

Public Communication and Collusion in the Airline Industry

2018 FTC Microeconomics

Gaurab Aryal¹ Federico Ciliberto¹ Ben Leyden²

November 1, 2018

¹University of Virginia, ²Cornell University

Overarching Question

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What information should firms be allowed to share in public?

Our Objective

Do managers of legacy U.S. airlines use their quarterly earnings calls to communicate with other legacy airlines in reducing the number of seats sold in the U.S?

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- We focus on discussion of “capacity discipline.”

A priori, collusion among airlines is difficult:

- Stochastic Demand.
- Difficult Monitoring.

Awaya and Krishna (2016, 2017, 2018):

Firms can use cheap-talk to sustain collusion in the presence of stochastic demand and private/noisy monitoring.

Data and Methodology

We build a novel dataset on the public communication content in airlines' quarterly earnings calls.

- Each quarter, publicly traded companies usually hold an earnings call where top executives discuss the content of their quarterly report with analysts and journalists.

We estimate a causal relationship between communication and the carriers' market-level capacity decisions.

- We estimate the effect on market-level capacity of *all* legacy carriers serving the market discussing capacity discipline in their latest earnings call.

Summary of Findings

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3. Should we be concerned about the endogeneity of communication and/or market structure?

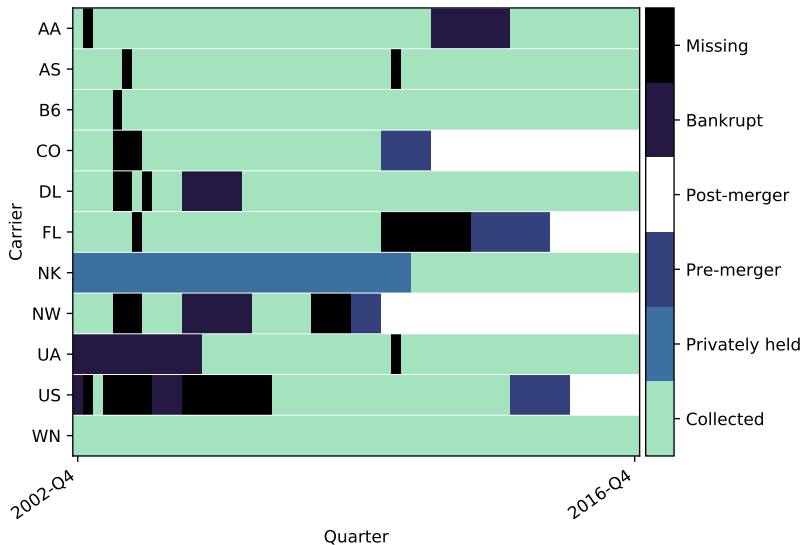
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3. Should we be concerned about the endogeneity of communication and/or market structure? (**No**)
 - We show evidence that communication is cond. exog.
 - Results are robust to instrumenting for market structure

Plan for the Talk

- Data
 - Transcript Data
 - Airline Data
- Empirical Analysis
- Addressing Possible Concerns
- Conclusion

Availability of Transcripts



We codify the informational content in the earnings calls to study capacity decisions change over time in response to that communication.

Two-step process:

- Use Natural Language Processing (NLP) to identify when carriers discuss “capacity discipline.”
- Use NLP to identify transcripts where carriers *may* be discussing capacity discipline, but didn’t use a variation of that phrase.
 - We manually review these cases to determine whether capacity discipline was discussed

