Distributional Effects of Mergers

Evidence from Low-Cost Carriers

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October 24, 2025

Motivation

- Horizontal mergers simultaneously possess pro-consumer and anti-consumer aspects.
- Throughout the economy, firms are heterogeneous in their customer bases.
  - Consumer Preferences: Vegan, Fast-Food, Steakhouses
  - Consumer Willingness to Pay: Legacy, Low-Cost Carrier, Ultra-Low-Cost Airlines
- How does a merger of two firms which target different consumer segments impact overall consumer welfare?

This Paper

- Uses the Blocked JetBlue-Spirit merger to analyze these issues.
- Estimates a structural model to simulate the merger effects on minimum fares, average fares.
- Finds that
  - The merger would have improved consumer surplus in the post-pandemic period.
  - Would have increased minimum market fares substantially in at least 35 markets even under assumptions favorable to the merger

Presentation Organization

- Setting
- Data and Summary Statistics
- Model and Results
  - Demand Model
  - Supply Model
  - Merger Simulations
  - Consumer Surplus
- Conclusion

Types of Carrier

- Three Types:
  - Legacy
    - Delta, American, United
    - Hub-and-Spoke Networks
  - Low-Cost
    - Ex: JetBlue, Southwest
    - Focus on Direct Flights, Uniform Fleets
  - Ultra-Low Cost
    - Model characterized by "Unbundled Fares"
    - Cheaper base fares, worse quality.

JetBlue

- Second largest Low-Cost Carrier in the United States, behind Southwest
- Primarily on the Eastern Seaboard, Select Inland, West-Coast Markets
  - Similar route structure to Spirit
- Increasingly Anti-Competitive
  - Northeast Alliance with American Airlines
- Saw Purchasing Spirit As Way to Bolster Fleet

Spirit

- Largest Ultra-Low Cost Carrier in the United States
- Focused on price conscious travelers
- Non-Fare "ancillary fees" charged on "unbundled" tickets
  - Checked Baggage Fees, Online Booking Fees, etc.
  - These fees make up roughly half of its revenue from serving passengers

JetBlue-Spirit Merger Timeline

- 2022:
  - February: Frontier Attempts to Acquire Spirit
  - April: JetBlue Intervenes with own Offer
  - October: Spirit Shareholders Approve Merger with JetBlue
- 2023:
  - March: DOJ, States File Suit
  - October-December: Trial
- 2024, January: Merger Blocked
  - Ruling noted that JetBlue offers higher quality products than Spirit, but consumers "who must" rely on Spirit would be harmed by merger

Airline Industry After Covid-19

- Airline Industry Was Dealing with Aftereffects of Covid-19 During Attempted Merger
- Consumer Base of Industry Changed
  - Business Travelers Historically Roughly Third of Riders
    - Less Price Sensitive than Leisure Travelers
  - Business Travel Did Not Immediately Recover Post Pandemic
  - Simultaneously: Leisure Travelers Built Up Cash Returns
  - Demand Elasticity Change Apriori Ambiguous

Data

- Airline Origin and Destination Survey (DB1B)
  - 10% Sample of Domestic Passenger Itineraries
  - Data on Origin, Destination, Fare, Route, Carrier
  - Ancillary Fees Not Included

Market, Product Definitions

- Markets defined as Year-Quarter-Origin-Destination
- Market Size is the Geometric Mean of the Population of Origin, Destination Metropolitan Statistical Areas
- Products Further Defined by Carrier, Nonstop Status

Summary Statistics - Product Level

	Pre-Pandemic		Post-Pandemic			
	Mean	(SD)	Mean	(SD)	Change	t-Statistic
Price (2017 USD)	233.37	(68.47)	212.77	(75.21)	-20.6	107.74***
Passengers	4248.33	(10185.27)	3531.43	(8648.27)	-716.9	28.81***
Distance (1000s)	1.41	(0.67)	1.41	(0.67)	0	-0.11
Extra Distance	0.13	(0.18)	0.14	(0.19)	0.01	-12.61***
Nonstop	0.28	(0.45)	0.26	(0.44)	-0.01	10.51***
Origin Destinations	29.97	(33.37)	29.24	(33.72)	-0.73	8.21***
Origin Presence (%)	36.23	(31.26)	34.77	(30.92)	-1.46	17.73***
Observations	307849		265196			

Summary Statistics - Market Level

	Pre-Pandemic		Post-Pandemic			
	Mean	(SD)	Mean	(SD)	Change	t-Statistic
Minimum Miles	1175.73	(642.42)	1185.57	(636.98)	9.84	-3.03***
Mean Miles	1228.56	(661.79)	1242.54	(657.02)	13.99	-4.18***
Number of Firms	2.94	(1.49)	3.21	(1.56)	0.27	-34.91***
Number of Products	3.52	(2.11)	3.79	(2.16)	0.26	-24.29***
Number of Customers	14970.24	(28280.06)	13375.81	(25085.61)	-1594.43	11.84***
HHI	8017.21	(4297.27)	7479.76	(4410.86)	-537.45	24.3***
Number of Markets	87363		70016			

