

Incentives of international and local hotel chains to invest in environmental quality

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This paper examines the extent to which the incentive of hotel chains to invest in environmental quality is dependent on whether they are locally or internationally well established. The author shows that there are two factors which give an international chain less incentive than a local chain to invest in the maintenance of the local environment: the 'public good' characteristic of environmental quality and the fact that the nature of the environment is a key factor in a destination's international competitive advantage.

Keywords: environmental quality; hotel chain; multinationals; horizontal and vertical differentiation; public good

The presence of hotel chains in the lodging industry continues to increase. In some countries, they are already predominant: for example, 70% of hotels in the USA are part of a chain. In other countries, they have a smaller, but growing presence: according to the Spanish Hotel Chains Association (1999), chains accounted for all 27.02% of all hotels in the country in 1999, compared to 17.8% only four years earlier.

Another important feature of the hotel industry is its increasing international expansion, as can be seen in the case of Spain (Urtasun, 2001). To take the examples of two of the most important Spanish hotel chains (Crédit Suisse First Boston, 2000), the Sol-Melia Corporation has, under various forms of control, 49% of its hotel establishments outside Spain, and over 66% of the hotel establishments controlled by Barceló are outside the country.

The aim of this paper is to study the ways in which hotel chains' incentives to invest in environmental quality are influenced by whether their business is predominantly local or international.¹ The analysis focuses on environmental quality because the environment is, to an ever increasing extent, one of the main

inputs of the tourism product. Bywater (1992) states that the demand side of the tourism industry is becoming more aware about environmental issues, even if the pace of development of this awareness varies among consumer segments and countries.

This study emphasizes two aspects of environmental quality. The first of these is the presence of quality externalities among hotel establishments in the provision of environmental quality. Indeed, a distinguishing feature of the hotel industry is that the quality of a specific resort affects the environment and thus the quality of the region in which it is located, so that there are externalities across hotel owners in a specific zone. For instance, the design of the surrounding buildings can be as important as that of the hotel itself. Similarly, residents at one hotel are likely to meet residents of neighbouring hotels in restaurants, at the beach, etc, and so the consumer's choice of location will be influenced by the general characteristics of the area, regardless of the characteristics of a particular hotel. Most importantly, hotels can be more or less environment-friendly depending on how they dispose of rubbish, waste-water etc. Obviously the impact of one hotel on the environment has consequences for the perceived quality of all the hotels in the area. Thus externalities across hotel establishments constitute a key factor in understanding the industry. The presence of these externalities creates a commons problem: quality is jointly produced by all hotel owners in the region. As a result, there will tend to be under-provision of quality (Baumol and Oates, 1988).

The second aspect of environmental quality emphasized here is the fact that the nature of the environment is a key factor in international competitive advantage to any hotel establishment in a given destination. As an example, Huybers and Bennet (2000) study the relative importance of the natural environment on the choices made by UK prospective tourists regarding their overseas holiday destinations. They establish 'the importance of the environment among the attributes of holiday destinations. It was found that potential overseas tourists were willing to pay a substantial premium to visit a destination with a high level of environmental quality.'

These two aspects of environmental quality are the key factors behind the finding of this paper: namely, that the incentive of a local hotel chain to invest in environmental quality is greater than that of an international chain. The local hotel chain internalizes to a greater extent than an international chain the external impact of its environmental investments. Furthermore, if an international chain invests in the environmental quality of a given region this reduces the attractiveness of the other tourist regions in which it is established.

The remainder of this paper is organized as follows. The next section presents the basic model and the subsequent section then analyses the incentives of hotel chains to invest in environmental quality. The final section summarizes the conclusions, discusses empirical evidence and suggests future lines of research.

The model

The model includes two tourist regions, several hotel establishments and two tour operators. It is a model of horizontal differentiation à la Hotelling (determined by the location of hotel establishments in either region) and of

vertical differentiation (determined by the environmental quality of the region in which the hotel is located).² There are two tourist regions in the world, A and B . Each is located at one end of a line of distance 1: region A at the left-hand end and B at the right-hand end. World tourists are uniformly distributed along the line. In each region $R \in \{A, B\}$ there are n_R hotel establishments. Each of these may belong to an international chain, to a local chain, or to no chain. Each hotel establishment can invest in quality.

