An economic model for tourism destinations: Product sophistication and price coordination

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Highlights

- We identify the destination’s key features: product sophistication and price coordination.
- We model the optimal development strategy of the tourism destination.
- We state a Coordination theorem and a Love for Variety theorem.
- We classify destinations based on type of coordination and type of resources.

Abstract

The paper models the optimal development strategy of a tourism destination by identifying and analyzing two key economic features: i) the long-term choice of whether to invest in the enhancing of natural and/or cultural resources (which act as common goods in the destination) or to increase the degree of sophistication of the tourism product (here intended as the variety of complementary services to accommodation that are demanded by tourists); ii) the short-term choice of whether or not to implement price coordination among local firms, a problem stemming from the anticommon nature of the tourism product. We build a two-stage model for the tourism destination, thus identifying the optimal degree of sophistication of the tourism product and the optimal institutional arrangement in terms of coordination. This approach helps shed light on the rationale underlying the development path taken by different destinations, thus overcoming some of the limits of existing literature and providing a simple taxonomy for the observed diversity of real-world destinations. Accordingly, we provide a classification of destinations based on the type of coordination and on whether the primary resource is natural, cultural or organizational.

1. Introduction

The literature in tourism studies has established the tourism destination (TD) as one of its key concepts. Indeed, many papers pivot around the organization, management, development, and sustainability of tourism destinations. From the researcher’s perspective, the TD embodies all the specific and problematic features of tourism, such as its systemic nature, in which “space” plays a fundamental role (Leiper, 1990). In fact, tourism supply meets demand in the destination; environmental and cultural resources, attractions and the hospitality industry are all located in the destination; the demand for tourism is revealed in the destination. In other words, the TD is the conceptual link between the complexity of the sector, the complementarity and substitutability of the many goods and services of which the tourism product consists, and the supply of available local resources. Several different definitions exist for the TD, ranging from management studies, where it is mainly interpreted as a product, to tourism geography where the destination is intended as the offer of the territory. In this paper we consider the destination from the economics perspective, as a kind of (meta) economic agent: a territorial system supplying at least one tourism product able to satisfy the complex requirements of the demand for tourism (Candela & Figini, 2012). The term “tourism product” defines what is commonly known as “a holiday”, or what tourism sociology calls the tourist’s experience.

But, where is the economics of destinations mentioned in the literature about tourism? Although its specific features are indeed discussed by other disciplines, such as geography, management, marketing and organizational studies, study of the TD from the...
Andergassen and Candela (2012, 2013). Within this framework, the present paper argues that the TD has specific focus on two specific aspects of the economics of tourism that, in our opinion, are not properly addressed by existing literature, i.e. the issue of coordination between local firms and the degree of sophistication of the tourism product. In addressing them, we extend and integrate the works of Andergassen and Candela (2012), who tackled the issue of sophistication, i.e. the supply of a variety of different local goods and services that are also demanded and purchased by tourists during their stay, and Candela et al. (2008) and Candela and Figini (2010), who addressed the issue of price coordination. Our approach follows Papatheodorou (2003), who was the first to formally analyze the issue of the complementarity and variety of services within the tourism product, and Wachsman (2006), the first to formally analyze the problem of price coordination within the destination (see also Alvarez-Albelo & Hernandez-Martin, 2009). The novelty of our paper is twofold. Firstly, we generalize the problem of coordination, tackling the main limitations in the results of Wachsman (2006) and Candela et al. (2008). Secondly, we jointly consider sophistication and coordination, thus building a unique economic model to describe the development and the organizational pattern for the TD. Our approach opens a new window through which to consider the economics of the destination, thus highlighting important policy implications for destination management and local stakeholders.

The economic model for the TD developed in this paper stems from two intertwined perspectives, empirical and theoretical. From the empirical perspective, our model aims at being consistent with the anecdotal evidence of the great diversity of tourism destinations throughout the world, which differ in their history, resources, organizational structure, institutional arrangement and specialization. In this respect, our model depicts different trajectories for the TD, hence being able to overcome the deterministic logistic shape of evolution described in the TALC model. Indeed, our set-up allows for multiple equilibria. In the same way, we are able to explain the reasons why some destinations can be locked into a certain stage of development while others skip one or more stages completely. This last problem is a key factor for potential destinations (particularly in developing countries), in which tourism has not (yet) developed, but is seen as an opportunity, often being considered a strategic path for economic development by both policy makers and local stakeholders. As we will highlight in the conclusion, our speculative theoretical framework suggests future directions in empirical research, e.g. testing whether the pattern of coordination and degree of sophistication in the tourism product are significant key factors in explaining the path of development of a given destination.

From the theoretical perspective, the destination is a novel, interesting object of study for economics. While some of the specific problems of the TD (the need to supply public goods and tackle externalities) are standard market failures which usually call for the intervention of the public sector (although Huybers & Bennett, 2003, show that the public intervention is not necessary if voluntary cooperation among local stakeholders for the management of common resources occurs), there are two specific, distinctive characteristics of the destination that are under-investigated and are also marginal issues in the standard economic theory.

1. The tourism product supplied and sold by (or within) the destination can be defined as a bundle composed of a set of elementary items. Such goods and services (accommodation, transport, shopping, attractions, events) are demanded in a complementary or substitutable way by tourists during their holiday experience. While the concept of bundle is a standard tool in economics (it is commonly used to build price indices to be applied both in theory and national accounting), what is new in tourism economics is its role as an object of study. The definition of the product as a bundle of complementary and substitutable goods opens up the issue of coordination and cooperation among local firms supplying the individual components of the holiday. In this paper, we focus mainly on the complementarity feature, which is particularly relevant for...
holidays and allows us to define the tourism product as an anticommon (Heller, 1998, 1999; Michelman, 1982). Accordingly, the holiday can only take place if the ‘permission to stay’ is granted by all firms supplying complementary services to tourists. Even if one firm only does not grant permission, the tourism activity in the destination cannot take place. Stemming from the anticommon nature of the tourism product, the relevant questions to be addressed by an economic model for the destination are: how can the anticommon problem be tackled? Is there any role that can be played by the destination management organization (DMO), paving the way for future research, both theoretical and empirical.

Section 5. Section 6 discusses the main results and caveats of the model, thus providing the intuition behind the model. Section 3 introduces and discusses the characteristics of the tourism destination although it cannot be defined as such (Candela & Figini, 2012; Michael, 2003). More specifically, in the industrial district firms either produce substitute goods (horizontal cluster) or intermediate goods which are then assembled (vertical cluster). On the contrary, in the TD, firms mainly produce complementary services that are sold directly to consumers. Brandenburger and Nalebuff (1997) call this a diagonal cluster, a concept that finds a perfect application in the TD and advocates what they call “co-operation”, that is, the co-existence of both competition and cooperation between firms. At the same time, local resources represent the main motivation for the trip, and therefore also enter the utility function of tourists. Such a combination of an item that is both an input of production and an argument of utility provides another novel economic problem to consider. Moreover, most of these resources are freely available (the landscape and the offer of territory in general) and can be considered as common goods (Hardin, 1968), while other resources can be developed by the destination, e.g. an event or an amusement park. In this respect, the relevant issues to be addressed by an economic model for destinations are: what is the process leading to the rise, the development, the specialization and the (environmental and economic) sustainability of the TD? What are the key-factors leading to the development of a tourism product based on natural and/or cultural resources rather than an institutional arrangement promoting a sophisticated tourism product? We will present and discuss the answers of our model to these questions in Section 5.

