Look before you leap: Comparison and profiles of hotel price determinants in four European markets

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Abstract

Pricing in the hospitality industry moves between adapting to a global demand and the need to manage locally. This double-edged challenge requires a managerial response based on flexibility and variety but one which is constrained by resources and competitive conditions. Since the sensitivity of each determinant may be different across types of hotels and countries, how hotel managers reach their compromises between determinants and countries remains an unsettled issue. Based on cross-nation methodology, we carry out a comparative analysis of price determinants from hotels in four main international tourist countries. The set of hypotheses developed are tested by estimating a quantile hedonic regression model with data from hotels in four countries. Results indicate that outcomes of pricing decisions differ by the country-of-operation, yielding a managerial profile per country. Also, the study estimates the contribution of the country to hotel pricing.

Keywords: Hotel pricing, Cross-nation, Differentiation, Agglomeration, Competition, Online reputation

1.Introduction

Hotel managers' pricing decisions can be understood as being rooted in a complex blend of the hotel's own resources, the local environment, and certain destination specific features. Thus, this study examines how hotels take advantage of differential pricing for various international segments, as the market conditions differ among countries.

The hospitality industry is a key sector in Europe; four countries of Europe (i.e., Spain, France, Italy, and UK) accounted for more than 73,000 hotels in 2021[1]. Although the hospitality and travel industry has been adversely affected by the COVID-19 crisis on a global level, proactive strategic responses are needed to adapt business models to new scenarios (Le & Phi, 2021). A comparative analysis of international hospitality management reveals notable differences among countries regarding the problems and challenges associated with the pandemic. Countries and cities did not experience the pandemic's impact in the same way. For example, occupancy rates in America and Asia fell further than in Europe (Statista, 2020a). Perceptions of COVID-19's effects on the hospitality industry have revealed variations from one country to another due to cultural differences (Shapoval et al., 2021).

From an international perspective, hotel price is also an essential factor for assessing hospitality competitiveness among countries (e.g., World Economic Forum, 2019). The literature has extensively discussed international pricing strategies from various perspectives, such as the supply-demand framework (Mattila & Gao, 2016), competitive environment (Becerra et al., 2013), profit maximization (Abrate et al., 2019), online

[1]Specifically, the number of hotel establishments opened in Spain was 17,133 (INE, 2021), in France 17,165 (INSEE, 2021), in Italy 29,267 at the end of 2020 (Statista, 2020a) and 9,889 in UK also at the end of 2020 (Statista, 2020b).

channels (Moro et al., 2018), and channel intermediaries (i.e., travel agencies) (Stangl et al., 2016).

Hotel pricing in an international context demands behavioural analysis of both consumers and hoteliers. The heterogeneity of hotel clientele (Abrate et al., 2012), together with the adoption of P2P platforms (Gibbs et al., 2018), foster a comparative approach to hotel pricing in the international context. At the same time, hoteliers take advantage of differential pricing because various markets have specific customer segments (Yelkur & DaCosta, 2001). There are huge differentials in hotel pricing across different countries (TheGlobalEconomy.com). Extant research about hotels location, though no generalizable, evidence that frequently hotels in the same destination apply similar pricing policies, rather than pursuing individualized pricing policies focused on the specific hotel and tourists' characteristics (Vives & Jacob, 2021). Explanations are related to hotels deal with similar revenue managers or prefer to cooperate with hotels already established in the destination searching for common managerial practices (Woo & Mun, 2020).

Concerning extant literature on pricing determinants in an international context, and despite extensive research on hotel pricing, there is a lack of studies that have addressed the existence of country-level similarities and differences in the impact that determinants have on price. Assaf et al. (2017) assess the determinants of hotel performance across different destinations, Viglia & Abrate (2017) model price determinants in rural hotels for several markets, Picazo & Moreno-Gil (2018) assess differences in package holidays prices between Mediterranean countries, and Arora & Mathur (2020) analyse differences across emerging and developed markets. The approach adopted in literature has rested on hedonic pricing theory accounting for intra-hotel attributes, hotel type, reputation, contextual factors, and country identification (n.b., see a review of this approach in Arora

& Mathur, 2020). Given hotels are 'location bound' (Whitla et al., 2007), with a confirmed relevance of local factors for explaining hotel performance (Assaf et al., 2017), we propose to enrich the existing approach in two ways: first, from a managerial perspective, by including spatiality and competition factors, and second, from a methodological approach, by adopting a cross-national analysis.

This study undertakes a cross-country analysis of pricing determinants, considering the recommended guidelines for cross-national research (Cadogan, 2010), adopting a more permanent and long-term perspective to avoid mispositioning of the hotel strategy (Melis & Piga, 2017), and assuming the identification of countries as single markets (Arora & Mathur, 2020). To approach the analysis empirically, we carried out comparisons of the effects of price determinants in 2,650 hotels in four main European countries according to their hospitality industry, using a quantile regression model to assess effects by different pricing segments. Hence, we rather adopt a long-term pricing perspective (i.e., uniform pricing) instead of a short-term analysis focused on price tactics (i.e., dynamic pricing), to adequately reflect the positioning of each hotel (Mitra, 2020), accounting for the magnitude of tour operators' demand (Vives & Jacob, 2020), and avoiding seasonality bias.

This study aims to provide several contributions to the hospitality literature. First, our study advances a new proposal to reduce the lack of moderators in the investigation of hedonic price models (Arora & Mathur, 2020). Second, given the expansion of international hotels and the need to mitigate the "liability of foreignness" (Woo & Mun, 2020), this study deals with several markets, overcoming the limitations of previous studies based on a single market on issues such as quality signals-vs-reputation (Abrate & Viglia, 2016), standardization-vs-differentiation (Yu et al., 2014), or agglomeration-vs-competition (Lee & Jang, 2015). This study concludes by providing an economic value

of the country effect and outlining a per country generalization of pricing driver behaviors (Cadogan, 2010).

2.Literature background and research questions

2.1 Market price premium

The tourism literature acknowledges the relevance of country image and reputation on tourist behaviour. Country image directly affects tourists' visit intentions and indirectly through tourists' beliefs about a country's products (Elliot & Papadopoulos, 2016) and tourists' destination evaluations (Zhang et al., 2018). Additionally, different destinations within a country may be linked to the country's master brand (Harish, 2010).

At the economic level, country economic performance positively influences hotel price levels (Lee, 2011). Focusing on firm behavior, institutional theory (Scott, 2001) supports the relevance of the institutional environment in organizational development. Management research supports the influence of the national economy and country environment on corporate governance practices (Daniel et al., 2012). Hotel literature has indicated country institutional factors affect hotel management behavior and perceived image, even more than the effects of local or industrial issues (Lee et al., 2017).

Hadad et al. (2012) conclude there are differences among developed countries associated with labor productivity, while Assaf & Barros (2013) confirm the impact of hotel ownership and location on hotel efficiency, concluding France, Spain, and the UK are among the countries with the most efficient hotel industries. Papatheodorou (2002) found resorts at Italian destinations are sold at a premium compared to Spanish destinations. Poater & Garriga (2009) observed destinations located in Nordic countries are the most expensive, followed by destinations located in Mediterranean countries, and the cheapest destinations are in Central Europe. Hence, we advance the following hypothesis:

H1: The country-of-operation influences hotel price.

2.2 Horizontal differentiation and country-of-operation

Hospitality research has highlighted the tension between standardization-vs-differentiation as a dilemma hoteliers must face given the industry's global context (Yu et al., 2014). The expansion of international hotel chains (Woo & Mun, 2020) promotes the standardization of services, especially in developed markets since they can thus attain significant benefits (Yu et al., 2014) but tourists value the hospitality and service received when there is a national identity element in the service provision (Ariffin et al., 2015).

Faced with this dilemma of standardization-vs-differentiation, strategic equilibrium theory (Deephouse, 1999) posits hotels balance the differentiation strategy intensity based on country conditions that legitimize the necessary adaptation level. In fact, some specific services provided by hotels have a different impact on price depending on the country (Arora & Mathur, 2020) and standardization can lead to strong price competition among countries (Picazo & Moreno-Gil, 2018).

However, differentiation does not always have a positive impact on hotel performance (Kim et al., 2020). Moreover, it has been confirmed that customers prefer international chains over independent hotels (Gao et al., 2018). Given there is a high penetration of international chains in developed European markets, except for Italy (Horwath HTL, 2018), we propose the following hypothesis:

> **H2:** There is a moderating effect of the country-of-operation on the negative relationship between differentiation and hotel price.

2.3 Country differences in hotel system categories

Extant hospitality literature has traditionally considered hotel category as the variable with the greatest influence on hotel pricing, showing a positive impact on price and considered as a proxy for the quality of the hotel as well as a protection factor against price competition (Becerra et al., 2013).

However, hotel category has limitations when it comes to explaining hotel price (Abrate et al., 2011), its impact can be heterogeneous depending on the destination (Mathur, 2019), and it is quite evident that there are differences from one destination to another for the same hotel category (Arora & Mathur, 2020). Additionally, there are multiple hotel classification systems worldwide with different criteria which generate heterogeneity within the same category (Minazzi, 2010; UNWTO, 2015). Table 1 highlights the differences between the classification systems in the four selected countries.

