

# Common Ownership Does Not Have Anticompetitive Effects in the Airline Industry

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## Publications:

- Lazy Dividends (July 2021), with James Weston.
- A Surrebuttal: There Are No Anti-Competitive Effects of Common Ownership in the Airline Industry (December 2022), with Kristopher Gerardi and Carola Schenone.
- Does Trading Anonymously Enhance Liquidity?, with Patrik Sandås, *Journal of Financial and Quantitative Analysis*, Volume 55, Number 7, November 2020, pp. 2372-2396.





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## **Publications:**

- A Surrebuttal: There Are No Anti-Competitive Effects of Common Ownership in the Airline Industry (December 2022), with Kristopher Gerardi and Carola Schenone.
- Can't Pay or Won't Pay? Unemployment, Negative Equity, and Strategic Default, with Kyle Herkenhoff, Lee O'Hanian, and Paul Willen. Forthcoming, Review of Financial Studies.
- The Effect of Large Investors on Asset Quality: Evidence from Subprime Mortgage Securities (2017) , with Manuel Adelino and Scott Frame. Journal of Monetary Economics, 87: 34–51.





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## Publications:

- Common Lenders Facilitate Tacit Collusion (January 2023), with Kris Gerardi, Daniel Streitz, and Farzad Saidi
- A Surrebuttal: There Are No Anti-Competitive Effects of Common Ownership in the Airline Industry (December 2022), with Kristopher Gerardi and Carola Schenone.



# Abstract

- Institutions often own equity in multiple firms that compete in the same product market (common ownership).
- Prior research(Azar, Schmalz, and Tecu,2018) has shown that these institutional “**common owners**” induce **anticompetitive pricing behavior** in the airline industry.
- This paper **reevaluates** this evidence and shows that the documented **positive correlation** between common ownership and airline ticket prices **stems from the market share component** of the common ownership measure, and not the ownership and control components.
- We further show that the results are **sensitive** to measures of investor control and to assumptions about equity holders’ ownership and control during bankruptcy.



# Introduction



- Sources of Identification
- Mapping Investor Control
- Ownership and Control of a Bankrupt Firm
- The Effect of Regression Weights

质疑

⇒ Azar, Schmalz, and Tecu(2018)

支持



# I. Revisiting the AST Analysis



## A. Measure of Common Ownership and Econometric Specification

O'Brien and Salop (2000) derive a theoretical measure of cross ownership that results from a manager maximizing the profits accruing to owners of her firm plus the profits these owners obtain from investments in other firms, including product market rivals.

$$HHI_{\Delta_{rt}} = \sum_j \sum_{k \neq j} \underbrace{\left( \frac{\sum_i \gamma_{ijt} \cdot \beta_{ikt}}{\sum_i \gamma_{ijt} \cdot \beta_{ijt}} \right)}_{\text{Ownership \& Control}} \underbrace{s_{rjt} \cdot s_{rkt}}_{\text{Market Shares}}, \quad (1)$$

where  $\gamma_{ij}$  represents owner  $i$ 's control over carrier  $j$  (measured as the number of shares that owner  $i$  votes in carrier  $j$ 's annual shareholders' meeting), and  $\beta_{ij}$  represents owner  $i$ 's cash-flow rights in carrier  $j$  (measured as the number of shares that  $i$  owns in carrier  $j$ ).





## The main econometric specification in the AST analysis

the market-carrier level

$$\log(p_{rjt}) = \alpha \cdot HHI\Delta_{rt} + \eta \cdot HHI_{rt} + \theta \cdot X_{rjt} + \alpha_t + \nu_{rj} + \varepsilon_{rjt}, \quad (2)$$

the market level

$$\log(p_{rt}) = \beta \cdot HHI\Delta_{rt} + \gamma \cdot HHI_{rt} + \theta \cdot X_{rt} + \alpha_t + \nu_r + \varepsilon_{rt}, \quad (3)$$

## B. Replication of the AST Data Set and Regression Analysis

- **The Journal of Finance's website**, includes the Stata code for filtering the raw data, conducting the empirical analysis, and replicating the tables and figures in AST.
- **Refinitiv**, institutional ownership data
- Airline data are publicly available
- Sample period, 2001:Q1-2014:Q4



