Open Voice or Private Message? The Hidden Tug-of-War on Social Media Customer Service

Shu He, Shun-Yang Lee, **Huaxia Rui**

Simon Business School, The University of Rochester

June 2023

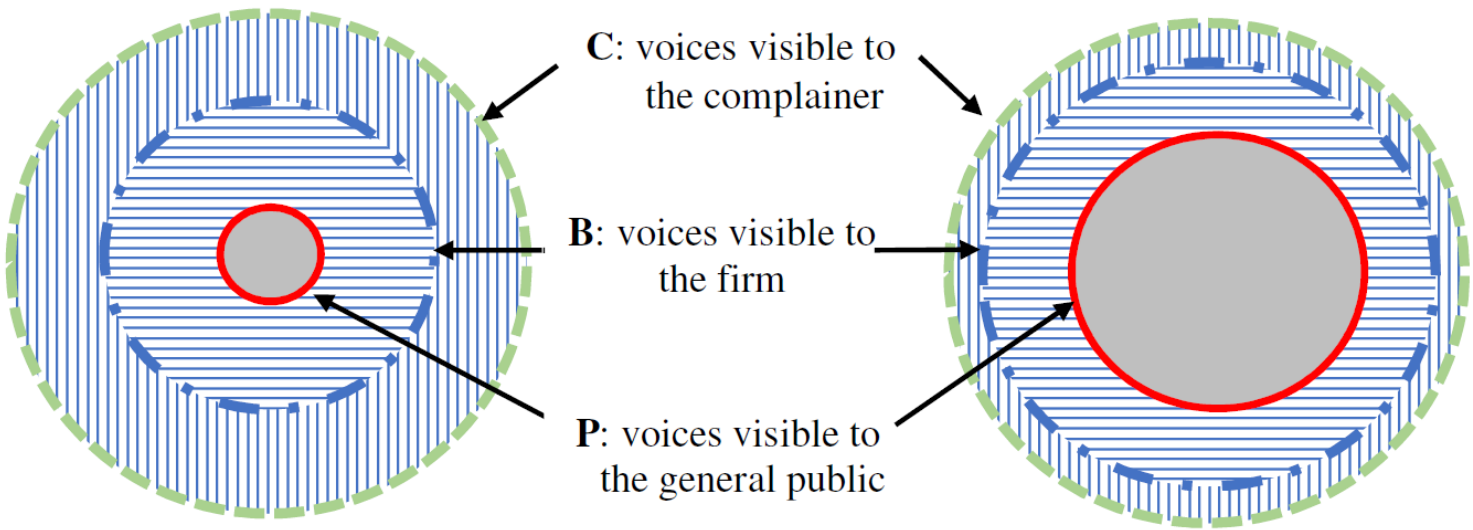
Outline

Agenda

Public Voice vs. Private Voice

How do we react when their perceived quality of a good or service is below expectation? Hirschman (1970) conceptualizes two options: voice or exit. In the social media era, we distinguish two types of voices:

- **Private voice**: voices solely communicated with the involved party and not visible to the general public.
- **Public voice**: voices that are communicated with the involved party and are visible to the general public.



Research Question: which channel do we choose to voice our discontent? Public or private?