The remainder of the paper is structured as follows: Section 2 introduces and discusses the characteristics of the tourism destination, thus providing the intuition behind the model. Section 3 describes the structure and rationale of the model, its assumptions and main limitations. Section 4 focuses on the issue of coordination and the optimal institutional set-up for the destination, while the main results in terms of resource specialization, variety and sophistication of the tourism product are described in Section 5. Section 6 discusses the main results and caveats of the model, thus paving the way for future research, both theoretical and empirical.

2. The characteristics of the tourism destination

From the economics perspective, the TD does not necessarily coincide with the destination management organization (DMO), one of the possible institutional set-ups that may prevail, or with the local policy maker. Instead, the destination can be seen as a hypothetical (meta) agent, a territorial system with a specific objective function to maximize and subject to given constraints. In this respect, the economics of destinations studies the relationship between demand (by different types of tourism hosted in the destination) and supply (by the mix of firms located in the territory) for the entire tourism product. In general, a destination may offer different types of holiday for different types of tourism, each possibly characterized by a different mix of specific goods and services, including the consumption of local resources, and accommodation. Therefore, the tourism product is made up of all the tourism destination specific and non-specific goods and services that are demanded during one day of holiday; its quantity is measured through the number of overnight stays and its value is the daily price of the holiday. In the case of multi-tourism destinations, the whole tourism product can thus be interpreted as the weighted average of the many types of holiday offered in the destination. Note that in the present context, where the demand function is known with certainty, choosing the daily price (which coincides with the weighted average price of the holiday) is equivalent to choosing tourism expenditure, i.e. the aggregate price of the holiday. It is well known that many conceptions of value exist, being particularly relevant in tourism where many non-market or semi-market goods (such as environmental and cultural resources) are demanded and used. As is typical to the economic approach, we only focus on the market value of the holiday, as determined by its price, and we neglect any implication regarding the social and cultural value of tourism in the destination. Nevertheless, we indirectly capture the cultural and environmental values of the resources of the destination through price and demand effects, as in our model consumer demand changes with the perception of environmental quality.

Contrary to what can be accomplished in applied research, in a theoretical model we have to rely on strong assumptions, less descriptive of the real-world complexity of destinations but able to unfold the core of the economic problem faced by the TD. We start by identifying two necessary conditions for the development of a tourism destination, and one necessary condition for its long-term sustainability (Andergassen & Candela, 2012).

Firstly, a generic point of interest, be it natural or artificial, must exist in order for the destination to come into being. In order to keep the model as simple as possible, while maintaining its explanatory power, local tourism resources are measured through a quantitative index R, which summarizes the overall endowment of the destination (its natural, cultural and organizational resources, the accessibility of its transport system, its infrastructures, etc.). R depends on both exogenous (nature, history and culture) and endogenous factors, such as the investment undertaken by the local community – public and private sectors – to adapt the endowment in order for it to be included successfully in the tourism product, and to preserve and enhance it by building amusement parks or conference venues, by organizing events, etc. In short, any destination can be identified by its endowment of resources, the only constraint being that R ≥ 0. Given a certain quantity R, we call z its quality as it is perceived by tourists. We assume that z depends (non-positively) on the number of overnight stays, hence roughly accounting for and measuring crowding and congestion effects. The sign of the relationship between parameter z and overnight stays is a matter of discussion, and we should also consider the different case of a positive or, more generally, a non-linear relationship. In this paper we assume that a threshold in the number of overnight stays exists, after which the effects of congestion are at play. Secondly, at least one variety of local goods has to be supplied together with hospitality and the local resource, otherwise there is
no reason to visit the destination. We measure the variety of the tourism product through \( n \), the number of differentiated tourism goods and services that form the tourism bundle; each good/service is represented by the index \( i = 1, \ldots, n \). The straightforward interpretation is that the higher the number \( n \geq 1 \), the greater the level of sophistication (the variety) of the tourism product. In the limit case \( n = 1 \) only the basic service needed to access the main resource is provided in the destination.

For the sake of simplicity, we assume that there are only two firms in the destination, one hospitality firm, supplying accommodation and the other one producing all the differentiated goods/services. The assumption of just having one firm supplying all the differentiated tourism goods/services greatly simplifies the exposition without altering the quality of the results (in footnote 2 we discuss how results change if this assumption is relaxed).

We consider identical tourists endowed with a CES (Constant Elasticity of Substitution) utility function, following a long strand of literature on product differentiation which dates back to the seminal paper by Dixit and Stiglitz (1977) and that has already been applied to tourism by Papatheodorou (2003). Hence, from the point of view of demand, the consumer has to decide how to allocate a given income among a set of generic consumption goods \( y \) and a tourism product \( t \), a bundle in which local resource \( R \) is measured through its overall quality \( z \), hospitality \( h \) and a variety of goods and services \( (x_i) \).

Moreover, the supply of different varieties \( i \) of the local good \( x_i \) and the complementary hospitality service \( h \) need to coordinate their quantity, quality and price, otherwise a suitable product able to meet the tourism demand cannot be supplied. For the sake of simplicity, we only consider coordination in price (assuming that both coordination in quantity and in quality are already in place, see Candela & Figini, 2010; Wachsman, 2006) between the only hospitality firm in the destination and the firm supplying differentiated tourism related goods and services.

However, the above-mentioned conditions are insufficient to guarantee the survival of the destination in the long-term. In fact, long-term economic profitability can only be achieved if the overall tourism profits of the destination, \( \Omega \), net of the costs \( K \) borne by the destination for the investment undertaken to promote and foster the local tourism sector, are at least as large as \( \Omega^* \), which is an exogenously defined threshold that guarantees the long-term survival of the destination. This is the static equivalent of the dynamic principle in which, in terms of endogenous growth theory, the growth rate attained through specialization in the tourism activity must be at least as large as the one that can be obtained if the destination specializes in alternative activities (Lanza & Pigliaru, 1995, 2000). Concerning the market structure of the destination, we assume that both firms are monopolists. This can stem from the fact that the destination operates in a monopolistic competition regime because of the peculiarity of its local endowment \( R \) thus translating into the market power of its hospitality firm (sector) and of the firm producing differentiated tourism goods \( x_i \), since these goods are linked to the local resource and their characteristics differ across varieties (Candela, Figini, & Scorruc, 2009). We acknowledge that in reality many firms are aware of their market competencies in many destinations or the local tour operator might have higher production costs stemming from information asymmetry or weaker economies of scale and of scope: hence it is represented as a dotted line in the decision tree in Fig. 1.

An important assumption of the model is that the production costs of the two local firms are nil (taking positive average production costs into account would not alter the qualitative features but only complicate the exposition of our results) and consequently tourism profits coincide with revenues, and hence with the total expenditure of tourists in the destination. This has an interesting implication, since it allows us to reconcile the target of profit maximization (standard for economic theory) with that of maximization of tourism expenditure, the usual target for a local tourism policy. Hence, the model can correctly describe the real-world practice of looking at overall tourism expenditure as the main indicator of tourism performance for the destination.

