

Cruise Investigation: Empirical Economic & Financial Analyses



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* The opinions expressed here are not necessarily those of the Commission or individual Commissioners. The opinions may not represent the views of any individual BE staff member.

Acknowledgements

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- We also want to thank BC Management and the NERO for their outstanding work on these matters.

Overview of Investigation

- Non-data issues
- Data issues
- **How did we work with outside economists?**
- Timing issues
- Where were we pre-data?

Issues

- Demand Elasticity(ies)
- Critical Loss
- Market Definition/Yield Management/Price Discrimination
- **Price Theories**
 - Unilateral Effects
 - Coordinated Interaction

Issues

- **Capacity Theories**

- Capacity Commitments

- Unilateral Effects

- Financial Analyses

- Coordinated Interaction

- Financial Analyses

- **Barriers to Entry**

Demand Elasticities

- *Qualitative Evidence*
 - Nature of the product (one kind of vacation)
 - Percentage of 1st time cruisers
 - Low average repurchase frequencies

Estimation of Demand Elasticities

- We used available data to relate changes in capacity to changes in price.
- Notable to this analysis was a **large change in capacity from 1999 to 2000 with only a modest reduction in price (and stable load factors)**.
- We analyzed this using a variety of techniques, including some regression analyses.
- , **short run elasticities greater than 2**

Critical Loss – Changes in Capacity *Utilization*

- Variable cost of serving an additional passenger is small or negative (on-board spending)
- So Critical Loss is quite small
 - The cruise lines have **acted** on those incentives:
 - Cruise lines “sell out” (stable load factors)
 - Cruise lines have been aggressively expanding capacity
 - Financial Analyses discussed below
- , **estimated elasticities too high to make an across-the-board price increase profitable**

Critical Loss – Changes in Capacity

, A substantial number of ships would need to be removed to achieve a significant price increase

Market Definition

- The hypothetical monopolist test is not passed for an across-the-board price increase
- However, a hypothetical monopolist using **yield management** could increase average revenues
 - The specifics of how this would be accomplished would be complex
 - It probably would involve some consumers paying a higher price and some paying a lower price

Market Definition and Competitive Effects

- “Fuzzy Markets”:

The strength of the market definition has implications for competitive effects analysis – particularly in a coordinated interaction case

Market Definition

, Market definition requires some sort of **price discrimination market** involving yield management

Investigation of Yield Management Systems and Management

- Interviews/Depositions
- Literature Search
- Information about Airlines
- How does competition impact yield management?
- **Cancellation rates and “arbitrage”**

Price Discrimination Analyses

- Who/What/When?
 - Characteristics of customer
 - Most sales through travel agents
 - Characteristics of purchase
 - Type of cruise
 - Type of berth
 - Time of booking

“SunGard Issues”

- Can we define the group of affected customers/transactions?
- For example, is there a group analogous to airlines “business travelers”?
 - Notice that business travelers are identified by time of booking/disinterest in no-change tickets rather than their specific “identities”

Does High Concentration + “Price Discrimination” “Mean” a Case?

- Economics
- *SunGard*

Competitive Effects

- Unilateral or Coordinated Interaction?
- Price and/or Capacity?

Price Theory: Unilateral Effects

- Demand elasticity higher for merged entity than for the industry
- Critical loss (in terms of level of sales) lower for merged entity than for industry
- The purpose of yield management is to try to identify higher willingness-to-pay customers
- Attempted targeting by merged entity creates opportunities that competitors will exploit through their yield management efforts

Price Theory: Coordinated Interaction

- , A viable theory would have to be *enhanced anticompetitive* price discrimination through coordinated interaction

State of Competition

- Relatively “new” dynamic industry
- This is a industry that appears to be very competitive on price, costs, quality, capacity utilization, capacity deployment, capacity expansion
- Main driver of competitive activity is industry growth
- General trend of declining average fares, costs, and increasing concentration
- *Is there a credible basis for a concern that the state of competition will be significantly adversely affected?*

Complexity of Cruise Product and Pricing

- Each ship has many different cabin types for each sailing (over 20 on some ships), and different sailings can have different cabin classifications
- Ships differ significantly in amenities and services
- Sailings differ by: port of departure, itinerary, offshore amenities
- Sales are by travel agents (over 90%)
- Prices may include airfare, group discounts, or vouchers for on-board benefits
- Most bookings do not stick
- Upgrades – very substantial variation in upgrades