## Table I Replicating AST Results

Panel A: Market-Carrier-Level Regressions						
	AST			DGS		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>HHI</i> Δ	0.194*** (0.046)	0.219*** (0.039)	0.149*** (0.038)	0.194*** (0.046)	0.218*** (0.039)	0.147*** (0.038)
<i>HHI</i>	0.221*** (0.025)	0.230*** (0.025)	0.165*** (0.021)	0.222*** (0.025)	0.230*** (0.025)	0.163*** (0.021)
Number of Nonstop Carriers			-0.010*** (0.003)			-0.011*** (0.003)
Southwest Indicator			-0.120*** (0.009)			-0.119*** (0.009)
Other LCC Indicator			-0.062*** (0.007)			-0.060*** (0.007)
Share of Passengers Traveling Connect, Market-Level			0.124*** (0.017)			0.123*** (0.017)
Share of Passengers Traveling Connect			0.099*** (0.014)			0.105*** (0.014)
Log(Population)			0.306*** (0.106)			0.306*** (0.106)
Log(Income Per Capita)			0.374*** (0.102)			0.370*** (0.103)
Log(Distance) · Yr-Qtr FE		x	x		x	x
Yr-Qtr FE	x	x	x	x	x	x
Market-Carrier FE	x	x	x	x	x	x
<i>R</i> <sup>2</sup>	0.82	0.83	0.84	0.82	0.83	0.84
# Observations	1,237,584	1,237,584	1,209,517	1,237,878	1,237,878	1,209,791
# Market-Carriers	46,513	46,513	45,248	46,510	46,510	45,244

Panel B: Market-Level Regressions

	AST			DGS		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>HHI</i> Δ	0.325*** (0.045)	0.311*** (0.040)	0.202*** (0.036)	0.323*** (0.045)	0.344*** (0.041)	0.197*** (0.037)
<i>HHI</i>	0.365*** (0.032)	0.357*** (0.031)	0.256*** (0.024)	0.365*** (0.032)	0.365*** (0.033)	0.256*** (0.025)
Number of Nonstop Carriers			-0.008** (0.004)			-0.008** (0.004)
Southwest Indicator			-0.149*** (0.014)			-0.150*** (0.014)
Other LCC Indicator			-0.100*** (0.010)			-0.101*** (0.010)
Share of Passengers Traveling Connect, Market-Level			0.158*** (0.019)			0.179*** (0.019)
Log(Population)			0.343*** (0.122)			0.354*** (0.122)
Log(Income Per Capita)			0.304*** (0.110)			0.318*** (0.109)
Log(Distance) · Yr-Qtr FE		x	x		x	x
Yr-Qtr FE	x	x	x	x	x	x
Market FE	x	x	x	x	x	x
<i>R</i> <sup>2</sup>	0.85	0.86	0.88	0.85	0.86	0.88
# Observations	262,350	262,350	254,999	262,534	262,534	255,173
# Markets	7,185	7,185	6,906	7,190	7,190	6,911



## II. Sources of Identification



We rewrite equation (2) substituting the formula for  $HHI\Delta$  from equation (1):

$$\log(p_{rjt}) = \alpha \cdot \overbrace{\sum_j \sum_{k \neq j} \left( \frac{\sum_i \gamma_{ijt} \cdot \beta_{ikt}}{\sum_i \gamma_{ijt} \cdot \beta_{ijt}} \right) s_{rjt} \cdot s_{rkt}}^{HHI\Delta} + \eta \cdot \overbrace{\sum_j s_{rjt}^2}^{HHI} + \theta \cdot X_{rjt} + \alpha_t + \nu_{rj} + \varepsilon_{rjt}. \quad (4)$$

Ownership & Control
Market Shares
Market Shares

### What Identifies the $HHI\Delta$ Coefficient?

If the common ownership component of  $HHI\Delta$  is driving the positive correlation with average prices

$\approx 0$

$> 0$

If the market shares component of  $HHI\Delta$  is driving ...