The study focuses on environmental quality, ignoring the idiosyncratic qualities of particular hotels. As noted above, in focusing on environmental quality, quality externalities among hotel establishments must be an essential building block in the analysis. To emphasize the presence of such quality externalities among producers, the extreme assumption is made that the quality of a hotel is the quality of the region in which it is located, disregarding the possibility that hotel establishments within a region can be differentiated. Thus the quality of region R (and of all hotel establishments within it) is jointly determined by the environmental quality of all hotel establishments in the region (as specified below).

To present the model in detail, we take as given exogenously the number of hotel establishments in each region, and whether they belong to a local chain, an international chain or no chain at all. There are n hotels of exogenous capacity k in both regions A and B ($n = n_A + n_B$). The model has the following stages.

Stage 1

Each hotel establishment i in each region R invests $Q_{Ri} \geq 0$ in environmental quality at a cost $c(Q_{Ri})$, where $c'(Q_{Ri}) > 0$, $c''(Q_{Ri}) > 0$, and $c'(0) = 0$.

It is assumed that the cost of quality investment does not depend on whether or not the establishment belongs to a hotel chain. It might be thought that a hotel chain would enjoy economies of scale when investing in environmental quality. However, since it is unclear how these economies would be influenced by whether the chain was international or local, and since the focus here is on the comparison of international with local chains, the presence of chain economies of scale in quality investments is not considered.

The quality of each region (and consequently of each hotel establishment in the region) is determined by the investments of all hotels in that region. That is, the quality of region R (and each of the hotel establishments within it) is:

$$q_R = \alpha_R \cdot \frac{\sum^{n_R} Q_{Ri}}{n_R}.$$

The quality q_R is determined by the amount of investment undertaken by all hotel establishments $\sum^{n_R} Q_{Ri}$, multiplied by a region idiosyncratic parameter α_R , and all this normalized by the number of establishments n_R in the region. α_R is to represent that, in a given time, the environmental potential of a region is provided exogenously, say by natural or non-natural conditions. Under this specification, a new hotel establishment that does not invest decreases the environmental quality of the region.

Stage 2

Hotel establishments in regions A and B distribute their capacities through tour operators TO_A and TO_B , respectively. The TO and hotel establishments in each region bargain and agree to share the net operating profits π of tourism accommodation: the TO keeps $(1 - \delta) \cdot \pi$ while the hotel gets $\delta \cdot \pi$. It is assumed that the variable costs of tourism accommodation (incurred by hotel establishments) and of distribution (incurred by the TO) are zero. Hence, net profits π are simply the price paid by tourists times the number of tourists. Since all hotel establishments are alike, prices are the same for all hotels in a region. Furthermore, in case there is excess capacity, hotel establishments share all visitors equally. Each tour operator TO_R sets price p_R to maximize its profits $(1 - \delta) \cdot \pi$, taking as given the price set by the other TO. Hence the Nash equilibrium will be derived on prices.³

Stage 3

Tourists are uniformly distributed along the world line of distance 1. They have a unit distance cost of transportation τ . That is, for a tourist located at x , going on vacation to region A , there will be a transportation cost of $\tau \cdot x$, whereas going to region B will involve a cost of $\tau \cdot (1 - x)$. The utility for a tourist located at point x of going to region R of quality q_R and price p_R is:

$$u(x, R) = r + v \cdot q_R - p_R - \tau \cdot d(x, R),$$

where r represents the utility of going on vacation to any region, v captures the effect of the specific quality of the region, and $d(x, R) \in \{x, (1 - x)\}$ is the distance between x and R . Then, given their location, the prices determined by the TO and the environmental quality of each region, the tourists decide whether to go to region A or B .⁴

Environmental quality

This section analyses the incentives for environmental quality investments by hotel establishments, depending on whether they are part of a local hotel chain, an international chain, or no chain at all. We examine the process 'backwards', first deriving tourism demand, then the pricing behaviour of tour operators, and finally the incentives to undertake quality investments.