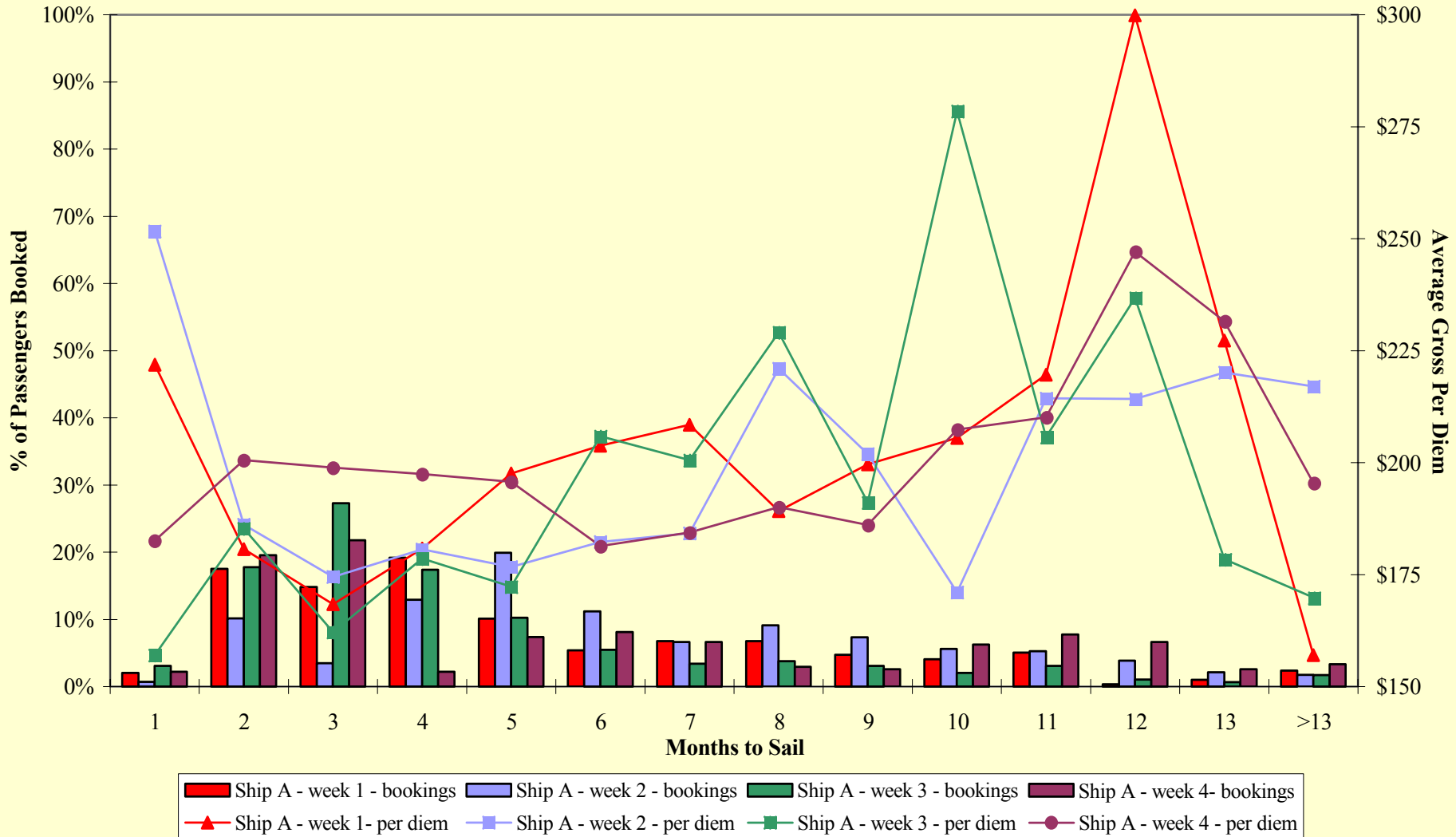
Empirical and Financial Analyses

- We had many gigabytes of data – transactions level data for four companies
- And a lot of financial data
- What I am going to display are some **examples** from the **many** analyses we conducted

Complexity: Variability in Pricing and Booking Patterns Across Sailings of The **Same Ship**

- **Purpose:** Assess the variability of pricing and booking patterns for a single ship for four consecutive sailings with the same itinerary
- **Data used:**
 - Transaction data from the parties with information on prices paid by passengers, what cabin they sailed in and when they booked.
- **Method:**
 - Select a ship that had four consecutive sailings of the same itinerary.
 - For each 30 day period prior to sailing for a cabin category, calculate the average price paid during that period and how many cabins booked for each of the four sailings.