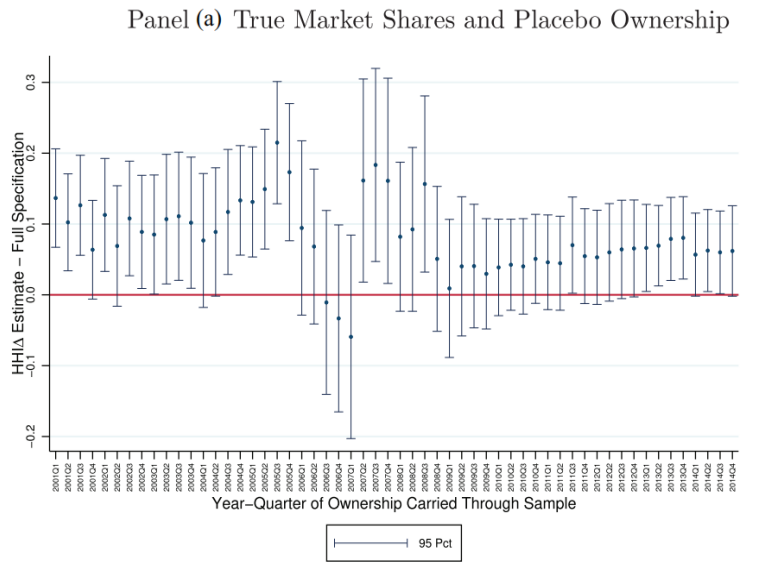
$> 0$

$\approx 0$

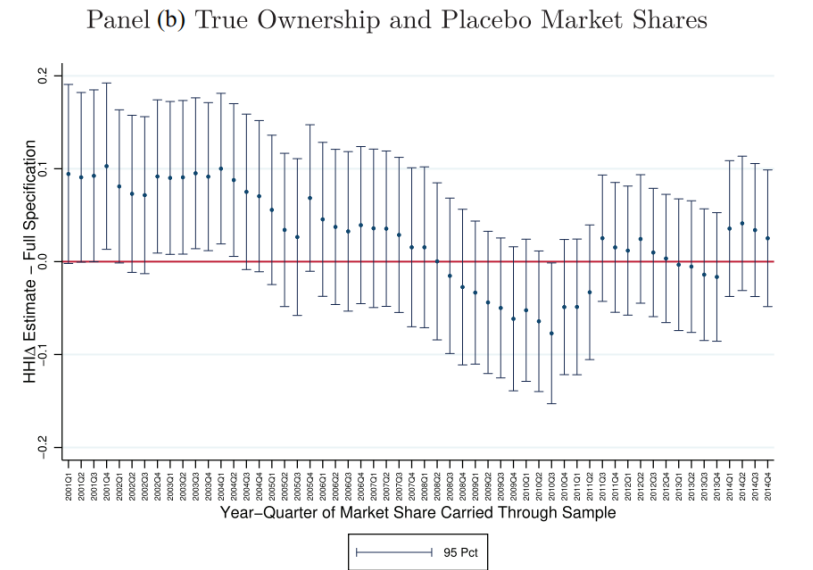
$HHI\Delta_{True Own}^{Placebo MS}$

$HHI\Delta_{True Own}^{Placebo MS}$





Market-Carrier Fixed Effects Regressions. Standard Errors Clustered at Market-Carrier and Date Level.

