

Exit, Tweets and Loyalty

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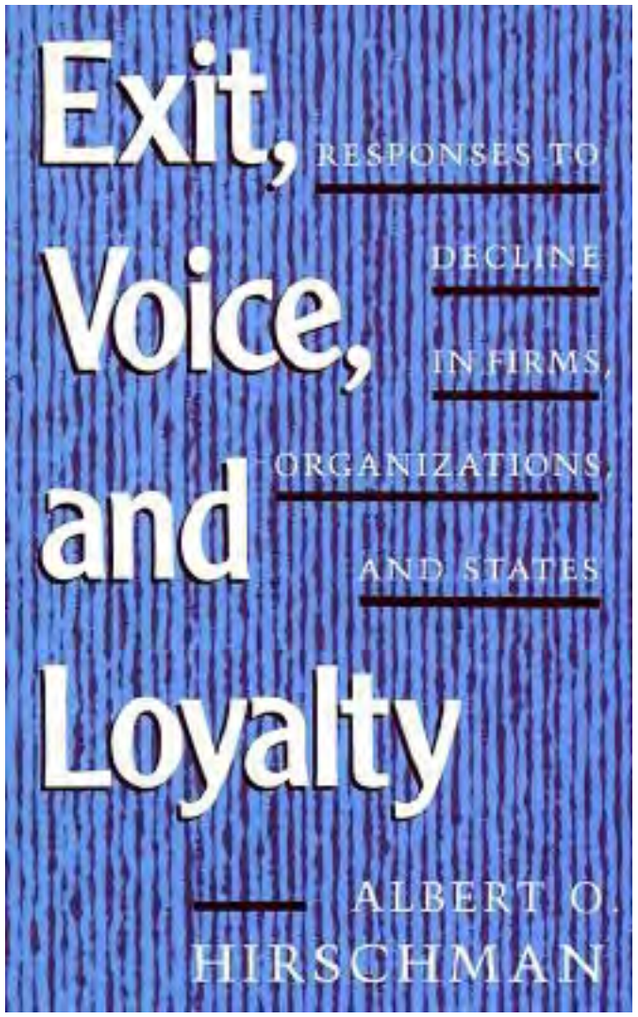
Before I Get Going

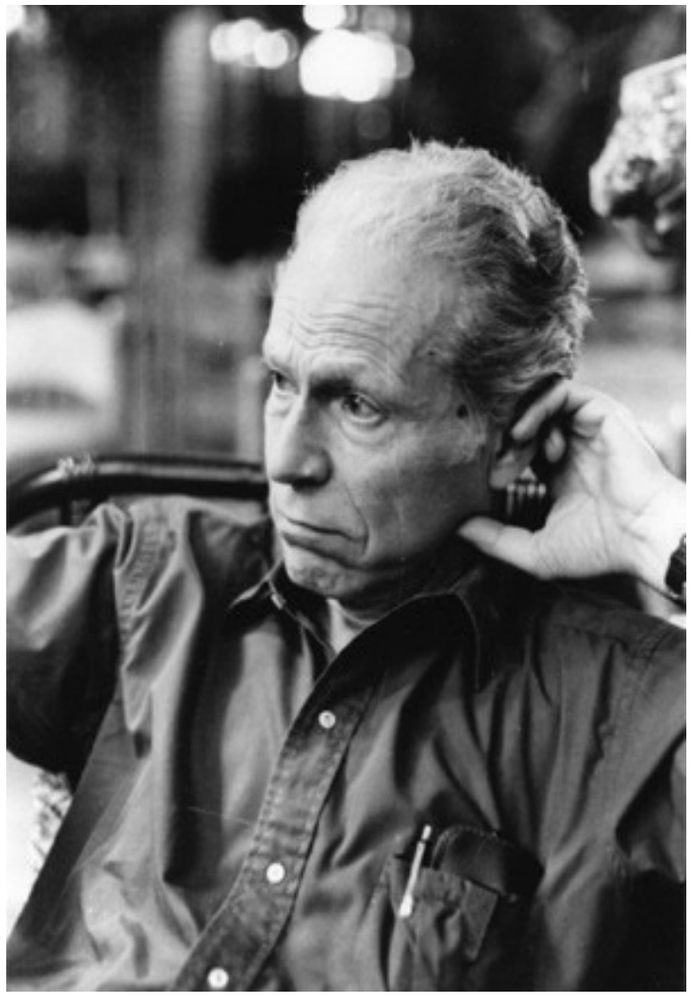
1. Who uses twitter?

