# Predatory Pricing? A Case Study of SouthWest's Entry into Hawaii

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# Overview

**Research question:** Did Southwest Airlines engage in predatory pricing in the intra-Hawaiian airline market in 2019-2024??

- ▶ Predatory pricing is defined as a "price reduction that is profitable only due to the increased market power the predator gains by eliminating, disciplining, or otherwise inhibiting the competitive behavior of a rival or potential rival" (Bolton et al. (2000))
- ▶ It is prohibited under the Sherman Act as a form of anticompetitive conduct
- ▶ In legal practice, predatory pricing cases are rarely successful due to the high burden of proof
- ▶ Empirical research on predatory pricing remains limited

# Outline

# Hawaiian Market Before Southwest Entry

- ▶ Hawaii's geographic isolation makes air travel essential
- ▶ Most carriers focused on mainland–Hawaii routes
- ▶ Inter-island routes (25% of traffic) were dominated by Hawaiian Airlines during the 2010s
- ▶ Hawaiian also held the largest share of mainland–Hawaii traffic (30%) and was strong on Hawaii–Japan routes
- ▶ These advantages helped Hawaiian earn $80M in average quarterly profit (2014–2018)

# Hawaiian Airlines vs Southwest

- In Q2 2019, Southwest entered Hawaii, including inter-island routes
- Its entry fares were 50% lower than Hawaiian's—and remained low for several years
- While penetration pricing is common, the prolonged price drop was unusual
- This raised concerns among Hawaiian Airlines and industry observers
- Hawaiian faced mounting losses from 2020, due to price pressure, the pandemic, and wildfires
- It was acquired by Alaska Airlines in August 2024

# Hawaiian Airlines vs Southwest



Figure: Wall art at Southwest's ETOPS center in Oakland Airport depicts Southwest as a shark devouring its local competitors, Hawaiian Airlines and Alaska Airlines
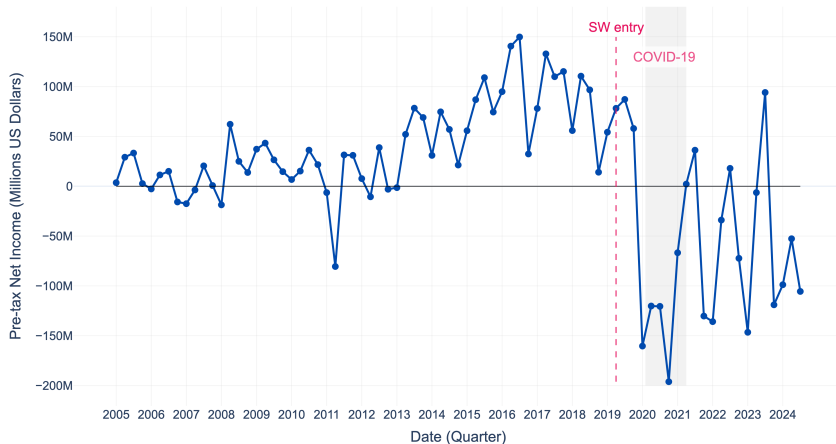
# Hawaiian Airlines financial data



Figure: Quarterly Hawaiian Airlines pre-tax net income. Source: author's calculations using Bureau of Transportation Statistics data

# Feasibility of Predatory Pricing

- **1. Difficulty of Recouping Losses**
  - Predation is only rational if the firm can later raise prices to recover losses
  - High post-predation prices may attract new entrants, undermining gains
  - Mitigating factors: entry barriers, reputation effects, and consumer switching costs
- **2. High Cost of Sustaining Below-Cost Pricing**
  - Extended price wars are costly, especially for large firms
  - Smaller rivals may endure losses more easily
  - Price discrimination and modern tech tools can reduce the cost of predation

# Feasibility and Rationality of Predatory Pricing

- **3. Capital Asymmetry and Financing Constraints**
  - Predators often assumed to have deeper financial resources
  - With complete information, predation should not occur in equilibrium
  - But with asymmetric information, predation may occur (Benoit (1984))
  - Prey may be unable to borrow if its financial position deteriorates (Fudenberg and Tirole (1985))

- **4. Predation vs. Merger**
  - A firm may choose predation over merger despite higher cost or uncertainty
  - Possible motivations: reputational benefits, lower regulatory scrutiny, or stronger bargaining leverage