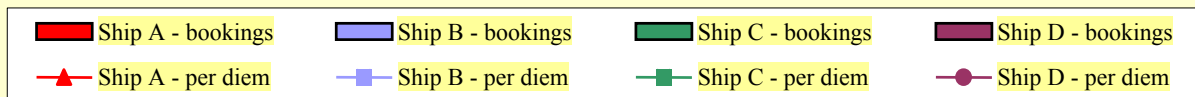
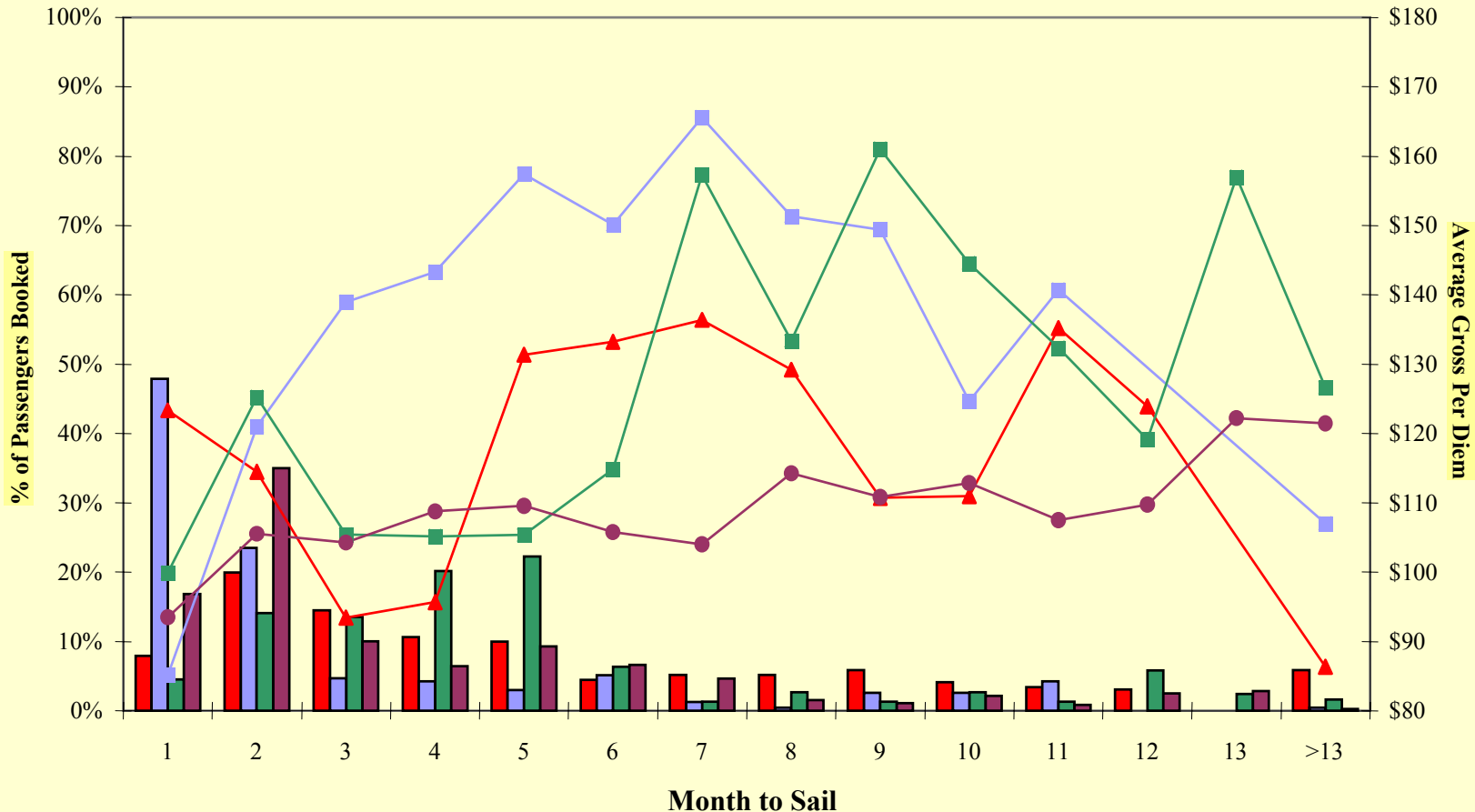
Average Gross Per Diem and Bookings by Months prior to Sailing for a Ship Sailing on Similar Itineraries on Four Consecutive Weeks (Category X Cabin)



Variation in Pricing Across **Competitors**

- **Purpose:** assess the relationship of pricing over booking cycle for head-to-head cruises
- **Data used:**
 - Transaction data from the parties with information on prices paid by passengers, what cabin they sailed in and when they booked.
- **Method:**
 - Select four **competing** ships that sailed from the same port in the same week with a similar itinerary.
 - For each 30 day period prior to sailing for a **cabin category**, calculate the average price paid during that period and how many cabins booked for each of the four sailings.

Average Gross Per Diem and Bookings by Months Prior to Sailing for Four Ships Departing the Same Port the same Day on Similar Itineraries (Category X Cabin)



Coordinated Interaction Theories

- “Small Numbers”
- Oligopoly Theory
- Maverick
- Existing “Coordination”

Tests of “Small Numbers” Theory

- Testing for relationship between measures of concentration or presence of particular competitors and measures of “price” (“**Natural Experiments**”)
- One issue was that the industry has grown rapidly, concentration has increased, and average prices have fallen (as have average costs)
- We found no credible relationship between measures of concentration or presence of particular competitors and measures of “price”