Tourism demand

At the third stage, tourists decide on the destination for their vacation. The quality of a hotel in regions A and B is q_A and q_B , respectively. The prices determined by the TOs are p_A and p_B , respectively. Then, the utility for a tourist located at x of going to A or B is, respectively:

$$u(x, A) = r + v \cdot q_A - p_A - \tau \cdot x,$$

$$u(x, B) = r + v \cdot q_B - p_B - \tau \cdot (1 - x).$$

Let x^* be the location of the tourist who is indifferent as to region A or B ; that is, the tourist such that $u(x^*, A) = u(x^*, B)$. Through some simple algebra we obtain:

$$x^* = \frac{v \cdot (q_A - q_B) - (p_A - p_B) + \tau}{2\tau}.$$

Clearly, given prices and qualities, all tourists located left of x^* prefer to go on vacation to region A , whereas all tourists located right of x^* prefer to go on vacation to region B . Hence, the demand faced by region A is $D_A = x^*$, and $D_B = (1 - x^*)$ is the demand faced by region B . Notice that both demand functions depend on relative quality and prices, and on transportation costs.

Tour operator pricing

Each TO (TO_A and TO_B) distributes the capacity of one region. The price for each hotel in a given region R is the same since they all exhibit the same quality q_R . Thus, each TO sets the price to maximize its profits, taking into account that its profits are a $(1 - \delta)$ portion of the net benefits of the region. Hence, TO_A

$$\max_{p_A} (1 - \delta) \cdot p_A \cdot x^* \text{ subject to } n_A \cdot k \geq x^*,$$

and TO_B

$$\max_{p_B} (1 - \delta) \cdot p_B \cdot (1 - x^*) \text{ subject to } n_B \cdot k \geq (1 - x^*).$$

As noted above, it is assumed that k is sufficiently large for the restrictions to hold, and we forget about them. Then, by solving first-order conditions and checking that second-order conditions are satisfied, equilibrium prices⁵ (p_A^* , p_B^*) are determined:

$$\begin{aligned} p_A^* &= \tau + \frac{1}{3} \cdot v \cdot (q_A - q_B), \\ p_B^* &= \tau - \frac{1}{3} \cdot v \cdot (q_A - q_B). \end{aligned}$$

Environmental quality investments

In the first stage, each local hotel establishment can invest in environmental quality, whether it belongs to an international or a local chain. On the one hand, there are n_A hotel establishments in region A and n_B hotel establishments in region B . A chain is formed by \hat{n} hotel establishments, with \hat{n}_A in region A and \hat{n}_B in region B . Finally, and without loss of generality, we take region A as the home region of the chain. Therefore, a completely local chain will be formed only by hotel establishments in region A , whereas an international chain will also have hotel establishments in the rest of the world (region B), allowing for different degrees of internationalization (larger or smaller \hat{n}_B).

To begin with, and as a benchmark, take a hotel establishment in region A that does not belong to a hotel chain. Then this hotel establishment would $\max_{Q_A} \pi_i$ where

$$\pi_i = \delta \cdot p_A \cdot \frac{x^*}{n_A} - c(Q_{Ai}).$$

Notice that $\frac{x^*}{n_A}$ is the share of tourism demand in region A that this establishment captures. The first-order condition is:

$$\delta \frac{1}{n_A} \left(\frac{\partial p_A}{\partial Q_{Ai}} \cdot x^* + \frac{\partial x^*}{\partial Q_{Ai}} \cdot p_A \right) = c'(Q_{Ai}). \quad (1)$$

Thus, investing Q_{Ai} in environmental quality implies an increase in the price received by the hotel establishments in region A and an increase in demand for the region. When deciding how much to invest, the hotel establishment takes into account only the impact on its own revenue.