Criteria/Country	Spain	France	Italy	UK	References
Ruling organization	Regional governments	National government	Regional authorities	National government through Visit Britain/Visit England	UNWTO (2015) Minazzi (2010)
Criteria and implementation	261 criteria Mandatory System	246 criteria Voluntary system	55 criteria Mandatory system	498 criteria Voluntary system.	UNWTO (2015) Minazzi (2010)
Frequency of inspections	Only initial and when change of ownership	5 years	Depends on region	Annual	UNWTO (2015)

Table 1. Hotel classification system specificities for each country

Although hotel classification based on the number of stars is widely used to justify price, the diversity of classification systems among countries can cause heterogeneity in terms of its impact on price, limiting its validity as a proxy for vertical differentiation (Abrate et al., 2011). Moreover, inconsistencies have been found in the regulation of the hotel category in some markets (Núñez-Serrano et al., 2014), which may weaken its intensity as a quality signal. Therefore, the following hypothesis is raised:

> **H3:** There is a moderating effect of country-of-operation on the positive relationship between star category and hotel price.

2.4 Online reputation and country-of-operation

Online reputation derived from user reviews has experienced a rapid rise as a quality signal in hotel booking (Yang et al., 2018). The factors identified to explain its increasing relevance are the limitations of category as a predictor of price and quality (Abrate et al.,

2011), the mismatch between expected quality level and category (Núñez-Serrano et al., 2014), the predominance of physical standards based on establishment rather than service levels (Minazzi, 2010) and the heterogeneous hotel classification systems indicated previously (UNWTO, 2015). Indeed, hotel classification systems reveal a lack of customer opinion integration (Blomberg-Nygard & Anderson, 2016).

Online reputation complements hotel category by reducing possible information asymmetries (Manes & Tchetchik, 2018). Travelers increasingly rely on reputation, using online platforms to seek out the experiences and valuations of others and to share their own (Yang et al., 2018). Consequently, online travel agencies (OTAs) have played a key role in hotels achieving price premiums (Yacouel & Fleischer, 2012). Hoteliers take a more tactical and less strategic approach by incorporating online reputation into their price management (Abrate & Viglia, 2016). Indeed, previous literature confirms the relevance of online reviews to hotel strategy and profitability, which are conditioned by the hotel geographical context (Yang et al., 2018).

In other industries, the moderating role of national culture in the relationship between online reputation and sales has been demonstrated. Particularly, Tang (2017) shows the effect of online reputation is heterogeneous and is affected by the product country-of-origin and by buyers' national cultural aspects, while Lin & Kalwani (2018) suggest national culture moderates the occurrence of online reputation and its impact on product sales. Additionally, the region of location exerts an influence on the online reputation of the hotels (Banerjee & Chua, 2016) and country moderates the impact of some hotel amenities on customer satisfaction (Moro et al., 2019). Finally, the penetration degree and dependence on OTAs may present differences in European developed markets (Stangl et al., 2016), which may moderate the incorporation of online reputation into price

management. To assess whether the national context affects the relevance and consequences of the online reputation, the following hypothesis is proposed:

H4: There is a moderating effect of the country-of-operation on the positive relationship between online reputation and hotel price

2.5 Competition environment and country-of-operation

Hospitality literature has identified the friction between two opposite effects on hotel performance: agglomeration-vs-competition (Lee & Jang, 2015) with contradictory findings. Agglomeration theories (McCann & Folta, 2008), which posit the benefits associated with co-location of hotels next to one another, have been empirically supported (Lee & Jang, 2015). However, the Industrial Organization theory (Shaked & Sutton, 1982), which posits the negative impact on hotel performance due to an increase in competition, has also received support (Becerra et al., 2013; Lee, 2015).

From an international expansion perspective, this contradiction is a key factor in the investment decisions of international hotels in foreign locations, as they prefer to choose markets where they can achieve advantages (Assaf et al., 2015). Consequently, to alleviate the "liability of foreignness", international hotels seek locations where the positive externalities due to agglomeration outweigh the negative externalities (Woo & Mun, 2020). However, previous studies have not incorporated an international perspective and are limited to a single market (Becerra et al., 2013; Falk & Hagsten, 2015; Lee & Jang, 2015), even though the prevalence of positive externalities due to agglomeration are dependent on aspects relating to markets, such as demand (Lee & Jang, 2015) and seasonality (Silva, 2016) that can moderate its effect.

Additionality, hotel agglomeration reveals different behavior patterns that require specific analyses based on country (Marco-Lajara et al., 2014). The hotel location is affected by the specific land use of countries (Fang et al., 2019) and hotel development is influenced

by urban planning (Luo & Lam, 2016). Since countries differ in their urban planning, we can expect the country can moderate the positive effects of agglomeration, with the hotel industry being the most dependent on locating in urban areas (Melo et al., 2009). Additionally, there is cross-country evidence of the two-way relationship between agglomeration and economic growth of the country (Krugman, 1991) and given our study framework is in developed European markets; we postulate the following hypotheses:

H5a: There is a moderating effect of the country-of-operation on the positive relationship between numbers of competitors and hotel price.

H5b: There is a moderating effect of the country-of-operation on the negative relationship between distance between competitors and hotel price.

3.Methodology

3.1 Variables and models

Hotel information was collected using Veturis.com, an international Wholesaler that groups several travel agencies focused on the transient travel market and hence Veturis can be considered like other sources such as OTAs that have been widely considered due to the availability of a wide range of hotel features (Latinopoulos, 2018). The final sample included 2,650 hotels from Spain, France, Italy, and the UK.

The dependent variable **Price,** in accordance with previous studies (Hung et al., 2010; Lee, 2015; Zhang et al., 2011) is the yearly average daily rate (ADR) for a standard double room during the year 2017 because it measures the current price paid per room for each lodging establishment and it is free of price variations caused by seasonal effects, distribution channels and events (Lee, 2015). **Price** is log-transformed to consider a semi-logarithmic model (Latinopoulos, 2018). For a continuous variable, the coefficient multiplied by 100 provides the percentage impact on price while, for a dummy variable, the percentage effect is computed by $100 \cdot (e^{\beta i}-1)$ (Halvorsen & Palmquist, 1980).

The following control variables, that have been widely considered in previous literature, are included in the hedonic price model: *Size=Number of hotel rooms* (Becerra et al., 2013); *Age=Hotel construction year* (Falk & Hagsten, 2015); *Hotel type* (aparthotel, hotel, and hostel), with aparthotel used as the reference (Falk & Hagsten, 2015); *N_Serv =Total number of services offered* (Latinopoulos, 2018) and *Urban_Hotel* (a dummy variable for urban hotels) (Falk & Hagsten, 2015).

The price determinants for regression analysis are:

- *Country dummy variables*. We included three dummy variables for France, Italy, and the UK (i.e., Spain is the reference) to control any unobservable difference between countries which may influence hotel price (hotel management, country economic performance, country international tourist arrivals).
- *H_Dif*. This variable measures the horizontal differentiation in the service space between hotels located in the same commercial zone from 0 (minimum differentiation) to 1 (maximum differentiation) with a measure based on the angular separation (Jaffe, 1986) as follows:

$$(H\_Dif)_i = 1 - \max_{\substack{j \in A_i \\ j \neq i}} \left(\frac{V_i \cdot V_j}{\|V_i\| \cdot \|V_j\|} \right)$$

  where A_i is the commercial area of hotel *i* and V_i is a vector with 71 dummy variables that represent the services offered by hotel *i* that includes hotel style, sport activities and food services.
- *Category*. This variable measures the official star rating of the hotel, from one to five stars and is the services quality indicator officially assigned by the corresponding agencies (Becerra et al., 2013).
- *Online_Reputation*. This variable, based on a reputational approach (Zhang et al., 2011) represents the yearly average online rating from customers of each hotel in 2017.

Each partner agency of Veturis group shows on its website the average rating given to each hotel. Veturis only allows real guests to post an online review after their hotel stay (Sánchez-Lozano et al., 2021) and hence it ensures a reliable and genuine measure of the online reputation.

- *Competition.* Each hotel's competition was computed by the number of lodging establishments within the same commercial area as the hotel divided by the logarithm of the number of overnight stays in the city where the hotel is located. (Sources: National Statistical Offices of all countries).
- *Distance*. For each hotel this variable provides the average distance, in kilometres, from hotels located in the same area divided by the surface in square kilometres of the city (Sources: National Statistical Offices of all countries) where the hotel is located (Becerra et al., 2013).

Table A.1 (Appendix A) contains the summary statistics for continuous variables and hotel distribution by country and hotel type.