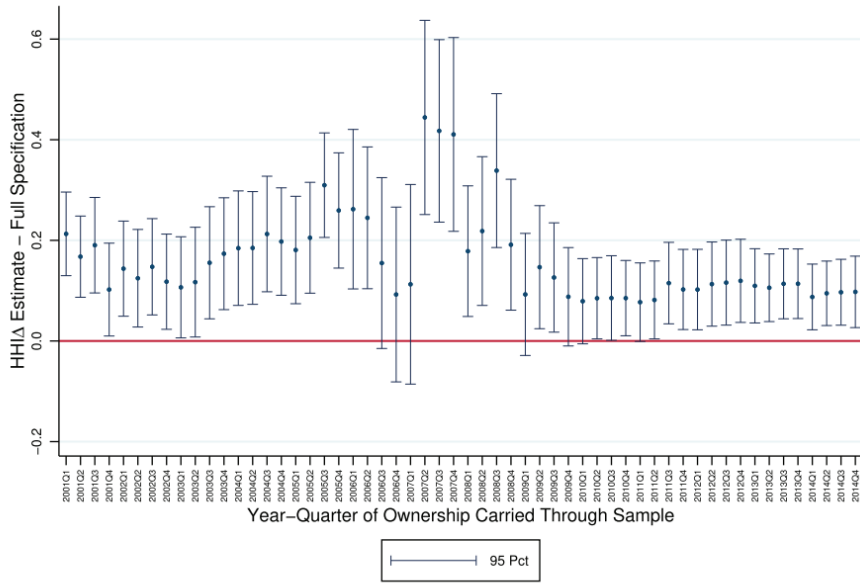


Market-Carrier Fixed Effects Regressions. Standard Errors Clustered at Market-Carrier and Date Level.

Figure 1. Identification: Market-carrier-level regressions.

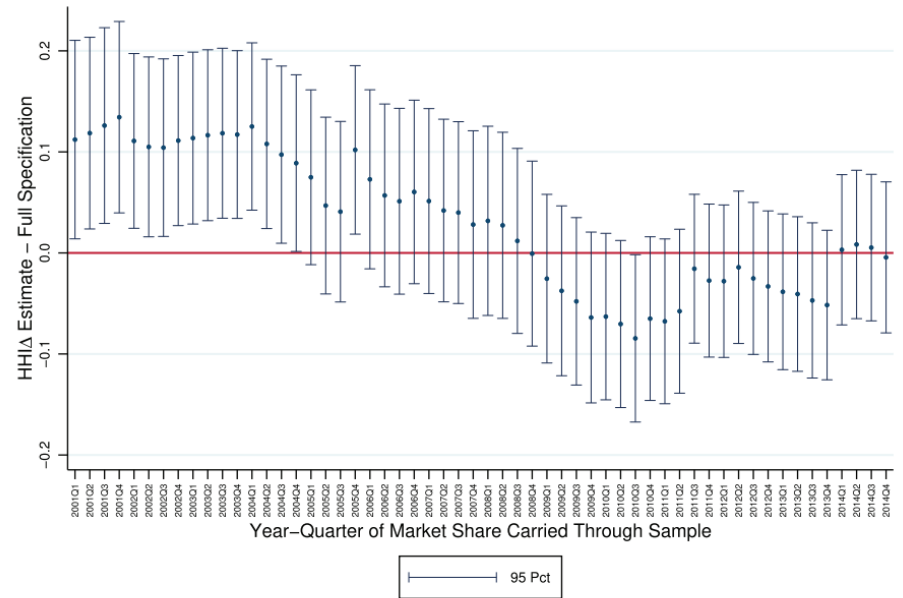


Panel (a) True Market Shares and Placebo Ownership



Market-Level Fixed Effects Regressions. Standard Errors Clustered at Market and Date Level.

Panel (b) True Ownership and Placebo Market Shares



Market Fixed Effects Regressions. Standard Errors Clustered at Market and Date Level.

Figure 2. Identification: Market-level regressions.



Table II  
Identification: Placebo Results

Panel A: Market-Carrier-Level Regressions		
	True Market Shares Placebo Ownership/Control (1)	Placebo Market Shares True Ownership/Control (2)
Mean of 56 <i>HHI</i> Δ estimates	0.081***	0.027
Standard Error Computation:		
Method 1	(0.014)	(0.032)
Method 2	(0.011)	(0.024)
Panel B: Market-Level Regressions		
	True Market Shares Placebo Ownership/Control (1)	Placebo Market Shares True Ownership/Control (2)
Mean of 56 <i>HHI</i> Δ estimates	0.161***	0.029
Standard Error Computation:		
Method 1	(0.027)	(0.053)
Method 2	(0.016)	(0.030)





