do play a role in solving the problem of asymmetric information between high quality establishments and potential tourists, while have a smaller role when establishments are of low quality (the lemons problem arises for high quality products, not for low quality ones).

Additionally, along the same lines, we also hypothesize that establishments belonging to a large hotel chain will have a lesser need of an intermediary (large hotel chains themselves are capable of building their own reputation and brand name); and that hotel establishments with a high customer loyalty (i.e., a large proportion of repeat customers) will also require less of the services of an intermediary. These repeat visitors already enjoy good information about the hotel's characteristics, and thus the asymmetric information between the buyer and the seller is lower; or, alternatively, the incentives of the establishment to cheat are smaller because its customers are repeaters with a high proportion.

In order to verify these hypotheses, we use data on a representative sample of hotel establishments that operate in the Balearic Islands, one of the leading tourist destinations in the Mediterranean. Our data contains information on the distribution channels of over 300 hotel establishments, which conforms a representative sample of the hotel population in the Balearic Islands. The information was obtained by means of a survey passed in year 2004, which asked managers of hotel establishments regarding the channel through which the capacity of the hotel was distributed (either through a tour operator or travel agent, or directly), and on other hotel characteristics.

The results obtained in the empirical analysis provide strong support to the role of intermediaries as providers of reputation, as certifiers of the quality of the establishment. First, we show that hotel establishments of a higher quality rely, to a larger extent, in intermediated distribution. Second, hotel establishments that belong to a large enough hotel chain capable of building, on its own, a brand name and a reputation, do rely less on intermediated distribution. And finally, we observe that hotel

establishments with a higher customer loyalty do also rely less on intermediated distribution. Thus, we observe that the empirical results conform to the predictions of the intermediaries' role to minimize transaction costs derived from the existence of asymmetric information between buyers (tourists) and final sellers (hotel establishments).

To our knowledge, there are few empirical papers studying intermediation (other than in the financial sector). One of such papers, and related to ours, is Clerides et al. (2006), which discusses the role of intermediaries in the transmission of information to potential tourists by explicitly analyzing the ratings supplied by tour operators on the hotel establishments they distribute, as opposed to the existing official ratings. Our approach is orthogonal to theirs: we study whether in those instances in which the transmission of credible information is more necessary the presence of intermediaries is larger. This would be evidence on the role of intermediaries as providers of reputation concerning the quality of the product. Other examples in the empirical literature on intermediaries and information are Koo and Lo (2004) on the tea sorting function of middlemen in Taiwan during the Japanese colonial era; and Jin and Kato (2004) on the online market for baseball cards in which sellers can send their cards to professional experts to have them graded.

The paper is organized as follows. In section 2 we review the main characteristics of the tourism industry, including the organization of its vertical chain, and present (within the context of this industry) our theoretical hypotheses. In section 3 we present the data that we use in section 4 to undertake the empirical analysis that test our hypotheses. In section 5 we then present a brief discussion of the impact of internet on intermediation in the tourism industry, to then conclude in section 6.

## **2. The tourism industry**

Tourism is a very important economic sector, both at a country level and from an international perspective. The number of international tourists traveling in the world reached 806 million in 2005. France, Spain and United States were the world's top three destinations, with a volume of US\$ 171,9 billion in international tourism receipts, while Germany, the United States, and the UK spent US\$ 201,5 billion on international tourism in 2005 (World Tourism Organization, 2006).

The tourist product consists of transportation (by airplane, train, bus, etc.) to the destination, accommodation at a hotel or apartment, entertainment services, meals, the natural environment of the destination, etc. All of these goods and services define the

tourism product, which has two main characteristics. First, it is a composite (a bundle) of a variety of goods and services, rather than being just a single good. And second, the tourist product is an 'experience good' rather than a 'search good' (Nelson, 1974). A search good is that whose quality can be ascertained before consumption, whereas the quality of an experience good can only be known by consumers after or during consumption. The tourist product is clearly of an experience nature: a tourist is uncertain, until vacation takes place, about the true quality of the hotel where he/she stays, both with respect to the characteristics of the infrastructure and the surroundings of the hotel, as well as the quality of the services (cleanliness, meals, etc.). Additionally, the tourist is also uncertain about the quality of the other composites of the tourist product (the punctuality and commodity of the flight, the safety of neighborhood where the hotel is located, etc.).

These two characteristics of the tourist product have determined the traditional role of intermediaries, tour operators and travel agencies, in the tourism vertical chain. This, we explain next.

### **2.1. Intermediation in the tourism industry**

A tour operator (TO) has traditionally negotiated with hotels, transportation companies, and other suppliers, and combined these vacation components into a package tour, sold to the final consumer as a single product and at a single price (Sheldon, 1986). Thus, a tour operator is an alternative organization to direct market exchange between final suppliers (hotels, airplane companies, etc) and final consumers (tourists).

When analyzing the tourism vertical chain, we observe that the costs of organizing transactions through arm's length (direct exchange between tourists and final suppliers) consist of: (i) coordination costs, (ii) search costs, and (iii) costs of quality uncertainty. *Coordination* of the several goods and services of the tourist product are what Milgrom and Roberts (1992) call 'design attributes', in which small failures in coordination are very costly. Thus, one of the main roles of intermediaries is to enhance and facilitate tight coordination, thus reducing the costs of broken coordination that would likely arise in a direct market exchange between the tourist and final sellers. Also, TOs and travel agencies facilitate to tourists the *search* for information regarding the characteristics (prices, etc.) of the several services that compose the package tour (flight, accommodation, and other relevant characteristics of the tourist destination that can be summarized in the subjective assessment of the TO). Search is expensive in terms of time and effort, and TOs and travel agencies reduce its cost by avoiding duplication of search effort by tourists and also by filtering the appropriate information

(see, for instance, Gehrig, 1993, and Yavas, 1999, for a theoretical analysis of the role of intermediaries in a search market).