2. Who has tweeted a complaint or compliment to a company?

3. Who has heard of Albert Hirschman's *Exit, Voice, and Loyalty*?

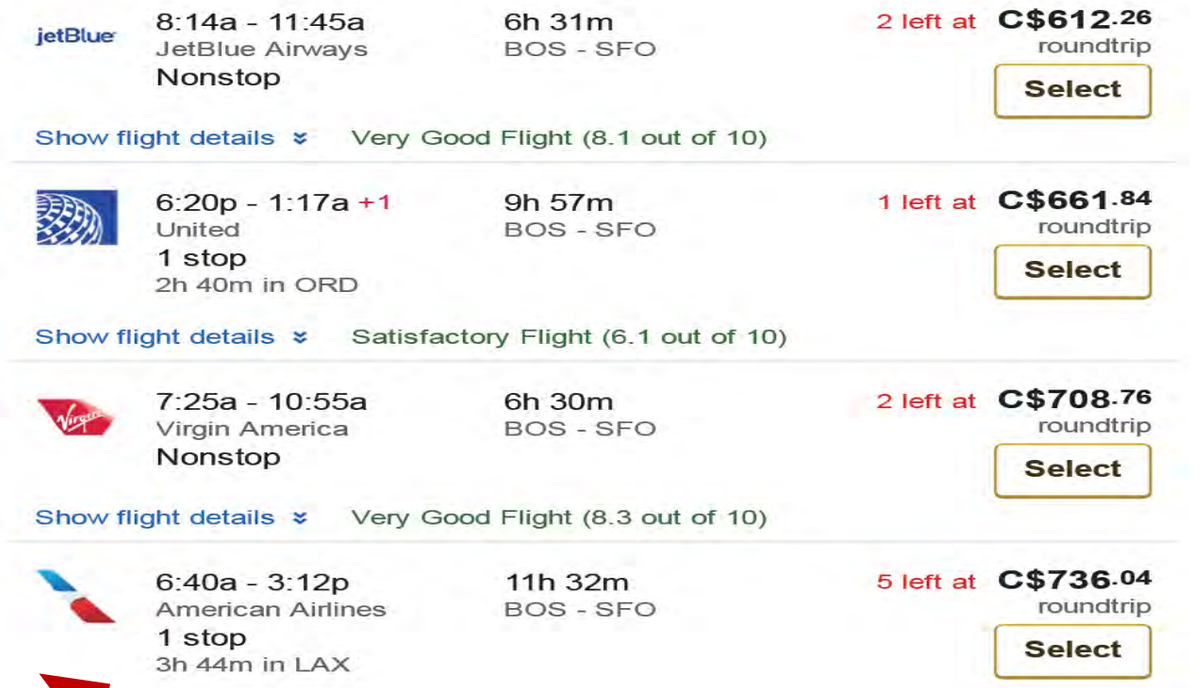
Old Theory Meets a New Setting





The Paper in a Nutshell

When faced with a negative quality shock, do you…



Exit?

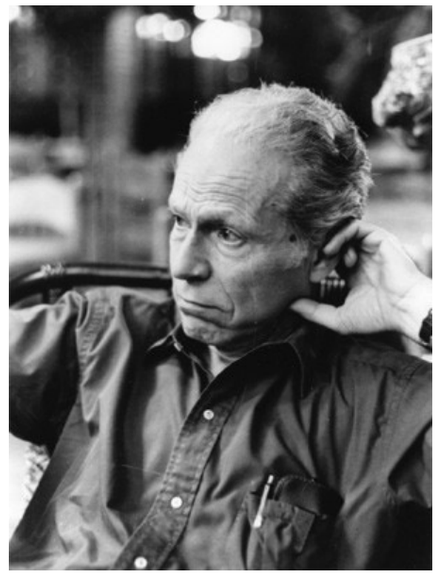
or

Voice?