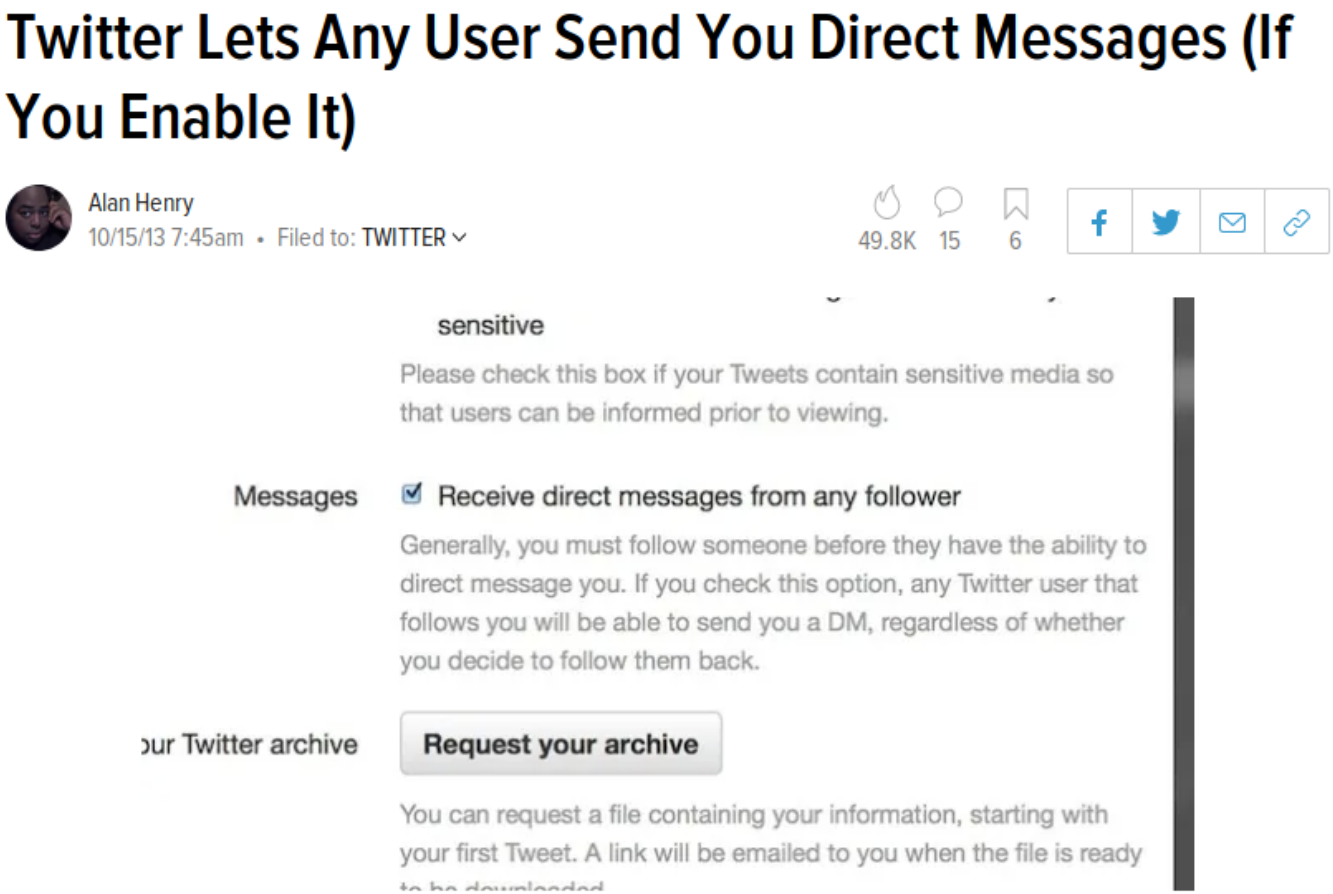
Hypothesis

A dissatisfied customer using social media customer service prefers to initiate a conversation with the firm via public voice.

To test the hypothesis, we can enable an initially unavailable option and observe the "traffic" change in the other channel.

Agenda

OpenDM



Twitter Lets Any User Send You Direct Messages (If You Enable It)

Alan Henry
10/15/13 7:45am • Filed to: TWITTER

49.8K 15 6

sensitive

Please check this box if your Tweets contain sensitive media so that users can be informed prior to viewing.

Messages

Receive direct messages from any follower

Generally, you must follow someone before they have the ability to direct message you. If you check this option, any Twitter user that follows you will be able to send you a DM, regardless of whether you decide to follow them back.

