

Airline Overbooking, part II

It is a common practice for airlines to sell more tickets for a flight than there are seats available on that flight. This is known as “overbooking.” The reason for this unusual business practice is simple. From experience, the airlines have learned that not everyone who buys a ticket for a flight actually goes on the flight. Some people miss connections, others experience changes in plans, a few become ill, and others just don’t show up. The dilemma for the airlines is how many tickets to sell for a flight to ensure that as many seats are filled on the flight as possible, but that no one who wishes to fly is without a seat.

Let’s consider a hypothetical airline, Mudlark Airlines. On one of its flights, previous records show that about 15% of people who had tickets for the flight did not take the flight. There are 120 seats on the plane.

1. Suppose that Mudlark decides to sell 140 tickets for this flight. Assuming that all 140 tickets are sold and that the outcome for each ticketholder is independent, how many ticketholders should the airline expect to show up?
2. What is the probability that at least 1 passenger is denied a seat due to overbooking?
3. How many tickets should they sell to reduce the probability of having an overbooked passenger to less than 1%? Justify your answer.

Suppose that tickets on this flight cost a flat rate of \$250 (this is not at all how most airlines operate!). In addition, Mudlark Airlines must give any traveler who purchased a seat for the flight, but who cannot travel due to overbooking, a compensation package that costs the airline \$500.

4. Calculate the expected income from ticket sales (less any overbooking costs) for the airline if they sell 140 tickets. Compare this to their expected income from ticket sales if they only sold 120 tickets. Does overbooking make sense for Mudlark?