Examples of Communication

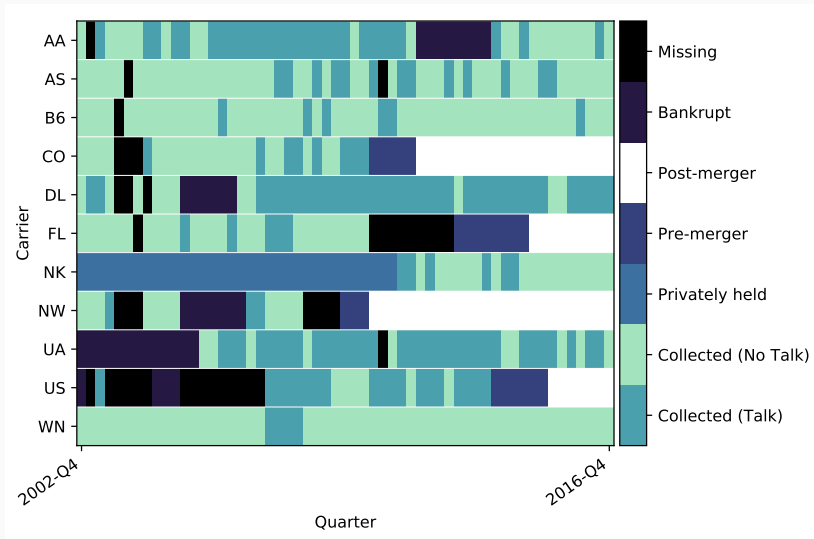
- US Airways

... mainline passenger revenue were \$2.1 billion, up 11.4% as a result of the strong pricing environment and continued industry capacity discipline.

- CEO of Delta

You've heard us consistently state that we must be disciplined with capacity...

Prevalence of Capacity Discipline Discussions



Frequency of Communication

	Communication	N
Legacy	0.541 (0.499)	253
LCC	0.131 (0.339)	160
Jet Blue	0.111 (0.317)	54
Southwest	0.073 (0.262)	55
All	0.383 (0.487)	413

- Bureau of Transportation Statistics: T-100 Domestic Segment.
- OAG Market Intelligence: Schedules dataset.
- Period of interest: 2002 Q4 - 2016 Q4.
- Market definition
 - Airport-pairs (E.g., ITH - PHL)
 - Flights to different airports in the same MSA are separate markets

Construction of Variable of Interest

$$\text{Capacity-Discipline}_{m,t} = \text{Talk-Eligible}_{m,t} \times (\text{All Legacies Discussed Cap-Dis})_{m,t}$$

1. At least 2 legacy serve the market ($\text{Talk-Eligible}_{m,t} = 1$)
2. All legacy discussed capacity-discipline in the prior quarter

$$\begin{aligned}\ln(\text{seats}_{j,m,t}) = & \beta_0 \times \text{Capacity-Discipline}_{m,t} \\ & + \beta_1 \times \text{Talk-Eligible}_{m,t} \\ & + \beta_2 \times \text{Monopoly}_{m,t} \\ & + \beta_3 \times \text{MissingReport}_{m,t} \\ & + \mu_{j,m} + \mu_{j,yr,q} + \gamma_{origin,t} + \gamma_{destination,t} + \varepsilon_{j,m,t},\end{aligned}$$

Results: Primary Findings

	(1) Log Seats	(2) Log Seats
Capacity Discipline	-0.01495 (0.00558)	
Legacy Market $\times$ Capacity Discipline		-0.01462 (0.00695)
Mixed Market $\times$ Capacity Discipline (Legacy)		-0.01838 (0.01067)
Mixed Market $\times$ Capacity Discipline (LCC)		-0.00740 (0.01184)
Talk Eligible	-0.13229 (0.01417)	-0.11810 (0.01413)
Market Missing Report	0.01723 (0.00595)	0.01923 (0.00600)
Monopoly Market	0.05393 (0.00924)	0.07725 (0.01047)
Legacy Market		-0.05417 (0.01248)
R-squared	0.866	0.866
N	840,149	840,149

Standard errors are in parentheses, and are clustered at the market level.

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3. Control Function Approach

Market structure is endogenous $\implies$ Capacity-Discipline is endogenous.

Results: Unilateral Discussion of Capacity Discipline

Do legacy carriers
reduce capacity when
they're the only carrier
in a Talk-Eligible
market who discusses
capacity discipline?

	Log Seats
Only j Talks	0.02933 (0.00570)
Talk Eligible	-0.05785 (0.00822)
Missing Market Report	-0.02111 (0.00647)
Monopoly Market	0.08349 (0.00925)
R-squared	0.866
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Capacity in Monopoly Markets

Do legacy carriers reduce capacity in monopoly markets after discussing capacity discipline?