We used moderated multiple regression (MMR), due to the advantages over alternative modelling (Schepers, 2016) to consider the following hedonic price models:

Null_Model: $lnPrice_i = \alpha_0 + \sum_{j=1}^{6} \rho_j C_{ij} + \sum_{h=1}^{3} \gamma_h D_{ih} + \sum_{j=1}^{5} \omega_j X_{ij} + \varepsilon_i$

Alternative_Model: $lnPrice_i = \alpha_0 + \sum_{j=1}^{6} \rho_j C_{ij} + \sum_{h=1}^{3} \gamma_h D_{ih} + \sum_{h=1}^{4} \sum_{j=1}^{5} \varphi_{hj} D_{ih} X_{ij} + \varepsilon_i$

where C_j are the control variables, D_h the country dummy variables, X_j the independent variables and ε_i is the random error. *Alternative_Model* considers interactions with all countries.

The *Alternative_Model* requires homocedasticity across countries, confirmed by the Breusch-Pagan test (Rosopa et al., 2016) (*p*-value 0.635). To prevent multicollinearity with interactions terms, we standardized the exogenous variables subtracting the respective mean. The variance inflation factors (VIF) did not detect multicollinearity problems since all values were below 4.52 (Kennedy, 2008).

The estimation methods were OLS and quantile regression (Koenker, 2005). The latter makes it possible to analyze which independent variables have a non-constant effect on the conditional distribution of price and may be more efficient than OLS under non-normality of residuals (Koenker, 2005). Shapiro-Wilk and Shapiro-France tests confirmed the non-normality of the residuals for OLS. We conducted estimations with the Barrodale-Roberts method (Koenker, 2005) at the 25th, 50th, 75th and 90th percentiles due to the positive asymmetry of the hotel price sample distribution (skewness value 9.70). Pseudo R^2 value (Koenker & Machado, 1999) was considered for goodness of fit. For OLS and quantile regression, standard errors were estimated by bootstrap methods (Davison & Hinkley, 1997; Feng et al., 2011). Figure 1 summarizes the statistical analysis implemented with R version 4.1.2.

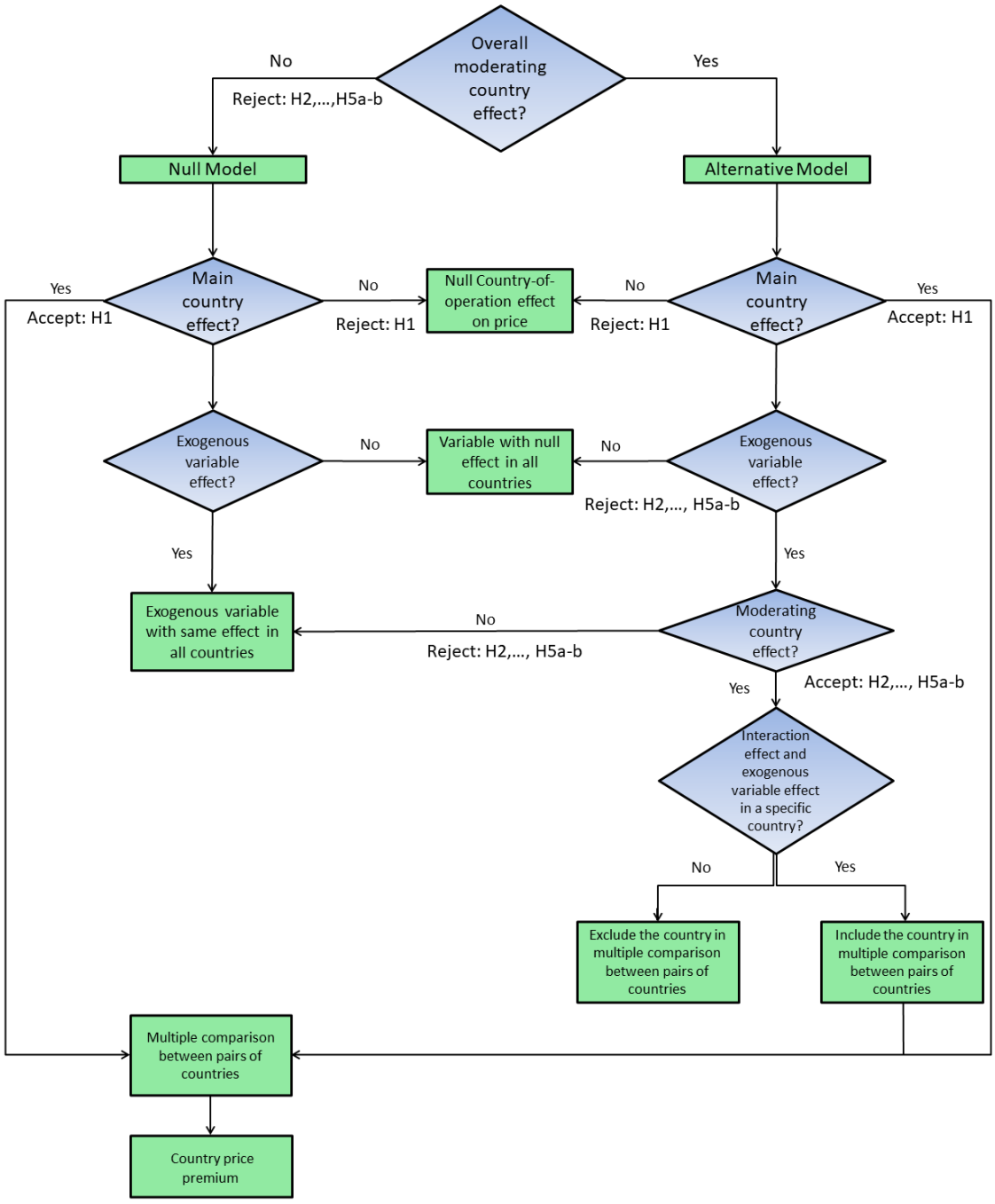


Figure. 1. Cross-country analysis methodology

4.Results

The first step was to analyze the overall moderating country effect through the significance of the *Alternative_Model* against the *Null_Model* (Figure 1). The F-test for OLS and the Wald test (Koenker, 2005) for quantile regression confirm an overall

moderating country effect (*p*-values below 2.2E-16). Table A.2 (Appendix A) show the *Null_Model* (only 25th and 75th percentiles) and *Alternative_Model* estimation.

Regarding main country effect (**H1)**, we performed a global test for significance of all coefficients corresponding to *Country dummy variables* with the *Alternative_Model* that confirmed in all models the main country effect (p-values below 2.2E-16). Following Figure 1, we analyzed the differences between countries through cross-country pair comparison tests (results available from the correspondence author on request).

Results showed the UK has the highest country effect, being significantly different from all other countries. French effect is significantly higher than Spain and Italy, except at 90th percentile where Italy and France do not show significant differences, whereas Italian effect is significantly stronger than Spain except at the 50th percentile, where both countries have the same effect. Due to the standardization of the exogenous variables, the main country effect is equivalent to the price premium in each country for hotels with mean values in the price determinants with respect to the Spanish price. Following Halvorsen & Palmquist (1980), Table 2 shows the percentage increase with respect to hotel price in Spain due to the main country effect.

Country	**OLS**	**0.25**	**0.5**	**0.75**	**0.9**
France	60.313	60.967	67.536	76.167	70.653
Italy	10.915	7.099	n.s.	15.610	41.046
UK	82.652	77.464	90.035	106.847	108.068

Table 2. Price premium in percentage for each country with respect to Spain

To test the hypotheses **H2-4** and **H5a-b**, we analyzed whether each exogenous variable has a significant effect (Figure 1) through an omnibus test for null interactions associated with each variable (Schepers, 2016). Table 3 shows results from the omnibus test for each independent variable and confirm a significant effect on price for all variables, except

H_Dif at the 90th percentile**.** Thus, differentiation has no impact on price for upscale hotels in all countries. The remainder of analysis excludes *H_Dif* at this percentile.

	OLS	Quantile regression			
		0.25	**0.5**	**0.75**	**0.90**
Variable					
H_Dif	$H_0: \omega_{H\_Dif\times Spain}=\varphi_{H\_Dif\times France}=\varphi_{H\_Dif\times Italy}=\varphi_{H\_Dif\times UK}=0$				
***p*-value**	0.061*	0.002***	0.028**	0.042**	0.905
Category	$H_0: \omega_{Cat\times Spain}=\varphi_{Cat\times France}=\varphi_{Cat\times Italy}=\varphi_{Cat\times UK}=0$				
***p*-value**	2.2E-16***	2.2E-16***	2.2E-16***	2.2E-16***	2.2E-16***
Online_Reputation	$H_0: \omega_{Online\times Spain}=\varphi_{Online\times France}=\varphi_{Online\times Italy}=\varphi_{Online\times UK}=0$				
***p*-value**	1.8E-10***	9.1E-7***	1.5E-13***	3.5E-5***	6.7E-6***
Competition	$H_0: \omega_{Comp\times Spain}=\varphi_{Comp\times France}=\varphi_{Comp\times Italy}=\varphi_{Comp\times UK}=0$				
***p*-value**	2.2E-16***	2.2E-7***	2.2E-16***	2.2E-16***	9.3E-11***
Distance	$H_0: \omega_{Agglo\times Spain}=\varphi_{Agglo\times France}=\varphi_{Agglo\times Italy}=\varphi_{Agglo\times UK}=0$				
***p*-value**	2.5E-7***	1.8E-4***	6.9E-5***	4.7E-5***	9.4E-4***

*p<0.1

**p<0.05

***p<0.01

Table 3. Global significant effect in the *Alternative_Model*.