More generally, a hotel chain chooses environmental investments in each hotel establishment such as to maximize the profits of the whole chain:

$$\max_{\hat{Q}} \pi(\hat{n}_A, \hat{n}_B),$$

where \hat{Q} denotes the vector of quality investments of each of the hotel establishments belonging to the chain, and where

$$\pi(\hat{n}_A, \hat{n}_B) = \delta \cdot \left[\hat{n}_A \cdot \left(p_A \cdot \frac{x^*}{n_A} \right) + \hat{n}_B \cdot \left(p_B \cdot \frac{1-x^*}{n_B} \right) \right] - \sum c(Q_{Ri}),$$

with $\sum c(Q_{Ri})$ being the (separable) costs of investing in all the hotel establishments of the chain. Then, in order to decide how much to invest in an establishment i in the home region (region A), the first-order condition with respect to Q_{Ai} is:

$$\delta \left[\frac{\hat{n}_A}{n_A} \left(\frac{\partial p_A}{\partial Q_{Ai}} \cdot x^* + \frac{\partial x^*}{\partial Q_{Ai}} \cdot p_A \right) + \frac{\hat{n}_B}{n_B} \left(\frac{\partial p_B}{\partial Q_{Ai}} \cdot (1-x^*) - \frac{\partial x^*}{\partial Q_{Ai}} \cdot p_B \right) \right] = c'(Q_{Ai}). \quad (2)$$

Notice that now the first term of the left-hand side of Equation (2) is multiplied by \hat{n}_A , the number of hotel establishments that the chain has in the home region. This means that the more hotel establishments the chain has in A , the higher is the incentive to invest in the home region. This is the case because the higher prices and higher demand due to quality investments in establishment i also affect the other hotel establishments of the chain in the region.

On the other hand, notice that the second term,

$$\left(\frac{\partial p_B}{\partial Q_{Ai}} \cdot (1-x^*) - \frac{\partial x^*}{\partial Q_{Ai}} \cdot p_B \right)$$

is negative. Investing in quality in a hotel establishment in the home region (region A) has the effect of reducing the demand for hotels owned by the chain in other parts of the world and the price they can charge. Furthermore, notice that this expression is multiplied by \hat{n}_B/n_B , the share of the supply of the chain in the rest of the world. This means that the more hotel establishments the chain has in B , the lower is the incentive to invest in quality in its hotels in region A .

We now state the following proposition.

Proposition. A local hotel chain has a larger incentive to invest in environmental quality in each of its establishments than an international chain. More specifically:

- (1) The larger the accommodation capacity of a chain in the home region (larger \hat{n}_A), the larger is its incentive to invest in environmental quality in its hotels in the home region.
- (2) The more international a hotel chain becomes (larger \hat{n}_B), the less it will invest in environmental quality in each of its hotels in the home region.
- (3) When the international chain locates abroad in regions that (a) have a higher environmental quality level than the home region ($q_A < q_B$) and (b) are weakly horizontally differentiated from the home region (small τ), then the incentive of the international chain to invest in the home region is even lower.

Proof. Points (1) and (2) have been proven above. In order to prove point (3) of the proposition, notice that with some computations we can show that:

$$\left(\frac{\partial p_B}{\partial Q_{Ai}} \cdot (1 - x^*) - \frac{\partial x^*}{\partial Q_{Ai}} \cdot p_B \right) = \frac{-3v\alpha_A}{6n_A} + \frac{v^2\alpha_A(q_A - q_B)}{6n_A\tau}.$$