Table III  
 “Model-Free” HHI $\Delta$

	Market-Carrier FE (1)	Market FE (2)
$HHI\Delta_{True Own}^{Placebo MS=1}$	-0.001 (0.001)	-0.002** (0.001)
$HHI$	0.121*** (0.018)	0.190*** (0.022)
Log(Distance) · Year-Quarter FE	x	x
Full Set of Controls	x	x
Year-Quarter FE	x	x
Market-Carrier FE	x	x
Market FE	x	x
$R^2$	0.8360	0.8753
# Observations	1,209,791	255,173
# Market-carriers	45,244	
# Markets		6,911



### III. Mapping Investor Control



$$HHI\Delta_{rt} = \sum_j \sum_{k \neq j} \underbrace{\left( \frac{\sum_i \gamma_{ijt} \cdot \beta_{ikt}}{\sum_i \gamma_{ijt} \cdot \beta_{ijt}} \right)}_{\text{Ownership \& Control}} \underbrace{s_{rjt} \cdot s_{rkt}}_{\text{Market Shares}}, \quad (1)$$

where  $\gamma_{ij}$  represents owner  $i$ 's control over carrier  $j$  (measured as the number of shares that owner  $i$  votes in carrier  $j$ 's annual shareholders' meeting), and  $\beta_{ij}$  represents owner  $i$ 's cash-flow rights in carrier  $j$  (measured as the number of shares that  $i$  owns in carrier  $j$ ).

- How Investors Exert Control?  
“voice” and “exit”
- Voting as a Proxy for Control through Voice (AST)

$$HHI\Delta_{Sole+Shared}$$

- Exit as a Proxy for Control

$$HHI\Delta_{Exit} = HHI\Delta_{Sole+Shared+No}$$



Panel A: Market-Carrier-Level Regressions

Voting Designation:	$HHI \Delta_{Sole+Shared}$ (1)	$HHI \Delta_{Exit} =$ $HHI \Delta_{Sole+Shared+No}$ (2)
$HHI \Delta$	0.147*** (0.038)	0.044 (0.031)
$HHI$	0.163*** (0.021)	0.138*** (0.021)
Log(Distance) · Year-Quarter FE	x	x
Full Set of Controls	x	x
Year-Quarter FE	x	x
Market-Carrier FE	x	x
$R^2$	0.84	0.84
# Observations	1,209,791	1,209,791
# Market-carriers	45,244	45,244

Panel B: Market-Level Regressions

Voting Designation:	$HHI \Delta_{Sole+Shared}$ (1)	$HHI \Delta_{Exit} =$ $HHI \Delta_{Sole+Shared+No}$ (2)
$HHI \Delta$	0.197*** (0.037)	0.106*** (0.034)
$HHI$	0.256*** (0.025)	0.236*** (0.025)
Log(Distance) · Year-Quarter FE	x	x
Full Set of Controls	x	x
Year-Quarter FE	x	x
Market FE	x	x
$R^2$	0.88	0.88
# Observations	255,173	255,173
# Markets	6,911	6,911