To our view, though, a main role of intermediaries in the tourism industry arises due to the informational asymmetries between final sellers and potential tourists. This role is specially important since, as stressed by The Economist Intelligence Unit, "the demand for a higher quality product is universal across Europe. (It) is expressed [...] in expectations of the standard of the accommodation and service at the destination" (Bywater, 1992). In this regard, and as studied by the literature, an intermediary might play one of two different roles. An intermediary might be an expert, whereby it has acquired the appropriate knowledge and skills to evaluate the quality of the good or service in question (Biglaiser, 1993). Alternatively, the role of the intermediary arises because of its ability to build a brand name and reputation signaling the package of high quality tours.

The key issue to building a reputation for providing high quality products is that the firm be a long run player or that the product is purchased repeatedly, or that it is purchased altogether with other products with which reputation is shared (as in Chu and Chu, 1994). While in a one shot interaction the firm (e.g a hotel establishment) has large incentives to misreport quality to the potential buyer, in a framework with repeated interaction the firm may have an interest in maintaining a sound reputation so as to ensure future business (Kreps and Wilson, 1982). Thus, when interaction between the seller and the buyer is not frequent or, when it is difficult for an outsider to the transaction to ascertain the quality of the good that has been exchanged, building a reputation is difficult or impossible, as it is quite the case for the tourism industry in a direct exchange between final sellers such as hotels and tourists (where often interaction occurs only once since tourists switch destination or place of accommodation).

Then, in such a framework, intermediation may provide a solution to this lack of incentives through a double way. Since the intermediary is going to supply a package tour consisting of many different products, in different places and to many consumers who are potential repeaters, it has the right incentives to ensure that the quality of the package is as promised; otherwise, the unsatisfied tourist will not repeat purchase to the same intermediary (a TO or a travel agency). And, since the intermediary is a repeat buyer of the final seller's product, this final seller has also an incentive to maintain an appropriate quality. Otherwise, in the case quality is not good enough, the

TO or the travel agency will stop distributing that firm's product so as to keep its reputation with the consumers.

## **2.2. Theoretical hypotheses**

In this paper, we focus on the role of intermediaries as distributors of the main component of the package tour, namely, the accommodation at the tourist destination (Borooah, 1999). Thus, we study the role of intermediaries between hotel establishments and tourists. Basically, for a hotel establishment there are two alternative distributional organizations: an intermediated distribution (by a TO and/or a travel agency), or a direct distribution where internet is playing a prominent and growing role (The Economist, 2005).

According to the theoretical framework presented above, the role of an intermediary (a tour operator) in providing credible information arises for hotel establishments that supply high quality services. It is these high quality hotels, therefore, that need to rely to a larger extent on intermediary distribution, as opposed to when a hotel offers (specializes) in low quality services, in which case less intermediation is needed. This analysis leads to the main hypothesis of our paper, namely, hypothesis H1.

Large sellers (e.g. a large hotel chain such as Hilton) might themselves have powerful incentives to build a reputation and a brand name for quality: since a tourist has the option to accommodate in an establishment of the chain in many different locations, the likelihood that a satisfied buyer will repeat is high (or that someone known to the tourist might accommodate in the same chain). As a consequence, a large chain does have an incentive to maintain a reputation for high quality. Thus, a (high) quality establishment under the umbrella of a large chain reputation will have a smaller need to rely on intermediation to distribute its product.<sup>3</sup> This is hypothesis H2.

Analogously, when tourist repetition is high, even a small firm (hotel establishment) may show high levels of quality if it expects that a high proportion of present tourists are likely to come back in a near future. Therefore, final sellers with a large amount of

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<sup>3</sup> In spite of the increasing importance of large hotel chains, many hotel establishments throughout the world are stand-alones or belong to a small chain, just like many other final sellers in the tourism industry such as car rental companies, restaurants, etc.

customer repetition will neither need to rely on intermediaries, which results in our third hypothesis, H3.<sup>4</sup>

Summarizing, the hypotheses that we test in the rest of the paper are:

H1. Hotels that offer a higher quality will show a higher reliance on distribution by an intermediary.

H2. Hotels belonging to a large chain (with a good reputation) rely to a lesser extent on intermediated distribution.

H3. Hotels with a low customer loyalty (smaller proportion of repeat visitors) will show a higher reliance on intermediated distribution.

#### *Alternative theories of intermediation in the tourism industry*

As we explained above, in addition to their role as guarantors of quality, intermediaries in the tourism industry do also play a role in the *coordination* of the several components of the package tour, and in the *search* of information on the characteristics of the tourism product (location, prices, etc.).

Consider first the role of intermediaries in the search of information. In this case, it is reasonable to expect that intermediaries will be less present in the distribution of capacity of large and well known chains since search by tourists themselves is then much easier (thus predicting a presence of intermediaries analogous to that of H2). Also, intermediaries will be less needed for those tourists that are repeat visitors and, thus, already enjoy the information (also analogous to H3). And finally, notice that potential tourists with a higher income (or wage) will most likely rely to a larger extent on intermediaries (since their opportunity cost of searching themselves is higher). To the extent that these high income tourists might also prefer higher quality establishments, the correlation between the presence of distribution by intermediaries and the quality of the establishments will exist as in hypothesis H1.

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<sup>4</sup> Along similar lines, Mazzeo (2004) studies the decision by a motel establishment to either affiliate to a chain (as a franchisee) or remain independent. Mazzeo obtains that in the motel segment of the lodging industry (which mainly aims to serve automobile travelers) chain affiliation is more common for motels located adjacent to interstate highway exits (rather than closer to the nearest 'business area'), and the likelihood that establishments observed at exits belong to chains is greater where the amount of traffic that passes by the exit is larger. This is coherent with our hypothesis H2 and H3: the repeat business incentive of an independent motel owner to supply adequate quality would be weakest farther away from the business area (and closer to the interstate highway traffic) and, as a consequence, the incentive to affiliate to a chain would be larger (and even more when there is more traffic).

Notice then, that even in the case in which our empirical analysis does not reject our hypotheses, it will not be possible to ascertain with certainty which one is the theory of intermediation that lies behind our data. In spite of this, we believe that our focus (hypothesis) on asymmetric information is reasonable, specially in light of the changes that internet and other ICTs (information and communication technologies) have made (and still are making) in the tourism industry. It should be clear that with internet (and other ICTs) searching information (on the location, etc.) has become much easier than before and, thus, the role of intermediaries in the search has (most likely) decreased to a large degree. Since, as we argue below in section 5, internet has not affected the existence of asymmetric information, it is our contention that the rationale behind our hypotheses H1 through H3 should be the presence of asymmetric information, rather than a search rationale.

