

What is it worth?

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The “PaxRev” Passenger Revenue Model

Objective:

**Estimate revenue differences in single markets
resulting from different passenger products
in a relatively simple and transparent manner**

PaxRev does NOT ...

PaxRev does NOT:

- Deal with price elasticity
- Deal with network effects
- Estimate absolute revenues
- Evaluate or optimize schedules

Principles

No model predicts perfectly

Acknowledge the model's limitations

**Note the direction of errors created by the model's limitations
(e.g. not treating price elasticity and network effects both lead to understating differences)**

**“Conservative” is just another word for a wrong answer
(Profitable concepts can be rejected because the revenue was “conservatively” underestimated)**

**Elements of the analysis are sometimes known
Provide opportunities to override modules in the model**

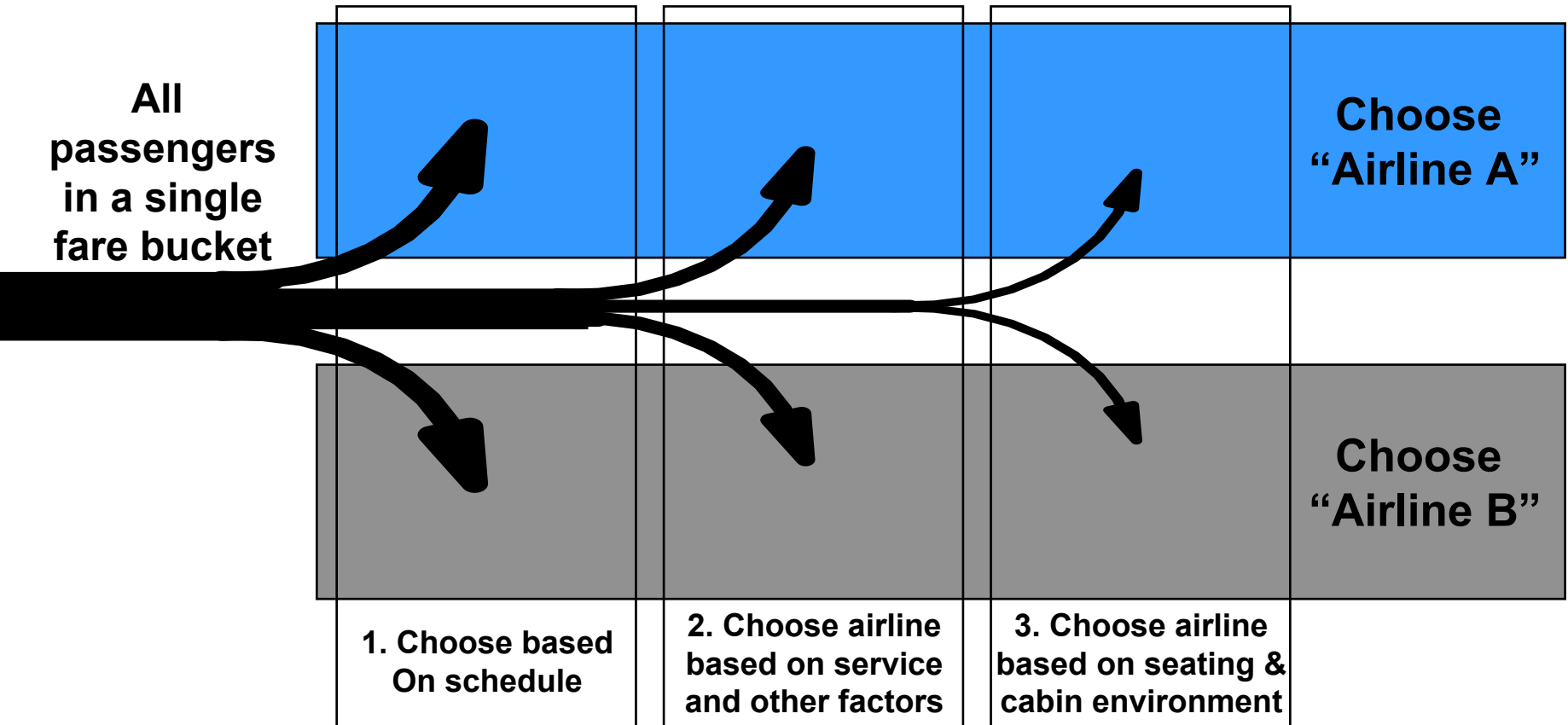
The PaxRev Passenger Choice Paradigm

Within each fare bucket:

- 1. How many passengers does the schedule allow to make a choice between airlines?**
- 2. How important is the seating and cabin environment to passengers making a choice?**
- 3. How many more passengers making a choice will choose the study airline as a result of a given difference in cabin and seating environment?**

What changes in load and yield result from the increase in demand in each fare bucket?

The PaxRev Passenger Choice Paradigm



A typical study

10-hour flights in which both the study airline and its competitor have one flight daily

Three different configurations for the study airline:

- 1. A 9-abreast 787**
- 2. An 8-abreast (3-2-3) 787**
- 3. A 9-abreast 787 in which more space-efficient seats provide the equivalent of one inch of additional pitch**

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How many passengers does the schedule allow to make a choice?