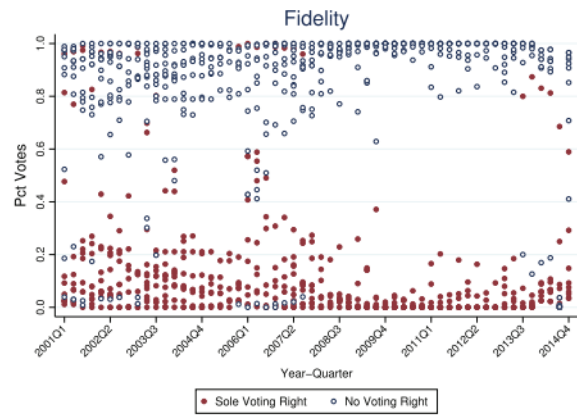
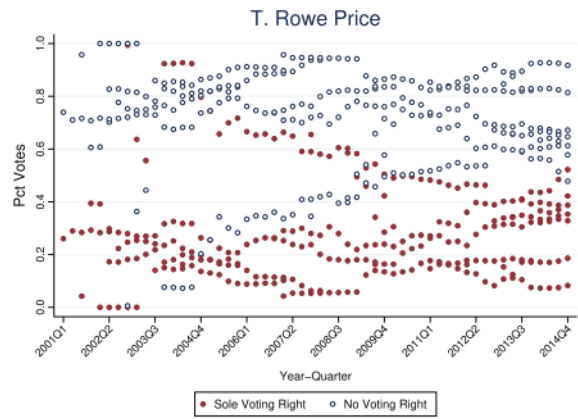
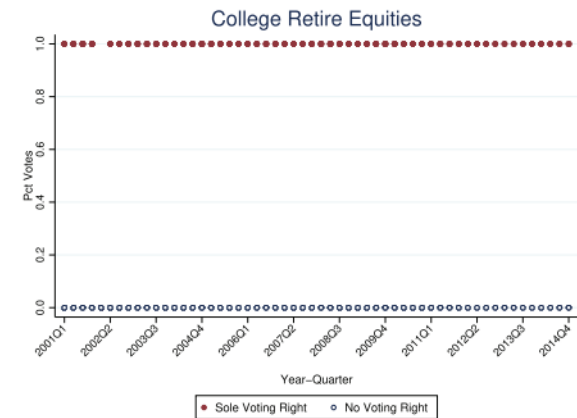
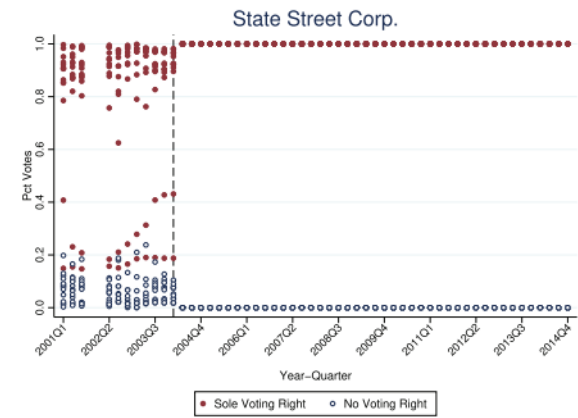
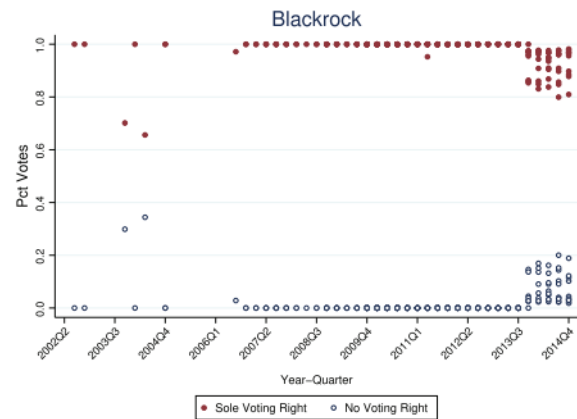
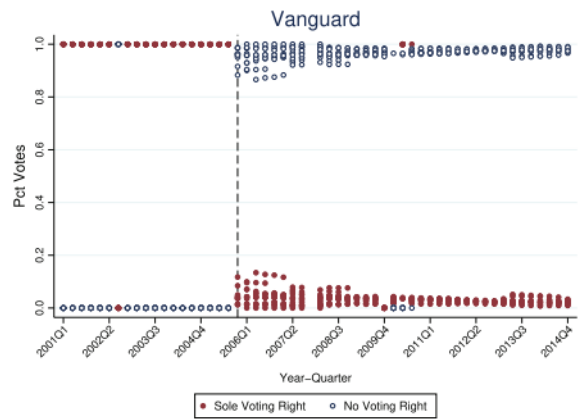
Table V

## Investors Who Report High Percentages of Shares with “No” Voting Rights

This table displays well-known institutional investors who report high percentages of airline shares for which they do not hold voting rights in the Refinitiv 13F database. For each investor, the table breaks down the fraction of shares reported as “sole,” “shared,” and “no” voting rights.