Next, we contrasted the moderating country effect for each explanatory variable with a significant joint effect through a global test for equality of interactions (Schepers, 2016). Table 4 shows results from the global test for moderating country effect.

Following Figure 1, for those variables with a significant effect and significant country moderation (Tables 3-4), Table A.2 (*Alternative_Model*) shows in which countries the variable effect is significant. For countries with significant variable effect, Table 5 shows the percentage impact on price per unit increase of the variable in each country. According to Tables 3-4, *H_Dif* at the 90th percentile was excluded from this analysis. For *Online_Reputation* at 25th percentile and *Distance* at 75th percentile, Table 5 only shows

the percentage change due to the variable effect without moderation from *Null_Model*. Similarly, Figure 2 shows the impact of each variable in each country. Finally, for variables with moderating country effect, we performed multiple comparisons between pairs for those countries where the specific variable has a significant effect (Figure 3).

	OLS	**Quantile Regression**			
		0.25	**0.5**	**0.75**	**0.9**
Variable					
H_Dif	H_0: $\omega_{H\_Dif\times Spain} = \varphi_{H\_Dif\times France} = \varphi_{H\_Dif\times Italy} = \varphi_{H\_Dif\times UK}$				
p-value	0.092^{*}	0.031^{**}	0.069^{*}	0.031^{**}	No effect
Category	H_0: $\omega_{H\_Dif\times Spain} = \varphi_{H\_Dif\times France} = \varphi_{H\_Dif\times Italy} = \varphi_{H\_Dif\times UK}$				
p-value	$3.9E\text{-}10^{***}$	$4.5E\text{-}4^{***}$	$3.4E\text{-}4^{***}$	$7.5E\text{-}5^{***}$	0.002^{***}
Online_Reputation	H_0: $\omega_{H\_Dif\times Spain} = \varphi_{H\_Dif\times France} = \varphi_{H\_Dif\times Italy} = \varphi_{H\_Dif\times UK}$				
p-value	$2.5E\text{-}4^{***}$	0.154	$8.4E\text{-}6^{***}$	0.020^{**}	0.009^{***}
Competition	H_0: $\omega_{H\_Dif\times Spain} = \varphi_{H\_Dif\times France} = \varphi_{H\_Dif\times Italy} = \varphi_{H\_Dif\times UK}$				
p-value	$2.2E\text{-}16^{***}$	$2.7E\text{-}7^{***}$	$2.2E\text{-}16^{***}$	$2.2E\text{-}16^{***}$	$1.2E\text{-}8^{***}$
Distance	H_0: $\omega_{H\_Dif\times Spain} = \varphi_{H\_Dif\times France} = \varphi_{H\_Dif\times Italy} = \varphi_{H\_Dif\times UK}$				
p-value	0.009^{***}	0.019^{**}	0.007^{***}	0.120	0.067^{*}

$^{*}p<0.1$

$^{**}p<0.05$

$^{***}p<0.01$

Table 4. Omnibus test for moderating country effect.

Concerning *H_Dif*, Table 4 shows moderation by country in its impact in all models except at the 90th percentile (upscale hotels), so **H2** is broadly confirmed. For OLS and lower midscale hotels (50th percentile) *H_Dif* has a null effect in all countries except in Spain where *H_Dif* has a significantly negative effect (Table 5, Figure 2). For economy hotels (25th percentile), *H_Dif* only has a significant negative effect in Spain and the UK where economy hotels can achieve a price premium through the standardization.

Variable	Spain	France	Italy	UK
			OLS	
H_Dif	-20.225*	n.s.	n.s.	n.s
Category	16.181***	23.053***	39.773***	33.058***
Online_Reputation	7.475***	n.s.	n.s.	6.620***
Competition	1.536***	n.s.	-0.215*	-2.323***
Distance	n.s.	-108.102***	-213.181***	-50.508***
			P25	
H_Dif	-16.701***	n.s.	n.s.	-65.930***
Category	13.818***	20.850***	23.068***	34.493***
Online Reputation (No moderation)			5.951***	
Competition	1.314***	-1.776**	n.s.	n.s.
Distance	n.s.	-260.444***	-129.483**	-20.430*
			P50	
H_Dif	-18.745***	n.s.	n.s.	n.s.
Category	17.005***	26.312***	32.702***	31.405***
Online Reputation	6.864***	n.s.	n.s.	9.240***
Competition	1.991***	-2.185**	n.s.	-2.928***
Distance	-25.576*	-223.663***	-167.203*	-42.889***
			P75	
H_Dif	n.s.	n.s.	42.393***	n.s.
Category	19.635***	24.912***	46.806***	30.306***
Online Reputation	7.505***	n.s.	n.s.	9.582**
Competition	1.987***	n.s.	n.s.	-4.249***
Distance (No moderation)			-46.811	
			P90	
H_Dif (Null effect)			n.s.	
Category	22.523***	25.583***	45.480***	30.706***
Online Reputation	7.645***	n.s.	n.s.	9.408**
Competition	1.780***	n.s.	-0.550**	-4.151***
Distance	-42.100***	n.s.	-344.452***	-66.534***

*p<0.1

**p<0.05

***p<0.01

Table 5. Percentage impact on price per unit increase for variable and country.

In most cases, the effect of *H_Dif* is null or negative. Only for Italian upper midscale hotels (75th percentile), the effect is significantly positive whereas in the other countries, its impact is not significant. Consequently, services standardization is not counterproductive for hotel pricing and differentiation only allows prices to be increased in Italian upper midscale hotels.