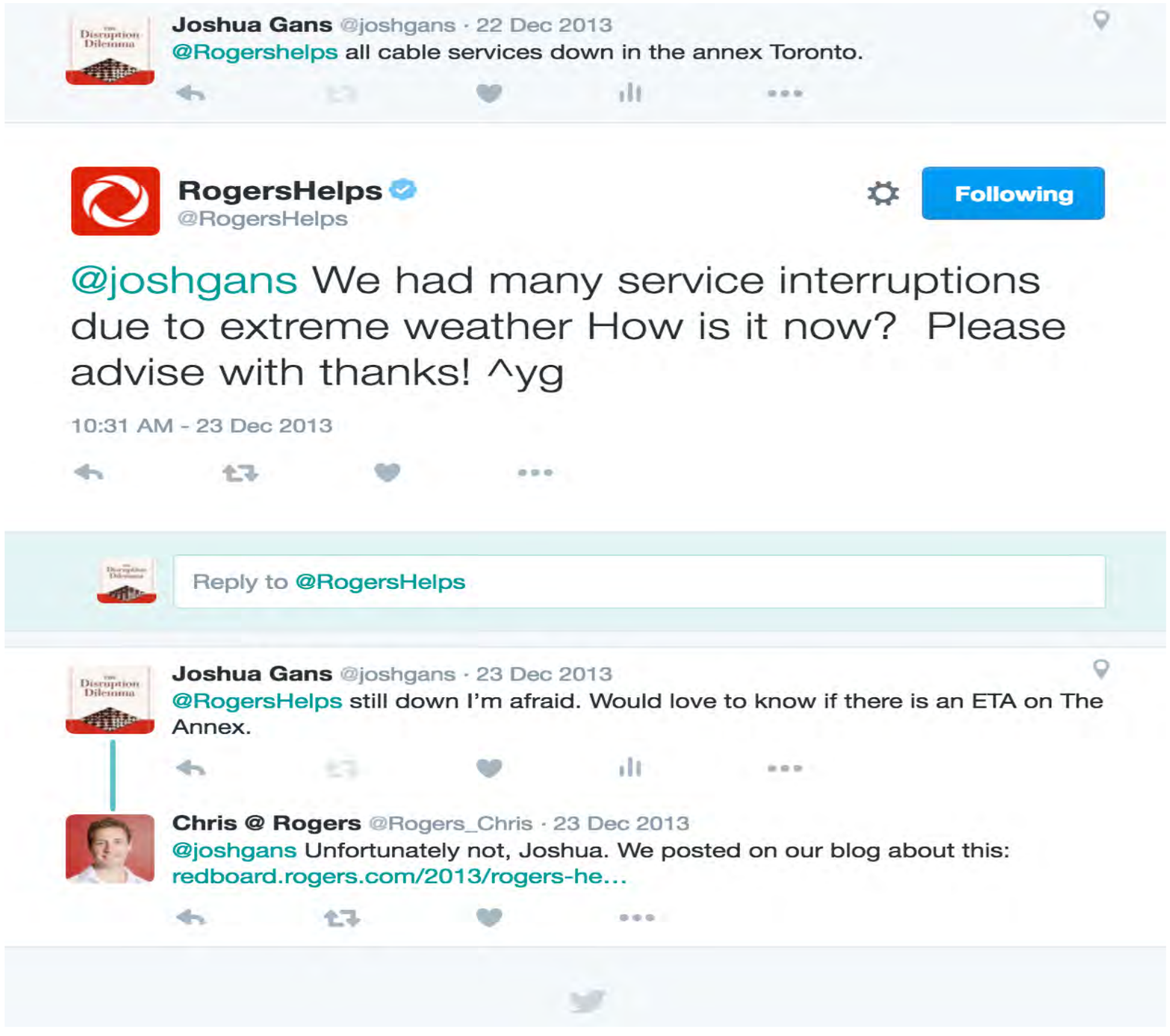
… and how does this choice vary with market structure?

Voice

“Any attempt at all to change, rather than escape from, an objectionable state of affairs whether through individual or collective petition to the management directly in charge, through appeal to a higher authority with the intention of forcing a change in management or through various types of actions and protests, including those that are meant to mobilize public opinion” (p. 30).