We first describe the demand side of the model. Since overall tourism profits \( \Omega \) are equal to tourism expenditure, which is directly linked to the number of overnight stays, they, in turn,
depend on the characteristics of the local tourism product. We follow Papatheodorou (2003) and Andergassen and Candela (2012) by assuming that tourists’ demand depends on: i) the availability of natural and/or cultural resources (see also Melian-Gonzalez & Garcia-Falcon, 2003); ii) the availability of a variety of local goods and services, such as restaurants, recreational activities, wellness and sport facilities, etc., that justify tourism in the destination, beyond the enjoyment of the main resource. In this respect, we assume that tourists show "a love for variety" in the tourism product, as defined by Dixit and Stiglitz (1977).

We consider a unit mass of identical tourists endowed with a CES utility function having the following arguments: i) the length of stay $h$ of the holiday at the destination; ii) the variety of $n > 1$ differentiated tourism related goods and services $x_i$ offered at the destination, with $i = 1, 2, \ldots, n$; iii) the index measuring the perceived quality $z$ of the destination’s resource endowment $R$; iv) the consumption of a non-tourism product $y$ (which can also be considered as the holiday in an alternative destination). The tourism product is defined by a bundle $T$ including overnight stays and the whole variety of local goods, $T = \{h, (x_i)\}$.

If we name with $U_{ij}$ the sub-utility of the consumer $j$ as a tourist and with $U_{ij}^d$ the sub-utility stemming from non-tourism consumption, total utility for the agent is $U_j = U(y(j), x(j), h(j), x(j))$ and can be written through the compound CES utility function (3) (compound CES utility functions have been used within the context of industrial organization and the economics of tourism by Jiandong (2003) and Andergassen and Candela (2012, 2013), respectively):

$$U_{Tij} = z \left[ h^\gamma(j) + \left( \sum_{i=1}^{n} x_i^\delta(j) \right)^{\frac{\gamma}{\delta}} \right]^{\frac{\delta}{\gamma}}$$

(1)

$$U_{yj} = y(j)$$

(2)

$$U_j = \left( U_{Tij} + U_{yj}^d \right)^{\frac{1}{\gamma}} = \left( y^\beta(j) + z^\delta \left[ h^\gamma(j) + \left( \sum_{i=1}^{n} x_i^\delta(j) \right)^{\frac{\gamma}{\delta}} \right]^{\frac{\delta}{\gamma}} \right)^{\frac{1}{\gamma}}$$

(3)

In such a model, $0 < \beta < 1$ implies that the non-tourism good $y$ and the tourism product $T$ are gross substitutes (if $\beta = 1$, the two goods are perfect substitutes); $\gamma < 1$ implies that overnight stays $h$ and the consumption of local goods $x_i$ are gross complements (if $\gamma \to \infty$ the two goods are perfect complements). We also assume that $\beta \leq \alpha < 1$, i.e. the degree of substitutability between tourism product $T$ and non-tourism product $Y$ is not greater than the degree of substitutability among local tourism goods and services $x_i$. Finally, $z$ indicates the perceived quality of the tourism resource, such as beaches, mountains and/or the cultural heritage of the destination. The resource quality $z$ has the O-ring property, that is, it enters the utility function (1) as a multiplicative factor since tourism exists if and only if $z > 0$.

The price of the non-tourism good is taken as a numeraire, $p_y = 1, p_i$ is the price of the overnight accommodation in the hotel, $p_i$ is the price of the $i$-th variety of the local good. The budget constraint of tourist $j$ is hence:

$$y(j) + p_y h(j) + \sum_{i=1}^{n} p_i x_i(j) = I$$

(4)

where $I$ is the tourist’s overall income, which is exogenous to our analysis since tourists, by definition, are non-residents. The tourism resource $R$, generally understood as the whole endowment of the territory, is considered a public good of the destination and therefore does not appear in the budget constraint (4) (see Papatheodorou, 2003). However, this assumption does not hold if the main resource of the destination is very specific and therefore semi-private, such as an amusement park or a museum.

We assume that the perceived quality of the resource, $z$, depends positively on its quantity $R$, $z_R > 0$, but with non-increasing returns, $z_{RR} \leq 0$, and non-positively on $H$, the total number of overnight stays in the destination, since the level of satisfaction the tourist gets from visiting the resource is inversely linked to the crowding of the site, $z_H \leq 0$ with $z_{HR} \leq 0$ and $z_{RR} \geq 0$. In particular, we assume that $z$ is a continuous function of $H$ and that a threshold $\mathcal{H}$ for aggregate overnight stays exists where $z_H = 0$ for $H \leq \mathcal{H}$ and $z_H > 0$ for $H > \mathcal{H}$. With this assumption we aim to model...
the case where aggregate overnight stays reduce the quality of tourism if they exceed the threshold $H$ (we wish to thank an anonymous referee for suggesting this functional form). Let the elasticity of $z$ with respect to $H$ be:

$$\varepsilon_H = \frac{\partial z}{\partial H} \frac{H}{z} < 0,$$

where $\varepsilon_H = 0$ for $H \leq H$ and $\varepsilon_H > 0$ for $H > H$.

We first derive the individual demand function for accommodation and the differentiated goods and services, and then calculate aggregate demand functions. Given the symmetry on the supply side of tourism products $x_i$ (by assumption average production costs of goods and services are all nil), we have that $p_i = p$ for all $i = 1, \ldots, n$. Since the mass of tourists is normalized to one, aggregate demand functions $H, X_i$ and $Y$ are simply the sum of the tourist’s individual demand functions $h(i), x(i)j$ and $y(j)$, for individuals $j \in [0, 1]$. More formally, $H = \int_0^1 h(j)dj, X_i = \int_0^1 x(i)jdj$ and $Y = \int_0^1 y(j)dj$, where $H$ represents total overnight stays in the destination, $X_i$ total consumption of the complementary local good $i$ and $Y$ total consumption of other goods. We consider parameter values such that the price of overnight stays at the equilibrium is greater than the price of differentiated tourism goods and services, i.e. $p_h > p$. Note that the individual tourist is small compared with the overall mass of tourists in the destination and therefore takes the perceived tourism quality as given when making decisions about how to consume. At an aggregate level, an individual’s choices feed back into tourism quality which, in turn, affects the individual and aggregate consumption behavior. In other words, a fixed point problem has to be solved.

The following properties of aggregate demand functions can be established.

**Lemma 1.** The aggregate demand function for overnight stays in the destination is $H^*(n, R, p, p_h)$, where $H^*$ is increasing in $n$ and $R$ and decreasing in $p_h$ and $p$; the aggregate demand function for the single tourism good is $X_i^*(n, R, p, p_h)$, where $X_i^*$ is decreasing in $n$, increasing in $R$ and decreasing in $p$ and $p_h$.

