

Twitter Analytics on Companies, Executives, and COVID-19

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Firm tweets

“Discretionary Dissemination on Twitter”

With Wenli Huang and Hai Lu

Questions

1. Firms *post financial tweets* more often around more material accounting news events, irrespective of the direction of the news (positive or negative)
 - Testing theory: Hummel, Morgan, and Stocken (2021 Working)
2. Firms *use hyperlinks* more often around more material accounting news events, irrespective of the direction of the news (positive or negative)

Example firm financial tweets

Financial

 **Goldman Sachs** 
@GoldmanSachs · [Follow](#)
 Official 

GS reports 2014 net rev of \$34.53bn, net earnings of \$8.48bn, & 11.2% ROE; 4Q net rev of \$7.69bn, net earnings of \$2.17bn and 11.1% ROE

8:37 PM · Jan 16, 2015 

 10  Reply  opy link

[ead more on Twitter](#)

 **The Boeing Company** 
@Boeing · [Follow](#)
 Official 

Boeing reports strong third-quarter results; raises revenue, EPS and cash flow guidance:



Non-financial

 **LendingTree** 
@LendingTree · [Follow](#) 

Tip: Your front door is a glimpse into your home. Add some personality. After all, you only have one chance to make a first impression!

10:41 PM · Sep 8, 2014 

  Reply  opy link

[ead more on Twitter](#)

 **Arrow Electronics** 
@ArrowGlobal · [Follow](#) 

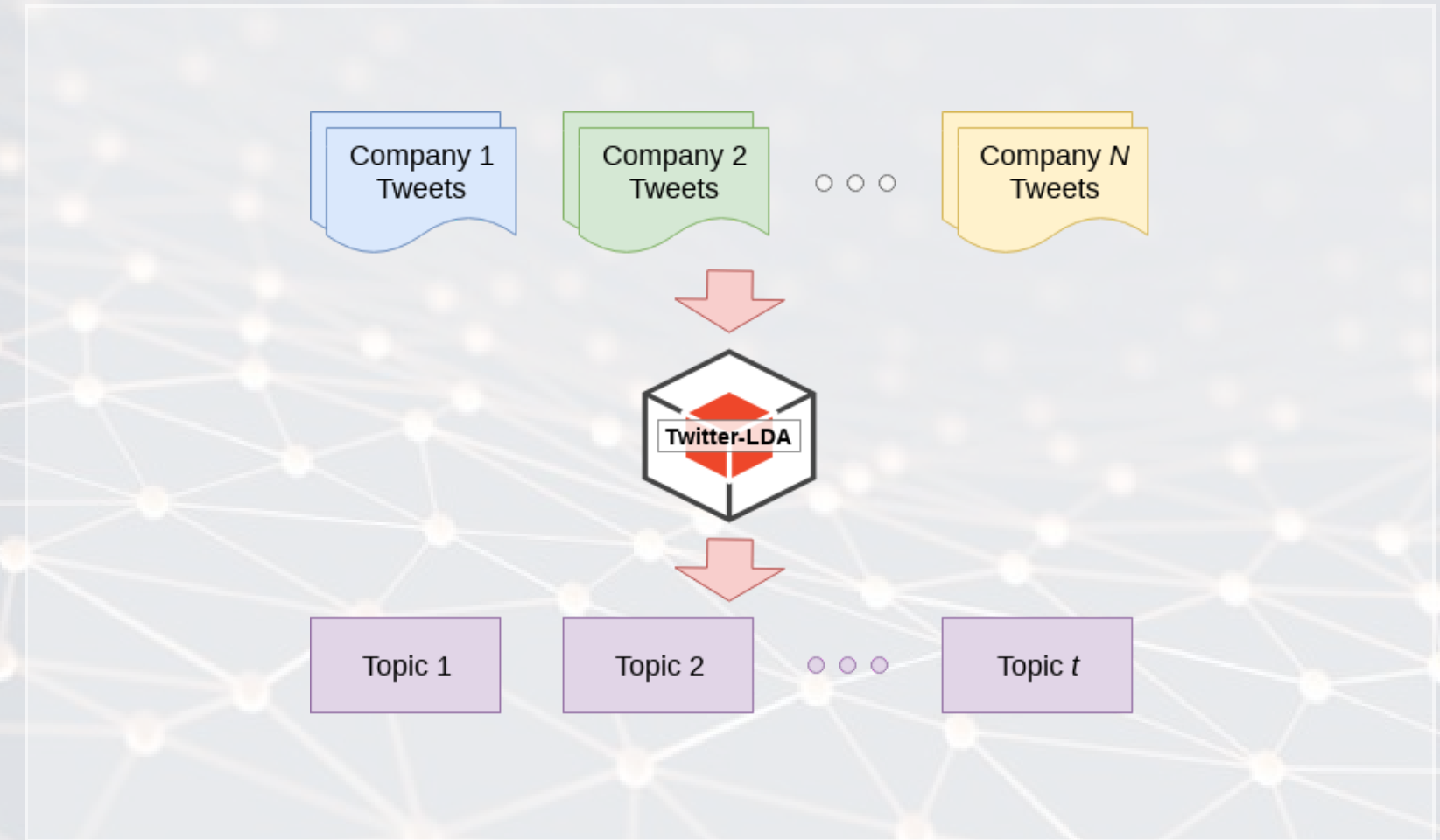
Are you thinking [#FiveYearsOut](#)? Then you should consider working with us. Apply online at arw.li/6017IveW