Twitter: A New Platform for Voice



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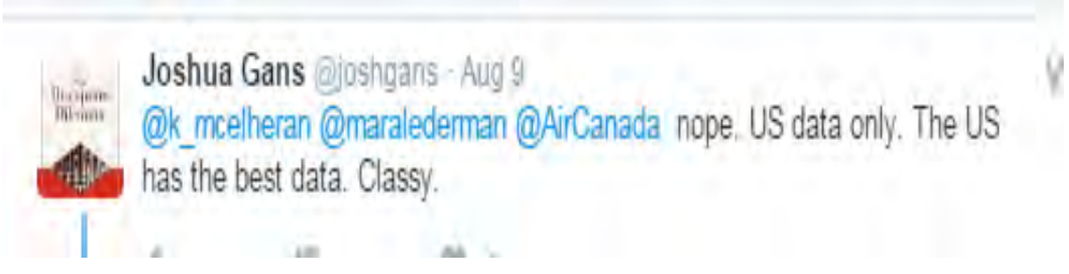


Research Questions

1. **Do consumers voice in response to negative quality shocks?**
2. **How does this relationship vary with market structure?**

Preview: Approach and Findings

What we do:

- Develop a theoretical model of voice as equilibrium of a relational contract between firm and consumer
- Show that voice is more likely to emerge as an equilibrium in more concentrated markets (resolving key ambiguity in Hirschman)
- Investigate this prediction using tweets made to or about airlines combined with data on airline on-time performance and local market structure

What we find:

- Consumers tweets more when on-time performance deteriorates (relative to airline's average in that market)
- Same deterioration in on- time performance generates more voice when an airline is the dominant carrier in a city
- Airlines are more likely to respond to tweets from their more valuable customers

Related Literature

- Fornell and Wernerfelt (1987, 1988) develop models that emphasize that firms may want to facilitate complaints in order to learn about their own quality.
  - Abrahams et al (2012) provide evidence that this mechanism can work in social media - providing automotive firms with information about vehicle defects.

- **Beard, Macher, Mayo (2015) estimate relationship between market strcutre and complaints about telecom companies to the FCC, using lens of Hirschman**

- Complaints and Word of Mouth: Richins (1983), Gatignon and Robertson (1986), Berger and Schwartz (2011), Forbes (2008), Chevalier and Mayzlin (2006), Mayzlin, Chevalier, and Dover (2014), Miller and Tucker (2013), Godes and Mayzlin (2009), Trusov et al (2009)

- Twitter: Ma, Sun, and Kekre (2015), Toubia and Stevens (2013), Bakshy et al (2011), etc.

- Airline market power and airline on-time performance

Theory

Intuition 1: Voice is costly so consumers will only voice when exit is hard…

→ Competition makes exit easy

→ ***More* voice in concentrated markets**

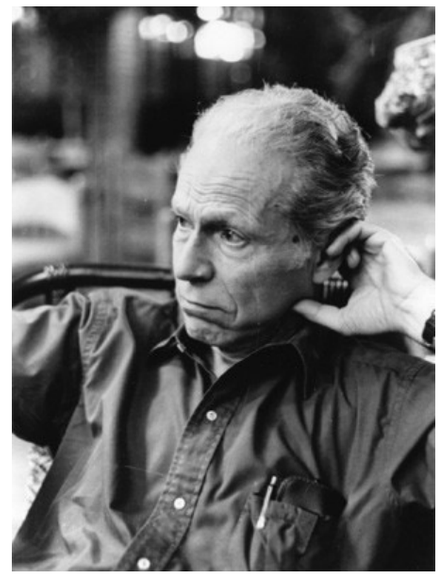
Intuition 2: Voice is costly so consumers will only voice if they expect a response…

→ Firms will respond if they fear losing customer…

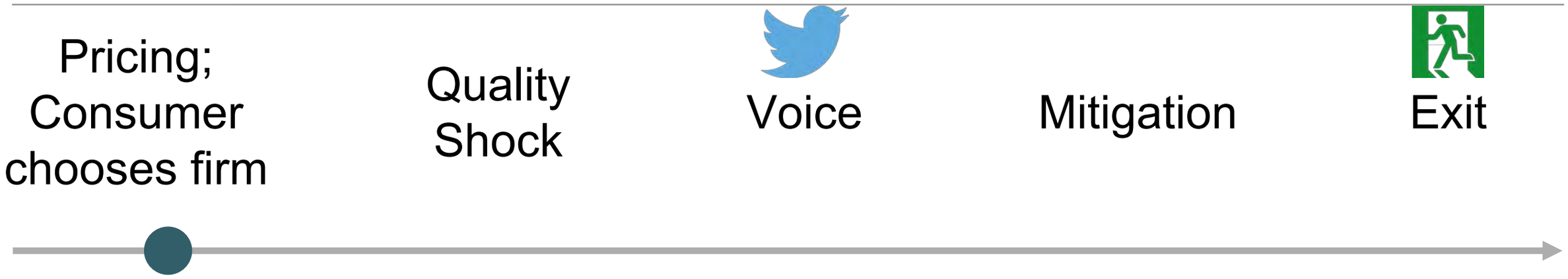
→ Competition gives customers a credible threat of exit