**Proof.** The proof can be found in the Appendix A.

Because of the complementarity between overnight stays and tourism related goods and services, an increase in $n$ leads to an increase in the demand for overnight stays. On the other hand, an increase in $n$ reduces the demand of each single tourism good $X_i$. By fueling tourism quality, an increase in $R$ increases the demand of overnight stays $H^*$ and the demand of tourism goods $X$. Changes in prices have the standard effect on demand: the law of demand holds; assuming that the elasticity of $z$ with respect to $H$ is not too large in absolute values, the complementarity between $x_i$ and $h$ implies that an increase in $p/p_h$ decreases the demand for $H^*(X^*)$.

Given that production costs are nil, the profits of the hospitality sector are $\Pi_h(n, R, p, p_h) = pH^*(n, R, p, p_h)$ and those of the firm producing the differentiated goods and services are $n\Pi(n, R, p, p_h)$, where $\Pi(n, R, p, p_h) = pX_i^*(n, R, p, p_h)$. Overall tourism profits for the destination are:

$$\Omega(n, R, p, p_h) = n\Pi(n, R, p, p_h) + \Pi_h(n, R, p, p_h).$$

1 An increase in $p$ unambiguously reduces $H^*$. An increase in $p_h$ produces two effects on $X_i^*$. Firstly, because of the complementarity between $x_i$ and $h$, it has a direct negative impact. Secondly, since it reduces $H^*$, it increases tourism quality $z$, thereby producing an indirect positive effect on $X_i^*$. If $\varepsilon_H$ is not too large, then the former effect dominates the latter. Formal proof of this result is available from the authors upon request.

4. Coordination between firms in the destination and the optimal pricing strategy

Like all multi-stage problems, the model has to be solved backwards, and the equilibrium prices of the different coordination alternatives (second stage of the problem) have to be determined in order to obtain the optimal endowment of local resources and sophistication of the tourism product (solution of the first stage problem). In this section, we solve the second stage of the problem by moving to the supply-side and assuming that firms and destinations are price-makers. This last hypothesis is coherent with real-world tourism markets, which are often non-competitive either because firms have a monopoly or oligopoly position or, as is the case for destinations, because of the high degree of differentiation of the tourism product at a global level (Candela et al., 2009).

Hence, we investigate the characteristics of optimal pricing strategies for the TD for a given choice of $n$ and $R$.

The daily price of the holiday in the destination, $\nu$:

$$\nu = p_h + n\frac{X^*}{H^*}$$

consists of the price for accommodation services and the price of differentiated tourism goods/services multiplied by the quantity demanded per day ($nX^*/H^*$). The equilibrium quantity for the tourism product is identified by the number of days spent at the destination (the number of overnight stays, $H^*$). As already mentioned, in this set-up tourism in the destination can be interpreted as ‘permission to stay’ granted by the firms supplying the complementary services demanded by tourists while on holiday: the tourism activity cannot take place if one of the two firms fails to grant permission. For instance, tourism demand would be nil if restaurants were unavailable in the destination, or if there was no accommodation. The catchy idea regarding the existence of a unique economic good, whose property is fragmented across different firms, is known as “anticommon” and is not new in Economics (see Heller, 1998, 1999; Michelman, 1982; Parisi, Depoorter, & Schultz, 2000; Parisi, Schultz, & Depoorter, 2004) although the concept has yet to be sufficiently exploited, particularly within the field of the economics of tourism where it nevertheless finds perfect application (Candela et al., 2008). Note that anticommon is the exact opposite of the much better known “common”, a good which is available to everyone but where property rights are not well-defined (Hardin, 1968).

In a general perspective, firms in the destination have to coordinate in quality (in order to avoid a situation whereby tourists staying in a luxury hotel can only find take-away restaurants, for example) and in quantity (to guarantee there is no rationing in any of the services demanded). However, in this paper we have neglected these issues and simply focused on price coordination. We introduce three different cases: (a) no coordination, where each firm maximizes its profits; (b) price coordination by means of destination management and (c) coordination provided by a tour operator supplying an all-inclusive holiday.

4.1. No coordination

Without coordination, firms solve independent maximization problems. In particular the maximization problem for the hospitality firm is $\max_{p_h}\Pi_h$. The first order condition for this problem is:

$$\frac{\partial \Pi_h}{\partial p_h} = H^* + p_h\frac{\partial H^*}{\partial p_h} = 0$$

(6)
The firm producing differentiated goods and services faces the maximization problem $\max_{p} \Pi$. The first order condition for this problem is:

$$\frac{\partial \Pi}{\partial p} = nX' + pn \frac{\partial X'}{\partial p} = 0$$ \hspace{1cm} (7)

By considering the first order conditions (6) and (7), and assuming that second order conditions are satisfied, we obtain a system whose solution is, if existing, a Nash equilibrium (see also Wachsmann, 2006) implicitly defining the optimal values of $p_{h}$ and $P$:

$$g_{h}(n, R, p, p_{h}) = 0 \quad g(n, R, p, p_{h}) = 0$$ \hspace{1cm} (8)

For each $R$ and $n$, optimal prices for the destination can be expressed as $p_{h}^{NC} = \phi_{h}^{NC}(n, R)$ and $p = \phi^{NC}(n, R)$, firm profits are $\Pi_{h}^{NC}(n, R)$ and $n\Pi^{NC}(n, R)$, and total tourism profits for the destination are $\Omega^{NC}(n, R) = \Pi_{h}^{NC}(n, R) + n\Pi^{NC}(n, R)$.

4.2. Coordination provided by the destination management

This type of coordination, which is external to the market, takes place if both the hotel and local firm support the role and back the activity of a public authority, namely, the destination management. We then assume that this local authority is able to coordinate the local tourism sector through informational and promotional activities and sell the tourism experience in the destination (local goods and hospitality) as if it were an all-inclusive package. Formally, the analytical problem becomes the maximization of overall tourism profits (tourism expenditure) in the destination:

$$\max_{p_{h}, p} vH = \Omega(n, R, p, p_{h})$$

where $v$ is the daily price of the holiday in the destination (5). Assuming that the second order conditions are satisfied, the first order conditions for this problem are:

$$\frac{\partial \Omega}{\partial p_{h}} = H + p_{h} \frac{\partial H}{\partial p_{h}} + np_{h} \frac{\partial X}{\partial p_{h}} = g_{h}(n, R, p, p_{h}) + np_{h} \frac{\partial X}{\partial p_{h}} = 0$$

$$\frac{\partial \Omega}{\partial p_{h}} = p_{h} \frac{\partial H}{\partial p_{h}} + nX + np_{h} \frac{\partial X}{\partial p_{h}} = g(n, R, p, p_{h}) + p_{h} \frac{\partial H}{\partial p_{h}} = 0$$ \hspace{1cm} (9)

from which we get for each $R$ and $n$ the optimal price for the destination $p_{h}^{DM} = \phi_{h}^{NC}(n, R)$ and $p^{DM} = \phi^{NC}(n, R)$, firm profits $\Pi_{h}^{DM}(n, R)$ and $n\Pi^{DM}(n, R)$, and total tourism profits $\Omega^{DM}(n, R) = \Pi_{h}^{DM}(n, R) + n\Pi^{DM}(n, R)$.

The following Proposition holds by comparing systems (8) and (9) and because of Lemma 1.