Concerning the role of intermediaries in the *coordination* of the components of the package tour, this role is probably still present in today's intermediaries (in spite that internet has made own coordination by the tourist much easier). It is not clear, however, why such a role of intermediaries in the coordination should be affected by the quality of the establishment, or by the establishment being a part of a large and well known chain. Thus, not rejecting hypotheses H1, H2 and H3 should be evidence of the intermediary's role in the resolution of asymmetric information, rather than its role as a coordinator of the package tour.

### **3. Data**

Our empirical analysis on the role of intermediaries in the hospitality industry will focus in the Balearic Islands (which include the islands of Majorca, Menorca, Ibiza and Formentera) in Spain. Spain is the second world tourism destination measured by international tourist arrivals: in year 2005 Spain received 55,8 million for the entire country. The Balearic Islands, with just one million inhabitants over the 44 millions of the whole Spain, received 9,6 million international tourist arrivals in 2005, which accounts to almost one fifth of all of Spain, making of these islands one of the leading tourist destinations of Spain and of the whole Mediterranean. Overall, the annual volume of international arrivals in the Balearic Islands represents around 1,19 % of the 806 million of the international tourist arrivals of the whole world (World Tourism Organization, 2006).

The information about the channels through which hotel establishments distribute their accommodation capacity, and about the characteristics of the hotels, was obtained

from a questionnaire survey which was applied to a representative sample of the hotel establishments that operate in the Balearic Islands. The questionnaire was developed with the aim to obtain relevant data about the strategy and competitiveness of the hotel industry of the Balearic Islands, given that the publicly available data provides insufficient information. The questionnaire was applied and answered by the directors of the selected hotel establishments of the accommodation sector via personal interviews carried out by pollsters who were trained to carry out the work.

The first version of the questionnaire was distributed during the summer of 2001, and the analysis of the data obtained allowed us to significantly improve the questionnaire that was applied to the same sample during the summer of 2004. One of such improvements was to include as a question the percentages of beds distributed through each channel: an intermediary such as a tour operator, a travel agency or a central reservation system; or directly by telephone, fax or internet, etc.<sup>5</sup> As a consequence, the empirical analysis of this paper relies on the 2004 survey, which also includes hotel establishment characteristics such as: the number of *stars* (the official rating) of the establishment, the capacity it offers (number of beds) and the chain to which it belongs (if any). Other characteristics include the type of customer it usually serves, which is depicted, among other things, in terms of their loyalty (whether it is a repeat visitor or not). The questions in the survey for this study are in appendix A1.

The selection process allows us to have a representative sample of the accommodation sector in the Balearic Islands. The relevant population includes 1,586 hotel establishments listed in the official census of tourism companies from the Tourism Council available for the year 2000 since those categorized as "Other" were excluded.<sup>6</sup> The sample was selected after stratifying this population according to three characteristics that make it heterogeneous: the geographical location, the hotel category, and the capacity (in number of beds). Our final sample, which includes 331 respondents selected randomly and proportionally from among the strata, is representative of the population of hotel establishments in the Balearic Islands with a

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<sup>5</sup> A central reservation system is a computer platform that buys rooms from hotel establishments, and resells them to travel agencies. It is thus an intermediary, specifically between hotel establishments and travel agencies. Its importance in our survey is, in any case, small, with the bulk of answers being travel agencies and tour operators.

<sup>6</sup> Those in the "Other" category are excluded because they represent a mere 0.5% of the total beds in the universe and because they present a greater heterogeneity in operation and in the set of services on offer, and are therefore not directly comparable to the rest of the categories of the universe

95.5% confidence level.<sup>7</sup> Of the 331 establishments, however, 55 did not respond to the percentage of intermediated distribution, 4 to the percentage of repeat visitors, and 41 establishments had some quality proxy missing. As a consequence, we end up with 251 observations.

#### **4. Analysis and results**

We begin our analysis by discussing the way we address our main hypothesis (H1) regarding the higher reliance on intermediation by high quality hotel establishments. We have available two types of variables as proxies of the quality of each hotel establishment: the official rating of hotel establishments, and a construct we build upon data of our survey.

For each establishment, its official rating (the number of stars) is the classification of hotel establishments by the Spanish government according to some criteria. The Spanish official rating ranges from 1 to 5 stars, each one demanding different specifications on the services and facilities offered by the establishment (such features may include the number of restaurants and swimming pools, availability of sports facilities, number of wait and cleaning staff, whether rooms have private bath as opposed to shower, satellite TV, etc.). The following table shows the distribution of establishments according to this official rating within our sample.

In our analysis we define the variable CATEG (for category) as one with three categories: it takes value 1 if the establishment has 1 or 2 stars; it takes value 2 if the establishment has 3 stars; and it takes value 3 if the establishment has 4 or 5 stars. We do this because of the small differences in requirements between 1 and 2 stars hotels, and the small number of 5 stars hotels.

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<sup>7</sup> The sample selection process is further refined with a controlled process of substitution for the non respondent hotels, replacing each inaccessible with another in the same layer so as to maintain the stratification unaltered, which leads us to the desired 331 observations (i.e., the average response level is of 100%).

**TABLE 1.**  
**OFFICIAL RATING OF**  
**THE HOTELS IN THE DATASET**

Stars	Number	Percentage
1	70	27.89
2	63	25.10
3	93	37.05
4	24	9.56
5	1	0.40
Total	251	100

As an alternative to the official rating, there is data on our survey that can be used to construct a proxy for the quality of the hotel establishment. As we can see in appendix A1 in a more detailed manner, we have the following possible proxies for the quality of a hotel establishment:

- workforce qualification: for each establishment there is the percentage of workers with a secondary or college education as opposed to less qualification; we have classified each establishment in its quartile, hence the variable takes value 1 through 4;
- training program: whether the establishment has in place a training program for its workforce; the variable thus takes value 0 or 1;
- continuous training program: whether the establishment has a continuous, as opposed to sporadic, training program; the variable takes value 0 or 1;
- managerial qualification: whether the manager has secondary or university education, as opposed to less qualified; the variable takes value 0 or 1;
- quality management innovation: whether there has been some innovation in environmental aspects or management quality practices these last 2 years; the variable takes value 0 through 3;
- operations management innovation: whether there has been some innovation these past 2 years in ICT for internal management uses, or in the establishment's facilities, such as the rooms, kitchen, etc.; the variable takes value 0 through 6.