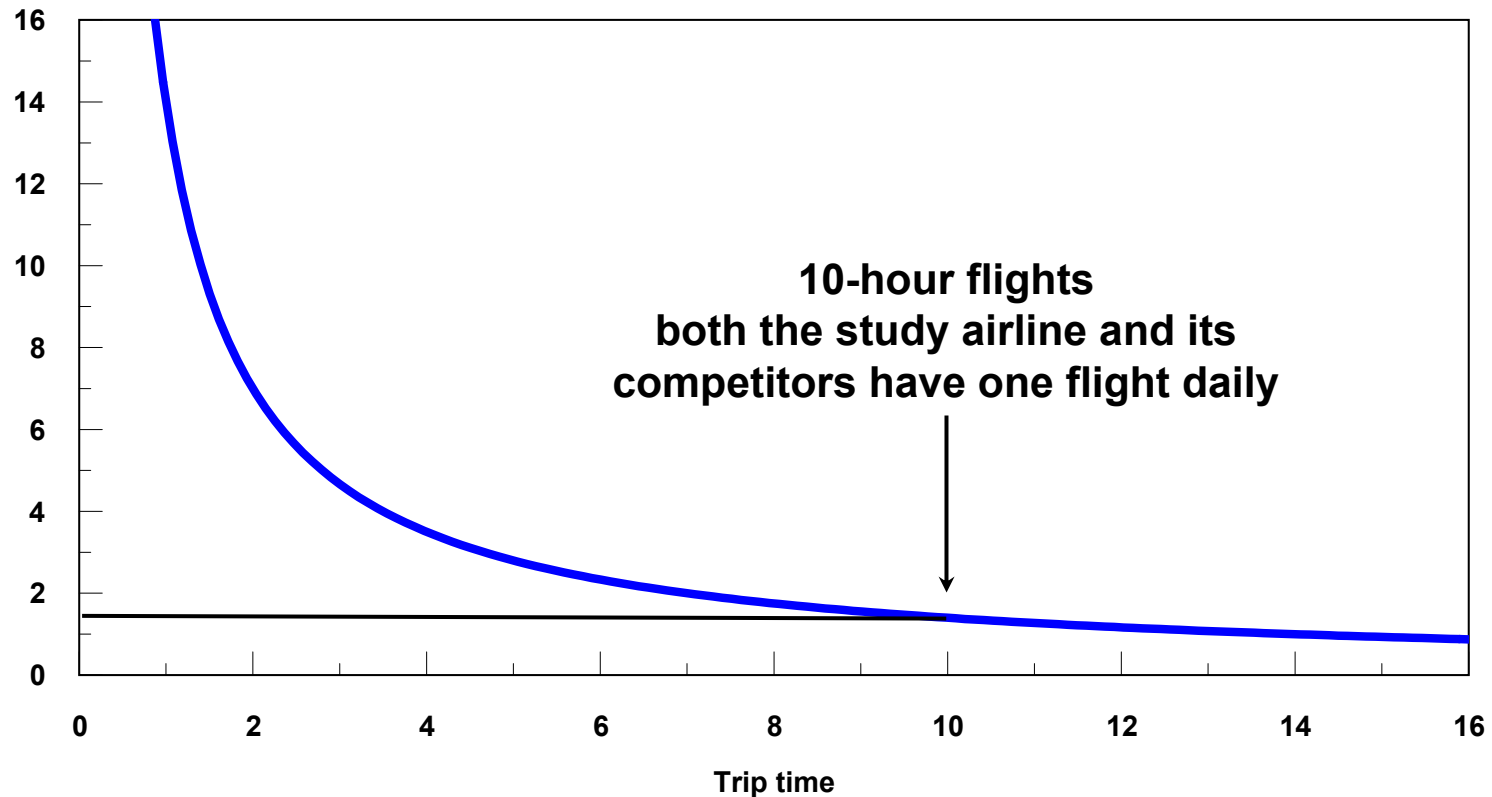
You can ask them:

- 1. Was this flight the only flight that met your schedule requirements or were there convenient alternatives?**
 - This was the only flight that met my schedule requirements (proceed to question 4)**
 - There were other flights that met my schedule requirements (proceed to the next question)**

A simple coverage model can provide insight into the portion of passengers faced with a choice

The frequency required to provide a comprehensive schedule is a function of trip time

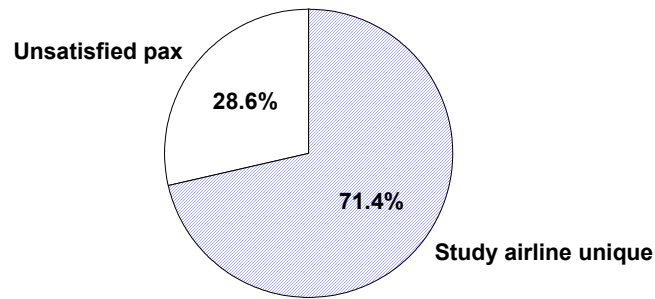
Daily frequencies required to provide convenient service for most passengers



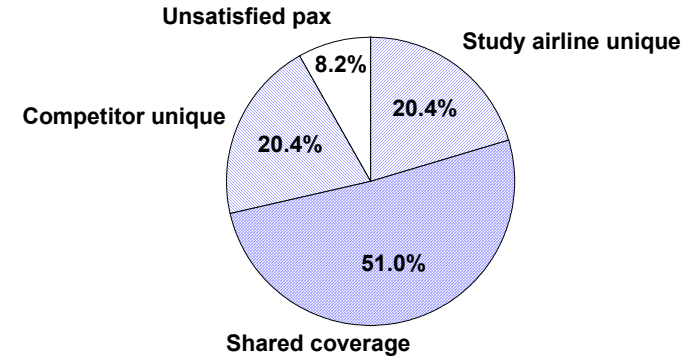
$$y = 14x^{-1}$$

A simple coverage model can provide insight into the portion of passengers faced with a choice

Study airline viewed alone

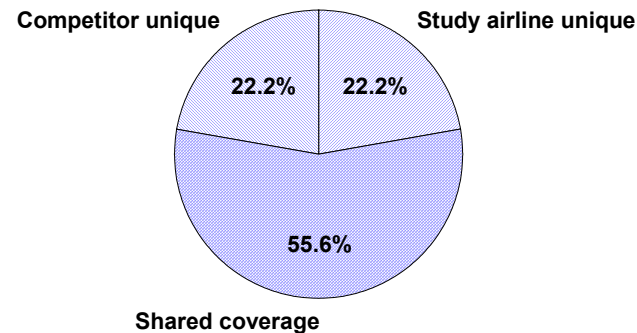


All airlines viewed together



**10-hour flights
both the study airline and its
competitors have one flight daily**

Normalized (unsatisfied pax replanned)



The PaxRev Passenger Choice Paradigm

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How important is the seating and cabin environment to passengers making a choice?

You can ask them:

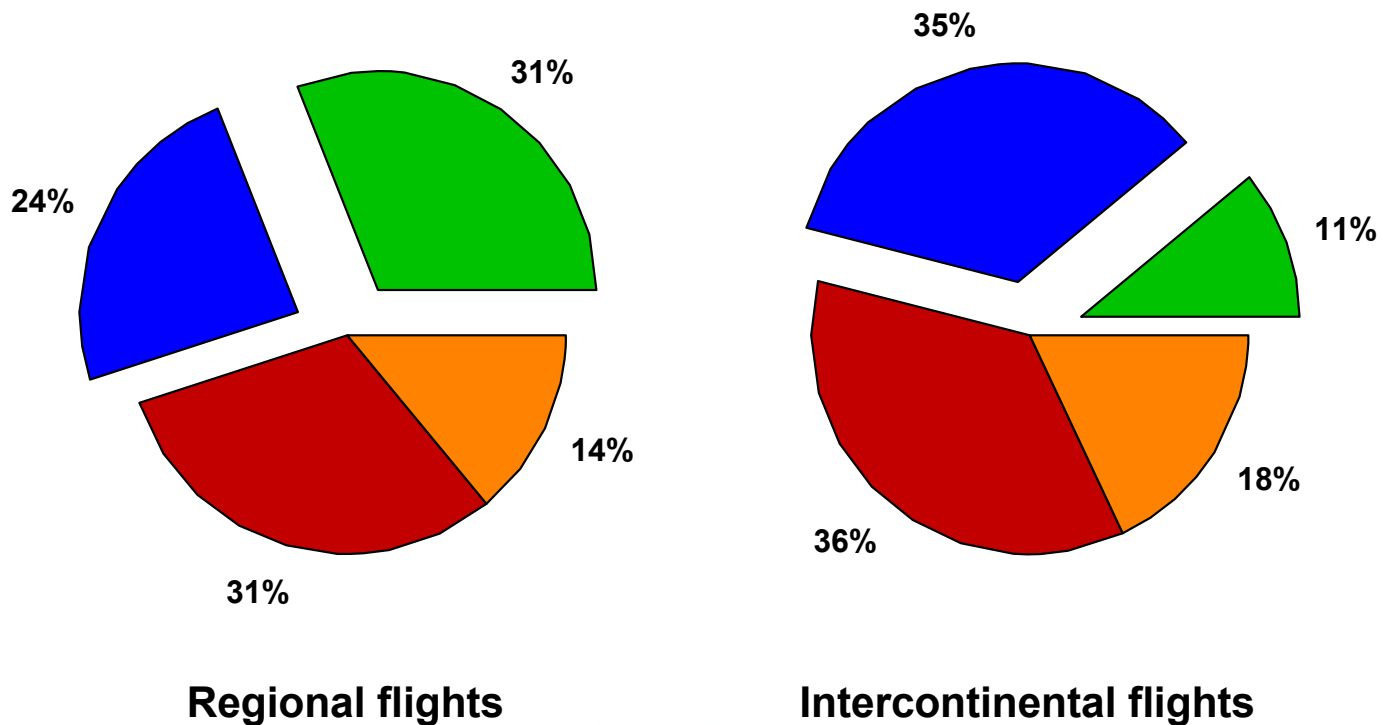
2. What was the most important factor in your selection of this flight?

- This airline's reputation for schedule reliability**
- The seating and cabin environment I expected**
- Frequent flyer or other marketing programs**
- The service level I expected**

Seating and cabin environment are critically important on long flights

What is most important to the passenger depends upon the length of the flight

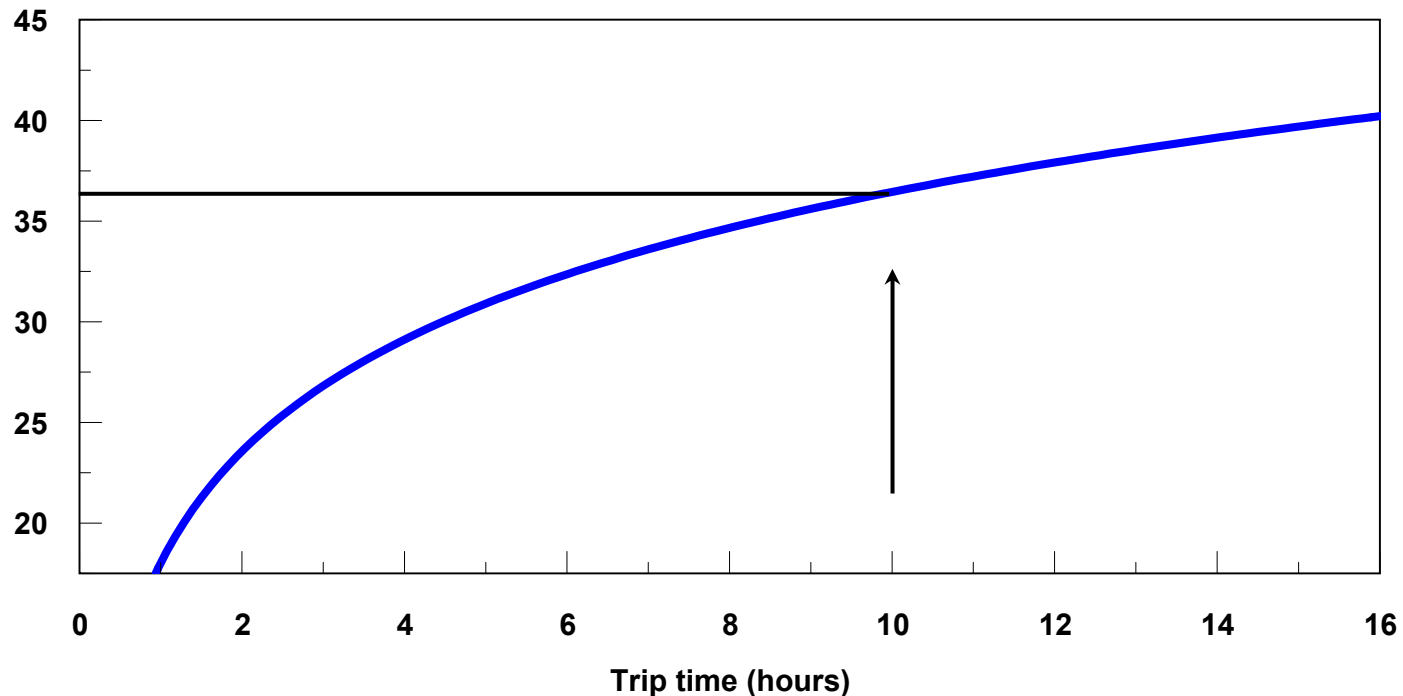
■ Schedule ■ Seating & Cabin ■ Service ■ Marketing Programs



Seating and cabin environment are critically important on long flights

The importance of seating and cabin environment factors grows as flights become longer

Percent of passengers naming cabin environment factors as the most important factors in their choice of an airline



$$y = 18 + 8(\ln x)$$

The PaxRev Passenger Choice Paradigm

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What changes in load and yield result from the increase in demand in each fare bucket?

How important is the seating and cabin environment to passengers making a choice?