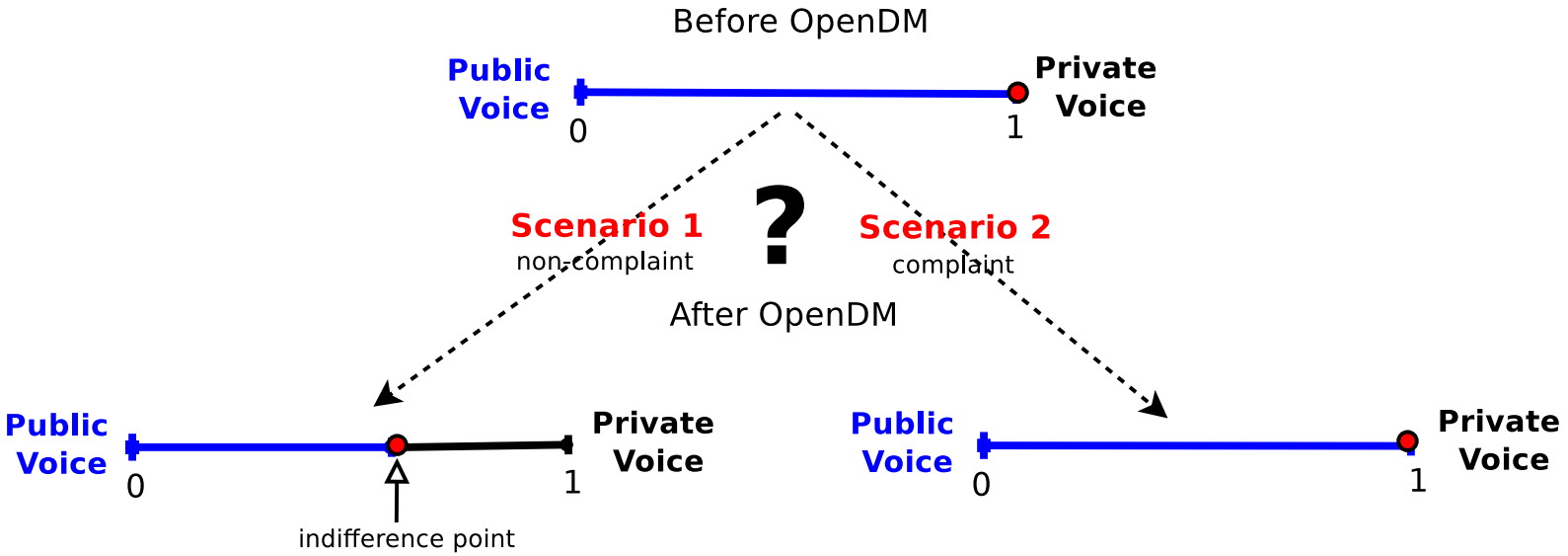
ur Twitter archive

Request your archive

You can request a file containing your information, starting with your first Tweet. A link will be emailed to you when the file is ready

- **Airlines**: Delta, United, American, Southwest
- **Sample period**: December 1, 2015 — July 31, 2016

Statistical Challenge



To statistically reject the null hypothesis that complaining customers switch from the public to the private channel after OpenDM, formulate the null hypothesis as at least certain percentage (e.g., 2.5%, 5%, 7.5%, or 10%) of the customers would have switched to the private channel in response to OpenDM.

- Test whether "the coefficient of the interaction term Treatment * before is greater than the threshold.
- These hypothesis tests allow us to operationalize the rejection of the null hypothesis and to statistically establish an upper bound of the effect size.

Identification Challenge

Delta airlines ($D = 1$) had OpenDM off at $t = 0$ and on at $t = 1$. The control airlines ($D = 0$) had OpenDM on at $t = 0, 1$. Let d be the treatment variable, taking 2 possible values:

- $d = 0$: OpenDM is off at $t = 0$ but is in place at $t = 1$.
- $d = 1$: OpenDM is on at $t = 0$ and $t = 1$.

Y_d^t: the potential outcome at period t given the treatment status d.

- $Y_0^{t=0}$: potential outcome at $t = 0$ if OpenDM is off at $t = 0$ but is on at $t = 1$.
- $Y_0^{t=1}$: potential outcome at $t = 1$ if OpenDM is off at $t = 0$ but is on at $t = 1$.
- $Y_1^{t=0}$: potential outcome at $t = 0$ if OpenDM is on at $t = 0$ and 1.
- $Y_1^{t=1}$: potential outcome at $t = 1$ if OpenDM is on at $t = 0$ and 1.

