

## MITOCW | MIT15\_071S17\_Session\_8.2.01\_300k

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In this lecture, we'll introduce linear optimization and apply it to airline revenue management.

Air transportation became a reality in the United States in the 20th century.

From 1938 to 1978, the Civil Aeronautics Board set fares, routes, and schedules for all interstate air transport.

Most airlines were very positive on this system, as it guaranteed their profits.

However, this system led to higher costs for a traveling public as well as to various inefficiencies.

For example, applications for new routes and fares were often delayed or dismissed.

In response to these inefficiencies, the administration of President Carter passed the Airline Deregulation Act in 1978.

The act encouraged more competition.

As a result, 52 new airlines were formed between 1980 and 2000.

Also, new air routes appeared.

Correspondingly, it saved passengers an estimated \$10.3 billion each year in travel time.

Lower fares was another outcome.

Ticket prices are now 40% lower than they were in 1978.

This led to more passengers.

The number of air passengers increased from over 200 million in 1974 to over 720 million in 2010.

More competition led to lower fares, as we discussed, while meeting operating costs.

This further led to heavy losses by air carriers.

Nine major carriers and more than a hundred smaller airlines went bankrupt between 1978 and 2002.

So it is natural to ask how did airlines compete?

In their attempt to sell more seats, airlines started to offer deep discounts.

For example, on January 17, 1985, American Airlines launched its Ultimate Super Saver fares to compete with

PeopleExpress.

The key strategy involved selling enough seats to cover fixed operating costs while selling remaining seats at higher rates to maximize revenues.

This led to the science of revenue management that we'll study in this lecture.

The key question in revenue management is how many seats to sell on discount.

The key consideration is that passengers have different valuations.

For example, business people value flexibility, whereas people seeking a vacation value good deals.

So if we sell too many discounted seats, then there would not be enough seats for high-paying passengers.

At the same time, if we sell too few discounted seats, then we will have empty seats, which lead to lost revenue.

So the key question is how airlines like American can allocate their seats among customers in order to maximize their revenue.