You can ask them indirectly:

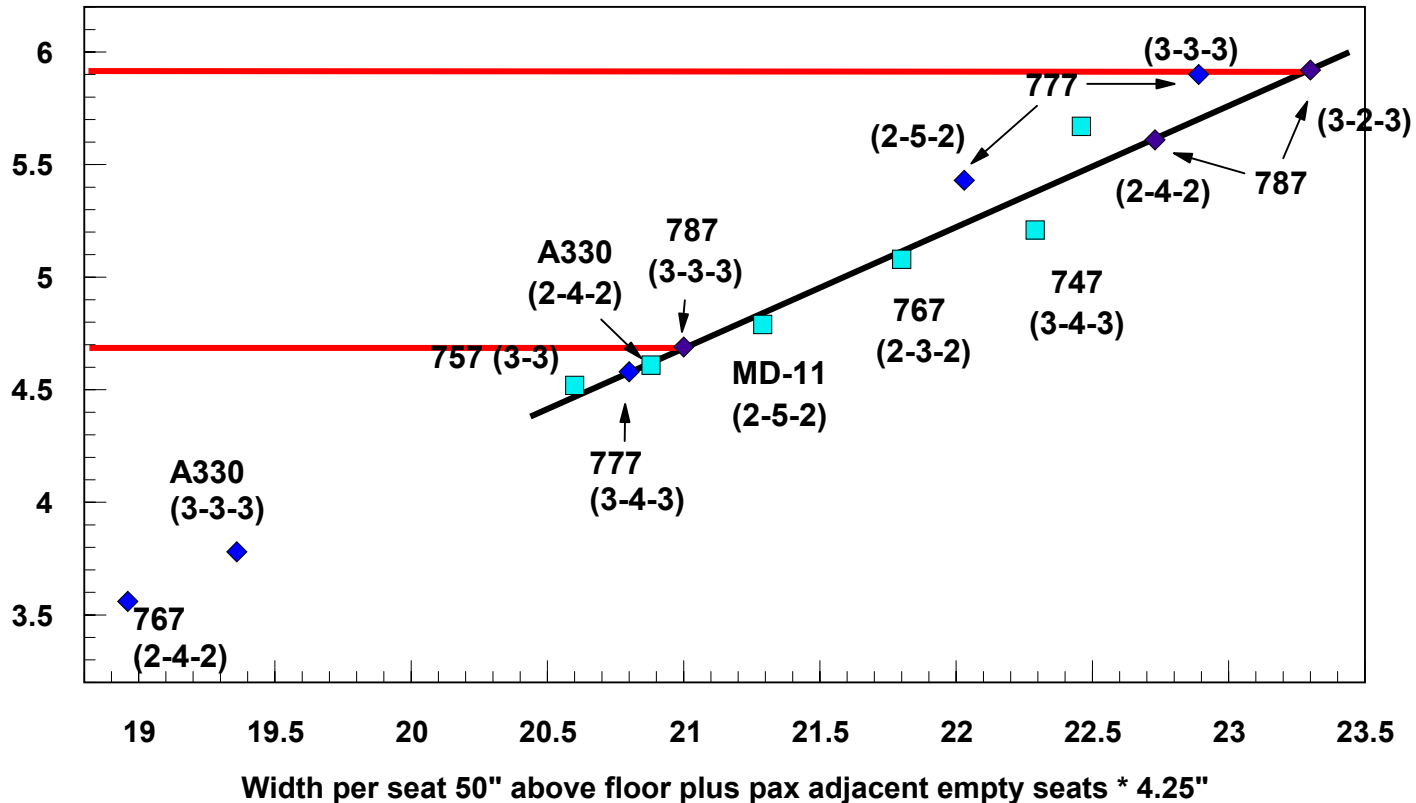
3. Please indicate in one of the boxes below your degree of preference for the airplane you are on now for a flight like this one:

Strongly avoid - - - - - **Strongly prefer**

The relation between effective seat width and preference enables the prediction of changes in demand

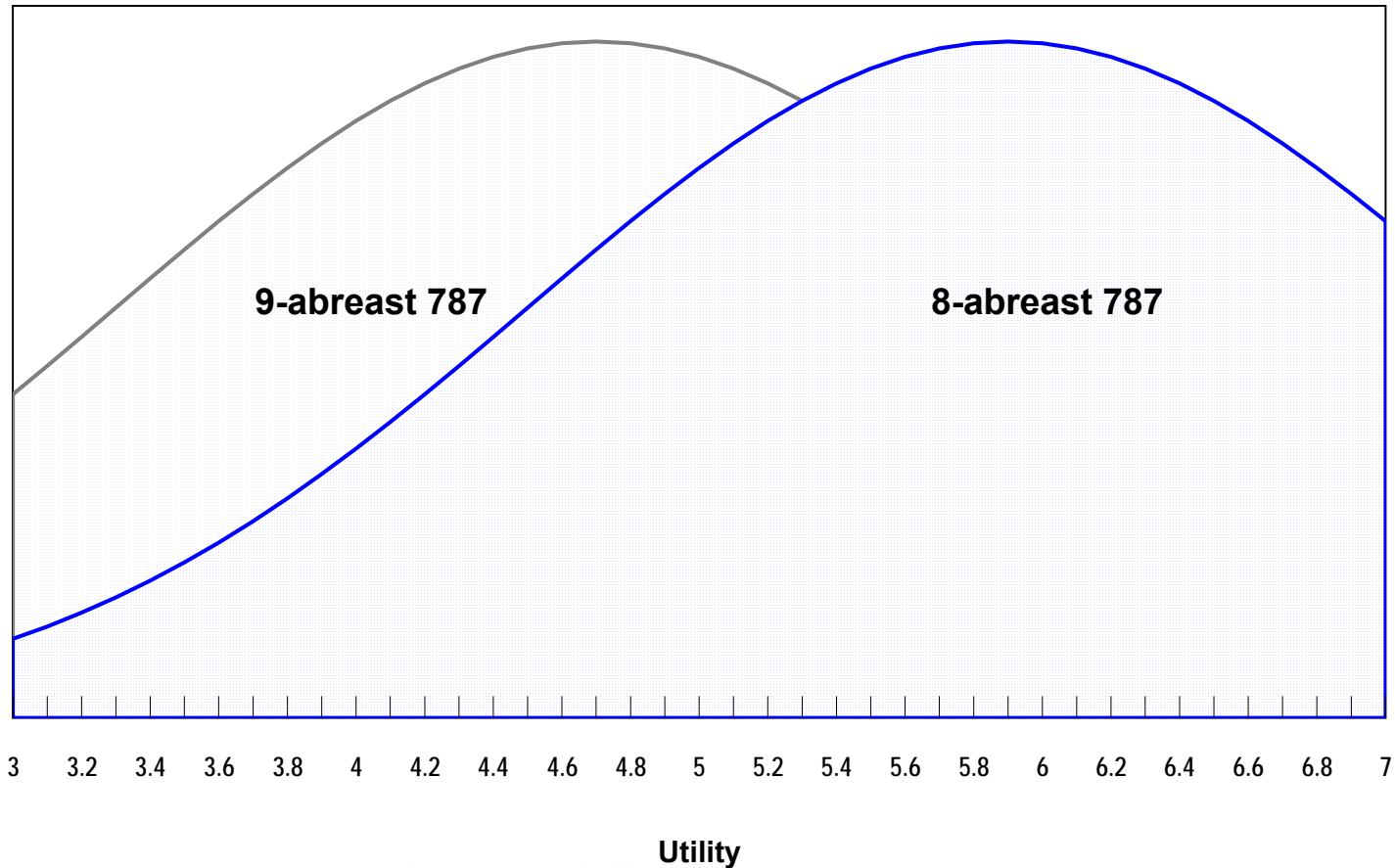
Effective width per seat can be used to estimate the preference for additional configurations