This expression (as explained above) is negative. However,

$$\frac{v^2\alpha_A(q_A - q_B)}{6n_A\tau}$$

can be negative or positive, depending on whether $(q_A - q_B)$ is positive or negative. Notice that

$$\frac{v^2\alpha_A(q_A - q_B)}{6n_A\tau}$$

is smallest (more negative) when $q_A < q_B$ and τ is small. *QED*

On the one hand, the environmental quality of a region (and of the hotel establishments within it) is characterized as a ‘public good’ jointly produced by all hotel establishments in the region. Since a local chain appropriates a larger proportion of the returns on investment in quality than a single hotel establishment, its incentive to invest in environmental quality is also greater. This increases with the share of the supply in the region it controls, since internalization occurs to greater extent the greater that share becomes. On the other hand, competitive advantage at a global level is provided by the environmental quality of the region. To the extent that, for an international chain, improving the environmental quality of a region involves reducing the competitive advantage of its hotels in the other region, its incentive to invest will be less than that of a hotel or a hotel chain located only in one region. This is so because investing in region *A* involves reducing the prices charged by and the demand for its hotels in the other region (point (2) of the proposition).

Finally, notice that the incentive for the international chain to invest in the home region also depends on the nature of the other regions in which the chain’s hotels are located. When they are located in regions that have a greater competitive advantage in respect of environmental quality, and these regions

compete strongly with the home region, the incentive is least. This is so because investing in environmental quality in the home region would greatly decrease demand for the chain in the rest of the world (since τ is small), and tourists were paying a higher price in region B (since $q_A < q_B$) – point (3) of the proposition.

Discussion and concluding remarks

This paper has presented a formal analysis of the incentives of hotel chains to invest in environmental quality, depending on whether they are international or local chains. As a necessary step, a model was presented that allowed the key elements in the analysis to be introduced. This is, it is suggested, an important contribution of the paper. Then, some insights were provided regarding the role played by the geographical distribution of hotel chains in the incentive to invest in environmental quality. It was shown that this incentive was found to be greater for local than for international chains.

It is suggested that the model captures clearly the impact of the geographical distribution of hotel chains on the degree of incentive to invest in environmental quality. However, there are other significant factors. For example, economies of scale, whether technologically or demand based, can have an impact. In such a case, a larger international hotel chain might end up investing more in environmental quality in each of its establishments than a local chain. Nevertheless, since there is *a priori* no clear way in which such economies can be related to the geographical distribution of chains, their influence has not been included in this analysis.

There is some empirical analysis of the factors that determine the deployment of environmental management practices in the hotel industry. One aspect that has been examined is the effect of being part of a hotel chain in such a deployment. Alvarez, Burgos and Cespedes (2001) and Gonzalez and León (2001) found the effect to be positive and statistically significant. That is to say, hotel establishments which belong to a chain carry out environmental practices to a greater degree than independent hotels. However, neither of these studies distinguishes between local and international chains, and therefore cannot be related directly to the results presented here.

There are many outstanding areas for further research, including the expansion strategies of hotel chains and the role played by environmental considerations in the formulation of those strategies. There is also a need for policy recommendations. And finally, the framework presented in this paper can be used in the study of other issues in the international hotel industry – for example, the role of tour operators in the home and host regions in the decision to invest in quality (an issue partly explored by Calveras and Vera-Hernández, 2002).

Endnotes

1. In this paper a 'hotel chain' is defined as an enterprise that controls and manages several hotel establishments. When adopting an international perspective, a 'multinational hotel chain' is defined as an enterprise that controls and manages several hotel establishments located in at least

two countries. The analysis focuses on horizontal MNEs, since international hotel chains clearly fall within this category. With respect to multinational hotel chains, the eclectic approach to multinational enterprise theory is adopted (Dunning, 1977; see Caves, 1996, for a thorough introduction to the literature on multinational enterprise). Within the eclectic approach, the literature on international hotel chains is sparse. The most interesting contributions are the analyses undertaken by Dunning and McQueen (1981, 1982), who revise the eclectic theory within the framework of multinational hotel chains.