These all are potential proxies of the quality of the services supplied by the hotel establishment (in table 2 we can see the descriptive statistics of these quality proxies). Since ex ante there is not a good reason why one proxy should be better than the

other, and since they are all positively correlated, our approach has been to apply principal components (or factors) to extract the main common and unobservable factors driving hotel quality (Jackson, 1991).

The aim of principal components analysis is to find the most important latent common factors that explain the observed variability within a set of related variables. Thus, the first principal component is the linear projection of the observed variables with the maximum variance or, equivalently, that maximizes the explanatory power of the observed variability up to certain normalization restrictions. Computationally, the coefficients of this linear projection coincide with the eigenvector associated with the largest eigenvalue of the variance-covariance matrix of the standardized variables. Indeed, the eigenvalue ( $\lambda_1$ ) is the total variation attributable to the principal component. If the matrix of observed variables has full rank, we can obtain as many principal components as variables. In our case, and following the conventional rule of thumb, we consider only those two factors with an eigenvalue  $> 1$  (see appendix A2). Factor 1 has an explanatory power of almost a 40 %, while factor 2 has around a 20 %. Altogether, factor 1 and factor 2 have an explanatory power of almost a 60%. We denote them, respectively, as QUALF1 and QUALF2.<sup>8</sup> In table 2 we can see the descriptive statistics of the principal components and of all variables in them.

**TABLE 2. DESCRIPTIVE STATISTICS OF THE QUALITY PROXIES AND THE PRINCIPAL COMPONENTS**

Quality Variables	Mean	Std.Dev.	Min.	Max.
1. Training	0.72	0.45	0	1
2. Continuous training	0.40	0.49	0	1
3. Employees education	2.41	1.05	1	4
4. Managers education	0.79	0.40	0	1
5. Quality management	0.67	0.95	0	3
6. Operations management	3.04	2.10	0	6
7. QUALF1	-0.06	1.01	-2.03	1.99
8. QUALF2	-0.12	1.00	-2.44	1.71

<sup>8</sup> As we can see in the third table in appendix A2, factor 1 (QUALF1) is mostly determined by the variables training, continuous training operations management and quality management, whereas factor 2 (QUALF2) is basically given by employee and managerial education.

Two issues arise with these two types of variables measuring the quality of hotel establishments (the official rating and the principal components QUALF1 and QUALF2). The first one is whether the official rating is a good enough proxy of the underlying quality of the establishment and, then, whether additional measures of quality are necessary or rather redundant. Clerides et al. (2006) discusses the informational content of the official ratings and shows that these ratings are noisy indicators of quality because of the use of non uniform standards across countries and limited information available to policymakers. Additionally, tour operators incorporate their superior information into their ratings which are, as a result, more accurate indicators of quality than nationally provided ratings. As a consequence, since official ratings seem to be noisy indicators of the quality of the establishment, it is probably interesting to incorporate all available additional information.

A second issue is related to the fact that, in our theoretical framework, intermediaries play a role as guarantors of *non-observable* quality to potential tourists. In this regard, our quality proxies are substantially different: while the official rating (the number of stars) is observed by all agents alike (whether a potential tourist, a tour operator or the establishment itself), the variables underlying QUALF1 and QUALF2 are not directly observable by the tourists, and may be observed by tour operators only after some inspection. As a consequence, since the purpose of intermediation is to provide credible information on the non observed quality of the hotel, QUALF1 and QUALF2 appear to be better constructs of the hypotheses that we are trying to test. Nevertheless, to the extent that the official rating might also proxy unobservable characteristics of the quality of the hotel establishment (other than the ones we have access to), we will also include it in our analysis. It is then interesting to see the correlations among all the proxies of the hidden quality of the hotel establishment (used to construct QUALF1 and QUALF2), and the official rating CATEG.

We see that most of the correlations for the items in the survey are positive and statistically significant. Furthermore, the correlation of CATEG and all these other proxies is also positive and strongly statistically significant, also with respect to QUALF1. However, it is also not so large, providing evidence that they are not measuring exactly the same things, making it worthwhile to include both the official rating (CATEG) and the principal components or factors (QUALF1 and QUALF2).

**TABLE 3.**  
**PAIRWISE CORRELATIONS BETWEEN THE VARIABLES THAT APPROXIMATE**  
**HOTEL QUALITY**

Quality Variables	1	2	3	4	5	6	7	8
1. Training								
2. Continuous training	0.49***							
3. Employees education	0.07	0.02						
4. Managers education	0.21***	0.07	0.31***					
5. Quality management	0.32***	0.43***	0.15**	0.15**				
6. Operations management	0.35***	0.45***	0.12*	0.10	0.43***			
7. CATEG	0.38***	0.43***	0.14**	0.22***	0.49***	0.42***		
8. QUALF1	0.72***	0.75***	0.29***	0.38***	0.71***	0.72***	0.59***	
9. QUALF2	-0.15**	-0.38***	0.72***	0.71***	-0.11*	-0.22***	-0.04	-0.04

\*\*\*correlation significantly different from zero at the 1% level

\*\*correlation significantly different from zero at the 5% level

\*correlation significantly different from zero at the 10% level

#### 4.1. Empirical model

Our empirical model is as follows:

$$INT_i = \beta_0 + \beta_1 QUALF1_i + \beta_2 QUALF2_i + \beta_3 CATEG_i + \beta_4 LCHAIN_i + \beta_5 LOY_i + \beta_6 SIZE_i + \beta_7 MONTHS_i + \beta_8 CUST_i + \epsilon_j$$

where the dependent variable is INT (intermediation), which measures the percentage of accommodation distributed by an intermediary (either a tour operator or a travel agency), as opposed to that distributed directly (through internet, telephone, etc.). We undertake both an OLS and a Tobit estimation.