Preference for model on intercontinental flights



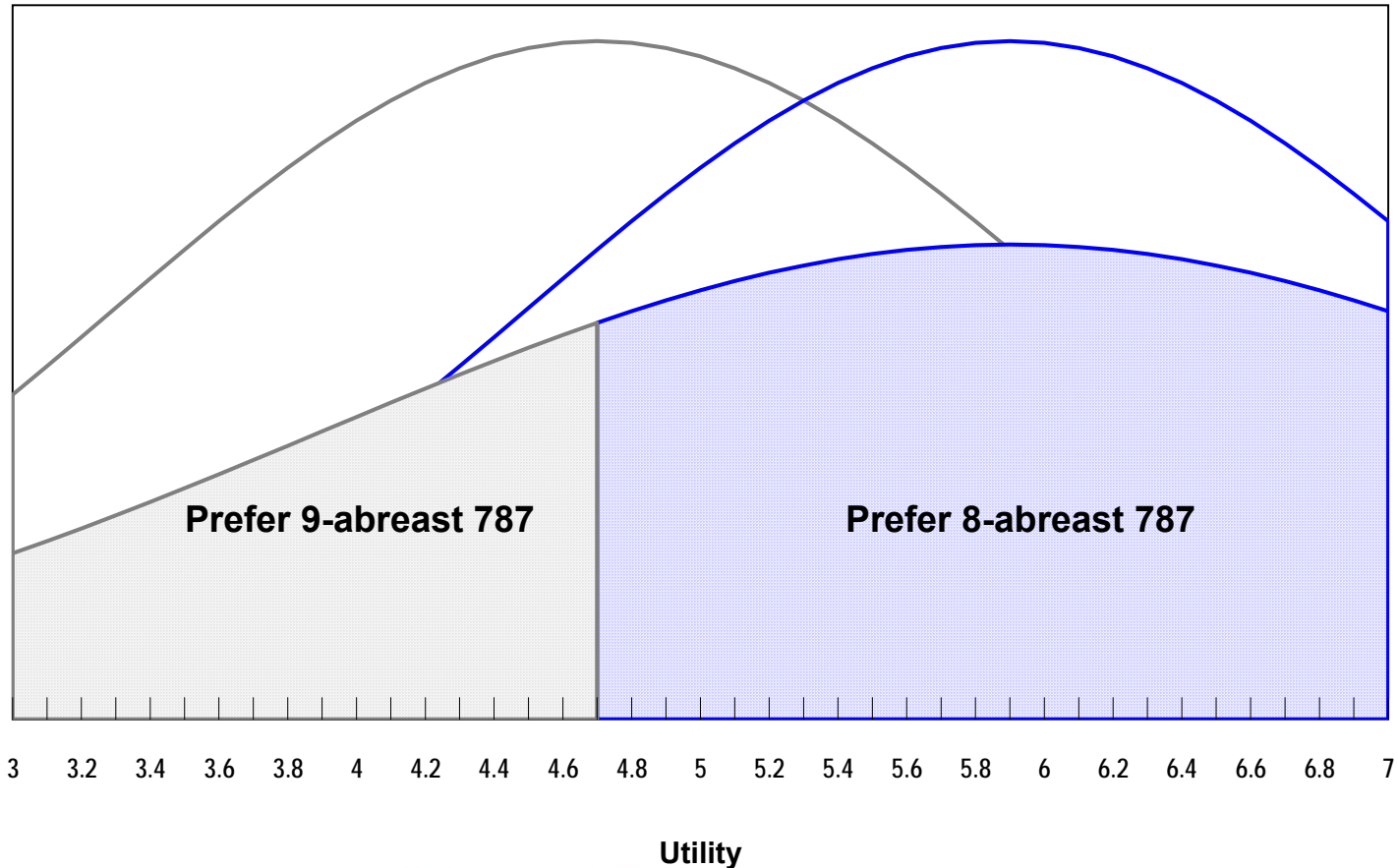
The relation between effective seat width and preference enables the prediction of changes in demand

Techniques for comparing distributions are well known



The relation between effective seat width and preference enables the prediction of changes in demand

