

The effects of inventory control and denied boarding on customer satisfaction: The case of capacity-based airline revenue management

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Abstract

This paper examines on the extent to which seat inventory control and denied boarding influence customer satisfaction. The effects of these core components of revenue management were analyzed within dummy regression models and ANOVAs. Our empirical analyses show that the effect of seat inventory control varies across booking classes. Reactions to cross-individual price differences caused by seat inventory control were more distinct in lower-priced booking classes. The same did not hold true for the impact of denied boarding on customer satisfaction, however, where there was no variation across booking classes. Furthermore, we found that favorable deviations from expected service performance (e.g. favorable cross-individual price differences) did not result in distinct satisfaction responses. Thus it must be assumed that revenue management practices have a net negative effect on customer satisfaction. Based on the results of the empirical analyses, implications for management and starting points for further research are presented.

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1. Introduction

The employment of revenue or yield management principles can be traced back over 25 years. Ever since the mid 1980s when major US airlines introduced revenue management in reaction to the market entry of low-cost carrier airlines, companies have used its principles to realize immense profits (Smith, Leimkuhler, & Darrow, 1992). In addition to its use in the airline industry, revenue management has been implemented in branches of the tourism industry as well (e.g. hotels and cruise lines). Together with the expansion of sectoral applications, price-based revenue management has developed alongside capacity-based revenue management (Li, 2006). In the context of price-based revenue management, it is not the availability of limited seat inventories in multiple booking classes that has to be controlled, but rather the price of services over a specific period of time.

Generally, it can be said that the introduction of revenue management represents one of the most important success stories in the application of marketing and operations research.

All is not golden, however, and the implementation of revenue management also has its drawbacks. One of these drawbacks is the potentially negative effect on customer relations that the practice engenders. Being denied boarding because a flight is overbooked or price fluctuations caused by seat inventory control may produce dissatisfied customers. In this context, Wirtz, Kimes, Ho, and Patterson (2003) present an overview of customer conflicts that can be caused by revenue management. The articles of Choi and Mattila (2004, 2005, 2006), Huang, Chang, and Chen (2005), Kimes (1994, 2002), Kimes and Wirtz (2002, 2003a, 2003b), Mattila and Choi (2005, 2006), and McGuire and Kimes (2006) empirically validate the effect of revenue management on customer relations. These empirical studies are largely based on the theory of dual entitlement (Kahneman, Knetsch, & Thaler, 1985). In contrast, the research of McMahan-Beattie, Yeoman,

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Palmer, and Mudie (2002) and McMahon-Beattie (2006) are primarily concerned with the construct of customer trust. Managerial recommendations for the reduction of customer dissatisfaction can be found in Noone, Kimes, and Renaghan (2003) and Wirtz et al. (2003).

A close review of these articles shows that several research gaps exist (see Table 1 for an overview of

empirical studies). Our research tries to fill some of these research gaps. To the best of our knowledge, this paper is the first to explicitly consider:

- *The effects of airlines' seat inventory control on customer satisfaction:* Up to now, Mattila and Choi (2005, 2006) have been the only one to have incorporated customer

Table 1
Empirical studies on the effects of revenue management on customer relations

Author(s)	Industry focus; data collection; methodological approach	Empirical findings
Kimes (1994) ^a	Hotels and airlines; convenience sample, US hotel guests ($n = 118$); survey research (scenario technique)	<ul style="list-style-type: none"> ● Perceived fairness is affected by different (price) information policies and rate restrictions. ● Unfavorable individual price differences are perceived as being unfair. ● RM practices are perceived less unfair in the airline industry than in the hotel industry.
Kimes and Wirtz (2003a) ^b	Restaurants; convenience sample, US, European, and Asian hotel guests ($n = 157, 77, \text{ and } 100$); experimental design (scenario technique)	<ul style="list-style-type: none"> ● Perceived fairness is affected by different ... <ul style="list-style-type: none"> ○ Cultural origins of respondents. ○ Framing of price differences (discount/surcharge). ○ Forms of demand-based pricing (rate restrictions). ● No interaction between framing and cultural origin is found. ● Demand-based pricing is generally considered fair.
Kimes and Wirtz (2003b)	Golf courses; random sample of customers of a US golf management company ($n = 296$); experimental design (scenario technique)	<ul style="list-style-type: none"> ● Different pricing and duration control practices affect perceived fairness. ● The effects of geographic location and frequency of play can be neglected. ● RM practices are generally considered to be fair.
Choi and Mattila (2004)	Hotels; convenience sample of US airline passengers ($n = 240$); experimental design (scenario technique)	<ul style="list-style-type: none"> ● Inequitable pricing results in perceptions of unfairness. ● The reference standard used to evaluate prices (expectation-based/social comparison) affects fairness perceptions. ● Offering information on pricing practices positively influences perceived fairness.
Huang, Chang, and Chen (2005)	Hotels; convenience sample of Taiwanese students and their relatives or acquaintances ($n = 276$); survey research	<ul style="list-style-type: none"> ● Favorable (unfavorable) cross-individual price differences are perceived as fair (unfair). ● Prices of services sold through the Internet that are equal to prices of service sold through traditional distribution channels are perceived to be less fair. ● Internet-based pricing techniques (e.g. auctions) are perceived to be less unfair than revenue management practices.
Mattila and Choi (2005)	Hotels; convenience sample of travelers who frequently stay at hotels for business purposes ($n = 240$); experimental design (scenario technique)	<ul style="list-style-type: none"> ● Information availability (absent/present) and price fluctuations (better/worse/same price) influence fairness perceptions. ● Price fluctuations impact satisfaction with the reservation process. ● Internal comparison standard: Information availability only impacts satisfaction when price quoted is equal to the comparison standard. ● Social comparison standard: Information availability has a positive (negative) impact on satisfaction when price quoted is better or worse than (equal to) the comparison standard.
Choi and Mattila (2006) ^c	Hotels; convenience sample, US and Korean airline passengers ($n = 120 \text{ and } 120$); experimental design (scenario technique)	<ul style="list-style-type: none"> ● There are cultural differences regarding the impact of hotels' variable pricing practices on perceived fairness. ● Giving full information about the logic of the pricing techniques improves fairness perceptions of US customers. ● Giving limited or full information improves fairness ratings of Korean customers when a higher price is quoted.

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