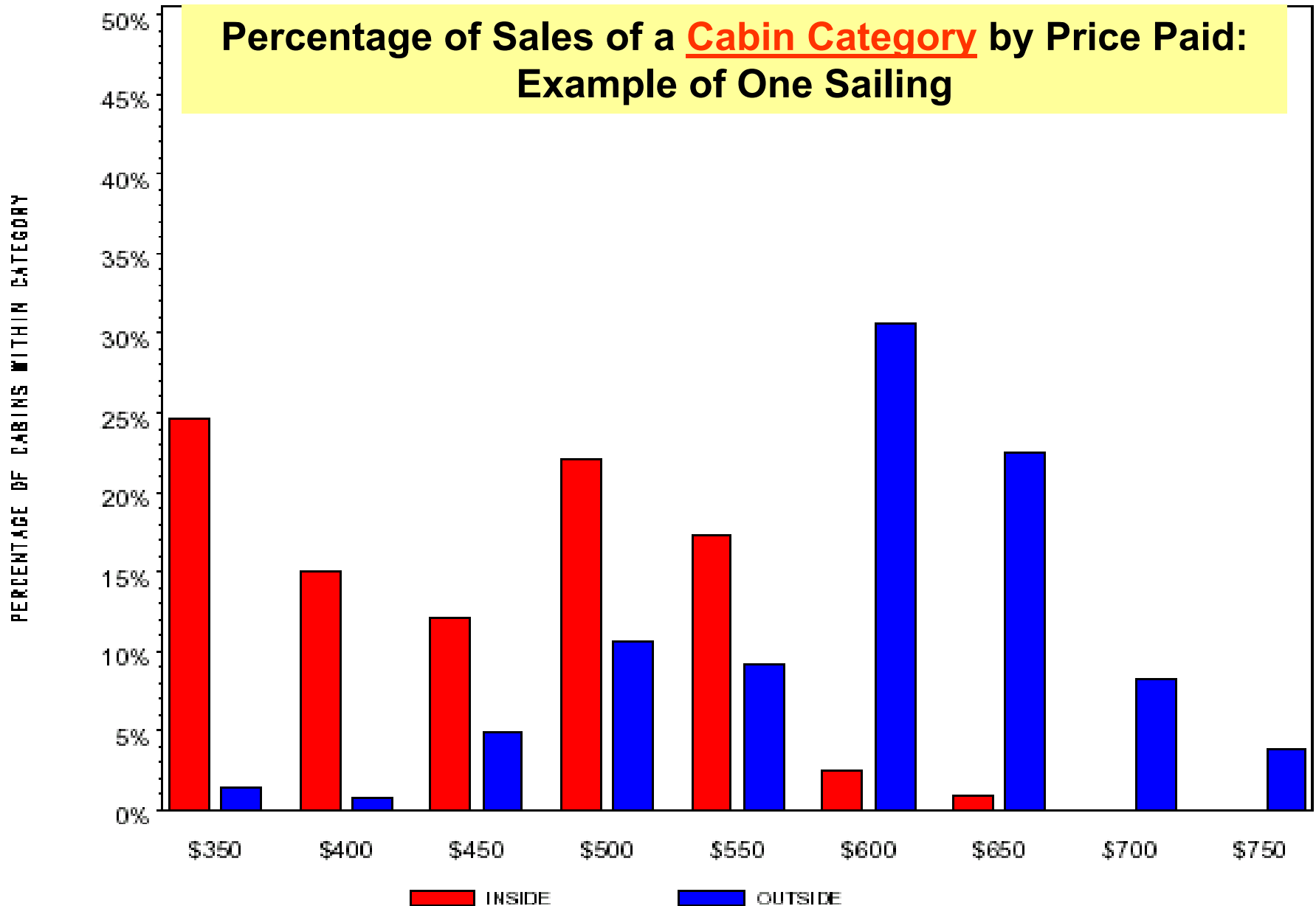
Tests for Coordinated Interaction Price Discrimination Theories

- Cabin type
- Time of booking
- Relationship of “early” and “later” prices
- The methodology was to search for evidence of **existing** effective price discrimination by these types, separately or in combination