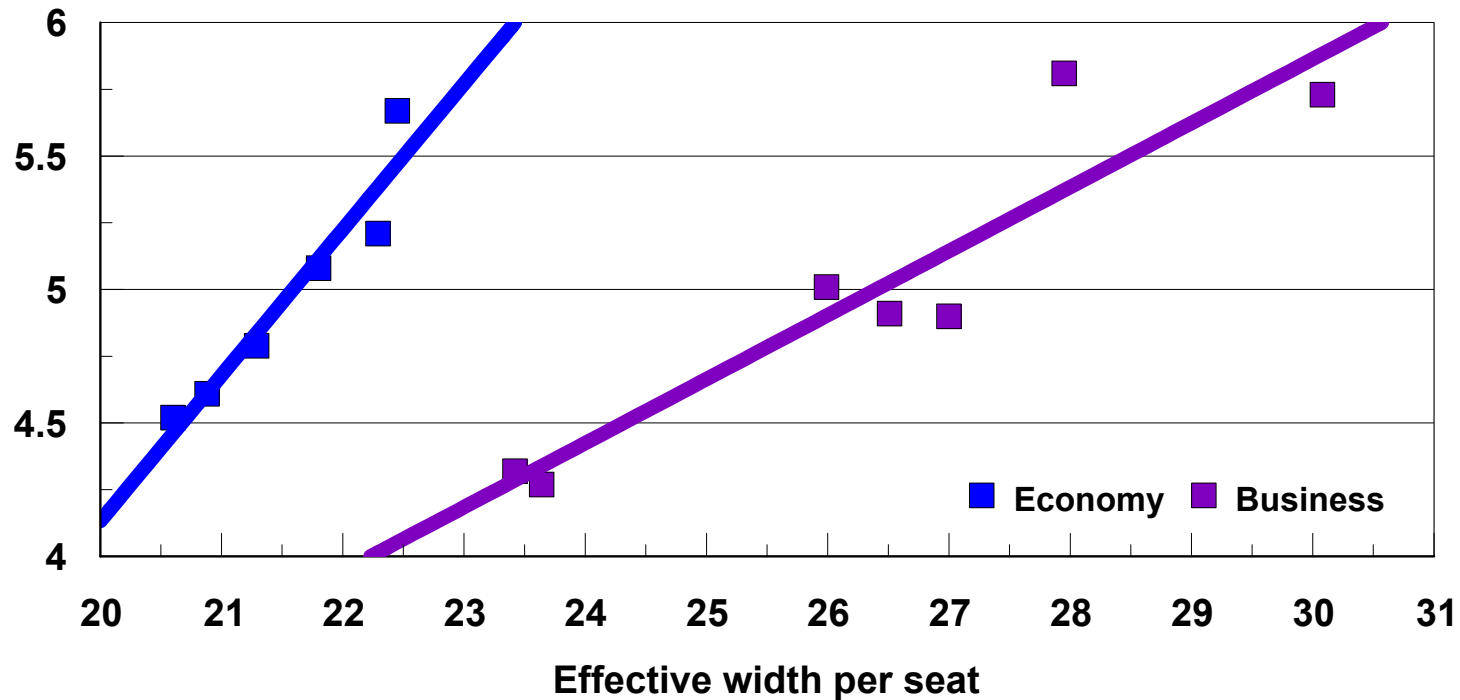
Techniques for comparing distributions are well known



The relation between effective seat width and preference enables the prediction of changes in demand

Effective width per seat has only half the impact on preference in business class as in economy

Preference



Economy: R-sq=0.92, $y = -6.79 + 0.55x$

Business: R-sq=0.86, $y = -1.33 + 0.24x$

Estimating the demand impact of the cabin and seating environment

We have useful calibration data for:

Economy class effective width per seat

Business class effective width per seat

Economy class effective pitch

**Selected architecture differences
(e.g. 767 Signature Interior vs 767 Classic)**

The PaxRev Passenger Choice Paradigm

Within each fare bucket:

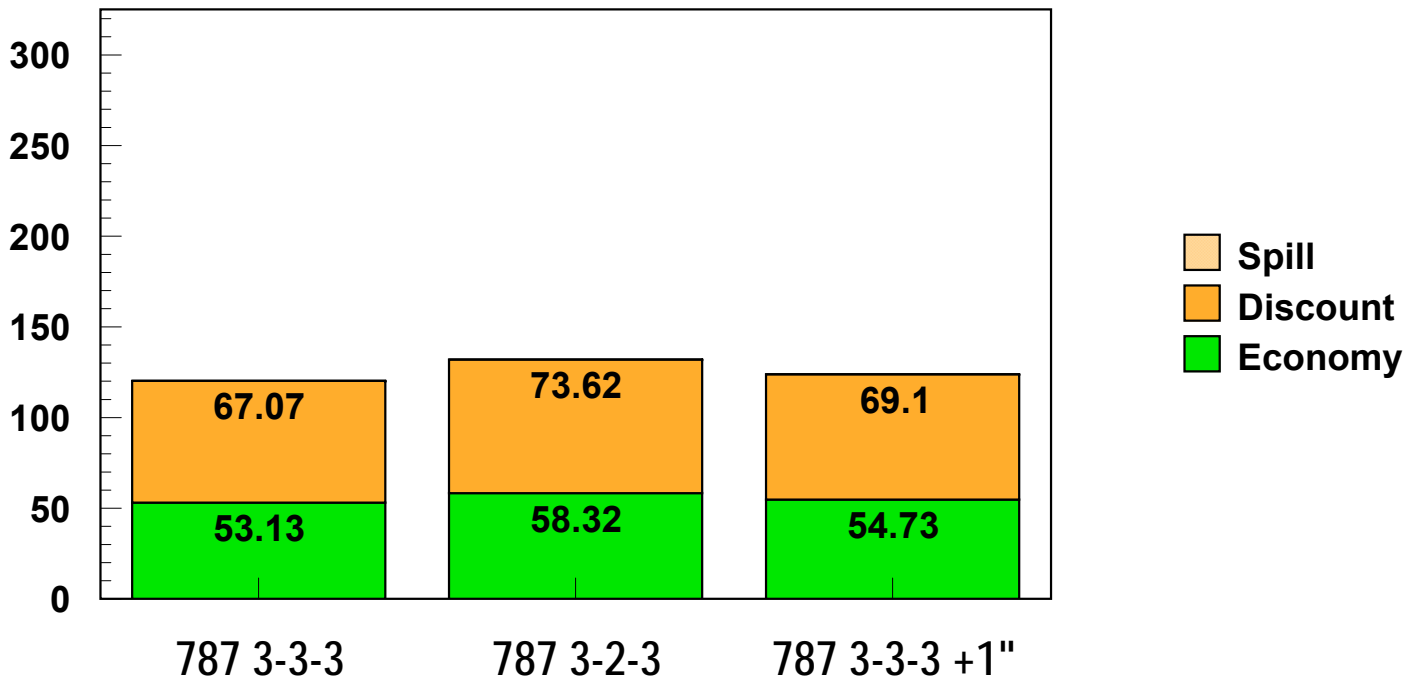
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What changes in load and yield result from the increase in demand in each fare bucket?