→ ***Less* voice in concentrated markets**

“The relationship between voice and exit has now become more complex. So far it has been shown how easy availability of the exit option makes the recourse to voice less likely. Now it appears that the effectiveness of the voice mechanism is strengthened by the possibility of exit. The willingness to develop and use the voice mechanism is reduced by exit, but the ability to use it with effect is increased by it.”



Formal Model



Symmetric as customer has infinitesimal loyalty

If choose to exit, no need to pay *B* and so no voice

If do not exit, no need to pay *B* and so no voice

Voice is never an equilibrium

Add Loyalty

Relational Contract (a la Levin 2002)

Between firm and customer

Definition. *A* (symmetric) relational contracting equilibrium with voice *exists if*

(i) a consumer exercises voice if and only if they observe a quality shock;

(ii) all firms offer a concession, B, if the consumer has exercised voice; and

(iii) a consumer exits their firm in the period following the exercise of voice if no concession is given.

Is there a B that makes consumer prefer to exercise voice rather than leave <u>and</u> makes firm prefer B to retain customer rather than let them leave?

Consumer uses voice if: $B \geq C$ (If no mitigation switch as expect *sB* higher value)

Firm responds to voice if: $\frac{\delta}{1-\delta}(p(n)-c-sB) \geq B$

A relational contracting equilibrium with voice exists if:

$$\frac{\delta}{1-\delta(1-s)}(p(n)-c) \geq C$$

For *n* large, relational contracting equilibrium does not exist

Positive correlation between market power & voice

Theory - Updated

Voice is costly so consumers will only voice if they expect a response…

→ Firms will respond if they fear losing a “loyal” customer…

→ Firms will care more about losing a valuable (high margin) “loyal” customer

→ Competition reduces the value of “loyal” customers

***MORE* voice in concentrated markets**

Predictions to Take to the Data

1. **Observe voice in response to quality deterioration**

2. **More voice in concentrated markets because consumers are more valuable:**

   - Margins are higher
   - Frequent flier programs have greater impact on consumer choice when airline serves most destinations out of the city (i.e.: when it is dominant)

3. **Firms more likely to respond to tweets from valuable consumers**

Twitter and Voice

Measure & quantify voice

Lower cost of voice

Public voice

Empirical Setting: U.S. Airline Industry

Distinctive Features

Can precisely measure quality across time & airlines

All major US airlines had Twitter handles by 2012

Airline markets are numerous with local market structures

Repeat customers are important

Data

- All tweets TO or ABOUT one of the 7 major airlines (American, Alaska, Delta, JetBlue, Southwest, United, US Airways) between August 1, 2012 and July 31, 2014
  - *Any tweets containing the airline's name or twitter handle*
  - *Original dataset had >11 tweets*

- Drop tweets not about an airline and retweets, leaving **4,003,326 unique tweets**

- Match tweets to cities or airports based on:
  1. City listed in twitter profile (36% of tweets)
  2. Lat/long at time of the tweet (7% of tweets)
  3. Airport mentioned in tweet (4% of tweets)

Overall, we have some form of location information for 41% of tweets

- Combine with data on airline on-time performance and local market structure (at city or airport level)
  - *From DOT and OAG respectively*

Random Sampling of Tweets from our Data

“@AmericanAir the only reason you shut the door is to stop the bleeding on your delay. We haven't moved yet u can say it was an 8:08 depart “

“Thanks to #AmericanAirlines for making every step of this process as time consuming & frustrating as possible. #fail #fail #fail #fail“

“@united Just got back from Moscow & Saint Petersburg using miles for Global First. Already researching the next bucket list destination!”