12:08 AM · Mar 7, 2015 

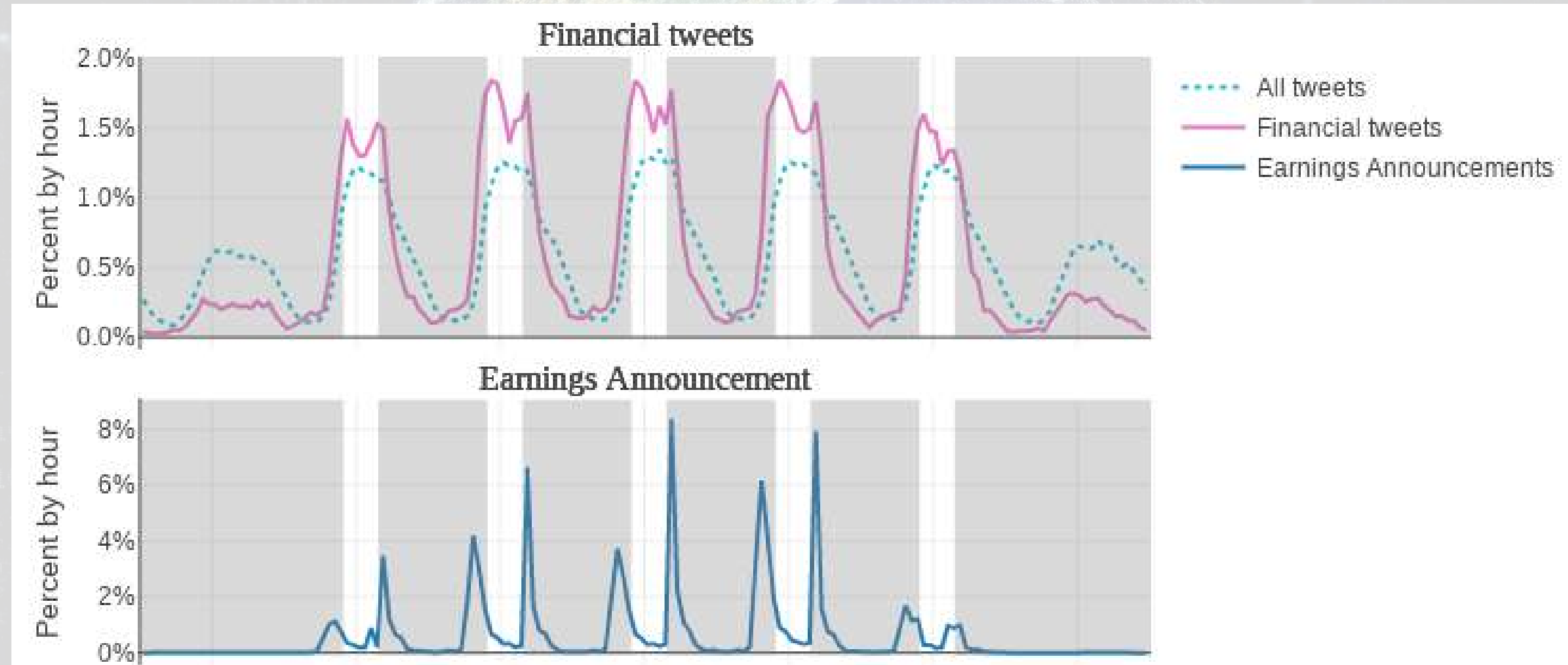
Classifying tweets

- Classify using Twitter-LDA
- Identify 60 topics
 - 1 financial topic
 - 42 nonfinancial topics
 - Business, conferences, marketing, and support
 - 17 other topics