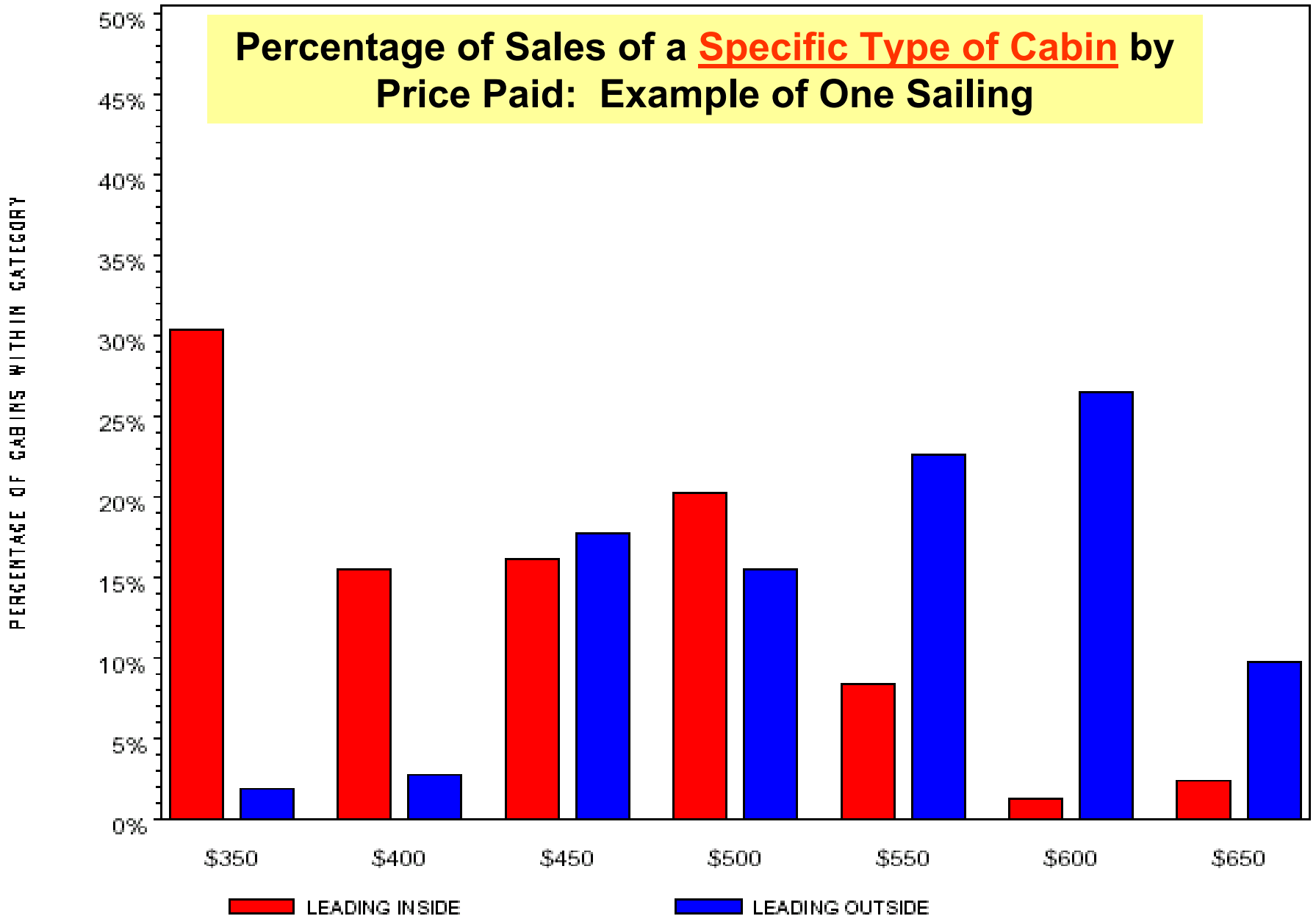
Variation in Pricing Within Cabin Types

- **Purpose:** Analyze pricing across cabin types to assess whether coordinated price discrimination by cabin type might be feasible.
- **Data used:**
 - Transaction data from the parties with information on prices paid by passengers and what cabins they sailed in.
- **Method:**
 - Select a sailing
 - For each cabin type and category, determine the distribution of prices paid

Percentage of Sales of a Cabin Category by Price Paid: Example of One Sailing



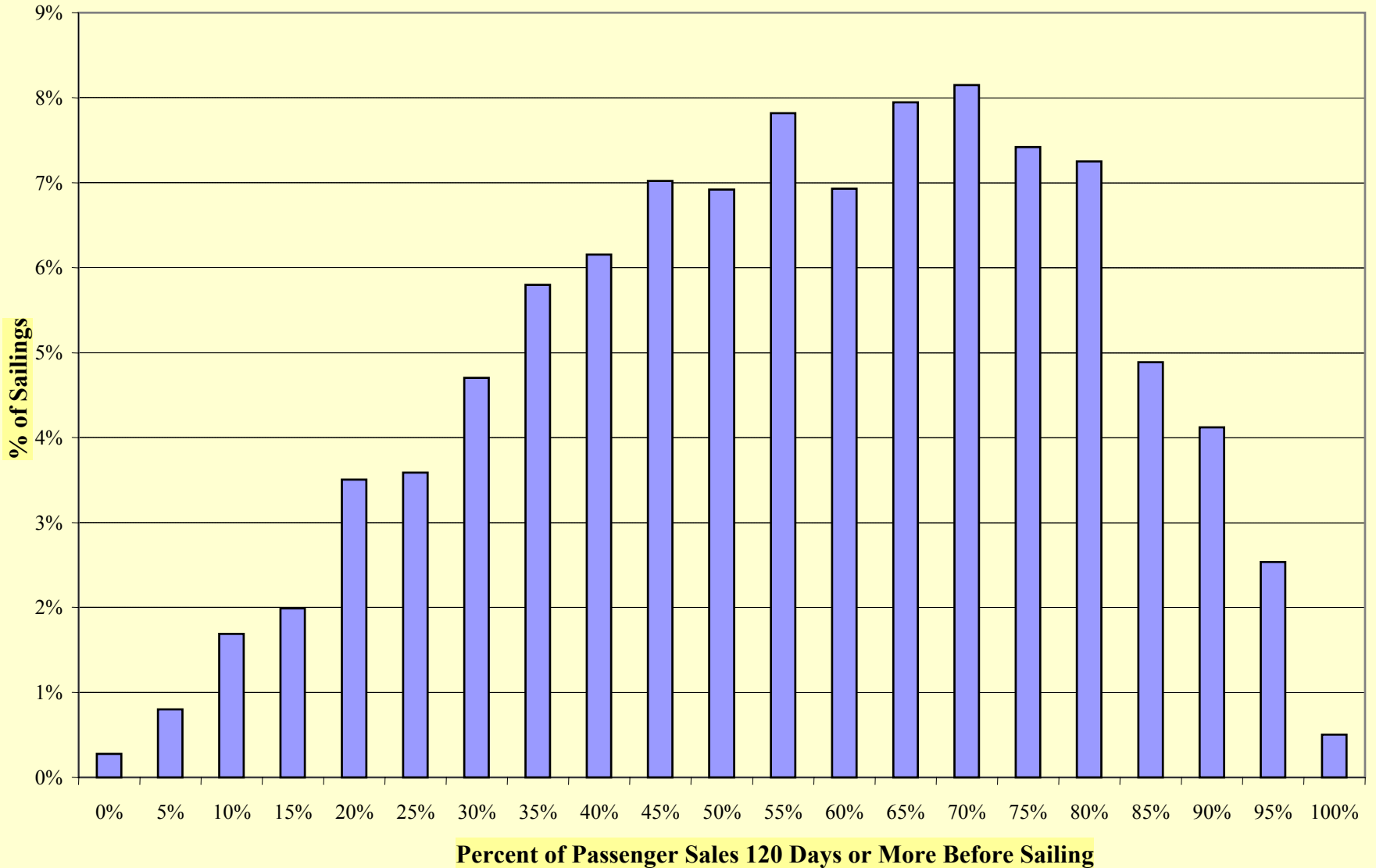
Percentage of Sales of a Specific Type of Cabin by Price Paid: Example of One Sailing