# Airline Industry and Predation

- ▶ The airline industry features several conditions conducive to predatory behavior:
  - ▶ Significant entry barriers
  - ▶ Loyalty programs that impose high switching costs (Orhun et al. (2022))
  - ▶ A high degree of price discrimination (Borenstein and Rose (1994))
- ▶ These factors make airlines a particularly attractive setting for predation
- ▶ Historical antitrust cases include:
  - ▶ American vs. Sun Jet, Vanguard, and Western Pacific
  - ▶ Delta vs. ValuJet
  - ▶ Northwest vs. Spirit and Sun Country
  - ▶ United vs. Frontier and Western Pacific
- ▶ In all cases, courts ruled in favor of the alleged predator

# Testing for Predation

- The main challenge in detecting predation is that intense price wars are a natural part of market rivalry
- Legal standards require comparing price to a measure of cost—usually Average Variable Cost (AVC)—and demonstrating the feasibility of recoupment
- Accurately estimating cost is difficult, as it requires detailed cost data
- In this research, I aim to complement price-cost comparisons with additional empirical evidence suggestive of predation

# Literature review

- **Predatory pricing:** Benoit (1984), Fudenberg and Tirole (1985), McGee (1958), Elzinga (1970), Burns (1986), Genesove and Mullin (2006)
- **Pricing in airline industry:** Borenstein and Rose (1994), Goolsbee and Syverson (2008), Williams (2022), Hortaçsu et al. (2024)
- **Contributions:**
  - Extends empirical literature on predatory pricing by analyzing a potential case in a modern market context
  - Enhances airline literature on pricing and market entry by examining competitive dynamics following entry into a previously monopolized market

# Data

- Data sources from Bureau of Transportation Statistics (BTS):
    - **DB1B:** 10% sample of U.S. airline tickets (used for fares and passenger flows)
    - **T-100:** Traffic and capacity data (used to compute load factors)
    - **Form 41:** Carrier-level financial data (used for cost estimation)
- COVID period: Q2 2020–Q1 2021
    - Captures pandemic disruptions and early recovery (vaccine rollout, traffic rebound)

# Empirical evidence

I present three empirical exercises to help understand the nature of Southwest's pricing strategy in the Hawaiian market.

- ▶ Price-cost analysis
- ▶ Event study comparing Southwest's entry into Hawaii with other markets
- ▶ Capacity and load factor analysis

# Cost Calculation

▶ Use industry standard: **Cost per Available Seat Mile (CASM)**
▶ Formula:

$$CASM = \frac{Total\ operational\ cost}{Total\ available\ seat\ miles}$$

▶ Adjust CASM:
  ▶ Exclude G&A and Depreciation/Amortization expenses
  ▶ Normalize by route distance using elasticity from Caves et al. (1984)
▶ Convert to average variable cost (AVC):

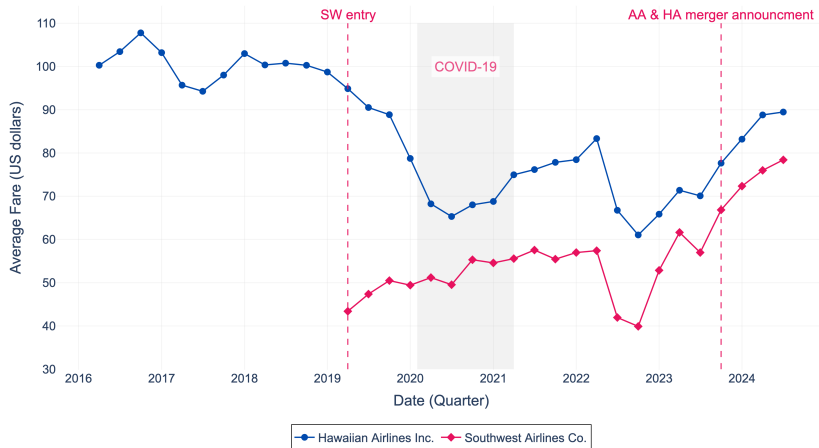$$AVC = CASM \times \frac{Distance}{Load\ factor}$$

# Average fares



Figure: Quarterly Hawaiian Airlines and Southwest average variable cost for inter-island flights
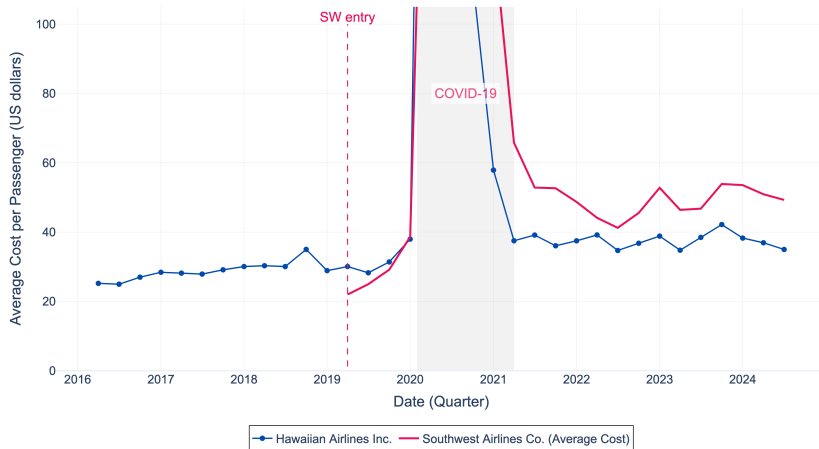
# Average costs