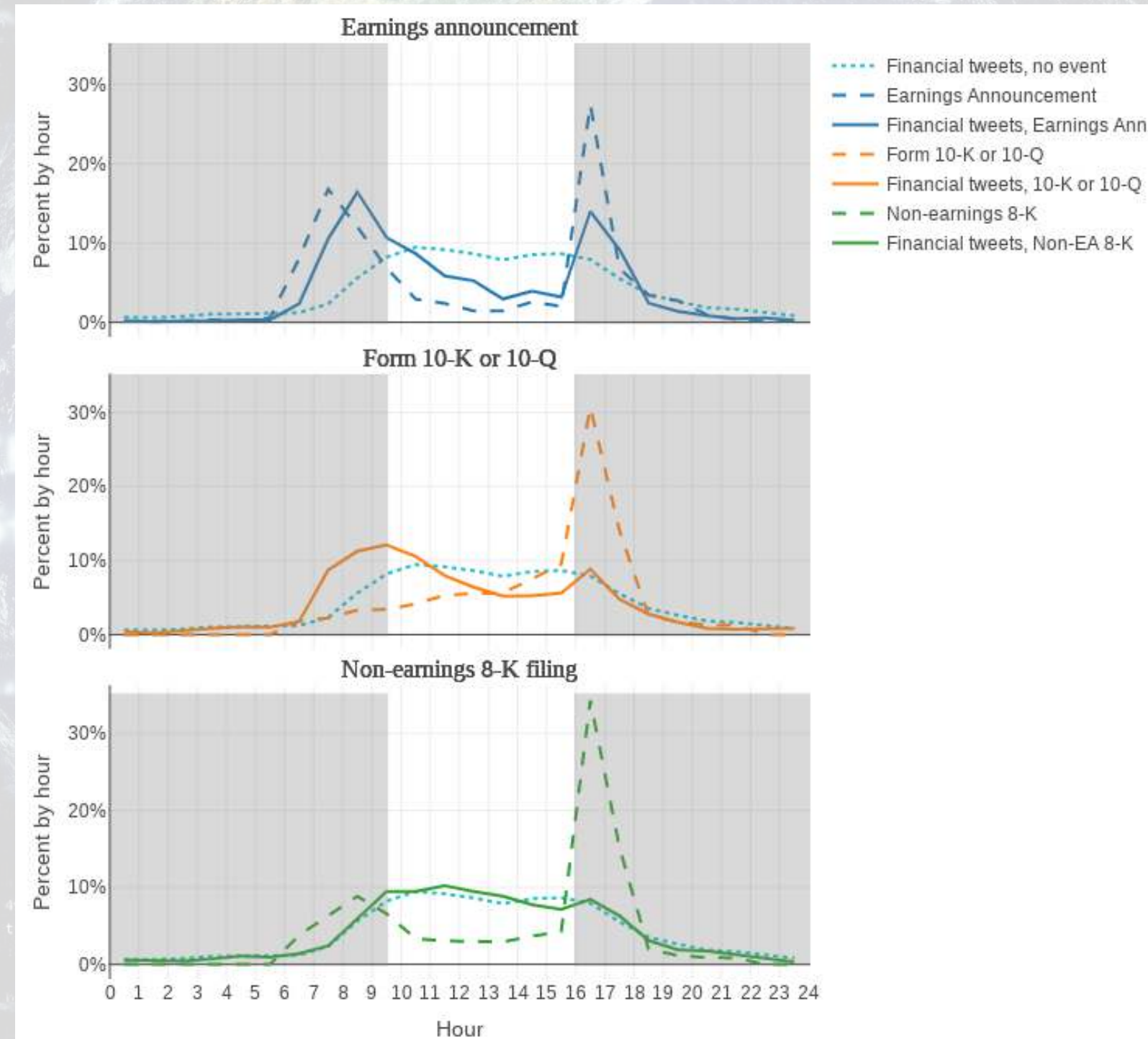


Number	Topic	Top_words
23	Financial	market, growth, markets, trading, earnings, global, report, quarter, results, energy
2	Nonfinancial: Marketing	#shareacoke, make, #tastethefeeling, gifs, reply, mistletoe, happy, tweets, #makeithappy, hashtag
12	Other	el, paso, police, trump, obama, man, city, donald, news, york