The independent variables (other than the principal components QUALF1 and QUALF2 of the proxies for quality presented above) are LCHAIN, which attempts to measure whether the chain to which the establishment belongs is large enough to have a good reputation on its own; LOY measures customer loyalty with a continuous variable which equals the percentage of total guests of the establishment that are repeat visitors; SIZE is the size of the hotel (natural logarithm of beds of the establishment); MONTHS is the variable that takes the number of months per year an establishment remains open; CUST is the type of customer the establishment hosts;  $\epsilon_j$  is the error term of the model.

More specifically, being able to build a reputation on its own is approximated with the binary variable LCHAIN which takes value 1 if the hotel establishment belongs to a 'large enough' chain with some establishment outside the Balearic Islands, and 0 otherwise (the list is in appendix A3). This variable tries to capture the fact that both the *size* and a *wide presence* of the chain provide it with incentives to build and maintain a reputation on its own (and, as a consequence, following H2, an intermediary will be less needed). Specifically, the *size* of the chain is approximated by the number of establishments of the chain, while the *wide presence* of the chain is approximated by its presence outside the destination, being the abroad presence more important (as a provider of incentives to build and maintain a reputation) than the national presence.

Admittedly, our measure of the ability and the incentives of a chain to build a reputation on its own (and thus having a smaller need of an intermediary) is to some degree arbitrary. Several points in our favor, however, should be noticed. First, glimpsing through the list in appendix A3, shows that only well known hotel chains have been classified with a 1. And second, we have also done some sensitivity analysis to check how dependent the results of the analysis are to our classification. As we show below, our results are shown to be robust to this sensitivity analysis.

*Control variables.* In our analysis we control for some variables that we believe might have some impact on the way hotel establishments distribute their capacity.

SIZE. We take as size the natural logarithm of the number of beds of the establishment. The number of beds is used rather than the number of employees because it is the usual practice in studies of the hotel sector (Chung and Kalnins, 2001). The natural logarithm is taken for the number of beds in order to avoid the fluctuations of the non-transformed variable, which has values ranging from 14 to 1,743.

MONTHS. The variable months equals to the number of months per year that each hotel stays open (it ranges from 1 to 12).

CUST. The binary variable customer takes the value 1 if the travel motive of the average host is traveling for business & congresses, cycling, other sports, excursions or culture events. The value 0 corresponds to the average host traveling for sun & beach, spa, health & beauty, sex or others.

Table 4 and Table 5 show the descriptive statistics and correlations for all variables considered in the analysis.

**TABLE 4.**  
**SUMMARY STATISTICS ON VARIABLES USED IN THE EMPIRICAL MODEL**

Variable	Mean	s.d.	Min.	Max.
1.INT	0.65	0.39	0	1
2.QUALF1	-0.06	1.01	-2.03	1.99
3.QUALF2	-0.12	1.00	-2.44	1.70
4.CATEG	1.57	0.67	1	3
5.LCHAIN	0.10	0.29	0	1
6.LOY	0.26	0.22	0	0.90
7.SIZE	4.72	1.05	2.64	7.46
8.MONTHS	7.79	2.47	1	12
9.CUST	0.39	0.49	0	1

**TABLE 5.**  
**CORRELATIONS FOR ALL VARIABLES IN THE EMPIRICAL MODEL**

Variables	1	2	3	4	5	6	7	8
1.INT								
2.QUALF1	0.39***							
3.QUALF2	-0.05	-0.04						
4.CATEG	0.45***	0.59***	-0.04					
5.LCHAIN	0.12**	0.17***	0.04	0.39***				
6.LOY	-0.19***	0.00	-0.09	-0.07	-0.16***			
7.SIZE	0.56***	0.57***	-0.02	0.7***	0.36***	-0.14**		
8.MONTHS	-0.26***	0.07	-0.11*	0.12**	0.03	0.08	0.00	
9.CUST	-0.22***	-0.01	-0.01	0.04	-0.15**	0.22***	-0.1	0.36***

\*\*\*correlation significantly different from zero at the 1% level

\*\*correlation significantly different from zero at the 5% level

\*correlation significantly different from zero at the 10% level

## 4.2. Results

In this subsection we explain the results of our estimations. The next tables show the results for our estimations; in addition to an OLS robust regression, the empirical verification of the model is also done with a Tobit estimation since the dependent variable (the relative importance of the intermediated distribution) is the percentage (on a 0 to 1 scale) of the total capacity that the hotel establishment distributes through an intermediary - i.e., a continuous variable ranging from 0 to 1. We will show that the results of the OLS and of the Tobit regressions do not differ in a significant manner.

**TABLE 6**  
**OLS ESTIMATIONS<sup>a</sup>**

Dependent variable: INT (% of intermediated distribution)

Variable	1	2	3	4	5a	5b
QUALF1	0.070*** [0.025]	0.069*** [0.024]		0.047* [0.026]	0.044* [0.027]	0.028 [0.030]
QUALF2	-0.028 [0.020]					
CATEG			0.147*** [0.045]	0.118** [0.047]	0.117** [0.051]	0.139** [0.057]
LCHAIN	-0.126* [0.075]	-0.131* [0.075]	-0.194** [0.077]	-0.177** [0.077]	-0.178** [0.082]	-0.190* [0.105]
LOY	-0.173* [0.095]	-0.162* [0.094]	-0.156* [0.094]	-0.165* [0.094]	-0.187* [0.098]	-0.182* [0.106]
SIZE	0.168*** [0.025]	0.170*** [0.025]	0.148*** [0.028]	0.134*** [0.029]	0.133*** [0.031]	0.141*** [0.033]
MONTHS	-0.039*** [0.009]	-0.038*** [0.008]	-0.039*** [0.009]	-0.041*** [0.009]	-0.042*** [0.009]	-0.040*** [0.010]
CUST	-0.074* [0.046]	-0.078* [0.046]	-0.098** [0.046]	-0.093** [0.046]	-0.091* [0.049]	-0.102* [0.053]
Constant	0.261* [0.145]	0.237* [0.145]	0.125 [0.127]	0.256* [0.145]	0.265* [0.152]	0.181 [0.161]
Observations	251	251	251	251	235	214
R <sup>2</sup>	0.398	0.395	0.396	0.406	0.395	0.396

<sup>a</sup> Standard errors are reported below the parameter estimates in brackets

In regressions (5a) and (5b) we exclude the borderline cases of our chain classification between small or large chains (0 or 1) so as to undertake a sensitivity analysis of this chain classification. See appendix A3.