Figure: Quarterly Hawaiian Airlines and Southwest average variable cost for inter-island flights
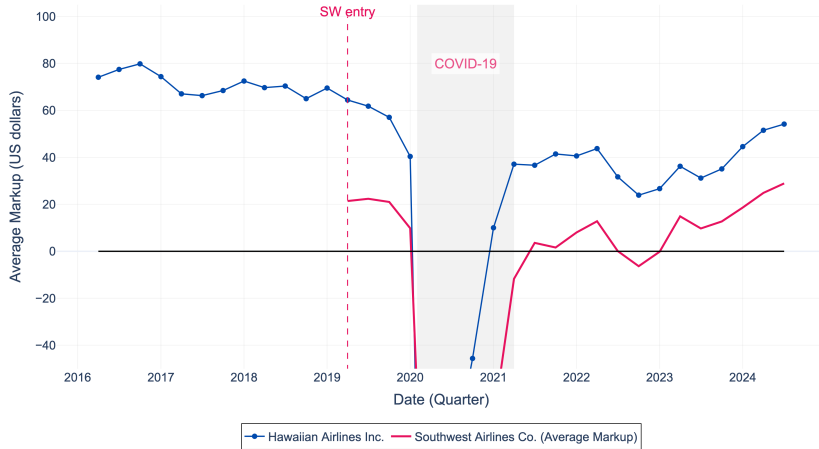
# Average markups



Figure: Quarterly Hawaiian Airlines and Southwest average markups for inter-island flights

# Price-Cost Comparison

- Fares dropped sharply after Southwest's entry
- Initial decline persisted through early post-entry quarters
- A second round of price cuts followed the lifting of COVID-19 restrictions
- During this period, costs increased while fares remained low
- Markups fell to near zero or turned negative — raising concerns about predation
- Hawaiian Airlines maintained positive markups throughout

# Event Study Design

- Price wars are common after market entry—especially when monopolies are broken
- I test whether Hawaii's price response differs from other Southwest entry cases
- Sample includes 4,171 directional markets that either faced Southwest entry (since 2011) or never did
- Markets defined as directional metro/micropolitan area pairs
- I estimate treatment effects using the imputation estimator from Gardner (2021), Borusyak et al. (2024)

# Imputation Estimator

**Step 1:**

- ▶ Estimate baseline model on pre-treatment sample:

$$y_{mt} = \Gamma_m + \Psi_t + \beta X_{mt}$$

  where $\Gamma_m$, $\Psi_t$ = market and time fixed effects; $X_{mt}$ = controls
- ▶ Pre-treatment defined as:
  - ▶ $t < t_0 - 3$ quarters (to allow for anticipation, Goolsbee and Syverson (2008))
  - ▶ For Hawaii: $t < t_0 - 6$ (regulatory delay: overwater certification)
- ▶ Include endpoint-state $\times$ COVID dummy to absorb state-specific COVID shocks

# Imputation Estimator

**Step 2:**

- Use Step 1 estimates to generate predicted outcomes: $\hat{y}_{mt}$
- Compute treatment effect: $\hat{\tau}_{mt} = y_{mt} - \hat{y}_{mt}$
- Aggregate $\hat{\tau}_{mt}$ by event time (quarters relative to Southwest entry) for treated markets of interest