Proposition 1. $p^{DM} < p_{h}^{NC}$ and $p^{DM} < p^{NC}$ and $\Omega^{DM} > \Omega^{NC}$.

Proof. The result follows from the second order conditions of the problem and the comparison of systems (8) and (9). In particular, suppose that $p = p_{h}^{NC}$ and $p_{h} = p_{h}^{DM}$, then from (9) and Lemma 1

$$\Omega_{h}/\partial p = np_{h}(\partial X/\partial p_{h}) < 0 \quad \text{and} \quad \Omega_{h}/\partial p_{h} = p_{h}(\partial H/\partial p_{h}) < 0$$

and consequently, because of concavity of $\Omega_{h}$, $p_{h}$ and $p_{h}$ are too large.

The intuition behind this result is that when goods are complements, their prices are too high when set individually, since firms are unable to internalize the negative effects a price increase has on the other firm’s demand and consequently its profits. Alternatively, the coordination of prices provided by the destination management makes it possible to set a more efficient daily price for the tourism product, thus leading to an increase in overall tourism expenditure even though individual prices are lower. However, profits for one of the two firms may be lower when price coordination is in place if the externality is strongly asymmetric, i.e. the price of one good strongly affects demand for the other, but not the other way around. For instance, consider the case where the price of overnight stays has a strong negative impact on the demand for differentiated tourism goods and services, and that the effect of a change in the price of these latter on the demand of overnight stays is negligible. In this case, the destination management would internalize this negative externality and thus fix a lower price for overnight stays, while keeping the same price for tourism goods. As a consequence, the profits of the hospitality service would be lower, those of the firm producing differentiated tourism goods higher and overall tourism profits would also be higher compared with a situation in which there is no price coordination. In this case, the destination management should also redistribute profits among its members. Note that Proposition 1 holds for a generic demand function as long as $\partial X/\partial p_{h} < 0$ and $\partial H/\partial p_{h} < 0$ and second order conditions are satisfied.

4.3. Coordination provided by a tour operator

Coordination can also occur endogenously when the market itself identifies a new type of firm for managing the antimcommon problem. Such a firm, known as tour operator in business practice, stipulates contracts with hotels and local firms by anticipating a payment that covers the market risk: the premium paid by firms for this insurance activity is the discount granted on the full market price (Castellani & Mussoni, 2007). The tour operator then promotes and sells the services within an all-inclusive holiday package, thus bearing the risk of no sale.

The contract is accepted by the hotel and the firm selling the differentiated goods if, despite the discount, their profits increase (or at least do not decrease) compared with the case of no coordination. Let us assume that the tour operator offers a free-sale contract in order to buy services from local firms in which the discounted price is $p_{h} - d_{h}$ for the overnight stay and $p - d$ for each differentiated good, and where $d_{h}$ and $d$ respectively, are the two discounts (to be interpreted as the insurance premium). The economic goal of the tour operator is to maximize its own profits $\Pi^{TO}$ (again, for the sake of simplicity, we assume that average costs of the tour operator are nil) subject to the participation constraint of local firms: they accept the contract rather than selling directly on the market if and only if their profits are at least as large as the profits they make without coordination. Such an optimization problem (for a different interpretation of the tour operator’s activity in the coordination problem, see Alvarez-Albelo & Hernandez-Martin, 2009), in a principal-agent setting is hence:

$$\max_{\Pi^{TO}} \Pi^{TO} = p_{h}H + npX - (p_{h} - d_{h})H - n(p - d)X \quad \text{s.t.} \quad (p_{h} - d_{h})H \geq \Pi_{h}^{NC} \text{ and } (p - d)X \geq \Pi^{NC}$$ \hspace{1cm} (10)

(11) are the participation constraints, where $\Pi_{h}^{NC}$ and $\Pi^{NC}$ are the firms’ profits obtained in Section 4.1 and constitute their outside options of not accepting the tour operator’s contract. If we assume that the tour operator (the principal) offers local firms (the agents) the minimum revenues of acceptance (transforming inequalities (11) into equalities, and thus determining $d$ and $d_{h}$ and by replacing the binding participation constraints (11) into the tour operator’s objective function (10) we obtain

$$\max_{\Pi^{TO}} \Pi^{TO} = p_{h}H + npX - \Pi_{h}^{NC} - n\Pi^{NC}$$ \hspace{1cm} (12)

It is easy to verify that the first order conditions of (12) are the same as those in (9) and thus optimal prices are $p_{h} = p_{h}^{TO}$ and $p = p^{TO}$, which are identical to those of the destination management.
4.4. Discussion

We can state the following theorem by comparing the solution of no coordination with those in the case of exogenous coordination through the destination management and endogenous coordination through the tour operator.

**Theorem 1 (The Coordination Theorem).** Given the anticommon property of the tourism product, coordination among firms in the destination, which can either be provided by the destination management or by a tour operator, increases profits from tourism.

Hence, price coordination enables the tourism activity in the destination to be more efficient.\(^2\) Note that this is an example of the prisoner dilemma where (price) coordination yields a Pareto superior solution to non-coordination.

In the case of coordination provided by the market as described in Section 4.3, however, there is a distributional conflict between the tour operator and local firms. Independently of the way in which the distribution is solved (which depends on the bargaining power of local firms, the tour operator and, in a more general setting, on the number of tour operators competing for the destination, see Alvarez-Albelo & Hernandez-Martinez, 2009), it is crucial to assess whether or not the tour operator is a local or foreign firm.

In fact, if the tour operator is a local firm, total tourism profits are the same as in the case of coordination by destination management, although the distribution of the overall profits among local firms changes. More formally, total profits in the presence of a tour operator are \(\Omega^{TO} = \Pi^{TO} + \Pi^{NC} + n\Pi^{NC}\) and thus it is easy to see that \(\Omega^{TO} > \Omega^{DM}\). On the contrary, if the tour operator is a foreign firm, its profits do not contribute to the destination’s income and thus total tourism profits of the destination are \(\Omega^{TO} = \Pi^{NC} + n\Pi^{NC}\) and thus \(\Omega^{TO} = \Omega^{DM} = \Omega^{NC}\) being the surplus generated by price coordination and thus forming the tour operator’s profits. It is then possible to state a corollary of the Coordination Theorem by focusing on the distributional consequences of endogenous coordination.

**Corollary 1.** When coordination is provided by a foreign tour operator, local profits are lower than in the case of coordination provided by the destination management. The type of coordination chosen in the destination, therefore, is not neutral with respect to the distribution of profits.

Clearly, the solution of a local tour operator dominates that of a foreign one (since in the former case the tour operator’s profits remain in the local economy), but it is fundamental to remember that this corollary stems from the assumption of identical cost structures for both tour operators, and thus may not hold in a more general setting. It is likely that for many destinations, particularly those in developing countries, the local tour operator might lack the skills or the market conditions to produce at such a (low) cost. To simplify this exposition, in the remaining part of the paper we focus solely on the case of a local tour operator.