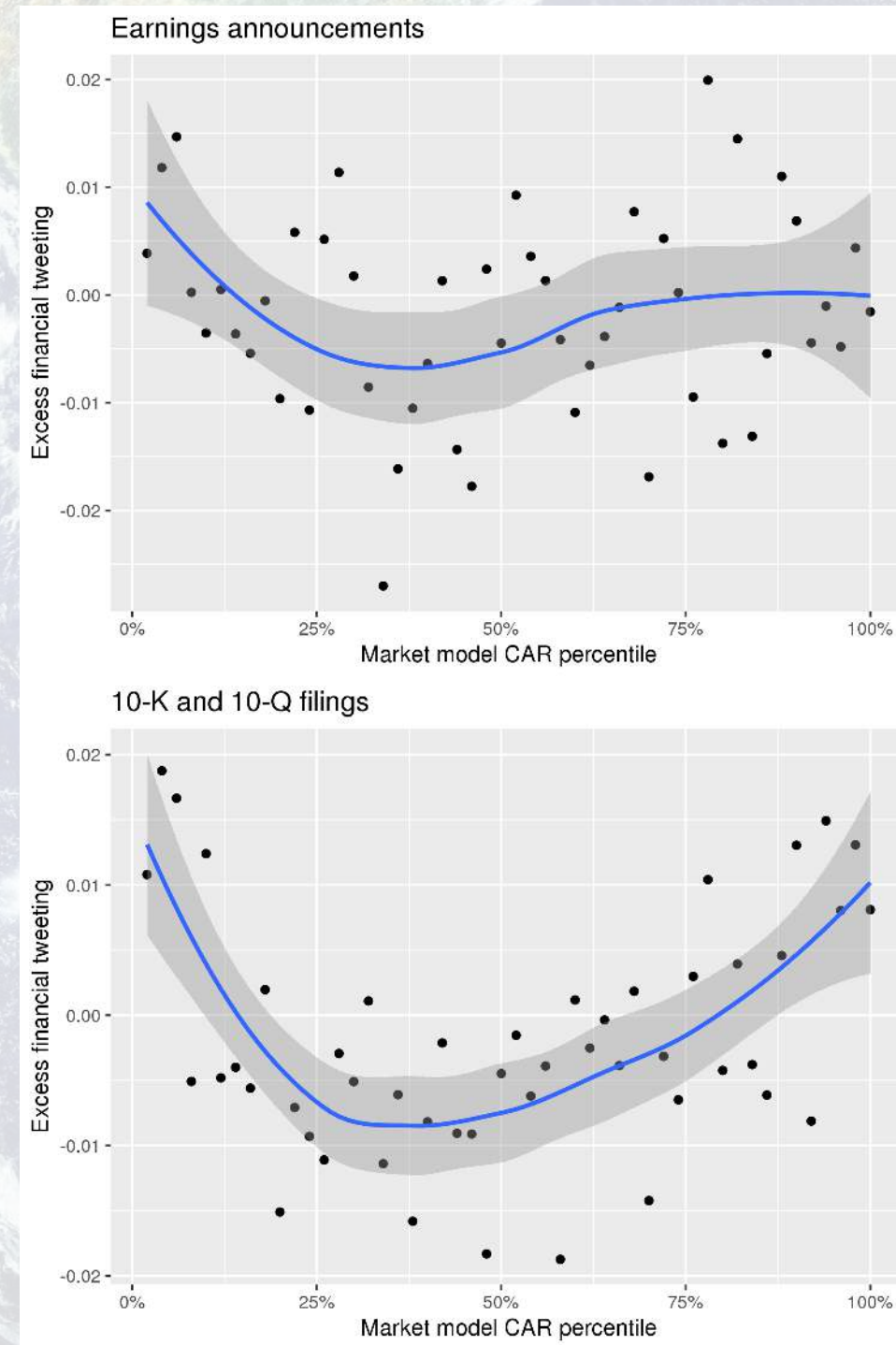
Tweeting behavior intraday



Financial tweets and Financial events



Financial tweets and event direction



Financial tweets and url usage

Table 5: URL Usage in Financial Tweets and Materiality of Events

	(1) Earnings Ann <i>logit</i>	Z	(2) 10-K, 10-Q <i>logit</i>	Z
$CAR_{Low} \times Event$	0.473***	[4.36]	0.342***	[2.71]
$CAR_{Mid} \times Event$	0.296***	[2.85]	0.112	[1.39]
$CAR_{High} \times Event$	0.355***	[3.42]	0.226**	[2.04]
<i>Year FE</i>	Included		Included	
<i>Month FE</i>	Included		Included	
<i>Industry FE</i>	Included		Included	
<i>N</i>	39,154		39,154	
<i>Pseudo R2</i>	0.0605		0.0592	

CEO and CFO tweets

“Executive tweets”

With Wenli Huang and Hai Lu

Research Questions and hypotheses

- What drives exec adoption of Twitter?
- Do executives view Twitter as an important channel for disclosure?

Hypotheses:

1. The market responds to executive financial tweets in addition to firm tweets.
2. The market responds more weakly (strongly) to executive tweets with content similar to firm tweets.
 - Weakly: *new information mechanism*, the market reacts to new information content posted by executives
 - Strongly: *trust mechanism*, the market reacts due to stronger social bonds with individuals than firms

Example exec tweets (Business)

Financial

 **Omar Ishrak** ✓
@OmarIshrak · [Follow](#)

Continuing to execute in both our product & SG&A cost reduction initiatives will provide consistent EPS leverage [#MDTEarnings](#)

7:05 AM · Feb 20, 2013

♥ 2 Reply opy link

[ead more on Twitter](#)

 **Matt Desch**
@IridiumBoss · [Follow](#)

Good summary of our recent quarterly earnings call: satellitetoday.com/telecom/2014/0...



A photograph of an Iridium office building with a sign in the foreground that says "iridium". The building is a modern, multi-story structure with a curved facade and large windows. The sign is white with the Iridium logo and name in blue and red.

Nonfinancial


 **Mark T. Bertolini** ✓
@mtbert · [Follow](#)

Arriving in Atlanta. A day meeting with customers is better than any day in the office. But I do love all the folks back in Hartford too :o)

12:12 AM · Feb 28, 2012

♥ Reply opy link

[ead more on Twitter](#)

 **Carl Bass**
@carlbass · [Follow](#)


Giving keynote tomorrow at [#inside3DPrinting](#) Talking about the good, bad of [#3Dprinting](#) and the future of software

9:28 AM · Apr 4, 2014


♥ 9 Reply opy link

[Read 1 reply](#)




Example exec tweets (Other)

 **Tony Thomas**
@TonyThomasWIN · [Follow](#)

Hail #uncool Mother Nature showing her fury



9:07 AM · Apr 20, 2015

 2  Reply  opy link

[Read 1 reply](#)