# Event study plot
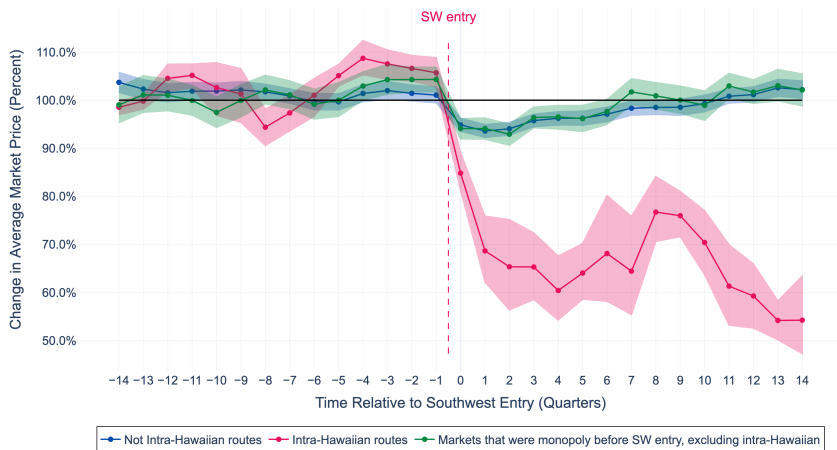


Shaded area is 95% confidence interval

# Event Study Inference

- ▶ Cannot reject $H_0 : \overline{\beta}_{\text{pre-treatment}} = 0$ for intra-Hawaiian and monopoly markets
- ▶ Joint test of all pre-treatment coefficients is rejected for non–intra-Hawaiian and intra-Hawaiian markets, but not for monopoly markets
- ▶ Placebo tests (with shifted treatment dates) show no significant effects
- ▶ Some anticipatory price increase is observed, especially in intra-Hawaiian markets
- ▶ Entry effect is largest and most persistent in intra-Hawaiian markets
- ▶ In other markets, prices return to pre-entry levels within a few years
- ▶ These patterns suggest that Southwest's behavior in Hawaii deviates from its usual entry strategy

# Excessive capacity

- Williamson (1977) suggests that excessive supply can serve as a signal of predation
- The predator commits to low prices by overproducing
- In the airline industry, the mechanism through which excess capacity affects pricing is better understood from a revenue management perspective
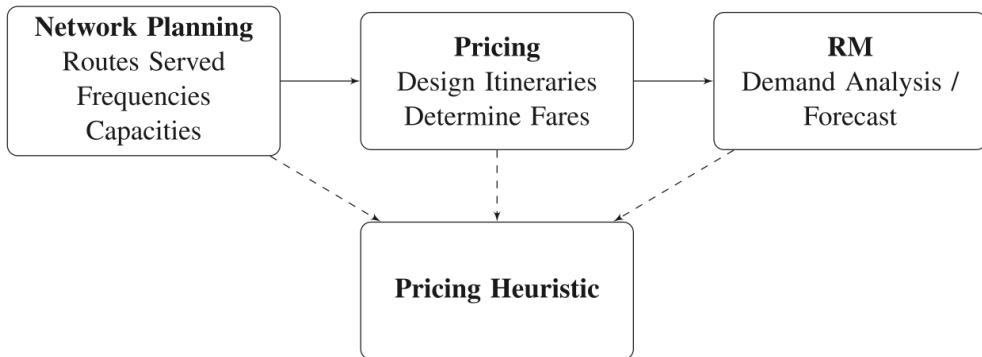
# Airline organisational structure



Figure: Division Responsibilities at Airlines.
Source: Hortaçsu et al. (2024)

Example of pricing heruisitic - Littlewood's rule

# Price wars

- One easy way to trigger a deliberate price war is by manipulating demand forecasts (e.g., using pessimistic estimates for higher-fare demand)
- Changing the price menu is costly due to transaction costs (ATPCO)
- A common practice is to introduce a single "sale fare"
- Adjusting capacity is the most expensive way to reduce prices, but it has the most significant long-term impact on market pricing and competitive dynamics
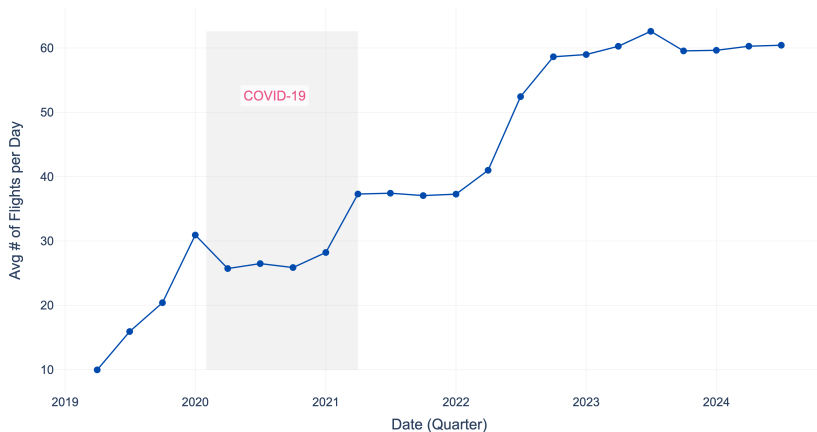
# Southwest capacity on intra-Hawaiian routes