\*\*\* estimated parameter significantly different from zero at the 1% level

\*\*estimated parameter significantly different from zero at the 5% level

\* estimated parameter significantly different from zero at the 10% level

Overall, the estimated model turns out to be useful in the empirical verification of the theoretical hypotheses: the overall effect of the explanatory variables on the dependent variable is statistically significant in all the estimated models. Furthermore, the estimated parameters are significant (at various degrees) as predicted by the theoretical hypotheses. Thus, the empirical analysis supports to a large degree our hypotheses.

**TABLE 7**  
**TOBIT ESTIMATIONS<sup>a</sup>**

Dependent variable: INT (% of intermediated distribution)

Variable	1	2	3	4	5a	5b
QUALF1	0.091** [0.038]	0.092** [0.039]		0.061 [0.040]	0.058 [0.042]	0.041 [0.047]
QUALF2	-0.034 [0.032]					
CATEG			0.202*** [0.067]	0.168** [0.070]	0.165** [0.077]	0.176** [0.088]
LCHAIN	-0.219* [0.112]	-0.225** [0.112]	-0.315*** [0.114]	-0.293** [0.114]	-0.309** [0.122]	-0.340** [0.157]
LOY	-0.286* [0.150]	-0.275* [0.150]	-0.256* [0.147]	-0.274* [0.147]	-0.310** [0.156]	-0.307* [0.173]
SIZE	0.237*** [0.039]	0.238*** [0.039]	0.205*** [0.042]	0.186*** [0.044]	0.192*** [0.047]	0.209*** [0.052]
MONTHS	-0.053*** [0.014]	-0.051*** [0.014]	-0.054*** [0.014]	-0.055*** [0.014]	-0.059*** [0.015]	-0.058*** [0.017]
CUST	-0.143** [0.071]	-0.147** [0.071]	-0.171*** [0.071]	-0.165** [0.071]	-0.154** [0.076]	-0.178** [0.084]
Constant	0.103 [0.224]	0.089 [0.224]	-0.051 [0.193]	0.114 [0.221]	0.11 [0.235]	0.011 [0.253]
Observations	251	251	251	251	235	214
Pseudo R <sup>2</sup>	0.221	0.218	0.225	0.230	0.223	0.215

<sup>a</sup> Standard errors are reported below the parameter estimates in brackets

In regressions (5a) and (5b) we exclude the borderline cases of our chain classification between small or large chains (0 or 1) so as to undertake a sensitivity analysis of this chain classification.

See appendix A3.

\*\*\*estimated parameter significantly different from zero at the 1% level

\*\* estimated parameter significantly different from zero at the 5% level

\* estimated parameter significantly different from zero at the 10% level

### *Hypothesis H1*

Overall, we see in Table 6 and 7 that the empirical analysis provides support to our main theoretical hypothesis H1; namely, that hotel establishments with a higher quality need to rely to a larger extent on distribution through an intermediary. More specifically, in regressions (1) and (2) of either table, we see that the first of the principal factors of the available proxies to the hidden quality (QUALF1) is statistically significant and positive (as predicted by the theory). Factor 2 (QUALF2), however, is also positive but not significant. This, altogether with the fact that this second factor was less explanatory of the joint variations of the proxies for the hidden quality, is why we drop QUALF2 in the remaining regressions.

In regressions (1) and (2) we do not include CATEG, the official (and observable by the customer) rating of the establishment. We do this in regression (3), while leaving out QUALF1, and obtain that CATEG is also positive and statistically significant, as the theory predicts. Then, in regressions (4) we include both QUALF1 and CATEG. The consequence of including both constructs is that CATEG remains positive and statistically significant, while QUALF1 loses explanatory power, even though it is still positive. While in the OLS estimation QUALF1 is still statistically significant at a 10%, in the Tobit estimation it is not significant (however, with a p-value of 0.131).<sup>9</sup> This is hardly surprising since, as we have shown in Table 5, QUALF1 (the non observable quality factors) and CATEG are strongly correlated. Finally notice that, to the extent that CATEG might also be considered (as discussed above) a proxy for the (non observable) quality of the hotel establishment, the results of regressions (4) would also still support our main hypothesis H1.

### *Hypothesis H2 and H3*

Concerning hypotheses H2 and H3, we see that the sign of the estimated coefficients is as hypothesized, always statistically significant (at various degrees) for both estimations and all regressions considered. Thus, following hypothesis H2, being part of a chain large enough (thus capable of building a reputation on its own) reduces in a large degree and in a significant manner the percentage of accommodation distributed through an intermediary.

As we suggested above, the classification of a chain as a 1 or as a 0 in the variable LCHAIN is an issue that deserves further exploration. This we do in regressions (5a) and (5b) in which case we leave out some establishments in the border of the 0 and 1 classification (see appendix A3). We observe that the results do not change in a significant manner; namely, the effect that being part of a large enough (reputable) chain reduces the need of an intermediary is shown to be robust to the classification of the hotel chains.<sup>10</sup>

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<sup>9</sup> In spite of the collinearity between QUALF1 and size, and between CATEG and size, the significance of the corresponding coefficients is unaffected. However, the quantitative effect of these variables on the intermediated distribution should be interpreted with caution because of the higher variance of the estimation of the coefficient.

<sup>10</sup> In other regressions not included in the tables we have considered as an independent variable the result of the multiplicative between quality (either QUALF1 or CATEG) and LCHAIN. Our hypothesis was that the parameter of this construct should be negative: the effect of a higher quality of establishments of large chains on the percentage of intermediated distribution should be smaller than that of independent hotels or of small

The effect of the percentage of repeat visitors is also as hypothesized: a high percentage of repeat visitors reduces the percentage of intermediated distribution. However, such effect is quite small, even though always significant in all regressions at the 10 % level. For instance, in regression (4) in the table 6 (the OLS estimation), increasing 10 points the percentage of repeat visitors among its visitors reduces in about 1.6% the percentage of intermediated distribution.