2. See Tirole (1988) for an introduction to the model of spatial competition à la Hotelling and to the modelling of vertical differentiation.
3. The literature on the industrial organization of the tour operator package industry is inconclusive with regard to the market power of TOs (Baum and Mudambi, 1994; Sheldon, 1986; Gratton and Richards, 1997). This study models the TO industry in a reduced way by assuming that there is a single TO in each region which enjoys some exogenous bargaining power with the hotel owners described by $1 - \delta$. δ ranges from 0 to 1, with δ near 1 representing the assumption of a contestable market and a δ closer to 0 representing a TO industry with market power.
4. It is assumed throughout that r is large enough to mean that individuals always go on vacation to either region A or B. Furthermore, it is also assumed that the capacity of accommodation in either region is never binding: that is, k is large enough.
5. Notice that this price is independent of the actual value of δ , and it is the price that the owners of the hotel establishments would set if they colluded to maximize profits.

References

- Alvarez, M.J., Burgos, J.J., and Cespedes, J.J. (2001), 'An analysis of environmental management, organizational context and performance of Spanish hotels', *Omega*, Vol 29, pp 457–471.
- Baum, T., and Mudambi, R. (1994), 'A Ricardian analysis of the fully inclusive tour industry', *Service Industries Journal*, Vol 14, No 1, pp 85–93.
- Baumol, W.J., and Oates, W.E. (1988), *The Theory of Environmental Policy*, 2nd edition, Cambridge University Press, Cambridge.
- Bywater, M. (1992), *The European Tour Operator Industry*, Economist Intelligence Unit, London.
- Calveras, A., and Vera-Hernandez, A.M. (2002), *Quality Externalities in a Vertical Structure: What is the Impact of Tour Operators?*, University College of London Discussion Paper 02-05.
- Caves, R. (1996), *Multinational Enterprise and Economic Analysis*, 2nd edition, Cambridge University Press, Cambridge.
- Dunning, J.H. (1977), 'Trade, location of economic activity and the MNE: a search for an eclectic approach', in Ohlin, B., Hesselborn, P.-O., and Wijkman, P., eds, *The International Allocation of Economic Activity: Proceedings of a Nobel Symposium Held at Stockholm*, Macmillan, London, pp 395–418.
- Dunning, J.H., and McQueen, M. (1981), 'The eclectic theory of international production: a case study of the international hotel industry', *Managerial and Decision Economics*, Vol 2, No 4.
- Dunning, J.H., and McQueen, M. (1982), 'The eclectic theory of the multinational enterprise and the international hotel industry', in Rugman, A.M., ed, *New Theories of the Multinational Enterprise*, Croom Helm, London, chapter 5.
- Gonzalez, M., and León, C.J. (2001), 'The adoption of environmental innovations in the hotel industry of Gran Canaria', *Tourism Economics*, Vol 7, No 2, pp 177–190.
- Gratton, C., and Richards, R. (1997), 'Structural change in the European package tour industry: UK/German comparisons', *Tourism Economics*, Vol 3, No 3, pp 213–226.
- Huybers, T., and Bennet, J. (2000), 'Impact of the environment on holiday destination choices of prospective UK tourists: implications for Tropical North Queensland', *Tourism Economics*, Vol 6, No 1, pp 21–46.
- McQueen, M. (1982), 'Appropriate policies towards multinational hotel corporations in developing countries', *World Development*, Vol 11, No 2.
- Ritchie, J.R. Brent, and Goeldner, C., eds (1994), *Travel, Tourism and Hospitality Research: A Handbook for Managers and Researchers*, John Wiley & Sons, New York.
- Sheldon, P.J. (1986), 'The tour operator industry: an analysis', *Annals of Tourism Research*, Vol 13, pp 349–365.

Spanish Hotel Chains Association (1999), *Annual Report*.

Tirole, J. (1988), *The Theory of Industrial Organization*, MIT Press, Cambridge, MA.

Urtasun, A. (2001), *Estrategias de localización, posicionamiento de producto y afiliación a una cadena: aplicación al sector hotelero español*, PhD thesis, Universidad Carlos III de Madrid.

Williams, A. (1995), 'Capital and the transnationalisation of tourism', in Montanari, A., and Williams, A.M., eds, *European Tourism: Regions, Spaces and Restructuring*, John Wiley & Sons, Chichester.