AIRLINE OVERBOOKING MODEL: THEN AND NOW

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ABSTRACT

Flight overbooking occurs when an airline knowingly arranges to sell seats beyond what the airline can provide, in particular when demand volume is uncertain. Traditionally, overbooking in any industry involving reservations has been necessary primarily to protect providers against loss of revenue. That is, when seats are unexpectedly empty while demand exceeds capacity, the airline fails to earn revenue from those seats. In addition, overbooking has been used to protect against underutilization of scarce resources. In all cases, overbooking would not have been necessary if demand were known with certainty.

However, now that payment for tickets is required in advance with essentially no refunds allowed, airline demand is indeed known with certainty. At least, this is the case for the masses flying economy class.

The traditional overbooking model, although it aims at minimizing unfilled seats, is ultimately a revenue maximization model. The decision variable in this case is the number of overbooked seats to allow per flight. Similarly, the modern overbooking model seeks to determine an overbooking level so as to maximize profit per flight. However, revenue is already at its basic maximum (i.e., all seats sold at some standard price). In the modern overbooking model revenue is further "maximized" essentially by double-selling seats. That is, all seats are already sold, and overbooking is done to fill those seats paid for yet left vacant by travelers who unexpectedly are unable to make their flights.

An obvious basic assumption of all overbooking models is that overall demand for a flight exceeds capacity. In addition, the no-show probability is taken into account in both the traditional and current case. However, that rate is substantially lower in the current case, since no-show travelers end up forfeiting whatever they have paid for their tickets.

A simple model, based on the literature, is presented in this paper and demonstrated both analytically and through an Excel-based simulation model. That model is then modified to represent a simple version of the current overbooking decision. The models are compared analytically, and through Monte Carlo methods. Ultimately, the goal of this research is to develop an understanding of why overbooking persists in spite of the apparent lack of justification given pre-paid ticket sales.