Observation Rule: $Y^t = Y_1^t \cdot (1 - D) + Y_0^t \cdot D$

$$
\begin{aligned}
\text{ATT}_0 = \quad & \mathbb{E}[Y_1^{t=0}|D=1] - \mathbb{E}[Y_0^{t=0}|D=1] \\
= \quad & \mathbb{E}[Y_1^{t=0} - Y_1^{t=1}|D=1] + \mathbb{E}[Y_1^{t=1}|D=1] - \overbrace{\mathbb{E}[Y^{t=0}|D=1]}^{\text{observation rule}} \\
\overset{\text{PT}}{=} \quad & \mathbb{E}[Y_1^{t=0} - Y_1^{t=1}|D=0] + \mathbb{E}[Y_1^{t=1}|D=1] - \mathbb{E}[Y^{t=0}|D=1] \\
\overset{\text{NC}}{=} \quad & \mathbb{E}[Y^{t=0} - Y^{t=1}|D=0] + \mathbb{E}[Y_0^{t=1}|D=1] - \mathbb{E}[Y^{t=0}|D=1] \\
= \quad & \underbrace{\mathbb{E}[Y^{t=0} - Y^{t=1}|D=0]}_{\text{time-reversed difference for control group}} - \underbrace{\mathbb{E}[Y^{t=0} - Y^{t=1}|D=1]}_{\text{time-reversed difference for treated group}}
\end{aligned}
$$

- **PT** (revised): $Y_1^{t=1} - Y_1^{t=0} \perp\!\!\!\perp D|X$
- NC: there is no carryover effect of technology adoption.

$$Y_0^{t=1} = Y_1^{t=1} \Longrightarrow \mathbb{E}[Y_0^{t=1}|D=1] = \mathbb{E}[Y_1^{t=1}|D=1].$$

The NC assumption would be violated if there is learning over time, for example, if we have a panel data. It's easier to justify if we have a repeated cross sectional data.

So, to estimate $\text{ATT}_0 = \mathbb{E}[Y_1^{t=0}|D=1] - \mathbb{E}[Y_0^{t=0}|D=1]$ is to estimate

$$\underbrace{\mathbb{E}[Y^{t=0} - Y^{t=1}|D=0]}_{\text{time-reversed difference for control group}} \quad - \quad \underbrace{\mathbb{E}[Y^{t=0} - Y^{t=1}|D=1]}_{\text{time-reversed difference for treated group}}.$$

Compare this with the ususal DID estimator:

$$\mathbb{E}[Y^{t=1} - Y^{t=0}|D=1] - \mathbb{E}[Y^{t=1} - Y^{t=0}|D=0].$$

We can simply run the ususal regression but

- switch the treatment status (i.e., $\tilde{D} \equiv 1 - D$), and
- relabel the time backward before running the regression.