Finally, the *control variables* are statistically significant. Thus, the size of the establishment, the number of months the hotel is open, and the type of customer do play a role in the joint effect of the explanatory variables in the intermediated distribution. We do not, however, try to explain the signs obtained since these are control variables, outside the scope of our theoretical hypotheses.

## 5. Tourism, internet and intermediation

Tourism is one of the industries where eCommerce has experienced a higher growth. Planning, booking and buying of travel vacations through the web have become increasingly popular, in Europe and specially in the US (see The Economist, 2005). This suggests a change in the organization of the vertical chain of the tourism industry. Does the tourist vertical chain move towards des-intermediation, whereby consumers will access directly final suppliers through internet? Or, rather, with internet, intermediaries still have a role to play in the tourism industry? Clearly, the advent of internet (and other ICTs) has had, and will likely continue to have, a major impact in the way hotels distribute their capacity and, thus, on the tour operator and travel agencies industry (see, e.g., Buhalis and Licata, 2002; O'Connor and Frew, 2002). To the extent that internet facilitates direct *coordination* by the tourist himself of the several composites of the package tour; and to the extent that internet reduces substantially the *search* costs of the potential tourists, the need for an intermediary probably diminishes.

Our analysis above, however, clearly indicates that, with internet, intermediaries still have a role to play in the tourism vertical chain, specifically in the resolution of the quality uncertainty that there exists between buyers and final sellers. In spite of its tremendous possibilities in the exchange of information, quality uncertainty (that is,

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chains. The rationale would be that since belonging to a large chain is an alternative, intermediation would then be less needed. The results of our regressions have, however, turned out to provide non significant estimations at a 10 % level.

asymmetric information) does not disappear with internet (Huston and Spencer, 2002). As a consequence, the need for an intermediary capable of providing a solution to the asymmetry of information problem remains. This is not to say that the intermediary industry will not be affected by this technology change. As a matter of fact, it is likely that ICTs will have profound effects on such industry. The Economist (2005), for instance, shows the increasing importance of what Buhalis and Licata (2002) call eMediaries; that is, on-line intermediaries of the tourism industry.

## **6. Concluding remarks**

The empirical analysis of this paper supports the role of intermediaries as providers of reputation in the presence of asymmetric information between the seller and the buyer. This role of an intermediary in the provision of credibility and reputation concerning the true quality of the good in exchange might arise because: (i) an intermediary has more incentives to become an expert; (ii) an intermediary is more likely to be involved in a repeated relationship with the buyer and the seller; (iii) an intermediary sells to the buyer other commodities in addition to the one in question. In this paper we have tested some theoretical hypotheses derived from this role of intermediaries in the tourism industry, an increasingly important sector in most economies.

More specifically, we have studied intermediation in the distribution of the capacity of the hotel industry in the Balearic Islands in Spain. Following their role as providers of reputation (as guarantors of quality), the degree of intermediation conforms to our main hypothesis H1: hotels of a higher quality (more prone to the lemons problem of asymmetric information) rely to a larger extent on intermediated distribution.

Additionally we have shown that, to the extent that a large enough chain is capable of building a reputation and a brand name on its own, the presence of intermediation will be smaller (hypothesis H2). Finally, hotels with a higher customer loyalty (a higher percentage of repeat visitors) do also rely less on intermediation (repeat visitors already enjoy good information on the quality of the hotel services; and a higher repetition of tourists already induces hotels not to cheat on the quality it supplies).

Thus, to our opinion, the analysis provides support to our hypotheses on the role of intermediaries as providers of reputation in a context of asymmetric information between final sellers and buyers. As a consequence, our results provide a rationale to the continuing presence of intermediation in the tourism industry even in the era of internet. In spite that with internet (and other information and communication technologies) coordination and the search for information has become an easier task

for the tourists on their own, intermediation still has (and will continue to have) a role to play as a guarantor of quality to the potential buyer. We have done our empirical analysis in a well known and well developed tourist destination, as it is the case of the Balearic Islands. It is likely, then, that the role of intermediaries as transmitters of information would be strengthened in a less well known and less developed tourist destination.

## Appendix A1. Questions of the survey that we use

**IDENTIFICATION CARD (2003):** Category; beds; number of opened months/year

### PROPERTY AND MANAGEMENT STRUCTURE

WORKS IN THE MARKET:	<input type="checkbox"/> independently			
	<input type="checkbox"/> Inside a:	Name	Marketing	Central Services
	Hotel Chain (only accommodation)			
	Diversified/integrated business group			

### GUEST TYPE (average or most common):

c) Percentage of repeating guest (% loyalty):

d) Booking manner (% approximate total booking):

- Tour-Operator: How many?
- Travel Agencies:
- Central Reservation Systems:
- Guest reservations by Telephone or fax (directly)
- Guest booking by Internet (directly):

**CUSTOMER TYPE:** Sun & Beach; Business & Congresses; Cycling; Golf; Other sports; SPA, Health & Beauty; Hikers; Artistic/Cultural Heritage; Sex Tourism; Other

**HUMAN RESOURCES:** Percentage of workers and/or employees that are

Qualified at	University:	
	Professional or Secondary:	
	Less qualified:	

- here is a training plan for workers where:
  - a) Training is:
    - Continuous
    - Intermittent
  - b) Training activities take place: (more than one option is possible)
    - Inside the company/firm
    - Externally organized courses

### HOTEL'S DIRECTOR:

- a) Education
  - Less qualified
  - Secondary / Professional
  - University

**TECHNICAL INNOVATIONS IN THE LAST 2 YEARS:** Innovations introduced in the past two years. Specified as innovation or no changes or subcontract/central

- o **Quality management innovation:**
  - Quality management systems (ISO 9000; TQM; EFQM; SCTE; etc.);
  - Environmental quality management systems (ISO 14000, EMAS, etc);
  - Measures which reduce environmental impacts without being in a system: energy and water saving, etc.