Nested spill routines can emulate the impact of higher demand levels in the Revenue Management System

Passengers boarded on an 15%ile load flight
Not nested into premium cabins

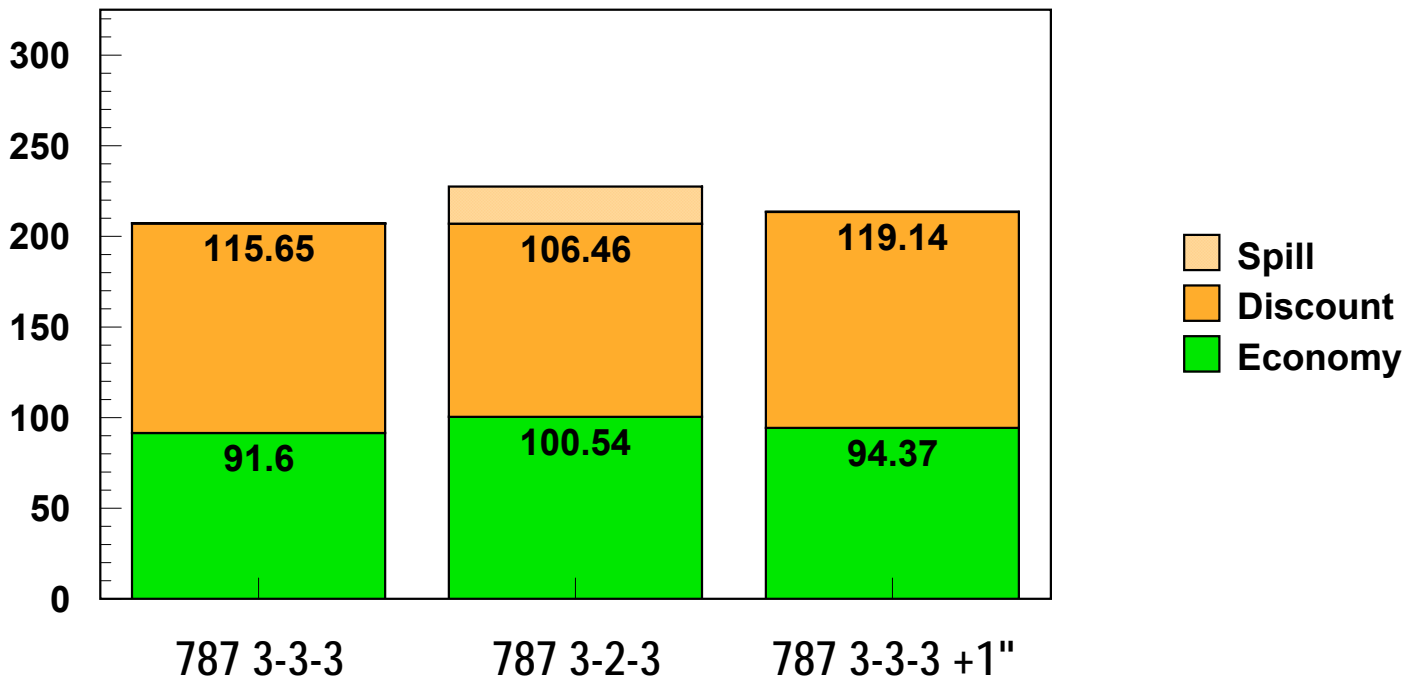
Passengers



Nested spill routines can emulate the impact of higher demand levels in the Revenue Management System

Passengers boarded on an 50%ile load flight
Not nested into premium cabins

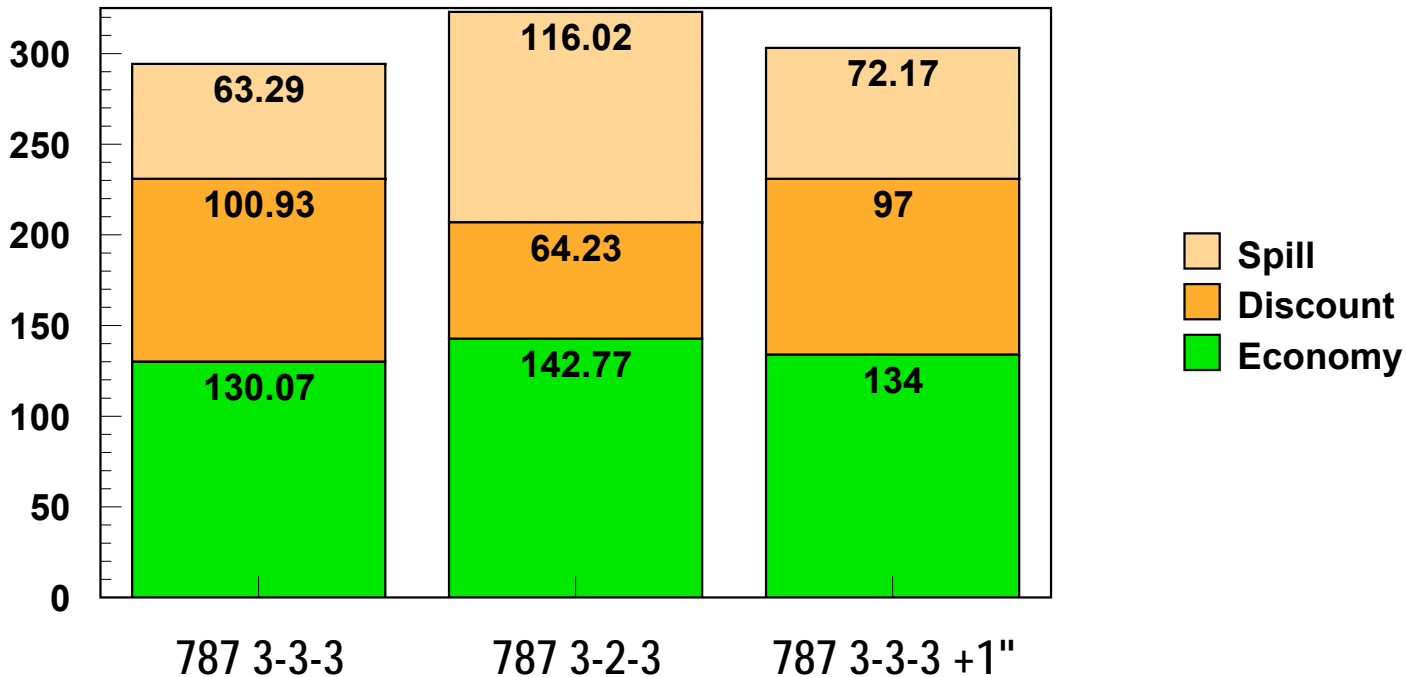
Passengers



Nested spill routines can emulate the impact of higher demand levels in the Revenue Management System