 **Carl Bass**
@carlbass · [Follow](#)

Another great day of spring skiing in the Alps



12:59 AM · Apr 11, 2014

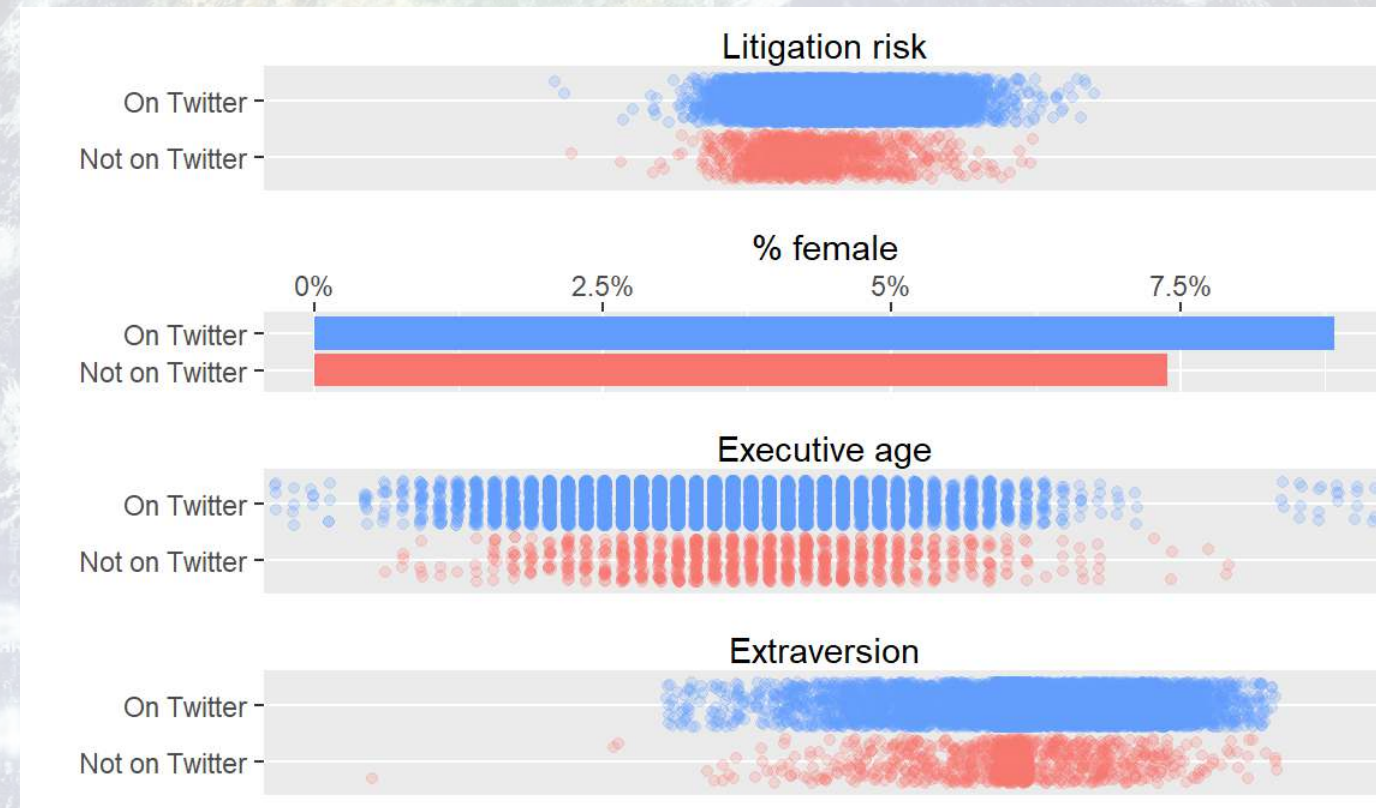
 4  Reply  opy link

[ead more on Twitter](#)