- (1): All markets
- (2): Only monopoly markets

	(1) Log Seats	(2) Log Seats
Monopoly Capacity Discipline	0.0197 (0.00667)	0.00835 (0.00387)
Talk Eligible	-0.0641 (0.00845)	
Missing Market Report	-0.0186 (0.00649)	-0.0116 (0.00607)
Monopoly Market	0.0787 (0.00941)	
Year-quarter-carrier	Yes	No
R-squared	0.866	0.869
N	840,149	439,858

Standard errors are in parentheses and are clustered at the market level.

Non-Unanimous Communication

How do legacy carriers respond when all but one discuss capacity discipline?

	Log Seats
$N - 1$ Capacity Discipline	0.01324 (0.00370)
Talk Eligible	-0.07382 (0.00861)
Missing Market Report	-0.0209 (0.00647)
Monopoly Market	0.08412 (0.006474)
R-squared	0.866
N	840,149

Standard errors are in parentheses, and are clustered at the market level.

Summary: Financial Transparency

We find that carriers do not reduce capacity. . .

- . . .when they unilaterally discuss capacity discipline
- . . .in monopoly markets after discussing capacity discipline
- . . .in markets where all but 1 of the legacy carriers discuss capacity discipline

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 - Find additional covariate $Z \in \{0, 1\}$ positively related with Capacity-Discipline and negatively related to capacity.
 - Then, *if*

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Test: Run primary regression with additional covariate for Z and check whether Z affects $\ln(\text{seats})$.

Conditional Exogeneity: Estimates

	Z's Coefficient	Capacity-Discipline
slow	-0.00514 (0.00479)	-0.01417 (0.00536)
weakness	0.01520 (0.00546)	-0.01539 (0.00554)
domestically	0.01914 (0.00511)	-0.01461 (0.00558)
internationally	0.00525 (0.00443)	-0.01518 (0.00559)
stable	0.00937 (0.00751)	-0.01551 (0.00562)
pace	0.00264 (0.00578)	-0.01525 (0.00554)

Use control function to address endogeneity of Talk-Eligible

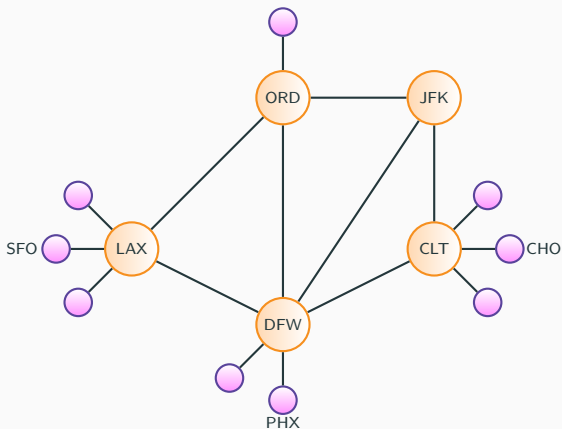
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- Instrument: Distance of an airport from a carrier's "hub."
- Affects entry decision $\implies$ affects Talk-Eligible
- Does not directly affect capacity choice

Hubs: Betweenness Centrality



Hubs are $\{DFW, CLT, LAX\}$.

Control Function Approach

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4. For each market m : using Multinomial Logit estimate

$$\hat{P}_{\ell,m,t} := \Pr(\ell | \{D_{j,m,t}\}_{j \in A_t}), \quad \ell = 1, \dots, L_t.$$

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6. Include $\hat{P}$ as instruments in control function approach.

Control Function Approach: Estimates

	Log Seats
Capacity Discipline	-0.01144 (0.00658)
Talk Eligible	-0.01098 (0.07145)
Missing Market Report	0.01423 (0.01707)
Monopoly Market	0.06690 (0.03013)
N	598,110

Bootstrapped standard errors, clustered at the market level, are in parentheses.

We find that legacy airlines use a form of public communication — their quarterly earnings calls — to coordinate capacity reductions.

- When all legacy airlines serving a market discuss “capacity discipline,” they reduce capacity by 1.45%
- This behavior is isolated to legacy carriers
- We show that our finding is not explained by carriers simply using their earnings calls as intended

Thank you!