Voting Rights Designation:	Sole	Shared	No
Old Lane	0.0%	0.0%	100.0%
Gilder, Gagnon, Howe & Co.	3.2%	0.0%	96.8%
Fidelity	8.1%	0.7%	91.2%
PRIMECAP Management	21.2%	0.1%	78.6%
T. Rowe Price	24.8%	0.0%	75.2%
Vanguard Group	26.5%	2.3%	71.2%
Selz Capital	35.2%	0.0%	64.8%
Capital Research Global Investors	49.5%	2.4%	48.1%
Wellington Management	45.7%	7.7%	46.6%
U.S. Trust Company	55.8%	1.7%	42.5%





## IV. Further Evidence of Fragility



## A. Ownership and Control of a Bankrupt Firm

When airline  $j$  operates under bankruptcy protection, investor  $i$ 's cash-flow and voting rights in  $j$  ( $\beta_{ij}$  and  $\gamma_{ij}$ , respectively) are not reported in SEC Form 13F and hence are missing from the Refinitiv database.

This is a significant issue as virtually every legacy airline filed for bankruptcy at some point during the sample period (2001:Q1 to 2014:Q4), and at least one carrier operated under bankruptcy in over half of the year-quarters in the sample.

Construct different HHI $\Delta$

$$\tilde{HHI}\Delta_{\text{Own Before}}^{\text{Ctrl Before}}$$

$$\tilde{HHI}\Delta_{\text{Own After}}^{\text{Ctrl After}}$$

$$HHI\Delta_{\text{Not Own}}$$

$$HHI\Delta_{\text{Own Before}}^{\text{No Ctrl}}$$





**Table VI**  
**Chapter 11 Bankruptcy Reorganization**

This table reports the dates during which an airline operated under Chapter 11 Bankruptcy protection during our sample period (2000:Q1 to 2014:Q4), and the distribution (recovery) that prebankruptcy equity holders received when the carrier exited from bankruptcy (column (5)). Figure IA.2 in the Internet Appendix presents an excerpt of a disclosure statement for United Airlines. Data for the first bankruptcy of US Airways are from Court Listener, accessed May 2019, <https://www.courtlistener.com/opinion/2014491/in-re-us-airways-group-inc/>.

Bankruptcy Dates and Distribution for Interests (Equity) upon Reorganization

Carrier	Bankruptcy		Emerging from Bankruptcy			Distribution to Interests
	Dates		Document	Page(s)	Date Reported	
	Filed	Emerged				
United Airlines	12/9/02	2/2/06	SEC Form 8-K	3 to 5	1/20/06	0
US Airways	8/11/02	3/31/03	Court Listener			0
US Airways	9/12/04	9/27/05	SEC Form 10-K	17	3/15/2006	0
Delta	9/14/05	4/24/07	Disclosure Statement		12/19/06	0
Northwest	9/14/05	5/18/07	SEC Form 8-K	5 and 24	5/21/07	0
Mesa	1/5/10	1/3/11	3rd Amended Joint Plan of Reorganization	1, 32, and 36	1/19/11	0
American Airlines	11/29/11	12/8/13	AMR & US Airways Merger: Information for AMR Investors	3	8/15/13	3.5% of new equity in merged carrier



## Table VII Ownership and Control Through Bankruptcy

Panel A: Market-Carrier-Level Regressions				
	Pre-Bkt Own & Ctrl Forward (1)	Post-Bkt Own & Ctrl Backwards (2)	No Ownership No (or Yes) Control (3)	Yes Ownership No Control (4)
<i>HHI</i> Δ	0.147*** (0.038)	0.097** (0.043)	0.037 (0.044)	0.050 (0.047)
HHI	0.163*** (0.021)	0.150*** (0.022)	0.133*** (0.021)	0.136*** (0.022)
Log(Distance) x Yr-Qtr FE	x	x	x	x
Full Set of Controls	x	x	x	x
Yr-Qtr FE	x	x	x	x
Market-Carrier FE	x	x	x	x
<i>R</i> <sup>2</sup>	0.84	0.84	0.84	0.84
# Observations	1,209,791	1,209,791	1,209,791	1,209,791
# Market-Carriers	45,244	45,244	45,244	45,244
Panel B: Market-Level Regressions				
	Pre-Bkt Own & Ctrl Forward (1)	Post-Bkt Own & Ctrl Backwards (2)	No Ownership No (or Yes) Control (3)	Yes Ownership No Control (4)
<i>HHI</i> Δ	0.197*** (0.037)	0.159*** (0.043)	0.070 (0.044)	0.093* (0.047)
HHI	0.256*** (0.025)	0.245*** (0.026)	0.218*** (0.026)	0.225*** (0.026)
Log(Distance) x Year-Quarter FE	x	x	x	x
Full Set of Controls	x	x	x	x
Year-Quarter FE	x	x	x	x
Market-Carrier FE	x	x	x	x
<i>R</i> <sup>2</sup>	0.88	0.88	0.88	0.88
# Observations	255,173	255,173	255,173	255,173
# Markets	6,911	6,911	6,911	6,911