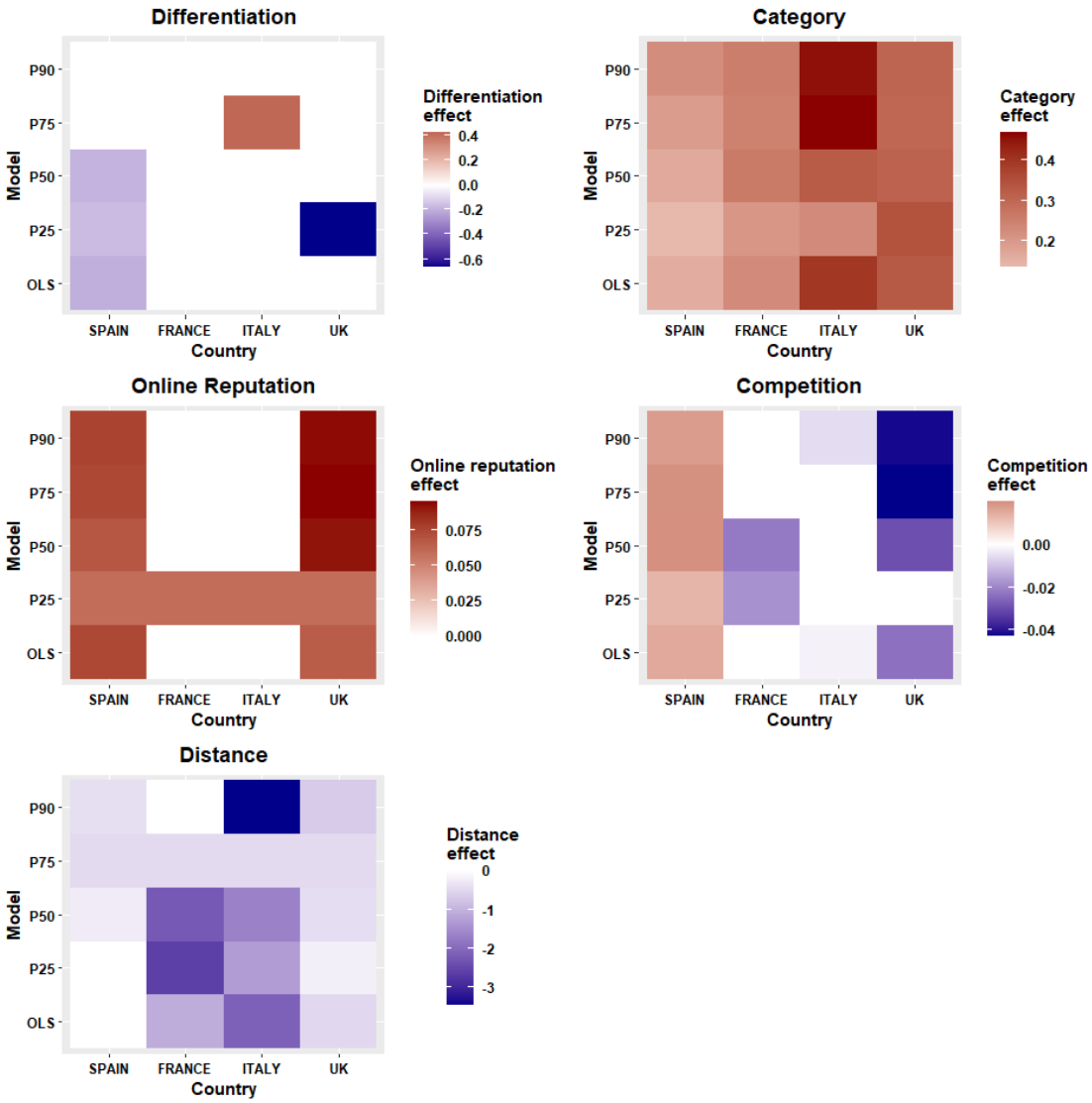
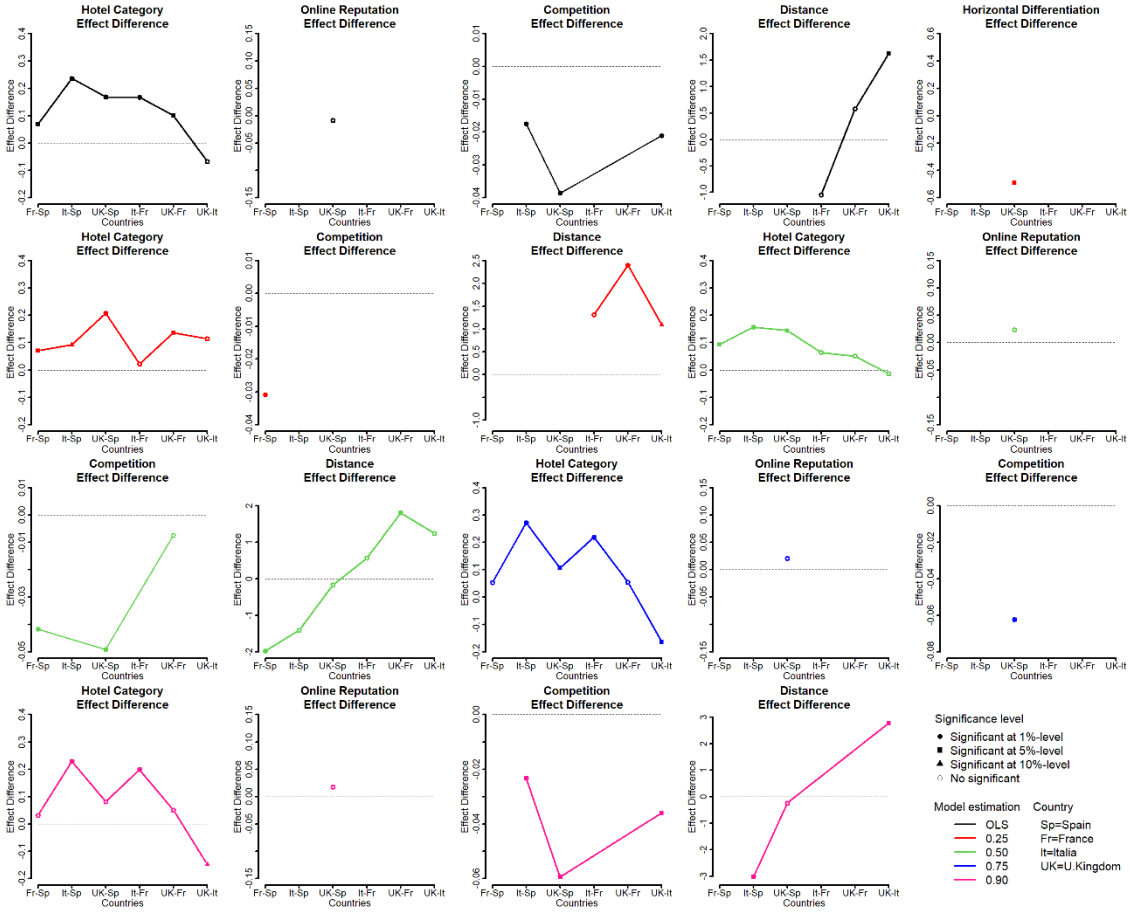


Figure 2. Variable effect by model and country.

Category has a significant overall difference in the impact on price due to the country for all models, which confirms **H3 (**Table 4). Since *Category* effect is always positive (Table 5, Figure 2), the moderation only influences its intensity. The stronger effect occurs in Italy and the UK without significant differences (Figure 3), except at 75th and 90th percentiles where Italy has the stronger effect. The lowest effect occurs in Spain, except at the 75th and 90th percentiles where Spain and France have the same effect. Thus, the hotel category is confirmed as a quality signal but without global validity (Arora & Mathur, 2020) since even in developed markets its effect can show considerable differences.



354

355 Figure 3: Effect difference significance between pairs of countries

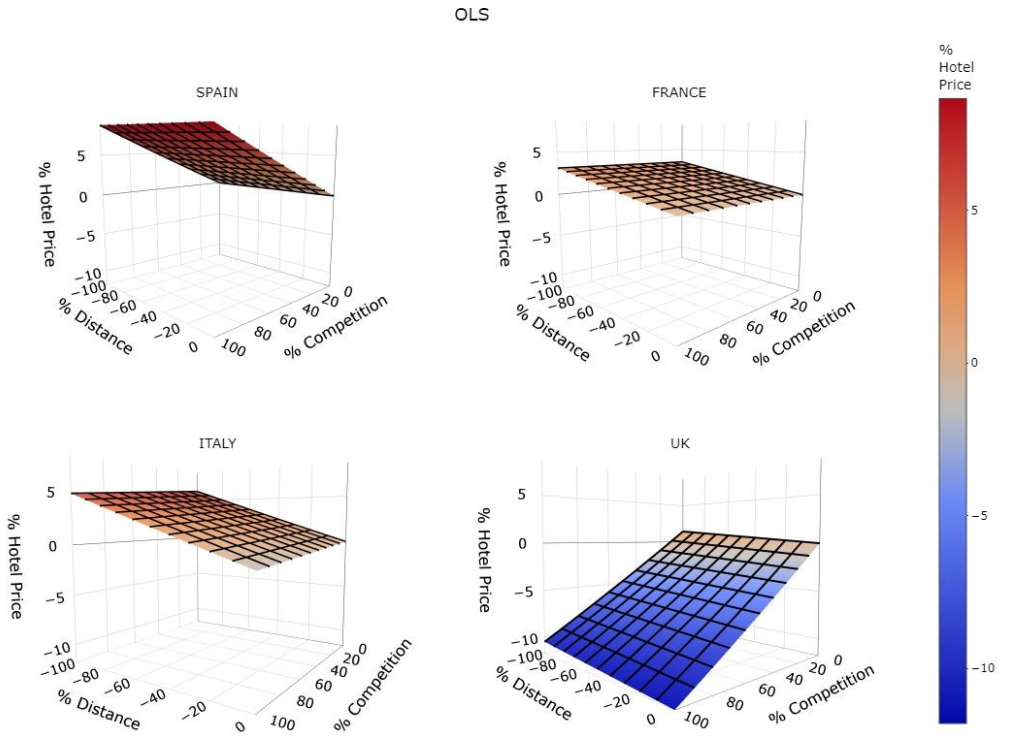
356 Regarding *Online_Reputation*, its effect is moderated by country except for economy
357 hotels (Table 4), where the positive effect is the same for all countries (Table 5, Figure 2)
358 so **H4** is broadly confirmed. Since its effect is positive or null, the moderation only
359 influences the effect intensity. *Online_Reputation* shows the same significantly positive
360 effect in Spain and the UK in all models (Figure 3). The French and Italian effects are
361 null except for the economy hotels mentioned above. Therefore, there are differences in
362 the extent of influence of online reputation on price in the countries analyzed.

363 Regarding *Competition*, there is a significant moderating country effect in all models
364 (Table 4), so **H5a** is confirmed. The Spanish effect is positive (Table 5, Figure 2) with
365 significant differences with the rest of countries (Figure 3) where the effect is null or
366 negative. In the UK, the effect is significantly negative for all models except at 25th

367 percentile. The Italian effect is negative only for OLS and 90th percentile. In France, only
368 at 25th and 50th percentiles the effect is negative. In all other cases, the effect is null.
369 Thus, the country moderation influences both the intensity and the valence of the effect.
370 Among countries with significantly negative effect, only for OLS and 90th percentile
371 there are significant differences between Italy and the UK.