Passengers boarded on an 85%ile load flight
Not nested into premium cabins

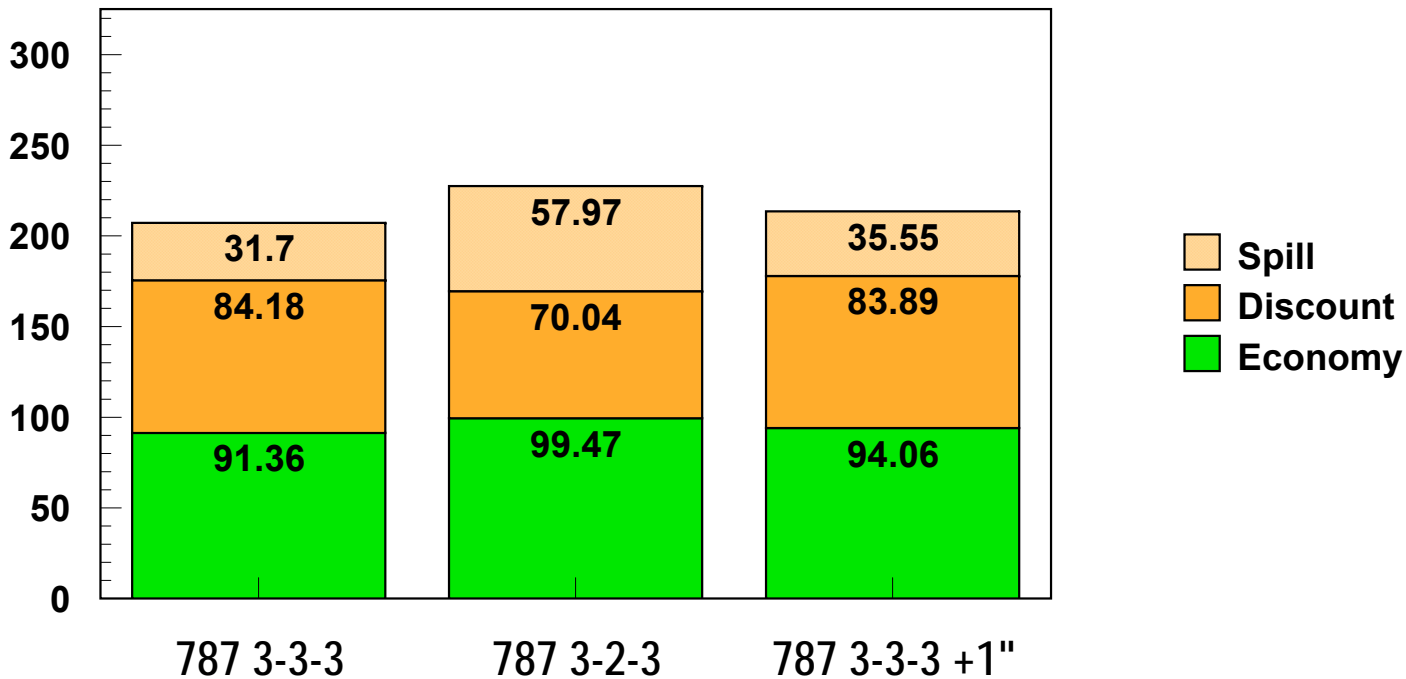
Passengers



Nested spill routines can emulate the impact of higher demand levels in the Revenue Management System

Average economy passengers per flight *Fully nested*

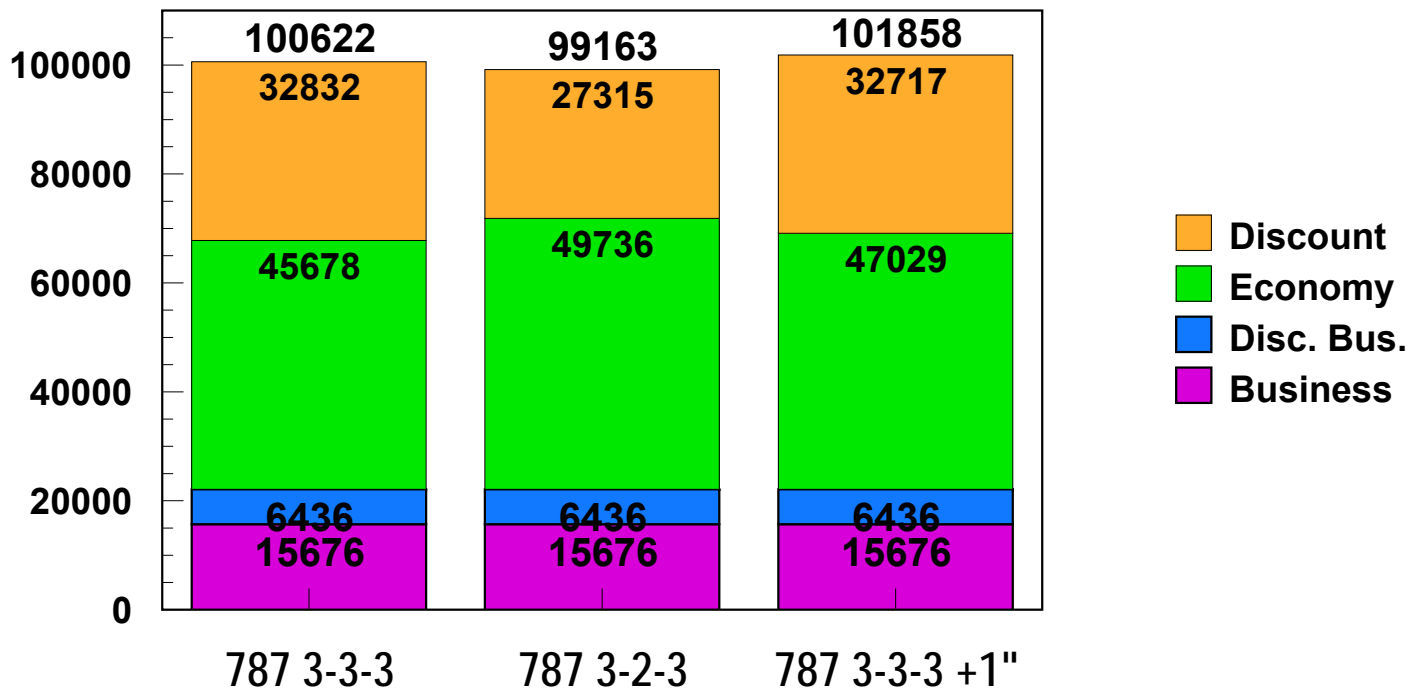
Passengers



Nested spill routines can emulate the impact of higher demand levels in the Revenue Management System

Average revenue per flight *Fully nested*

Dollars



Different study parameters will lead to different answers

More competition will tip the balance toward the greater demand of the 8-abreast configuration

Shorter ranges will tip the balance further toward the greater capacity of the 9-abreast configuration

Complex combinations of factors will tip the balance in directions not easily predicted