Tweet content over time

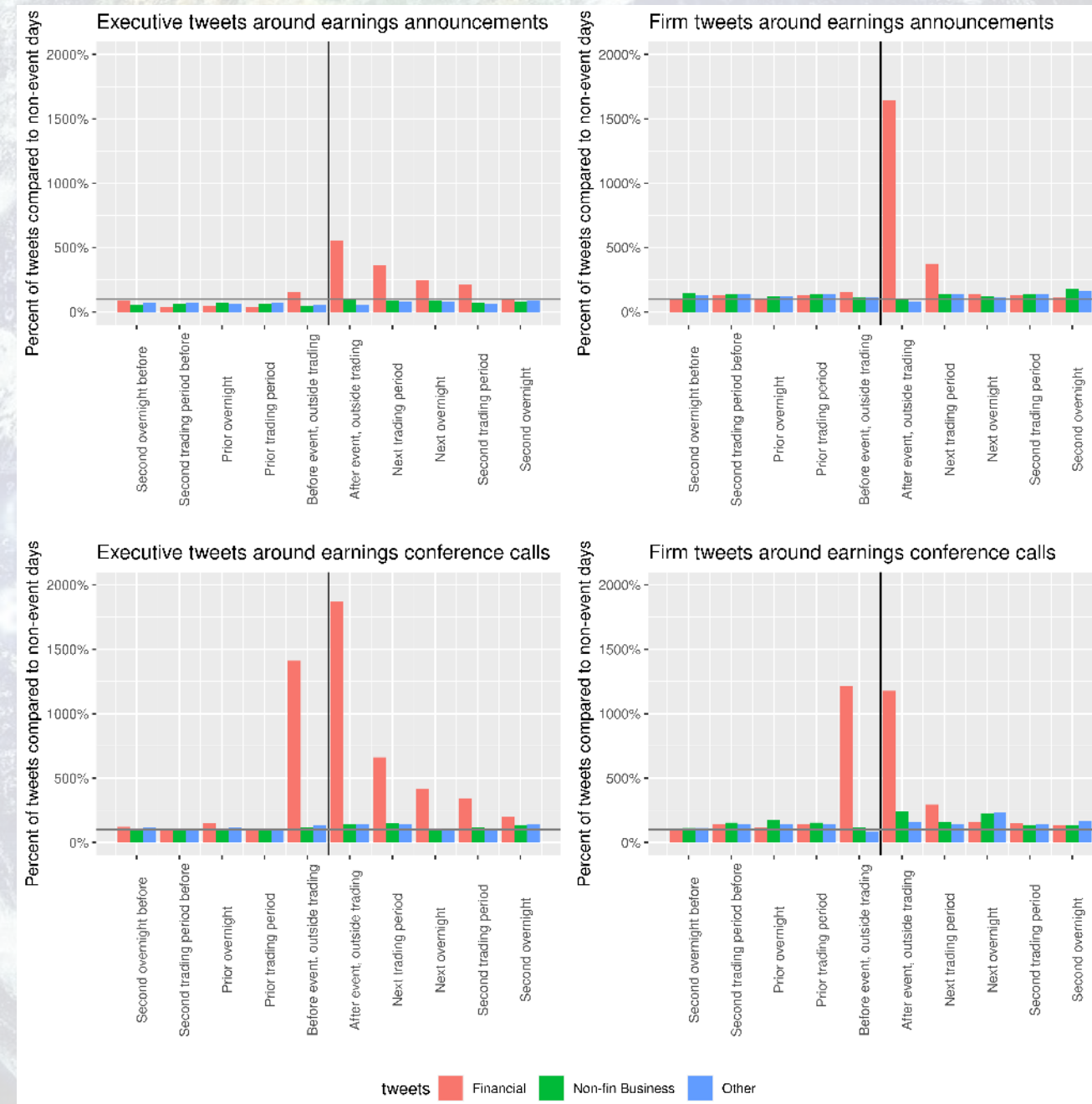


Executive Adoption of Twitter



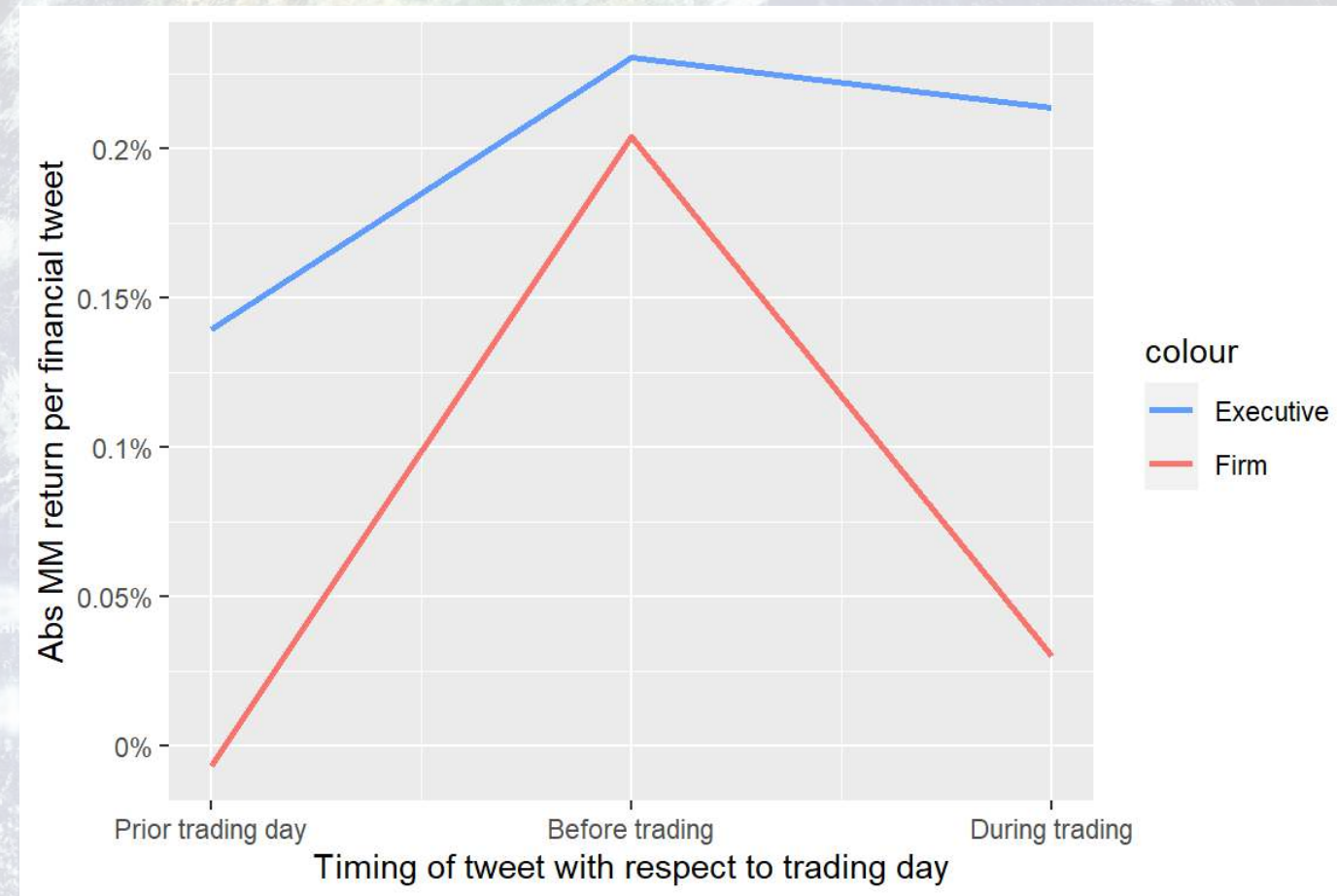
Adoption is higher when younger, female, extroverted, or facing higher litigation risk.
SEC's 2013 guidance lowers adoption rate at high litigation risk firms.