5. The optimal level of sophistication of the tourism product in the destination

In this section, we move on to the first stage problem where the TD has to find the optimal pattern of development given the price solutions for the coordination problem defined in Section 4. We argue that, following a long-run strategy of development, the local policy maker can engage in investments that enrich the destination’s natural as well as cultural resource endowments \(R\). Moreover, we argue that it can directly or indirectly control the degree of sophistication of the tourism product \(n\). This is done, for example, through either granting licenses to open shops or other business activities or, in a more microfounded model, by taxing or subsidizing the setup cost for single production/commercial facilities. In a fully-fledged model, one should first calculate the optimal private degree of product differentiation followed by the optimal social one, and then find the optimal policy intervention such that the private one coincides with the social one (however, this is beyond the scope of the paper). More formally, the TD faces the following maximization problem

\[
\max_{n,R} \Omega \left( n, R, p^C, p^h \right) - K(n, R)
\]

s.t. \( K - R \geq \Omega^* \)

where \(K(n, R)\) are the policy maker’s cost of enforcing a degree of sophistication \(n\) and endowing the destination with resources \(R\), where \(\delta K/\delta n > 0, \delta K/\delta R > 0, \delta^2 K/\delta n^2 > 0\) and \(\delta^2 K/\delta R^2 > 0\). A change in \(n\) and \(R\) affects tourism profits directly and indirectly through a change in \(p^C\) and \(p^h\). Since the solution of the second stage is either exogenous or endogenous price coordination with equilibrium prices \(p^C = p^{TO} = p^{DM}, p^h = p^{TO} = p^{DM}\), the indirect effect is of second order and can thus be neglected because of the envelope theorem. Formally, the total derivative of tourism profits with respect to \(n\) is

\[
d\Omega = \frac{\partial \Omega}{\partial n} dn + \frac{\partial \Omega}{\partial p^C} dp^C + \frac{\partial \Omega}{\partial p^h} dp^h
\]

where the first term is the direct effect of \(n\) on \(\Omega\) and the last two terms are the indirect effects through \(p^C\) and \(p^h\), respectively. Because of \(\delta^2 \Omega/\delta p^C^2 = 0\) and \(\delta^2 \Omega/\delta p^h^2 = 0\), and thus only the direct effect matters, i.e. \(d\Omega/\delta n = \delta \Omega/\delta n\). The case of a change in \(R\) gives symmetric results. Finally, (14) is a sustainable development constraint requiring that tourism profits must be sufficiently large as to guarantee the survival of the destination over time.

Before characterizing the solution to problem (13), we describe the analytical properties of \(\Omega\), which is a special case of the results in Andergassen and Candela (2012).

**Proposition 2.** (a) \(\Omega\) is increasing in \(R\). (b) \(\Omega\) is decreasing in the degree of tourism sophistication \(n\) if \(e_{1\gamma} < 1\) and is increasing if \(e_{1\gamma} > 1\), where \(\lambda_{\gamma} = \gamma/(1 - \gamma)e (\gamma = (-1, 0))\).\(^3\)

**Proof.** See the Appendix A.

An increase in the destination’s resource endowment increases the demand for overnight stays as well as the one for tourism related goods and services and thus overall tourism profits increase. Differently, an increase in the degree of sophistication of the tourism product has an ambiguous effect on tourism profits, depending on the degree of complementarity between overnight stays and tourism goods as well as on the elasticity of tourism quality with respect to the size of the tourism activity. To
understand the intuition behind this result we have to disentangle the effects of the two opposing forces that are at play, namely, a love for variety and a tourism depreciation effects. If overnight stays and tourism goods are independent (that is, for εjz → 0); then an increase in n does not affect overnight stays H. Consequently, the tourism quality does not decrease and thus the only effect is that tourists spend more in a given destination owing to their love for variety. Hence, tourism profits increase. In a similar vein, profits increase unambiguously if overnight stays and tourism goods are complements, where an increase in n increases overnight stays H, and the perceived tourism quality does not decrease as H increases (i.e. for H ≤ Ω where zH = 0). On the other hand, if zH < 0 (that is, if H > Ω), then an increase in H reduces tourism quality, thereby reducing tourists’ expenditure on the overall tourism product. If the reduction in tourism quality is sufficiently strong (that is, |ε1j| > 1/|zH|) then this latter effect more than offsets the love for variety effect and thus overall tourism expenditure, that is, overall tourism profits, decrease. On the other hand, if the reduction in tourism quality is sufficiently weak (that is, |ε1j| < 1/|zH|), then an increase in the degree of sophistication increases tourism profits.

Assuming that parameters are such that for some values of n, Ωn > 0 (if on the contrary Ωn < 0 for all n ≥ 1, then tourism development through sophistication is not viable) the marginal rate of substitution between R and n provides a theoretical answer to the question about the conditions driving the creation of a tourism destination, its development pattern and its sustainability. In fact, the optimal degree of investment in specialization (through enhancement of resources or sophistication) of the tourism destination is given by the maximization of tourism profits. The first order conditions of the maximization problem (13) are:

\[
\delta Q = \frac{\partial Q}{\partial K} \Delta K \quad \text{and} \quad \delta Q = \frac{\partial Q}{\partial n} \Delta n
\]

and describe the optimal policy mix of the destination, determined with respect to the relative marginal gain (the marginal rate of substitution between R and n) and to the relative marginal costs of local investments in R and n (\(\delta Qn = -\delta K/\delta n\), respectively. Moreover, by means of technical progress, the elasticity \(\varepsilon_jz\) affecting the properties of \(Q\) described in Proposition 2 might change. The interpretation would be that the tourism sector is moving away from being a low technology sector, thus increasing its options of preserving, restoring and requalifying its resources.

If the negative tourism quality effect always dominates the positive love for variety effect (i.e. \(\varepsilon_jz > 1\) for each \(n ≥ 1\) and \(R > 0\)), then development of the destination through tourism sophistication is not feasible and can thus only occur through resource investments. Investment in resources may pave the way for tourism sophistication to become a viable development strategy if it alleviates the negative tourism quality effect (formally, if \(\delta Q \Delta n < 0\)) and thus the destination can twin resource investments with tourism sophistication to foster tourism activity.

The different solutions make it possible to recognize different organizational and development patterns for real-world destinations. For example, if we narrow the analysis down to beach tourism in Italy, there are destinations with limited resources but a highly sophisticated tourism product, like Rimini for example; destinations with extraordinary natural resources and no sophistication at all, with local supply limited to hospitality such as some coastal areas of Sardinia; there are destinations with significant natural resources and a certain degree of variety of local products like the Costa Smeralda. This has important theoretical and political implications as, according to the TALC model, these three different types of destination are at different stages of their evolution, while in the present model they are different optimal equilibria stemming from alternative endowments of resources and specialization patterns.

Moreover, to complete the description of the solution to problem (13), we need to discuss the relevance of the sustainable development constraint (14): \(Q(n*, R*) - K(n*, R*) ≥ 0\). If this condition holds we can affirm that tourism development is viable and sustainable. If instead \(Q(n*, R*) - K(n*, R*) < 0\), then tourism profits are below the minimum threshold and the solution for a territory willing to become a destination is not economically viable.