Hence, the variable 'quality management innovation' takes value 0, 1, 2 or 3, depending on how many of these 3 tickets has had some innovation, if any.

○ **Operations management innovation:**

- ❑ ICT (information and communication technologies) uses in internal management;
- ❑ kitchen equipment;
- ❑ dining room, bars & restaurants equipments;
- ❑ room installations;
- ❑ security systems, equipments and machinery;
- ❑ cleaning, laundry and maintenance

Hence, the variable 'operations management innovation' takes value 0 through 6, depending on how many of these tickets has experienced some innovation these last 2 years.

## Appendix A2: principal factors of quality variables

Factor analysis/correlation                      Number of obs                      =                      302  
 Method: principal-componentfactors Retained factors                      =                      2  
 Rotation: (unrotated)                      Number of params                      =                      11

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.30839	1.08500	0.3847	0.3847
Factor 2	1.22339	0.42387	0.2039	0.5886
Factor 3	0.79952	0.15278	0.1333	0.7219
Factor 4	0.64673	0.11112	0.1078	0.8297
Factor 5	0.53561	0.04926	0.0893	0.9189
Factor 6	0.48635		0.0811	1.0000

LR test: independent vs. saturated:  $\chi^2(15) = 289.16$  Prob> $\chi^2 = 0.0000$

### Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Uniqueness
Employees education	0.3239	0.7479	0.3358
Training	0.7161	-0.1047	0.4763
Continuous training	0.7050	-0.3663	0.3688
Managers education	0.4034	0.6907	0.3603
Operations management	0.7192	-0.1932	0.4454
Quality management	0.7167	-0.0679	0.4817

Scoring coefficients (method = regression)

Variable	Factor 1	Factor 2
Employees education	0.14030	0.61132
Training	0.31020	-0.08556
Continuous training	0.30541	-0.29940
Managers education	0.17476	0.56454
Operations management	0.31157	-0.15794
Quality management	0.31049	-0.05551

## Appendix A3: Chain classification

Hotel chains classified as LCHAIN = 1				Hotel chains classified as LCHAIN = 0			
Hotel Chain	Hotel establishments			Hotel Chain	Hotel establishments		
	Balearic Islands	Rest of Spain	Abroad		Balearic Islands	Rest of Spain	Abroad
SOL MELIA	30	87	141	GRUPO PLAYA SOL	32	0	0
FIESTA HOTELES	29	5	4	IBB HOTELES	3	6	0
IBEROSTAR	17	10	28	SAINT MICHEL	23	0	0
RIU	16	40	30	PROTUR	18	0	0
BARCELO	10	16	38	THB	17	2	0
HOTETUR	7	5	13	STIL HOTELES	10	1	0
HESPERIA	4	S	S	SAINT JORDI	11	0	0
CLUB MED	1	S	S	SIRENIS HOTELES	11	0	0
RELAIS & CHATEAUX	na	S	S	ACORN	10	0	0
HIPOTELS	15	7	0	MARINA HOTELES	10	0	0
GRUPOTEL	39	0	0	OLA HOTELES	10	0	0
HOTELERA PIÑERO	7	2	2	BQ	9	0	0
				INSOTEL	8	0	0
				DOR HOTELES	7	2	0
				GAVIMAR	7	0	0
				GRUPO ANDRIA	7	0	0
				PRINSOTEL	7	0	0
				INVISIA HOTELES	6	1	0
				BLAU HOTELES	6	0	1
				JS HOTELES	6	0	0
				MAC HOTELES	5	1	1
				AMIC	5	0	0
				BG HOTELES	5	0	0
				GRAN ISLA HOTELERA	5	0	0
				POLLENSINA	5	0	0
				INTUROTOEL	5	0	0
				PALMIRA	5	0	0
				SET HOTELES	5	0	0
				VALENTIN	5	0	0
				GREEN OASIS	4	6	0
				CADENA MAR	4	0	0
				ESPERANZA HOTELES	4	0	0
				SORDIBIZA	4	0	0
				EDEN	3	0	0
				EIX	3	0	0
				IR HOTELES	3	0	0
				PALIA HOTELES	2	3	0
				RTM HOTELES	2	0	0
				IHM HOTELES	3	2	0
				MORLANS HOTELES	2	0	0
				HOTELES BALBOA	1	1	0

The variable LCHAIN tries to capture the fact that large enough chains are able themselves to build a reputation and a brand name; as a consequence, their need to rely on intermediaries is reduced. Thus, the variable LCHAIN takes value 1 when the chain is “large enough” to have a sound reputation, a recognizable brand name, while takes value 0 for small chains.

We have classified hotel chains as a 1 according to the number of establishments they have, putting more emphasis on the chain having a larger presence abroad, rather than the number of establishments at home.

More specifically, we have data concerning the number of establishments each chain has in the Balearic Islands, in the rest of Spain, and in the rest of the world. The data refers mostly to year 2000. Things were not significantly different in year 2003.

S: stands for a several (and significant) number hotel establishments, present both in the rest of Spain, and at an international level. We do not have the precise number of establishments for these chains in the year 2000, nor 2003.

na We do not know how many establishments did Relais & Chateaux have in the year 2000. Today, it has 4 establishments in the Balearic Islands.

In any case, observing the hotel classification above clearly shows that chains classified as 1 are larger and very well known chains, whereas chains classified as a 0, are mostly local chains, with a scarce or null presence abroad. In spite of this, we have thought interesting to check the robustness of our chain classification.

#### Sensitivity analysis

In regressions (5a) and (5b), in both tables 6 and 7, we have done our sensitivity analysis concerning the hotel chain classification. This analysis consists upon doing the regressions without the borderline cases, namely, considering only a more clear cut hotel chain classification.

Thus, in regressions (5a) we exclude the observations of establishments of HOTELERA PIÑERO, GRUPO PLAYA SOL, IBB HOTELS, SAINT MICHEL, PROTUR, THB.

Then, in regressions (5b), in addition to not considering these establishments, neither do we include the establishments of HIPOTELS, GRUPOTEL, STIL HOTELS, SAINT JORDI, SIRENIS HOTELS, ACORN, MARINA HOTELS, OLA HOTELS.

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