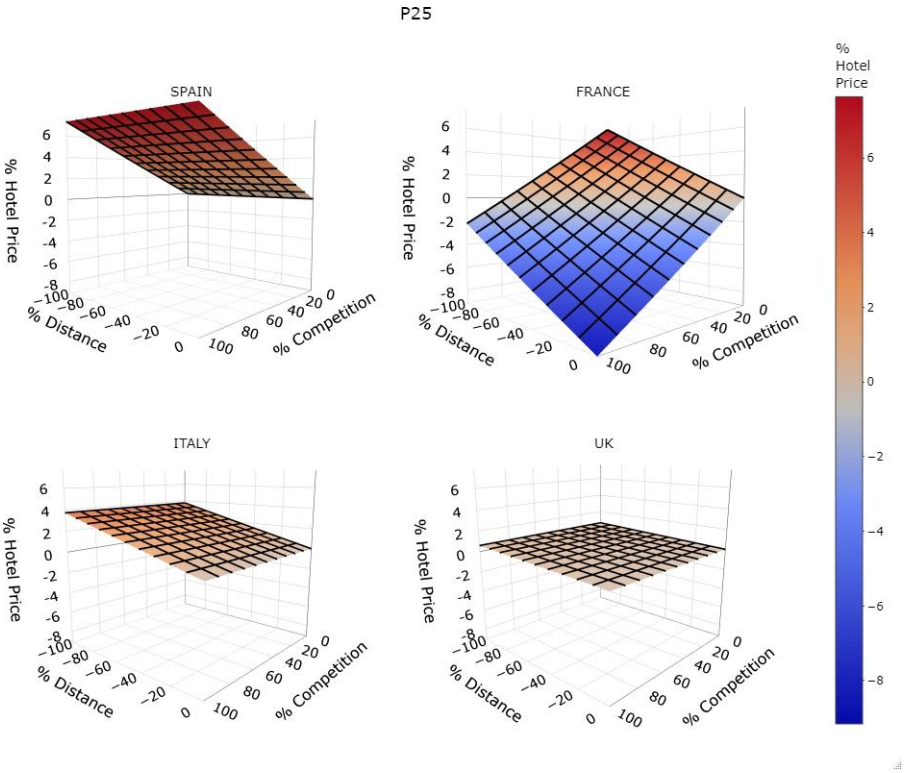
372 Concerning *Distance*, its effect is moderated by country in all models except at 75th
373 percentile (Table 4) which broadly confirms **H5b (**Table 4). In all countries, *Distance* has
374 the same negative effect for upper midscale hotels (i.e., the shorter the distance to
375 competitors, the higher the price) (Table 5, Figure 2) whereas in all other cases the effect
376 is negative or null in all countries, so the moderation only influences the effect intensity.
377 For OLS, only the difference between the UK and Italy is significant (Figure 3). For
378 economy hotels, the UK has a significantly lower effect intensity than France and Italy.
379 For 50th percentile, only the differences between Spain and France and between UK and
380 France are significant. Finally, for upscale hotels the strongest effect occurs in Italy,
381 followed by the UK and Spain with significant differences for all pairs comparisons.

382 To analyze the existence of a global agglomeration effect (i.e, positive impact on price
383 due to an increase in *Competition* and a decrease in *Distance*) Figures 5-9 display the
384 percentage impact on price due to a percentage increase in *Competition* mean and
385 percentage decrease in *Distance* mean.



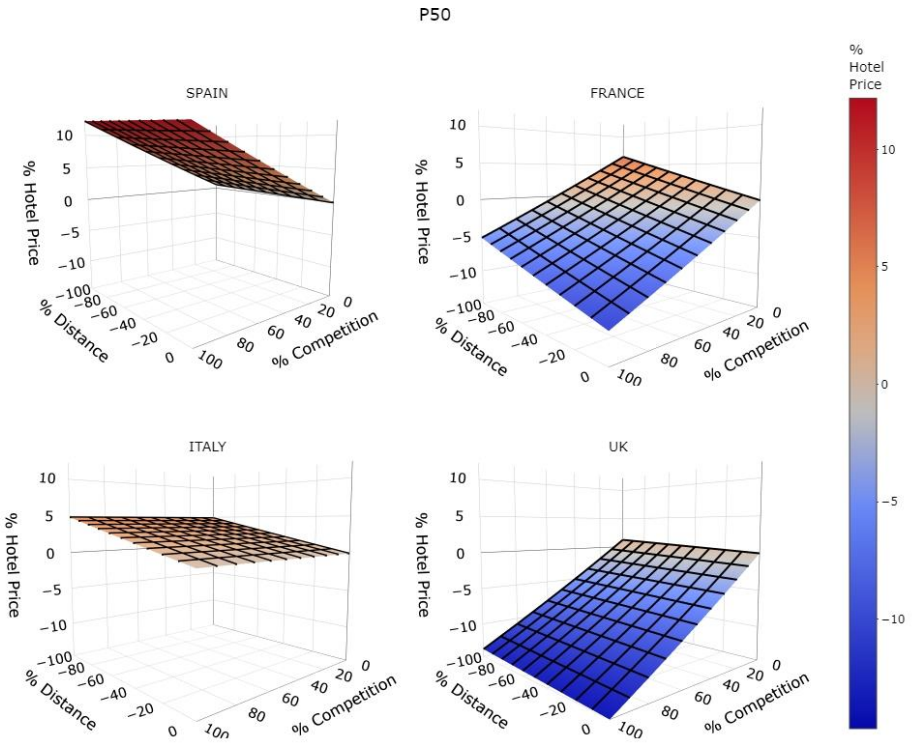
386

387 **Figure 4.** OLS percentage impact on price per percentage increase in *Competition* mean
388 and percentage decrease in *Distance* mean.



389

390 **Figure 5.** P25 percentage impact on hotel price per percentage increase in *Competition*
391 mean and percentage decrease in *Distance* mean.



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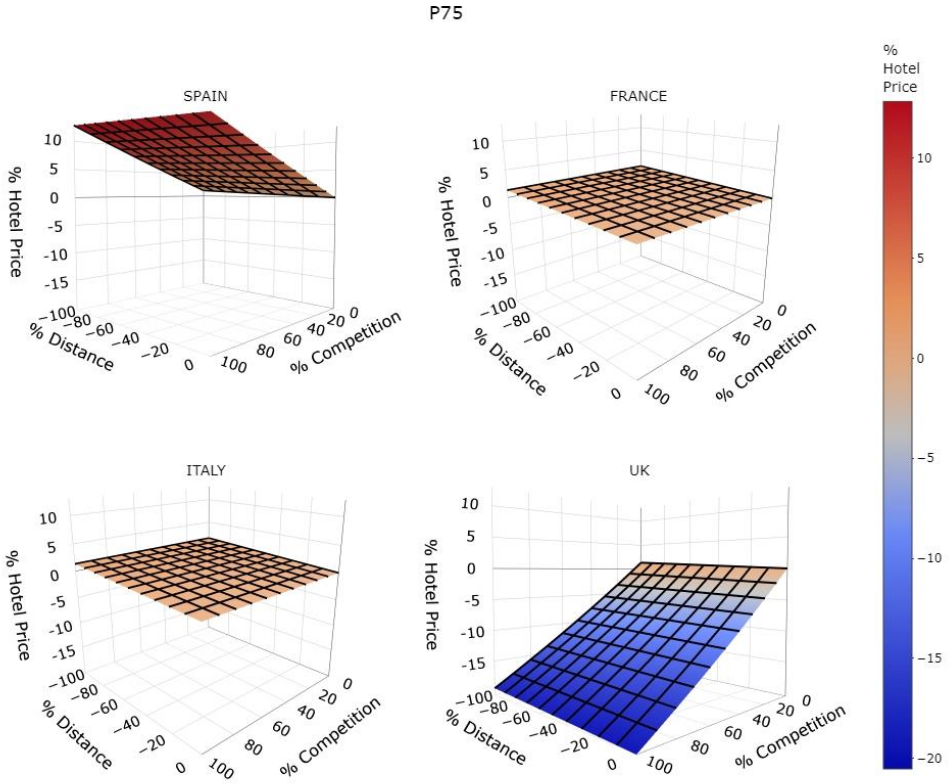
393 **Figure 6** P50 percentage impact on price per percentage increase in *Competition* mean
394 and percentage decrease in *Distance* mean.



395

396 **Figure 7** P75 percentage impact on price per percentage increase in *Competition* mean
397 and percentage decrease in *Distance* mean.

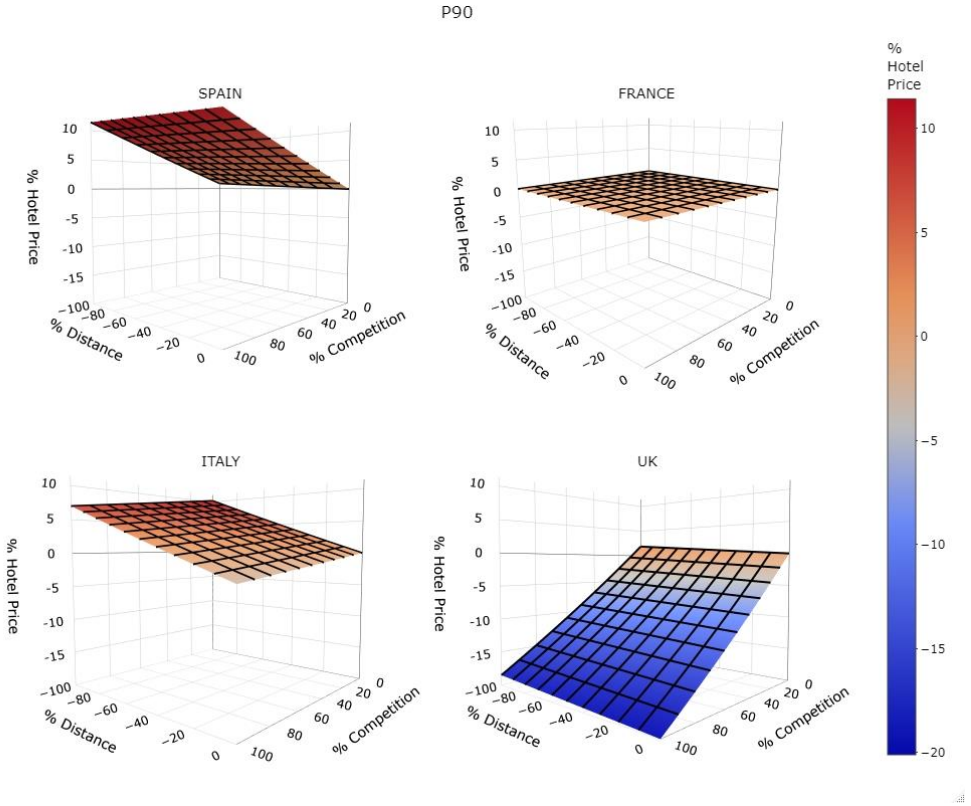


Figure 8 P90 percentage impact on price per percentage increase in *Competition* mean and percentage decrease in *Distance* mean.