Timing of Bookings

- **Purpose:** Assess whether there is a systematic pattern of when cabins are booked to determine if coordination of timing of discounts might be feasible.
- **Method:**
 - Determine for each sailing the percentage of passengers that had booked by – as one example – 120 days prior to sailing.
 - Determine the distribution of this percentage across sailings.
 - Note: Subsequent analyses also display the variability in booking patterns.

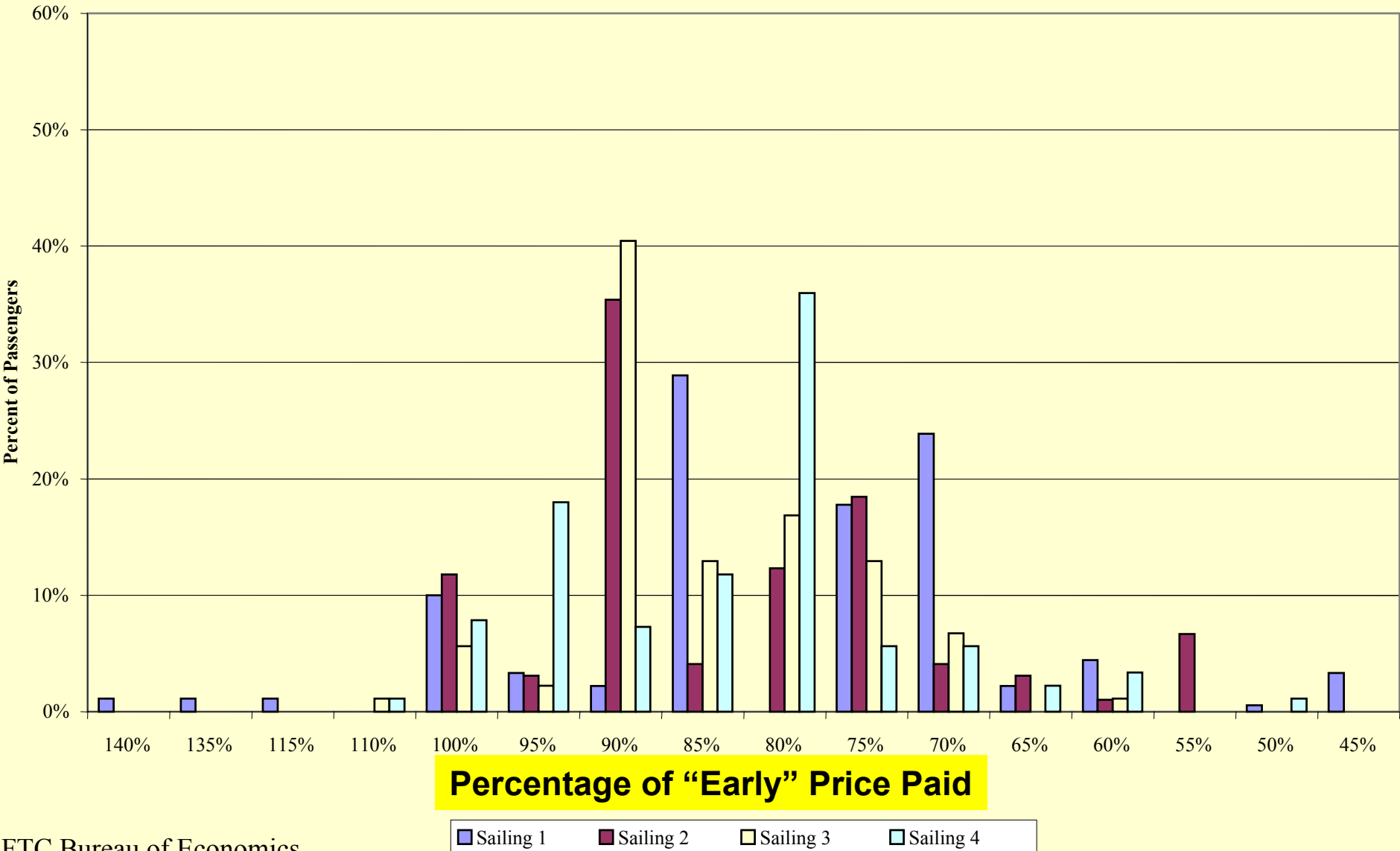
Distribution of Percent of Capacity Filled at 120 Days Before Sailing Across All Sailings