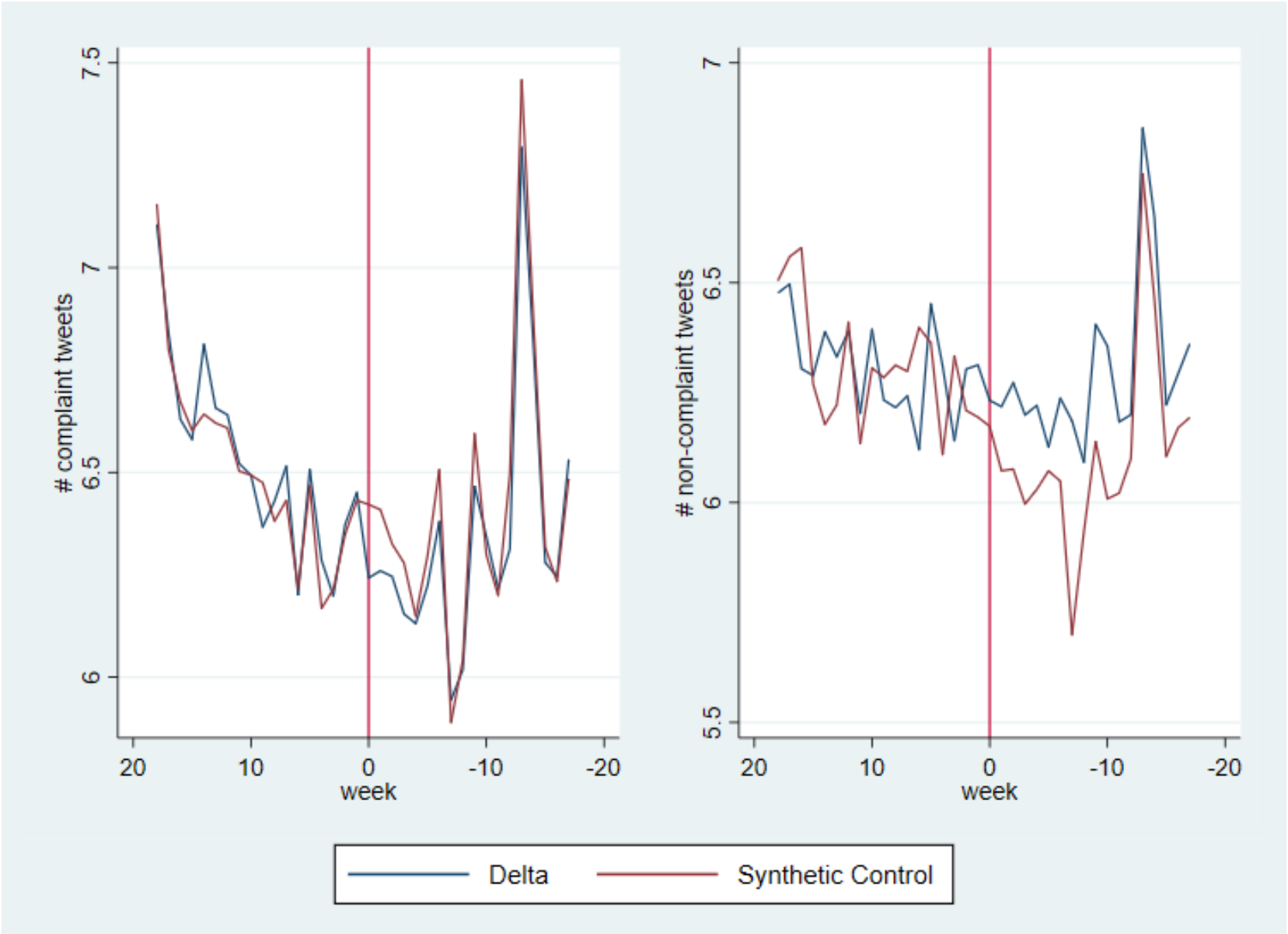
Alternatively, run the DID backward and flip the sign of the estimated coefficient.

Agenda

Results

	Channel choice				
	DID			SCM	
	Non-complaint	Complaint	All	Non-complaint	Complaint
	(1)	(2)	(3)	(4)	(5)
Treatment*Before	0.186***	-0.00608	-0.00608	0.188*	-0.0589
	(0.0499)	(0.0488)	(0.0614)	(0.100)	(0.0510)
Treatment*Before *Non-complaint			0.192**		
			(0.0868)		
Two-way interactions			Yes		
Airline fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
# observations	972	972	1,944	972	972
R-squared	0.304	0.486	0.311		

	Complaint			
Threshold	2.5%	5%	7.5%	10%
	(1)	(2)	(3)	(4)
Corresponding Null hypothesis	α_1>2.5%	α_1>5%	α_1>7.5%	α_1>10%
p-value	0.262	0.126	0.049**	0.015**
Reject H0	No	No	Yes	Yes


complaint tweets
7.5
7
6.5
6
20
10
0
-10
-20
week
non-complaint tweets
7
6.5
6
5.5
20
10
0
-10
-20
week
Delta
Synthetic Control