“@delta you may want to consider some way to heat the jet bridge when it is -6 outside...#justsaying”

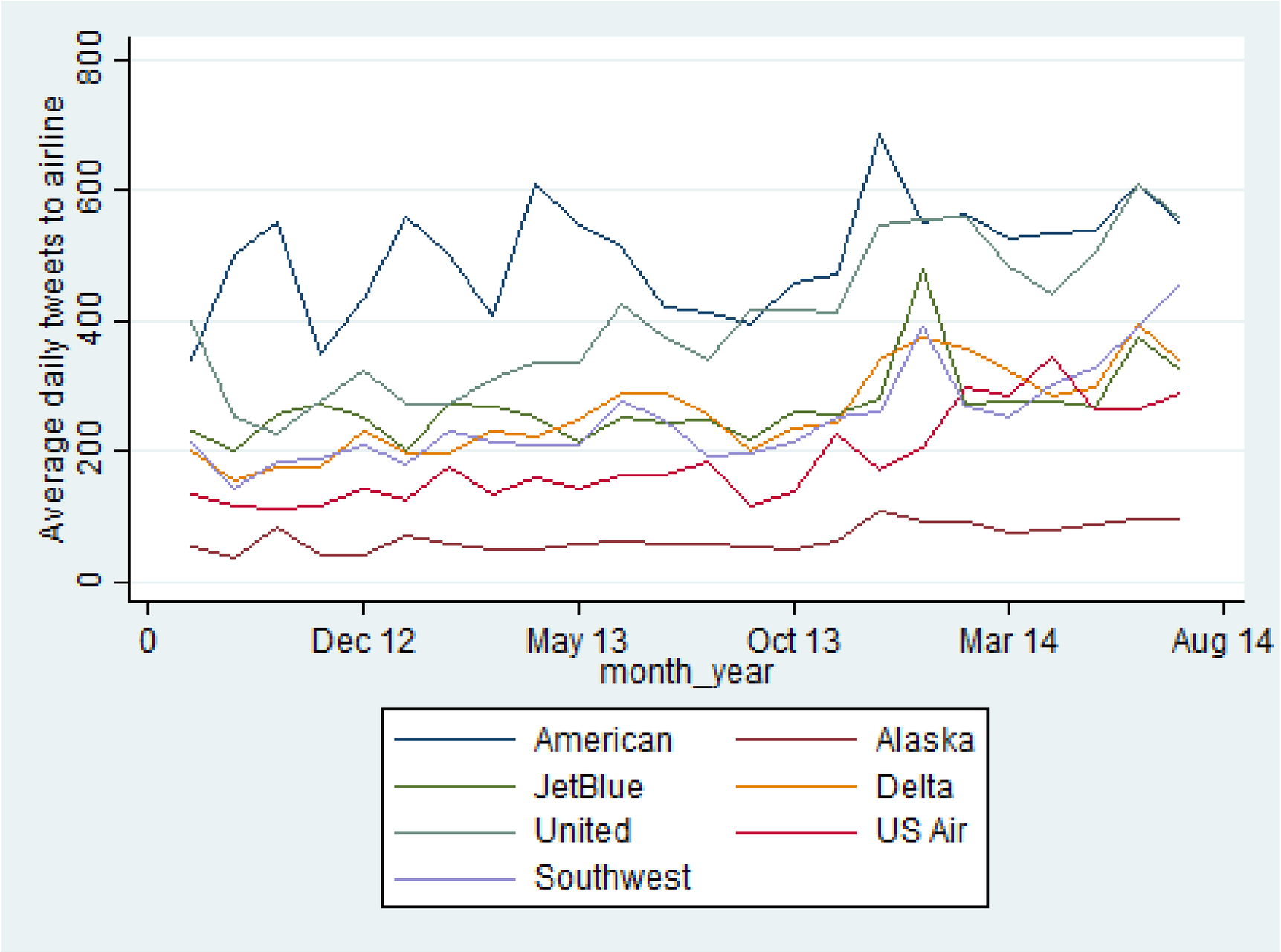
“Hey @United : IT'S A HOLIDAY. Maybe you should've had more workers in to work the checkin desk. Thanks for a crappy start to our flight. “

“@JetBlue looks like we'll be reunited again. Work is sending me to Baltimore and I only fly JetBlue”

“I don't often drink free beer on a flight, but when I do, it's Dos Equis on the @USAirways Shuttle DCA-BOS. http://t.co/LAbq4oIW2L”

“Today is the last day I will ever fly @USAirways. After going 0-3 flying through Philly and being forced to spend the night every time.“

Ave. Daily Tweets, by Month and Airline (w/ city info)



Empirical Strategy

- Quality precisely measured and varies on a daily basis → Allows us to measure how voice responds to quality deterioration *by a given firm in a given market*

- Many local markets with varying market structures → Allows us to observe the same airline with the same deterioration in quality under different market structure

Effectively estimating:

When Delta's on-time performance in a market deteriorates, how many more tweets does it receive from consumers in that market, relative to the number of tweets it gets in that same market when on-time performance is good?

