Selling Tourism Products through the Opaque Channels

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Abstract

This paper analyses the properties of the advanced Opaque booking systems used by online travel agencies in conjunction with their traditional transparent booking system. In section 2 an updated literature review is presented. This review underlines the interest and the specificities of Opaque goods in the Tourism Industry. It also characterises properties of the Name-Your-Own-Price channel introduced by Priceline and the Opaque channel developed by Hotwire. Then, in section 3, the possibility of joint-implementation of more than one opaque booking system by an online intermediary is discussed. Finally, in section 4, intuitions and preliminary results are presented.

Keywords: Opaque Selling, Name-Your-Own-Price, Pricing Strategies, Distribution Systems, Economics of Tourism, Online Travel Agencies, Probabilistic Goods.

1 Introduction

In the last years, emergence of the Internet has deeply changed the industry of tourism, organisation of markets and pricing mechanisms developed by firms. Tourism is by far the most developed and innovative online business, fostered by creation of online travel agencies (OTAs) of different kinds and sophisticated pricing and segmentation strategies. Leading global OTAs have emerged[1] which dominate the distribution of travel and tourism services. However, extensive uses of the Internet have given rise to niche players. Some of these players have specialised in innovative pricing models. Hotwire.com[2]and Priceline.com are the most important companies having successfully developed this strategy on the US market. They have developed Opaque offers, in which the services' characteristics are concealed (hotel or airlines brands, exacts hotels' location or travel schedule) until the payment is completed, and online pricing mechanisms such as Name-Your-Own-Price in which instead of posting a price, the seller waits for a potential buyer's offer that he can either accept or reject. These empirical developments open many different questions. Why would hotels and airline companies be willing to sell their products through Priceline/Hotwire and lose advantages (and profit) of product differentiation (Shapiro and Shi, [2008])? Certain firms should find these strategies more profitable. But as pointed out by Wilson and Zhang [2008], 'though on-line auctions are a multi-billion dollar annual activity, with a growing variety of sophisticated trading mechanisms, scientific research on them is at an early stage'. Nevertheless, some interesting

[1]Expedia, Travelocity, Orbitz, Opodo
[2] acquired by Expedia in 2003

advances can be traced in the recent literature, related to the innovative strategies implemented by Priceline or Hotwire. A short literature review is provided in section 2. Then, in section 3, an important issue still not elucidated is presented, which is the focus of this paper: *since many variants of Opaque systems exist, is there an advantage for an online intermediary to use simultaneously more than one opaque distribution channel*? In order to answer this question the case of monopoly facing a heterogeneous demand is considered. Afterwards, in section 4, intuitions and preliminary results are discussed.

2 NYOP and Opaque Posted-Price Selling: A Literature Review

Recent literature developments focus either on NYOP channel or on posted-price opaque selling. Indeed, none of existing papers combines nor compares these two types of opaque booking mechanisms, what makes the present paper's originality. Moreover, most literature on NYOP selling mechanism even omits the question of products' opacity (except the ones of Wang, Gal-Or, Chatterjee [2005] and Shapiro, Zillante [2007]). Hence, in this short survey first questions related to NYOP booking channel will be considered and second - the issues relative to opaque products.

First, it should be underlined that an intermediary implements a NYOP selling mechanism to improve its profits, by successfully segmenting the demand in order price discriminate its clients (Wilson, Zhang [2008]; Shapiro, Zillante [2009]; Wang, Gal-Or, Chatterjee [2005]; Hann, Terwiesch [2003]), and therefore to reduce price competition (for further information on the case of duopoly, see Fay [2008]). Demand can be segmented either because consumers are differentiated by their price sensitivity/willingness to pay or by the levels of haggling, frictional and transaction costs that they can afford (Hann, Terwiesch [2003]; Terwiesch, Savin, Hann [2005]; Fay [2008]). Moreover, in order to retain the largest part of consumer's surplus, Priceline restricts its clients to a single bid. Some travellers manage to bypass this restriction (Fay [2004]), which is detrimental for intermediary's profits (on the opposite of hypothetical possibility of repeated bidding (Spann, Skiera, Schäfers [2004]; Fay [2008]), which additionally reduces consumer's uncertainty).

The second line of research analyses another mode of opaque selling, where prices are posted. These papers focus on the fact that some product's attributes or characteristics are concealed. On traditional channels it was already not always beneficial to fully inform consumers about market prices, because of the risk of their price sensitivity increase and then - of creation of downward price pressures. Thus, it is beneficial for service providers to implement multichannel distribution across mechanisms with different levels of market transparency (Grandos, Gupta, Kauffman [2008]), because channel differentiation decreases price competition and allows price discrimination (Shapiro, Shi [2008]). This result is all the more important, if high rate consumers are sufficiently brand-loyal (Fay [2008]). Moreover, opaque selling can be defined as probabilistic selling, providing a buffer against seller's own uncertainty and though helping him to segment the market (Fay, Xie [2008]). Finally, opaque selling is not only beneficial for the intermediary, but also impacts overall welfare by enabling very price sensitive consumers to travel (Jiang [2007]).