Figures 4-9 show that there is a global agglomeration effect (red area) in Spain and Italy in all cases, in France for OLS and 25th percentile, and in the UK only for economy hotels. On the other hand, the blue area suggests a global competition effect (i.e negative effect due to an increase in *Competition* and a decrease in *Distance*) in French economy hotels and in the UK in all cases except for economy hotels, since there is only a positive impact on price if the distance can decrease considerably for small increases in competition (red area). Finally, the global agglomeration effect is null for French upscale hotels.

Spain has the strongest global agglomeration effect in all cases, followed by Italy except for the 75th percentile where the Italian and French effects do not show a significant difference. On the other hand, the global competition effect shows greater intensity in the

UK except for economy hotels where in the UK there is an agglomeration effect and in France a competition effect.

Given the heterogeneous impact of some determinants due to the country, the overall market price premium with respect to Spain (i.e., the percentage increase in price due to the market for hotels with the same characteristics) may be heterogeneous. When there is a significant country moderation for a specific determinant X_j, following Halvorsen & Palmquist (1980), we computed the market price premium with respect to Spanish hotels as a function of X_j (i.e., other explanatory variables ceteris paribus) as follows:

$$Country\ Price\ Premium\ (\%) = \frac{Price_{Country} - Price_{Spain}}{Price_{Spain}} \times 100$$

$$= \left(\exp\left(\gamma_{Country} + (\varphi_{Country\ j} - \varphi_{Spain\ j}) \cdot X_j\right) - 1\right) \times 100$$

where γ_{Country} denoted the main country effect and $\varphi_{\text{Country j}}$ denotes the coefficient for X_j in the specific country. Otherwise, the market price premium is the main country effect. Spain is the reference because it is the country with the lowest main country effect in all models.

Figure 9 displays for all models the country price premium as a function of each determinant. Given that differentiation is not moderated by the country for upscale hotels, the price premium remains at the values provided by Table 2 whereas for 75th percentile is similar in the case of France and the UK but not for Italy whose price premium can improve considerably through high differentiation. For OLS and 50th percentile the price premium for all countries respect to Spain are negatively influenced by standardization, which is similar for economy hotels, except in the UK, where the standardization allows to achieve higher price premiums compared to the rest of countries.

Concerning Category, Figure 9 shows the UK price premium is the highest in most cases and the heterogeneity of the Italian price premium that it is negative with respect to Spain

for 1- and 2-star hotels and it is positive from 3 to 5-star hotels (except at 50th percentile where price premium is positive from 4-stars hotels). Even for upscale hotels, it is higher than the French price premium for 5-star hotels.

French and Italian price premium decreases as the level of online reputation increases (Figure 9) and Italian price premium can even be negative. Thus, French, and Italian high reputation hotels command smaller market price premium than low reputation ones, which usually attain the highest price premium, except for economy hotels which command static price premium due to lack of moderation. The price premium for UK midscale and upscale hotels is positively influenced by online reputation while for OLS it is negatively influenced.

Regarding *Competition*, all countries suffer a decrease in the price premium respect to Spain, which can become negative for high values of *Competition*. The sharp falls in French economy and lower midscale hotels and British hotels (except for economy hotels) stand out.

Concerning *Distance*, price premium respect to Spain is stable for 75th percentile in all countries due to lack of moderation. For all other models, premiums in all countries can improve respect to Spain by locating in crowded areas, except for French upscale hotels whose price premium experiences a strong increase as *Distance* increases.

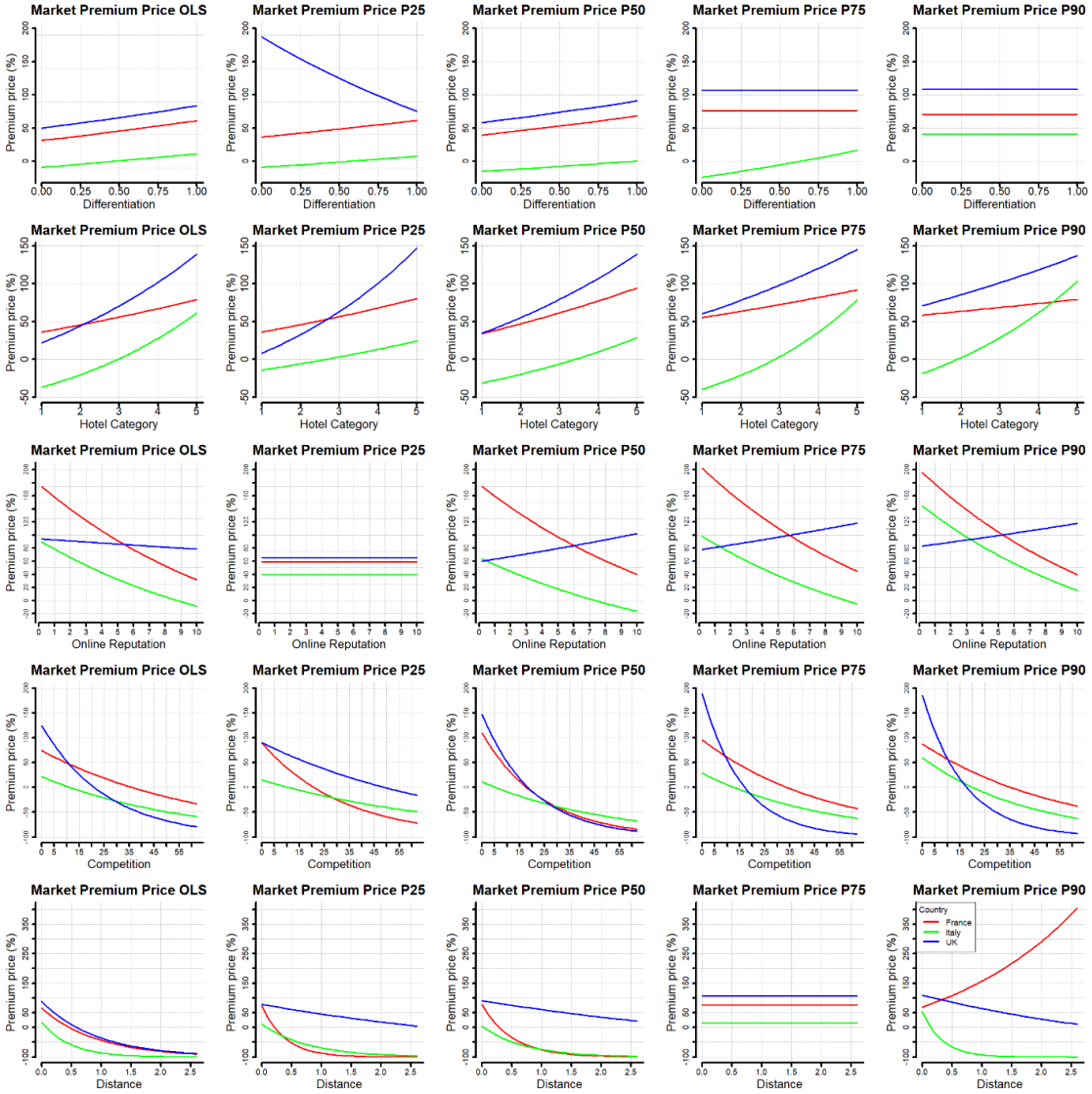


Figure 9. Country price premium (%) as a function of each determinant.

5. Conclusions and limitations

Prior research has shown the relevance of both international competitiveness and the image of hotels (Lee et al., 2017) as well as their local knowledge and adaptation to countries of operation (Woo & Mun, 2020). Also, the overall relevance of online information for travelers (Yang et al., 2018) and due to the utmost relevance of location and spatial concentration decisions (Marco-Lajara et al., 2014), we base on cross-nation methodology to elucidate the differential effects of strategic hotel pricing decisions depending on the country-of-operation. Thus, we performed a comparative analysis with

a wide dataset of hotels in four countries. Our findings are based on a quantile regression analysis that contemplates heterogeneous effects over price distribution. We provide a new perspective to hotel pricing research by showing how country can moderate some relationship(s) between determinants and price even in developed markets.