Empirical Strategy

- For Pre-Pandemic Period, Post-Pandemic Periods:
  - Estimate Demand
  - Impose Supply Assumption
  - Recover Marginal Costs
  - Estimate Merger Simulations
- Why two periods? Post-Pandemic had
  - Irregular Demand Patterns
  - Irregular Routing (Northeast Alliance)

Demand Model

- Random-Coefficient Nested Logit Model
  - All air travel products are in one nest, while the outside good is the other nest.
- Consumer i in market t has indirect utility from buying product j as defined by

$$U_{ijt} = \delta_{jt} + \mu_{ijt} + \epsilon_{ijt}$$

- δ_{jt} is the mean utility across consumers in market t for product j
- μ_{ijt} is the consumer's deviation from this mean utility
- ϵ_{ijt} is an unobserved consumer-level shock

Demand, Supply Estimation

- Identification comes from four sets of instruments - Cost Shifters (Endpoint Hub Interactions), Interactions of Exogenous Regressors, Gandhi-Houde Differentiation Instruments, Number of Products in Each Market
- Consumers will purchase the good with the highest utility
- Utility of the outside good is normalized to zero, allowing for integration to recover estimated good shares.
- Supply Model: Assume Bertrand competition with differentiated products following exogenous determination of product offerings

Demand Model Results - Selected Coefficients

Variable	Pre-Pandemic	Post-Pandemic
Linear Coefficients		
Price	-3.02***	-3.11***
	(0.36)	(0.44)
Nonlinear Coefficients		
Price	0.592***	0.599***
	(0.12)	(0.12)
Nesting Coefficient		
Nesting Parameter	0.139***	0.115***
	(0.046)	(0.032)
Summary Statistics		
Period	2017Q1-2019Q4	2021Q2-2023Q2
N Products	307849	265196
N Markets	87363	70016

Supply Model Results

Variable	Pre-Pandemic	Post-Pandemic
Mean Elasticity	-5.519	-5.211
Spirit Mean Elasticity	-4.07	-3.44
JetBlue Mean Elasticity	-5.34	-5.18
Mean Markup (%)	19.38	20.97
Summary Statistics		
Period	2017Q1-2019Q4	2021Q2-2023Q2
N Products	307849	265196
N Markets	87363	70016

Merger Simulation

- Estimate three counterfactuals for each period.
  - Best Case, Average Case, Worst Case
  - Resulting Products Have Lower/Average/Greater Marginal Cost, Unobservables of the Two
- Like products get combined with like products: Nonstop with Nonstop, Connecting with Connecting
  - The merged connecting products take the minimum miles flown
  - All products are JetBlue

Why Care about Minimum Market Fare?

- In the judgment blocking the merger, the core element of consumer harm was the existence of consumers who'd exit the market without Spirit's unbundled fares being offered.
- By analyzing the change in the simulated minimum fare after the merger, we can gain an understanding of how realistic this issue is.
- Today, this is the first of two merger simulation results that I present.

Merger Results - Percent Change Minimum Market Fare

	Pre-Pandemic			Post-Pandemic		
	Best	Average	Worst	Best	Average	Worst
< 0	256	206	167	389	302	230
0-25	1186	830	710	1058	650	617
25-50	56	419	383	53	414	300
50-75	19	62	206	28	137	246
75-100	11	11	56	16	36	109
$100 <$	5	5	11	10	15	52

Consumer Surplus

- Calculating consumer surplus with my data is hindered by the lack of data on ancillary fees.
  - A customer who will pay for checked bags when flying with Spirit will have her change in consumer surplus over-estimated.
- To better understand how the lack of data on ancillary fees impacts my estimates, I adjust observed prices using data from Spirit's annual 10-K financial filings.
- As such, I scale the average ancillary fee charged by Spirit by overall market fare and add it to the recorded fare.
  - Then re-estimate model.

Change in Consumer Surplus Estimates

	Total Change in Consumer Surplus	
	Pre-Pandemic	**Post-Pandemic**
Main Merger Analysis		
Best Case	3,740,089,657	6,943,764,751
Average Case	-355,595,347	1,665,903,471
Worst Case	-1,294,518,659	515,351,671
Ancillary Fee Adjustment Merger Analysis		
Best Case	-161,377,502	2,019,197,851
Average Case	-1,174,813,263	765,481,251
Worst Case	-1,500,841,809	379,642,080

(Note: JetBlue-Spirit Markets Only)

Change in Consumer Surplus Findings

- Change in consumer surplus is greater without the adjustment for ancillary fees
- However, merger is consistently estimated to be favorable (unfavorable) to consumer welfare in the post-pandemic (pre-pandemic) period.
  - Increases of over $350 million in even the worst case simulation for the post-pandemic period.

Conclusion: On the Merger

- Some consumers would have been plausibly forced out of the market.
  - Over 35 markets had minimum fares increase by over 50% in even the best-case simulation
- However, in the post-pandemic period, merger would have increased consumer surplus within JetBlue-Spirit markets.
  - Consumers prefer JetBlue products to Spirit products ceteris paribus.
- However, under a cost-benefit analysis, proper approval of this merger would have depended on how likely the policy maker believes the post-pandemic travel environment is to continue.
  - Policy makers that believe that consumer demand will return to pre-pandemic norms should always block the merger