From a policy perspective, the implication of this section of the model is that destination management can trigger tourism development in two ways: either by investing in the enhancement, preservation and improvement of existing resources, or by supporting an increase in the variety of local tourism goods and services, i.e. what is known as the ‘degree of sophistication of the tourism product’. While the former strategy is usually bound by the exogenous endowment of historical sites, cultural heritage and natural environment, the latter can be implemented through the interaction between the private and the public sectors and has the advantage of fueling forward and backward linkages among tourism firms and between tourism firms and other sectors. Lastly, it is remarkable to note how the increase in the degree of sophistication of the tourism product has a double effect on total expenditure: on the one hand, it positively affects profits through an increase in the total number of overnight stays; on the other, it negatively affects it through a perceived worsening of quality due to the effects of congestion and crowding. As a particular case, if the development level of a destination is such that it does not bear congestion effects, i.e. \(H < \Omega\) where \(c_f = 0\), or if this effect is very small, i.e. \(\varepsilon_jz < 1/|zH|\), these properties define a “Love for Variety Theorem” for the destination, allowing tourism to “take-off” in the long run. Variety in the tourism product can then be a strategic asset.

**Theorem 2 (Love for Variety Theorem).** As long as the negative externalities on tourism quality are small, reorganization of the tourism destination toward increasing the variety of available goods and services raises tourists’ welfare and their willingness to spend on tourism at the expense of non-tourism consumption, thereby stimulating the economic development of the destination.

6. Conclusions

In this paper we have developed an economic model for the tourism destination by focusing on two specific aspects that, in our opinion, cannot be studied properly with the standard toolbox of micro and macroeconomic theories and for which the destination is an interesting object of study from the economics perspective: i) the tourism product can be defined as a bundle composed of a set of elementary items. Such goods and services (accommodation, transport, shopping, attractions, events, etc.) are mainly demanded in a relationship of complementarity by the tourist during the holiday experience; ii) the territory (its endowment of resources and its organizational structure) is argument of both production and utility functions, and hence the destination can be analyzed as a (meta) economic agent taking important decisions from the supply side at an intermediate level to the micro (firms and tourists) and macro-levels (the country’s entire economy). Two key issues have been identified in order to understand the rise, specialization, development and institutional arrangement of tourism destinations. These are i) the choice between investing in the variety of the tourism product (its sophistication) or enhancing local resources; ii) the coordination of local firms, stemming from the anticommon property of the tourism product.
These problems have been jointly analyzed and tackled in this
paper for the first time, building on a recent strand of literature (Andergassen & Candela, 2012, 2013; Candela & Figini, 2010; Candela et al., 2008; Huybers & Bennett, 2003; Papatheodorou, 2005; Candela et al., 2008; Huybers & Bennett, 2003; Papatheodorou, 2005; Wachsmann, 2006). Our theoretical set up allows us to state: i) a ‘Love for Variety Theorem’ which depicts alternative development trajectories allowing the destination to reach its economic goal: from investing in enhancing resources to the process of increasing the sophistication of the tourism product; ii) a ‘Coordination Theorem’, from which different institutional set-ups can be identified, ranging from local destination management to the coordination provided by the tour operator.

It is important to highlight that, since in the real-world each destination has different cultural, natural and socio-economic characteristics, and since stakeholders are often called upon to make decisions within a framework of bounded and limited rationality, the model presented in this paper does not aim to reduce ‘ad unicum’ and propose a unique and converging model of destination development and management. On the contrary, we wish to provide a theoretical basis for the plurality of real-world solutions: in this sense, we believe that our model has more explanatory power than the TALC model. Indeed, as far as coordination is concerned, we can identify:

- ‘Individually based destinations’, in which there is no coordination between local firms operating in the tourism sector. Given our assumption of no organizational costs, or equivalently iden
tical organizational costs, this solution is always dominated by (endogenous or exogenous) coordination. However, as we argue later in this section, this may not always be the case;
- ‘Community managed destinations’, in which local firms are co
dordinated by a local authority: the destination management (that can be a public body, an association of local firms, or an out-sourced destination management organization – DMO);
- ‘Corporate based destinations’, in which coordination is provided by a tour operator (and where it is important to distinguish whether the tour operator is local or foreign).

As far as tourism sophistication is concerned, we can identify:

- ‘Resource based destinations’, where the tourism product is based on local resources (either natural, cultural or artificial), with a very limited variety of differentiated goods;
- ‘Sophistication based destinations’, where local resources are very limited but the tourism product is based on a large variety of local goods and services;
- ‘Mixed based destinations’, where there is a balance between local resources and a certain degree of sophistication of the tourism product.

Overall, since the economic problem of the destination is identified in our model by two dimensions (sophistication and coordination) and since we list three classes for each dimension, we are theoretically able to propose a taxonomy of destinations in (at least) nine classes, to which we have to add:

- ‘Non-tourism destinations’, regions in which investing in tourism is neither economically viable nor convenient.

We believe that our model is a first step in jointly analyzing the two fundamental features of tourism destinations (sophistication and coordination) which were recently introduced in literature, and in providing a new perspective for tourism economics. We are aware of the many limitations of the model, stemming, in particular, from some over-simplifying assumptions that make applying it to real-world policy planning difficult. However, the model is already sufficiently intricate in the present setting, and relaxation of some assumptions might excessively complicate its solution, at least at the present state of the art.

In this respect, the main limitation is that the model is a partial equilibrium one, since the destination is analyzed in isolation. The most important extension would therefore be to move toward a general equilibrium framework with inter-destination competition (by considering at least two competing destinations). A second important extension would be to introduce a multi-destination player into such a general setting like, for example, an internation
al hotel chain which is a monopolist in the sector and owns hotels in all destinations. This is exactly what Wachsmann (2006) does in a simplified model of coordination with linear demand. It would then be very interesting to check the robustness of his results (that the advantages of intra-destination coordination tend to disappear when competition between destinations is introduced and when a monopolistic multi-player appears in both destinations) in our more general framework. Similarly, an open question would be to see what happens if coordination is provided by the same tour operator in both destinations.

Future research should also relax some other, more technical assumptions. Firstly, accounting explicitly for production and coordination costs, which may reverse the result that price coordination is optimal and might affect in a non-trivial way investment and development strategies in the first stage of the game. In fact, if one takes organizational costs into account then no-coordination may become the optimal institutional set-up, provided that the relative organizational costs of exogenous and endogenous coordina
tion are sufficiently large. Secondly, by assuming that differen
tiated tourism related goods and services are produced by more than one firm with some market power, that is, abandoning the assumption of monopolistic competition and framing the model in the context of oligopolistic competition, one could explicitly study the more general price coordination problem where complementarity and substitutability, the core elements of the tourism product, coexist. Thirdly, real-world destinations often differ with respect to the preferences of tourists to crowding. Hence the present assumption of tourists being crowding-averse, which is tantamount to assuming that a snob-effect is at work, has to be extended to the alternative assumption of mass tourism, where a band-wagon effect would be at work instead. In this respect, Swann (2000) might be an interesting approach to follow in a dynamic perspective. Fourthly, another extension would be to transform the multiple-stage problem into a simultaneous equilibrium in which both prices and types of investment are jointly determined. Lastly, dynamics could be introduced explicitly in the model, to investigate the evolution of the destination and optimal policy intervention over time. This, and other related issues, are left for further theo
retical research.