## B. The Effect of Regression Weights

- AST weight all pricing regressions by average passenger counts.
- We offer two possible justifications.

First, since the weights are based on passenger counts, their inclusion places more emphasis on high-volume, heavily trafficked, markets. Focusing efforts to promote cooperation and anticompetitive behavior with rivals in these markets could be justified if they are also the most profitable ones. However, while more passengers yield higher revenue, operating costs on high-volume routes may also be higher, casting doubt on whether these are, in fact, the most profitable markets.

The second, more plausible, economic rationale for the use of regression weights entails regulators concerned with the effect of common ownership on consumer welfare. Specifically, regulators might consider the extent of consumers adversely affected by the alleged anticompetitive behavior of common owners, justifying the focus on high-volume markets.



**Table VIII**  
**The Effect of Using Regression Weights**

This table presents results from estimating the AST specification with and without regression weights based on passenger counts. Columns (1) and (2) display results at the market-carrier level. Columns (3) and (4) display similar results at the market level. Robust standard errors, in parentheses, are clustered by year-quarter and market-carrier (columns (1) and (2)) and market (columns (3) and (4)). Significance at the 1%, 5%, and 10% level is indicated by \*\*\*, \*\*, and \*, respectively.

	Market-Carrier-Level Regressions		Market-Level Regressions	
	Weights (1)	No Weights (2)	Weights (3)	No Weights (4)
<i>HHI</i> Δ	0.147*** (0.038)	0.045** (0.022)	0.197*** (0.037)	0.149*** (0.026)
<i>HHI</i>	0.163*** (0.021)	0.193*** (0.013)	0.256*** (0.025)	0.221*** (0.019)
Log(Distance) · Yr-Qtr FE	x	x	x	x
Full Set of Regressors	x	x	x	x
Year-Quarter FE	x	x	x	x
Market-Carrier FE	x	x	x	x
Regression Weights	x		x	
# Observations	1,209,791	1,209,791	255,173	255,173
<i>R</i> <sup>2</sup>	0.84	0.61	0.88	0.84
# Market-Carriers	45,244	45,244		
# Markets			6,911	6,911



## IV. Further Evidence of Fragility



## A. The Effect of Aggregating Ownership and Control to the Fund Family Level

AST aggregate ownership and control rights held by each fund to the fund family level. The estimated relationship between  $HHI\Delta$  and ticket prices is not materially affected by whether we aggregate ownership and control across funds in a family, do not aggregate at all, or use an aggregation strategy different from that in the AST analysis.

## B. The Effect of Alternative Airline Ticket Filters

Implementing alternative sample filters does not significantly affect the  $HHI\Delta$  coefficient estimate.



## VI. Conclusion



- First, we implement a placebo analysis that shows that the **positive effect of the measure of common ownership**, on average airline prices **is identified by variation in airline market shares** rather than variation in institutional ownership and control.
- In addition, we show that reasonable alternative assumptions regarding the mapping of voting designations to **investor control**, the treatment of ownership and control **in periods of bankruptcy**, and the use of **regression weights** that emphasize high-volume markets significantly weaken and sometimes completely eliminate the positive correlation between the measure of common ownership and average ticket prices.





THANKS!