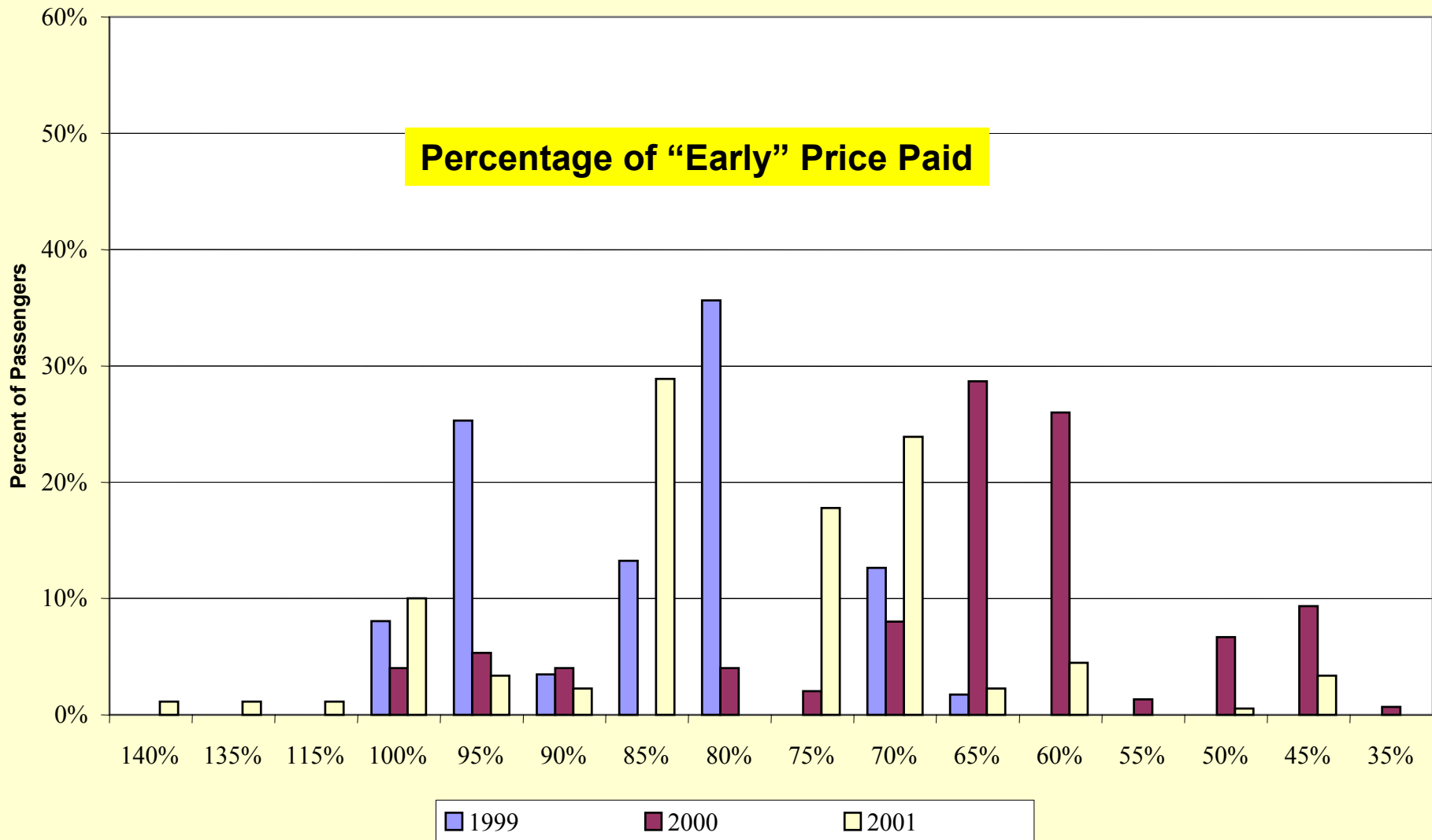
Relationship Between “Early” and “Later” Transaction Prices

- **Purpose:** Assess whether there is a systematic relationship between “early” and “later” transaction prices that might make coordination over “early” prices feasible.
- **Data used:**
 - Transaction data from the parties with information on prices paid by passengers.
- **Method:**
 - Select a sailing and a cabin category.
 - Looking at the data, determine an “early” price that is paid by a number of passengers (not the brochure price).
 - For each passenger sailing in that category, calculate the actual price paid as a percentage of the “early” price.

Distribution of Passengers Paying Rounded Percentage of “Early” Price for Four Consecutive Sailings of Ship A, for a 7 Day Cruise, Category 1 Cabins



Distribution of Passengers Paying Rounded Percentage of “Early” Price, for Three Identical Sailings of Ship A, in Three Consecutive Years Category 1 Cabins