And, is this relationship different in markets in which Delta is the dominant airline in a market vs. markets in which it isn't?

3 Main Variables

1. **# tweets about an airline from people in a given city on a given day**

2. **# of the airline's flights from that city on that day that are >15 min late or cancelled**

3. **Airline's share of departing domestic flights from that city**

Selected Summary Statistics

Variable	N	Mean	St Dev	Min	Max
# tweets to airline/city	318,853	4.25	12.31	0	1184
# flights delayed>15 min or cancelled	318,853	7.16	22.02	0	806
I(Operates 30-50% of departing flights)	318,853	0.12	0.33	0	1
I(Operates >50% of departing flights)	318,853	0.05	0.21	0	1
# tweets to handle	318,853	2.95	8.93	0	768
# tweets mention on-time performance	318,853	0.77	2.82	0	452
# very negative tweets	318,853	0.97	3.59	0	587
# very positive tweets	318,853	1.90	5.67	0	457

Level of observation is the *airline-city-day*

Functional Form

- Both # tweets and # flights delayed or canceled (per airline-location-day) have a large mass at zero and a very long right tail.

- The mean and the st dev of these variables differ substantially across airline-locations, with large means and standard deviations where the airlines have a larger presence – eg:
  - In Atlanta, Delta has mean 157.6 with a standard deviation of 113.8; US Airways has mean 1.9 delayed with a standard deviation of 2.1.
  - In Charlotte, Delta has mean 3.5 with a standard deviation of 3.4; while US Airlines has mean 49.5 with standard deviation 33.5.

- To create a measures that are comparable across airline-locations, **we standardize by subtracting the airline-location mean and dividing by the standard deviation**

- Has been used in other settings to adjust measures that have different means and variances (Chetty, Friedman, and Rockoff 2014; Bloom, Liang, Roberts, and Ying 2014).

- All results are robust to using log(x+1).

Does Quality Deterioration Generate Voice? (Table 5)

Dependent Variable	***# of tweets to airline, from consumers in a given city (or airport), on a give day***		
	City info in profile	*City info in profile*	*Airport information in lat/long or tweet*
# flights delayed>=15 or canceled	0.131***	0.078***	0.051***
	(0.007)	(0.005)	(0.0004)
# airline flights	0.005	0.001	-0.0003
	(0.004)	(0.004)	(0.003)
Fixed effects	Airline, City	City-day, Airline-city	Airport-day, Airline-arpt
N	318,853	318,210	382,220
R-sq	0.018	0.005	0.002

Does Relationship Vary with Market Dominance? (Table 6)

Dependent Variable	***# of tweets to airline, from consumers in a given city, on a give day***		
	City info in profile	*Any location information*	*Airport information in lat/long or tweet*
# flights delayed >=15 min or cancelled	0.070***	0.071***	0.041***
	(0.005)	(0.005)	(0.004)
# delayed or cancelled * 30-50% share of flights	0.047***	0.050***	0.042***
	(0.012)	(0.011)	(0.010)
# delayed or canceled * >50% share of flights	0.086***	0.094***	0.098***
	(0.019)	(0.021)	(0.013)
Fixed effects	City-day, Airline-city	City-day, Airline-city	Airport-day, Airline-airport
N	318,210	328,825	382,220
R-sq	0.005	0.006	0.003

What Types of Tweets are Being Made? (Tables 7, 8 and 11)

Dependent Variable	***# tweets about on-time performance***	***# tweets NOT about on-time performance***	***#very negative tweets***	***# very positive tweets***	***# tweets to handle***	***# tweets NOT to handle***
# flights delayed >=15 min or cancelled	0.102***	0.046***	0.088***	0.020***	0.059***	0.046***
	(0.007)	(0.004)	(0.007)	(0.003)	(0.005)	(0.004)
# delayed or cancelled * 30-50% share of flights	0.040*	0.041***	0.044**	0.033***	0.049***	0.014
	(0.015)	(0.010)	(0.013)	(0.009)	(0.010)	(0.009)
# delayed or canceled * >50% share of flights	0.120***	0.065**	0.106***	0.056***	0.092***	0.047**
	(0.025)	(0.016)	(0.025)	(0.011)	(0.021)	(0.015)
N	318,210	318,210	317,458	317,458	318,210	317,977
R-sq	0.01	0.003	0.007	0.001	0.005	0.002