Figure: Average number of daily flights per quarter
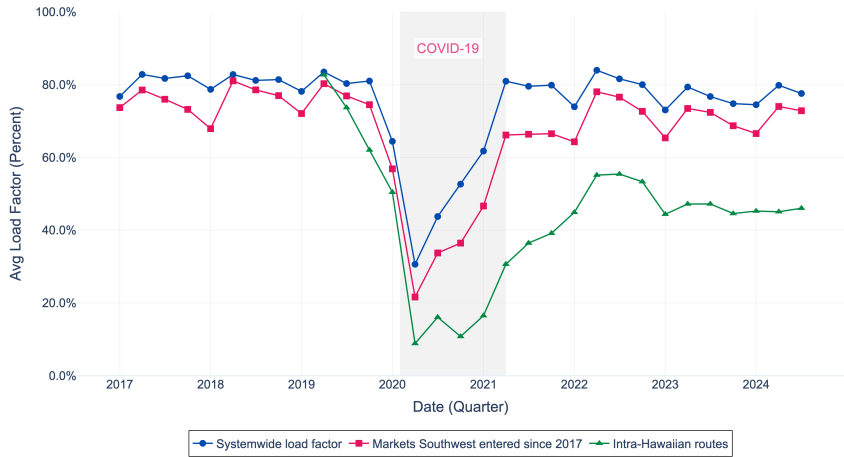
# Southwest load factors



Figure: Southwest load factors on different routes

# Excessive Capacity

- Post-pandemic load factors on intra-Hawaiian flights were significantly lower than both Southwest's systemwide average and those on other newly entered routes
- Despite this, Southwest increased its total capacity on intra-Hawaiian flights by approximately 30% in 2022
- A widely promoted "special fare" of $38 accounted for the majority of ticket sales during this period
- Together, these patterns suggest that Southwest may have been both triggering a price war through aggressive discounting and committing to low price levels by expanding capacity

# Summary of Empirical Evidence

- Southwest's pricing in Hawaii was unusually aggressive compared to other entry events:
  - Event study shows significantly larger and more persistent price drops in intra-Hawaiian markets
  - Price-cost analysis reveals consistent near-zero or negative markups, inconsistent with profit-maximizing behavior
- Capacity decisions support a predation narrative:
  - Southwest expanded capacity despite persistently low load factors
  - Revenue management theory suggests this behavior is consistent with committing to lower prices over the long term

# Recoupment Possibilities

▶ If Southwest had eliminated Hawaiian Airlines, it could have gained monopoly power over inter-island flights and expanded its dominance on mainland and international routes

▶ This would have enabled fare increases and positioned Hawaii as a trans-Pacific hub, creating long-term entry barriers and allowing recoupment of early losses

▶ However, Hawaiian merged with Alaska Airlines, preserving competition and blocking Southwest's path to monopoly

▶ *Ex ante*, this potential for recoupment might have justified a predatory attempt

▶ *Ex post*, Southwest appears to have miscalculated:
  ▶ The strategy proved unsustainable and incurred great losses for the airline
  ▶ Following the merger, Southwest has begun scaling back its Hawaiian operations
  ▶ Inter-island fares have started to rise in response to the merger announcement

# Possible Non-Predatory Explanations

▶ While Southwest's pricing was aggressive, labeling it as predation may be too strong a claim
▶ Some possible alternative incentives for the observed pricing strategy:
  ▶ **Loss leader strategy:** Using inter-island routes to attract customers and grow demand for more profitable mainland flights
  ▶ **Loyalty programs:** Hawaii is important for Southwest's frequent flyer and credit card programs
  ▶ **Gate access:** Sustained presence on inter-island routes may have helped secure limited gate slots at Hawaiian airports

# Conclusion and Future Research

▶ Southwest's pricing strategy in Hawaii featured unusually deep and persistent price cuts, paired with aggressive capacity expansion and low load factors
▶ These behaviors deviate from standard profit-maximizing strategies and align with theoretical features of predatory pricing
▶ However, it is still hard to distinguish this from mere competition
▶ **Future research:** Apply recent methods from the conduct-testing literature

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# Appendix 1

- Two level of prices $p_L$ and $p_H$, $p_H > p_L$
- Total capacity $C$
- Distribution of demand for higher price: $Q_H \sim F_H$
- Customers arrive in the increasing WTP
- Idea: reserve $x$ seats for $p_H$ where $x$ is solution for

$$p_H \cdot Pr[Q_H > x] = p_L$$

- Sell first $C - x$ seats for $p_L$
- The greater total capacity $C$ the more seats are allocate to $p_L$ and the lower average price

Return