On a different perspective, there are many interesting questions that the model’s set-up and its conclusions leave open to empirical research. Firstly, there is the issue of measuring sophistication and price coordination. Concerning sophistication, both the number of tourism businesses and their degree of diversification should be taken into account. At the same time, a fundamental issue regards how to estimate the importance of local resources, both in terms of quality R and quality z. Concerning coordination, a careful measure should be able to distinguish between the different types of organizational patterns. Secondly, what are the factors determining the pattern of sophistication and coordination chosen by the destination? Is the empirical evidence coherent with our theoretical model? Thirdly, is the economic performance of the tourism destination and its evolution over time correlated with the degree of sophistication of its tourism product and with the type of...
coordination prevailing among firms? The answer to this question is crucial in determining the validity of the model, in which the absence of catching up and of a converging model of development for tourism destinations is a key result. While the huge body of literature in destination management can provide us with the state of the art on how to approach these empirical issues, we leave these questions open for future research.

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Appendix A

Proof of Lemma 1. Since there is a continuum of tourists, each one has a negligible effect on tourism quality z. Using Lagrange to solve the problem of maximizing (3) under the budget constraint (4), the first order conditions for the representative consumer read as follows:

\[ \left\{ y^\beta + z^\beta \left[ h^\gamma + \left( \sum_{i=1}^{n} x_i^\beta \right)^{\frac{1}{\beta}} \right] \right\}^{\frac{1}{\gamma}} y^\gamma - 1 = \lambda \]

(16)

\[ \left\{ y^\beta + z^\beta \left[ h^\gamma + \left( \sum_{i=1}^{n} x_i^\beta \right)^{\frac{1}{\beta}} \right] \right\}^{\frac{1}{\beta}} z^{\frac{1}{\beta}} - 1 = \lambda p_i \]

(17)

\[ \left\{ y^\beta + z^\beta \left[ h^\gamma + \left( \sum_{i=1}^{n} x_i^\beta \right)^{\frac{1}{\beta}} \right] \right\}^{\frac{1}{\beta}} \left( \sum_{i=1}^{n} x_i^\beta \right)^{\frac{1}{\gamma}} - \lambda p_i = 0 \]

(18)

while from (17) and (16) we obtain \( p_h = \left( x^\beta \left( h^\gamma + \sum_{i=1}^{n} x_i^\beta \right)^{\frac{1}{\gamma}} \right) h^{-1} / y^\beta - 1 \) which, using (19), reads as:

\[ y = h(p_h)^{\frac{1}{\gamma}} z^{\frac{1}{\beta}} \left( 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p_h} \right)^{-\lambda_i} \right)^{\frac{1}{\gamma}} \]

(20)

For the following it is convenient to express parameters characterizing the consumer’s preferences in (1)–(3) using the definitions \( \lambda_g = \beta / (1 - \beta) (0, \infty), \lambda_z = \gamma / (1 - \gamma) (-1, 0), \lambda_a = (1 - \alpha) / \alpha (0, \infty). \)

We calculate \( h \) by substituting (19) and (20) in the budget constraint (4) and obtain:

\[ h(n,z) = \frac{1}{p_h \left[ 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p_h} \right)^{-\lambda_i} \right] \left( 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p_h} \right)^{-\lambda_i} \right)^{\frac{1}{\gamma}}} \]

(21)

where \( h > 0 \). Substituting (21) back into (19) and (20) one obtains:

\[ x(n,z) = \frac{1}{p \left[ 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p} \right)^{-\lambda_i} \right]} \]

(22)

\[ n + p^\gamma \left[ 1 - \sum_{i=1}^{n} \left( \frac{p_i}{p} \right)^{-\lambda_i} \right] \]

(23)

and,

\[ y(n,z) = \frac{1}{1 + p_h^\gamma \left[ 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p} \right)^{-\lambda_i} \right]^{\frac{1}{\gamma}}} \]

Since all tourists are identical, \( h(j) = h \) and \( x(j) = x \), and consequently \( H = h \) and since \( p_j = p \) it follows that \( x_j = x \). Next we calculate the aggregate demand function \( H(n, R) \), where the tourists’ aggregate choice \( H \) feeds back into tourism quality \( z \). Using (21), we have to solve the following fixed point problem:

\[ H = f(p_h, p, n, z(H, R)) = \frac{1}{p_h \left[ 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p_h} \right)^{-\lambda_i} \right] \left( 1 + n^\gamma + \sum_{i=1}^{n} \left( \frac{p_i}{p_h} \right)^{-\lambda_i} \right)^{\frac{1}{\gamma}}} \]

(24)

for \( i = 1, \ldots, n \), where \( \lambda \) is the Lagrange multiplier. Using the assumption that all firms producing tourism related goods are symmetric we have \( p_i = p \) and hence obtain \( x_i = x \), for each \( i = 1, \ldots, n \). From (17) and (18) we obtain:

\[ x = h \left( \frac{p}{p_h} n^{1-z} \right)^{\frac{1}{\gamma}} \]

(19)
Proof of Proposition 2. Proof of part (a) of the Proposition is in the text. Part (b). The derivative of the denominator of $\Omega$ with respect to $n$ is:

$$\frac{\partial H^*}{\partial n} = -\frac{H^*2\beta}{\gamma + \lambda \alpha n^{\lambda + \lambda - 1}} \left\{ \left[ 1 + P_{p} (p_{p})^{-\lambda n} \right] + \left\{ 1 + n^{\lambda + \lambda - 1} \right\} \right\} > 0 \quad (25)$$

and,

$$\frac{\partial H^*}{\partial k} = \frac{H^*2\beta}{\gamma + \lambda \alpha n^{\lambda + \lambda - 1}} \left\{ 1 + P_{p} (p_{p})^{-\lambda n} \right\} > 0 \quad (26)$$

Next consider the price effects. Observe that $f_{H} < 0, f_{p} < 0$ and that:

$$f_{p} = -\frac{H^*2}{\gamma + \lambda \alpha n^{\lambda + \lambda - 1}} \left\{ \left[ 1 + P_{p} (p_{p})^{-\lambda n} \right] + \left\{ 1 + n^{\lambda + \lambda - 1} \right\} \right\} < 0 \quad (27)$$

Applying the implicit function theorem to (24) we obtain $\partial H^* / \partial n < 0$ and $\partial H^* / \partial p < 0$.

Using the equilibrium expression for $H^*$ with respect to $n$ can be written as:

$$\Omega_n(R, n) = \frac{\beta^2}{\gamma + \lambda \alpha n^{\lambda + \lambda - 1}} \left\{ \left[ 1 + P_{p} (p_{p})^{-\lambda n} \right] + \left\{ 1 + n^{\lambda + \lambda - 1} \right\} \right\} \times \frac{\lambda \alpha n^{\lambda + \lambda - 1} (p_{p})^{-\lambda n}}{1 - \frac{\lambda \alpha n^{\lambda + \lambda - 1} (p_{p})^{-\lambda n}}{(\epsilon_{H}^{\gamma + \lambda \alpha n^{\lambda + \lambda - 1}} - 1)}}$$

which establishes the result.

References


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