Executives' Discretionary Tweeting



Executives seem to view Twitter as an important disclosure channel

Executives Drive Stock Returns



Executives' financial tweets lead to investor reaction beyond that of firms

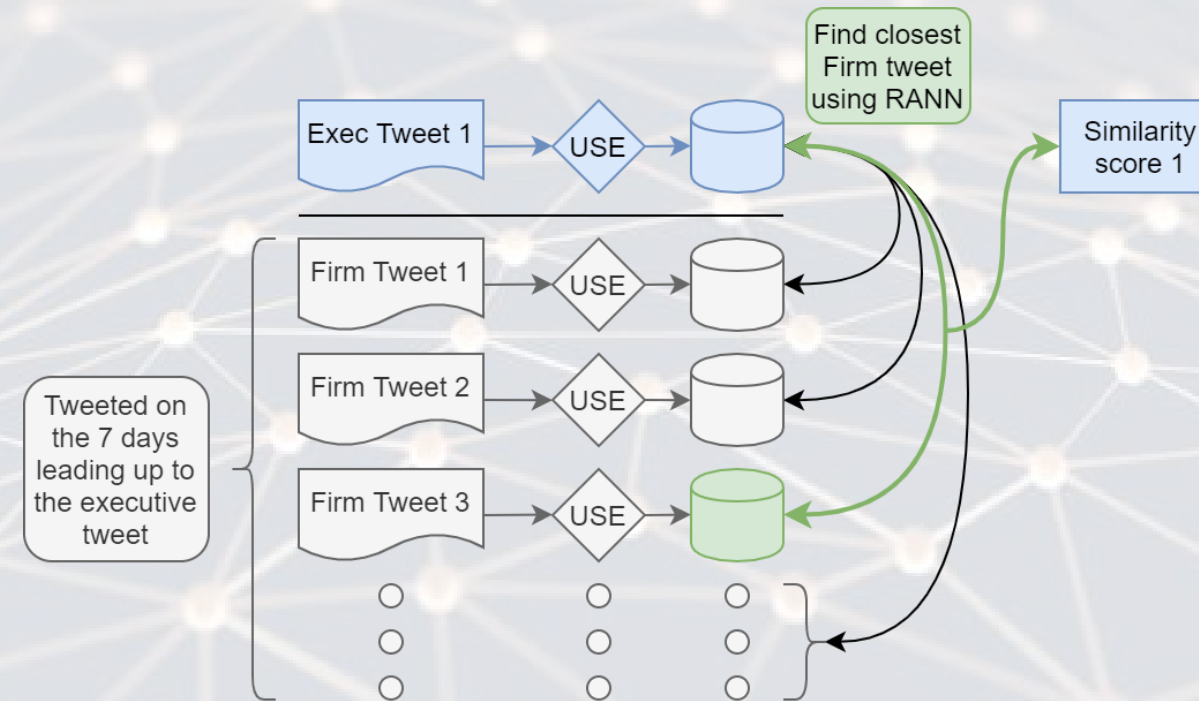
Market Reaction Mechanism: Trust

Variable	During trading hours $ MMR_t $	Before trading hours $ MMR_t $
Fin tweets, Exec	-0.025** (-2.22)	
Fin tweets, Exec × Similarity	0.074** (2.26)	
Fin tweets, Exec × No firm tweets	0.026** (2.35)	
Fin tweets, Exec		-0.014*** (-3.17)
Fin tweets, Exec × Similarity		0.046*** (3.30)
Fin tweets, Exec × No firm tweets		0.017*** (3.41)
Controls; Firm, Exec, Year, Month FE	Yes	Yes

Result is consistent with **Trust** driving investor reaction to exec financial tweets.