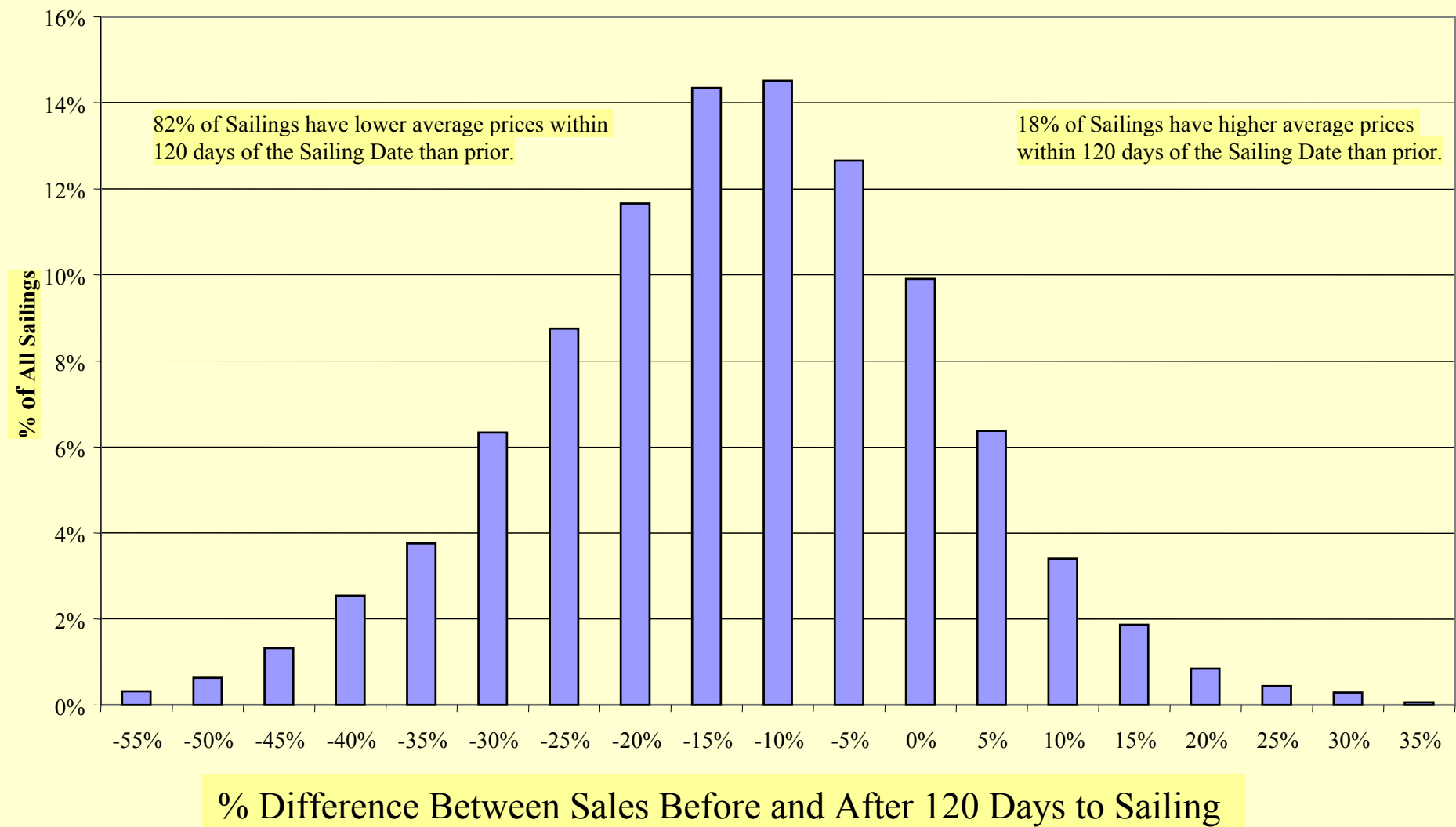


Relationship Between “Early” and “Later” Transaction Prices

- **Purpose:** Assess whether there is a systematic relationship between “early” and “later” transaction prices that might make coordination over “early” prices feasible.
- **Data used:**
 - Transaction data from the parties with information on prices paid by passengers
- **Method:**
 - Determine for each sailing, the percentage difference in average prices paid for all cabins before and after 120 days to sailing.
 - Determine the distribution of this percentage across sailings.

Relative Pricing Before and After 120 Days to Sailing

All Cruises - All Cabins



Other Empirical Analyses

- Correlations of Prices across similar itineraries
- Price movements
 - Reacting to Competition?
 - Reacting to Booking Curve?
- Analysis of competitor and industry load factors over time
- Modeling of Booking Curve/Pricing

Capacity Theories

- Ships to be delivered in the next 3-4 years equal a very substantial increment to current capacity
- Fringe also has considerable amount of capacity coming on line in the next few years and continues to make new commitments
- Entry or redeployment for European-based competitors?
- Recall Critical Loss – you need to change a lot of capacity to move the needle on price

Capacity Theories: Oligopoly Theory

- “Consensus” Issues
 - Capacity expansion has been profitable
 - New ships are an important form of product and promotion competition
- “Punishment” Issues
 - What happens to “punishing” capacity given very low critical loss?

Financial Analyses of Capacity Changes

- We conducted **extensive financial analyses** of the profitability of redeployment – unilateral and various coordination scenarios – that included demand elasticity/cannibalization as part of analyses
- We did similar financial analyses of restriction of capacity expansion

Data Analysis is Not a “One Way Street”

- Data analysis may **rebut** a *prima facie* case (
or
it may **support** a case (
- We won't know until we analyze the data
- **We will continue to demand the data in 2nd Requests and we will analyze those data**
- **If you interact with us *à la* BE Best Practices (posted on our web site) we will be reasonably transparent**