5.1 Theoretical implications

Firstly, our work encompasses several markets, which has allowed us to analyze in a broader context the role played by each price determinant in a more universal way finding out which determinants have a more globalized role, and which are more local in hotel pricing management in developed markets, thus surpassing limitations from previous studies. Second, our study contributes to reducing the lack of moderator identification in previous hotel price hedonic studies (Arora & Mathur, 2020) and highlights the moderating role of the country in the effect intensity of some determinants and even its valence, which allows us to delve deeper into the country-level differences. Additionally, our results expand on the previous studies (Arora & Mathur, 2020) that confirm the existence of a price premium associated with the country, providing us with a novel finding that this premium is not homogeneous for all hotels in the same country and its magnitude can depend on reputational attributes, location in relation to competitors, and the services on offer.

Regarding the standardization-vs-differentiation confrontation (Yu et al., 2014), given that the effect of differentiation in most cases is negative or null, it is confirmed that the service standardization in developed markets is a determinant that allows either to increase prices (economy hotels in UK and Spanish lower midscale hotels) or to provide benefits by saving the cost of implementing additional services or offering them for free (Lin, 2017). Only in the Italian upper midscale hotels does the differentiation of services

allow prices to be increased, which may be supported by the lower penetration of international chains in this market (Horwath HTL, 2018).

As expected, the global role of hotel category as a quality signal to reduce information asymmetry (Manes & Tchetchik, 2018) is confirmed. Although, the intensity of its effect is moderated by country, which can be partly explained by its different regulation, even in developed markets (Table 1). In Spain, it has lost significant validity, which may be due to the inconsistency in the regulations (Núñez-Serrano et al., 2014).

The heterogeneity in the degree of online reputation incorporation in price management is verified, except for economy hotels. The UK is the market with the strongest inclusion of online reputation as price determinant followed by Spain, which partly compensates the loss of validity of Spanish category as a quality signal (Manes & Tchetchik, 2018), being a less strategic and more tactical market whereas in the UK, the incorporation of online reputation in price management has not reduced the validity of the category. France and Italy are purely strategic markets (except for economy hotels) that only consider category as a reputational signal (Abrate & Viglia, 2016).

Finally, regarding agglomeration-vs-competition confrontation (Becerra et al., 2013; McCann & Folta, 2008), results show that in developed markets, the benefits from locating close to competitors outweigh the negative effects of competition, except in French economy and lower midscale markets and in the UK markets (except in economy hotels). Thus, both intensity and valence of the global agglomeration effect is moderated by the country. Given the null or negative role of differentiation in services, our results extend previous studies about which agglomerations are more beneficial (Lee & Jang, 2015), since they confirm that undifferentiated hotel agglomerations can obtain more benefits than differentiated ones in developed markets, except for the case of Italian upper midscale hotels for which differentiated agglomerations are more beneficial.

5.2Managerial implications

First, hotel managers and international chains that operate in developed markets must bet on undifferentiated service offers with respect to competitors, except for those that operate in the Italian upper midscale market. Additionally, they must locate near to competitors due to the benefits that they can obtain relating to price (with the exceptions noted above). Second, given the relevant role that the agglomeration effect has on the investment decisions of international chains, the Spanish and Italian hotel markets are the most attractive regarding the decision about investing in new properties in developed markets. On the contrary, France (for economy and lower midscale hotels) and the UK are the least attractive markets due to the global competition effect. Finally, hotel managers operating in the UK and Spain must implement a more dynamic and tactical price management, incorporating online reputation compared to the more static nature of the French and Italian market and Italian (except for economy hotels) (Abrate & Viglia, 2016). These insights allow us to propose a differentiated pricing dashboard for each country and price cluster (Figure 2).

5.3 Limitations and future research

This study includes some limitations that can direct future research. First, the countries included have a tourism sector with a high level of competitiveness (World Economic Forum, 2019). Future research should consider other less competitive developed markets to strengthen the results obtained from our work through a global understanding of the moderating role of country in the impact of price determinants.

Second, the study provides evidence of the moderation role of country on price determinants through a simplistic incorporation of dummy variables. Future research could explore alternative ways of examining the specific national factors that influence price determinants. Third, our study shows the heterogeneity effect of online reputation

on price according to country, but future research should incorporate the origin of customers' online reviews since its effect is influenced by cultural and national customer aspects (Tang, 2017). Finally, our study has considered annual prices assuming a static approach for hotel price, future research should consider the incorporation of the dynamic nature of hotel price.

Acknowledgements

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756

Appendix A: Sample descriptive statistics and model estimation

Variable	Mean	St. dev.	Median	Min	Max
lnPrice	4.370	0.494	4.288	3.305	7.204
Size	109.5	117.900	79	3	1989
Age	2000	25.065	2004	1575	2017
N_Serv	3.332	3.219	3	1	28
H_Dif	0.978	0.114	1	0	1
Category	3.405	0.796	4	1	5
Online_Reputation	7.383	1.114	7.500	0.200	10
Competition	5.408	10.396	1.824	0.060	62.903
Distance	0.028	0.079	0.010	0	2.617
Hotel_type\Country %	**Spain**	**France**	**Italy**	**UK**	
Urban_Hotel	56.203	61.475	65.196	73.333	
Hotel_type\Country %	**Spain**	**France**	**Italy**	**UK**	
Aparthotel	8.074	1.639	0.490	1.905	
Hotel	91.230	97.814	99.510	97.619	
Hostel	0.695	0.546	-	0.476	

Table A.1. Sample descriptive statistics.

	OLS	0.25		0.5	0.75		0.9
	Alternative	Null	Alternative	Alternative	Null	Alternative	Alternative
Intercept	5.016***	4.347***	4.713***	4.760***	5.661***	6.278***	7.953***
France	0.472***	0.470***	0.476***	0.516***	0.616***	0.566***	0.534***
Italy	0.104***	0.007	0.069**	0.027	-0.048	0.145**	0.344***
UK	0.602***	0.582***	0.574***	0.642***	0.864***	0.727***	0.733***
Size	1.4E-4**	2.4E-4***	2.6E-4***	1.0E-4	1.5E-4	2.0E-5	1.5E-4
Age	-3.3E-4	-1.7E-4	-3.6E-4	-2.5E-4	-5.2E-4	-8.1E-4	-0.001**
Hotel	-0.181***	-0.093***	-0.056	-0.116***	-0.280***	-0.299***	-0.622***
Hostel	-0.313***	-0.169**	-0.127	-0.214*	-0.233	-0.378***	-0.670***
N_Serv	0.002	-0.004*	-0.001	0.001	0.001	0.004	0.009*
Urban_Hotel	-0.017	0.020	0.010	-7.0E-4	-0.002	-0.030	-0.064**
H_Dif		-0.103***			-0.059		
Category		0.169***			0.231***		
Online_Reputation		0.060***			0.054***		
Competition		0.003***			0.009***		
Distance		-0.472**			-0.468***		
H_Dif×Spain	-0.202*		-0.167***	-0.187***		-0.078	-0.013
H_Dif×France	-0.030		0.111	0.213		0.216	-0.106
H_Dif×Italy	0.285		0.089	0.165		0.424***	0.366**
H_Dif×UK	-0.232		-0.659***	-0.112		0.114	0.090
Category×Spain	0.162***		0.138***	0.170***		0.196***	0.225***
Category×France	0.231***		0.209***	0.263***		0.249***	0.256***
Category×Italy	0.398***		0.231***	0.327***		0.468***	0.455***
Category×UK	0.331***		0.345***	0.314***		0.303***	0.307***
Online_Reputation×Spain	0.075***		0.087***	0.069***		0.075***	0.076***
Online_Reputation×France	0.017		0.033	-1.0E-4		0.009	0.002
Online_Reputation×Italy	-0.004		0.032	0.030		0.008	-0.050
Online_Reputation×UK	0.066***		0.052**	0.092***		0.096**	0.094**
Competition×Spain	0.015***		0.013***	0.020***		0.020***	0.018***
Competition×France	-0.010		-0.018**	-0.022**		-0.005	-0.003
Competition×Italy	-0.002*		-0.001	-9.0E-5		-0.001	-0.006**
Competition×UK	-0.023***		-5.0E-4	-0.029***		-0.043***	-0.042***
Distance×Spain	-0.239		-0.161	-0.256*		-0.199	-0.421***
Distance×France	-1.081***		-2.604***	-2.237***		-0.417	-0.123
Distance×Italy	-2.132***		-1.295**	-1.672*		-1.851**	-3.445***
Distance×UK	-0.505***		-0.204*	-0.429***		-0.554***	-0.665***
R^2	0.3967	0.2319	0.2571	0.2713	0.2392	0.2858	0.3107

*p<0.1 **p<0.05 ***p<0.01

Table A.2. Model estimation.