All specifications include airline-city and city-day FEs

Do Airlines Respond to More Valuable Customers? (Table 10)

Dependent Variable	***=1 if Tweet received response via twitter***
Airline 30-50% share city	0.238***
	(0.008)
Airline >50% share city	0.173***
	(0.013)
Frequent flier keyword	0.258***
	(0.027)
Probability sentiment is negative	0.062***
	(0.017)
Number of followers, 25th -50th percentile	0.043***
	(0.009)
Number of followers, 50th -75th percentile	-0.052***
	(0.011)
Number of followers, 75th -99th percentile	-0.118***
	(0.013)
Number of followers, over 99th percentile	0.136***
	(0.024)
Handle	3.120***
	(0.034)
Customer service keyword	0.392***
	(0.010)
On time performance keyword	0.482***
	(0.010)
N	3,478,212

(We Think) this Conceptualization of Voice Applies Broadly

PREVIOUS MESSAGES

Share Details: I made an order at 6:31 tonight. it was supposed to arrive at 7:22. it was only delivered at 8:14 pm. this is an unacceptable delay. in the meantime, I had to make my children something else for dinner so they didn't even eat the food when it was finally brought. could my order please be refunded or credit applied to my account. I have never had such a bad experience with uber eats. it has been reliable in the past. thank you Mara Lederman

Sent by **Mara L.** on Saturday, October 29, 2016 at 0:30:20 AM

RESOLVED

OTHER ISSUE

Hi Mara. So sorry to know that your order took a while to be delivered and we hate to hear this negative experience of yours. Please let us make it up to you.

After checking the order history, I've gone ahead and **fully refunded the whole order**. You should receive an updated receipt shortly and see the refund in your account within the next business days. And to nullify the poor experience you've had, I included a **$10 promotion** in your account and it will automatically apply on your next UberEATS order.

We appreciate your patience all this while and we're looking forward on doing more business with you!

Sent by **Rachel** on Saturday, October 29, 2016 at 0:46:42 AM

Twitter's Take

Tweet

Making customer service even better on Twitter

Thursday, February 18, 2016 | By Ian Cairns (@cairns), Product Manager [17:00 UTC]

A simple way to start a Direct Message

Direct Messages are a great way for customers to have a private conversation with a business. Customer service conversations often start in Tweets, but then need to transition to a private channel when personal information is required. We're making that transition as easy as a single click. A business can now add a deep link to their Tweets that automatically displays a call to action button, which allows the customer to send the business a Direct Message, quickly and easily.

Customer Feedback

We're also announcing a new feature called Customer Feedback that enables people to privately share their opinions with a business after a service interaction.

Twitter's Take

Tweet

New research: consumers willing to spend more after a positive customer service interaction on Twitter

Monday, December 7, 2015 | By Wayne Huang (@WayneYHuang), Research Team [21:54 UTC]

For many, Twitter has become a de facto online customer service platform. For instance, every month Twitter users send over 100,000 questions, complaints, and comments to major US airlines (Twitter internal data, November 2015).

Our main finding: prompt customer service really does pay off. Customers who received replies from airlines on Twitter were more satisfied with their experience, more willing to recommend the airline, and willing to pay more money for a ticket for that airline in the future.

Summary

- Developed a model suggesting that voice can be the equilibrium of a relational contract between consumers and firms

- Model predicts **more voice when less choice** because less choice means higher margins and more valuable customers

- **Collection of empirical results** that suggest consumers use voice when faced with quality deterioration and in a way that is consistent with relational contracting model:
  - *People voice on twitter in response to quality deterioration*
  - *Elasticity of complaints with respect to quality increases with market power*
  - *Larger increase in negative tweets and tweets about service quality*
  - *Complaints are directed to the company in particular (via handle)*
  - *Airlines are more likely to respond to complaints from higher value customers*
  - *Consumers who get a response are more likely to tweet again*