3 Issue, General Settings and Cases to Consider

This paper tends to answer an important question, not yet developed in the existing literature: *is it suitable and efficient for an OTA to implement simultaneously more than one Opaque channel?*

3.1. General Settings

Supposing that everyday there are two flights from city1 to city2: the first one leaves city1 at 7am and the other at 6pm. The flight booking level on the traditional channel is estimated with a small error only few days before the departure date. The OTA knows the distribution of states of the world, which are defined by Table 1.

Table 1. Available seats for the flights from city1 to city2 on a given date

States of the world	Number and type of available tickets	Probability
1	*m* seats at 7:00am flight	1/4
2	*m* seats at 6:00pm flight	1/4
3	2*m* seats at 7:00am flight	1/8
4	*m* seats at 7:00am flight *m* seats at 6:00pm flight	1/4
5	2*m* seats at 6:00pm flight	1/8

There are $2n$ potential travellers, differentiated by their willingness to pay, distributed in two subpopulations of n agents. Travellers belonging to subpopulation A prefer the 7am flight and subpopulation B - the 6pm flight. There are more potential travellers than available seats in any state of the world, i.e. $n>>m$. Each subset of n potential travellers is distributed uniformly on segment $[0, a]$ with $a>0$ representing agent's maximum willingness to pay. Agents are all risk neutral, i.e. they care only about maximising their utility (Sandmo [1971]). If agent decides not to purchase the product and not to bid, or his bid is not accepted, his utility vanishes.

The intermediary can implement either: (1) an Opaque "Hotwire style" posted-price system; (2) a NYOP "Priceline style" system; (3) both systems. The timing of actions is as follows:

- At stage 1, the OTA chooses between (1), (2) and (3). The OTA fixes the price for the Opaque channel and/or launches a single bid process on the NYOP channel.
- At stage 2, potential travellers purchase (or not) tickets on the Opaque channel and/or they choose to post (or not) a single bid at the NYOP channel.

- At stage 3, the OTA knows the exact number (*m* or 2*m*) of available seats on each flight. The OTA sets the threshold price for the NYOP channel and sells the tickets to those whose bids exceed this price. Each successful bidder pays the rate that he has posted.

The relevant equilibrium concept is Stackelberg equilibrium (Stackelberg [1934]), where the OTA is the leader and potential customers are considered as followers, i.e. the intermediary acts first and only after his decision, that is observed by consumers, they choose their own actions. Accordingly, the game is solved by backward induction: at stage 3, the OTA chooses the best action (*i.e.* it sets the lower limit price for the NYOP channel, if (1) and (3) have been selected), given the action previously taken by travellers at stage 2; at stage 2 potential travellers choose their own best actions, given the OTA's decisions at stage 1 (the system implemented and the Opaque channels' price), their expectations of OTA's decisions at stage 3 and level of information on the chance that the bid gets accepted; at stage 1, the OTA chooses the appropriate distribution strategy and the Opaque channel's price if (1) or (3) is implemented.

3.2. Cases to consider

Considering the travellers' information completeness levels the future model will analyse two settings. First, in case of complete but imperfect information about the states of the world, potential passengers know the exact number and the distribution of available seats, as well as the other agents' propensity to pay. Under those settings, optimal prices, profits and welfare levels for each possible distribution strategy will be calculated. The results of this first case will be considered as a benchmark to the second section of the model. Indeed, the case of imperfect and incomplete information will be then examined, what means that the agents estimate imprecisely the distance between their own location and the position of the agent with the highest propensity to pay. Given the number of tickets available and the possible uncertainty levels, three situations are to be considered: (1) small number of tickets available (lower than half of the number of potential travellers) and moderate uncertainty; (2) small number of tickets but relatively strong uncertainty; (3) the number of tickets higher than half of the number of potential travellers.

4 Preliminary and Expected Results Discussion

It is quite complicated to decide, if two or more forms of Opaque channels can coexist. Both considered channels are opaque, *i.e.* they do not provide precise information to travellers on the quality of the travel. If passengers had complete information on the flight frequency and the other ticket's attributes and if they knew the distribution of the other consumers' propensity to pay, all of them would choose to use the NYOP system, and quit the Opaque channel, because each consumer would be able to bid a price corresponding to his reservation price. Thus, it is equivalent for the OTA to implement NYOP channel alone or to jointly-implement both systems.

If passenger's information is imperfect and incomplete, depending on traveller's uncertainty levels, two types of results are expected. On one hand, if uncertainty is strong, potential travellers estimate their relative propensity to pay very inexactly. They imagine that they would have to bid very high in order to get the ticket at the NYOP channel, while the posted price on the Opaque channel seems to them to be lower. Consequently, in case of joint implementation, potential passengers would purchase the tickets on the posted-price Opaque channel. On the other hand, if uncertainty is moderate, potential travellers are able to better estimate their relative propensity to pay. If the two systems are jointly implemented, agents who underestimate their relative propensity to pay would purchase at the Opaque posted-price channel in order to be sure to travel, while the others, who estimate their relative propensity to pay as high, would bid at the NYOP channel. Thus, the joint implementation of the two systems seems to be the optimal solution for the OTA.

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