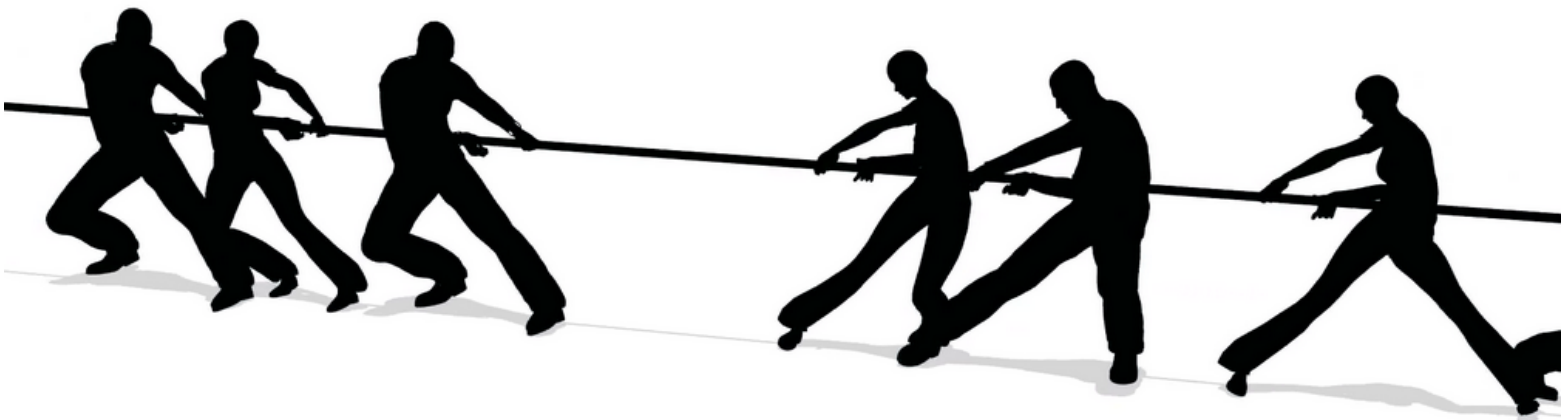
	DID				SCM			
DV: log number of dialogues	Group 1 (0-0.25)	Group 2 (0.25-0.50)	Group 3 (0.50-0.75)	Group 4 (0.75-1)	Group 1 (0-0.25)	Group 2 (0.25-0.50)	Group 3 (0.50-0.75)	Group 4 (0.75-1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment *Before	0.173***	0.167***	0.0670*	-0.0597	0.229***	0.251***	-0.0259	-0.0244
	(0.0348)	(0.0433)	(0.0397)	(0.0449)	(0.0494)	(0.0901)	(0.138)	(0.0892)
Airline fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.850***	6.158***	6.459***	7.398***				
	(0.0447)	(0.0479)	(0.0535)	(0.0570)				
# observations	972	972	972	972	972	972	972	972
R-squared	0.805	0.396	0.675	0.791				

	Social Media Influence		
	Non-complaint	Complaint	All
	(1)	(2)	(3)
Treatment *Before	-0.386***	0.00129	0.00129
	(0.0362)	(0.0249)	(0.0262)
Treatment*before*Non-complaint			-0.387***
			(0.0441)

Agenda

Conclusions

We also did a randomized field experiment to show that firms prioritize the private channel to the public channel, and a controlled experiment to further validate that complaining customers' preference of public voicing.



- Customers and firms have different preference regarding public and private channel choice.
- There is a hidden tug-of-war between the traditional mode of customer service featuring firm control and social media customer service featuring shared control.

Managerial Implications

Firms wishing for an improved public sentiment as a result of customers switching to the private channel may be disappointed.

- Customer self-selection into different channels may lead to larger percentage of negative voices in the public space.
- **Twitter**: *it's important to treat both types of messages with equal priority.*

Oscar Munoz: *It's a new era with regard to social media and it's just something we have to adapt to and accept.*