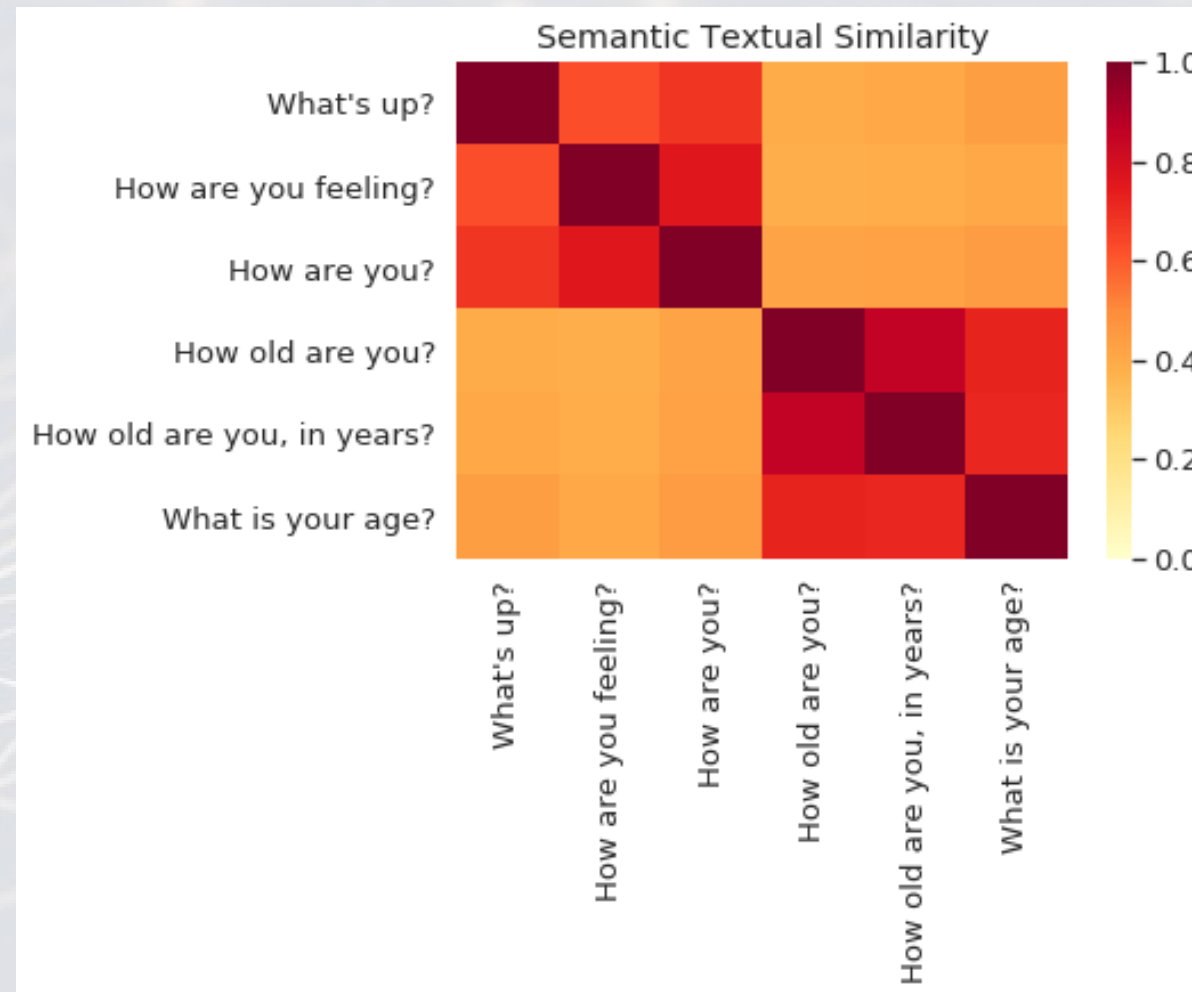
Methodology: Trust vs Information

We identify how *content-wise* similar each exec tweet is to corresponding firm tweets via **Universal Sentence Encoder (USE)**.



USE is a neural network method that relies on word **meaning** and word **order** to determine sentence meanings. It does not rely on word choice.

USE example



USE abstracts away from word choice!

COVID-19 tweets

WIP with Hai Lu and Jee-Eun Shin

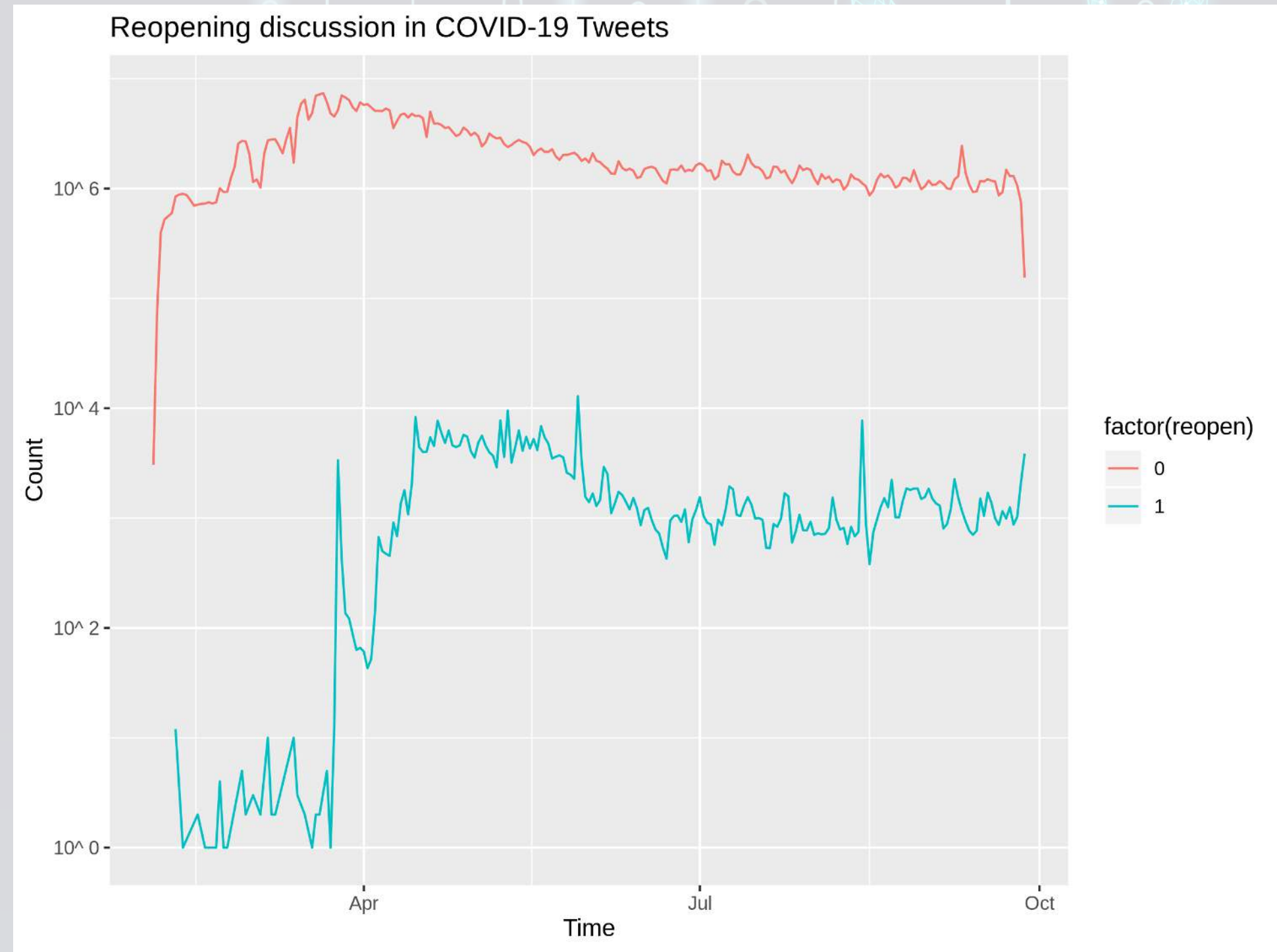
Large scale data exercise

- This project is pushing into “Big Data” territory
 - 1.1 *billion* unique messages gathered
 - 25+ languages
 - 190+ countries, territories, and regions

Project's goal

1. To understand, at a macro level, why some economies reopen and others don't, based on the local sentiment
2. To understand the impact of local sentiment on economic activity post-reopening

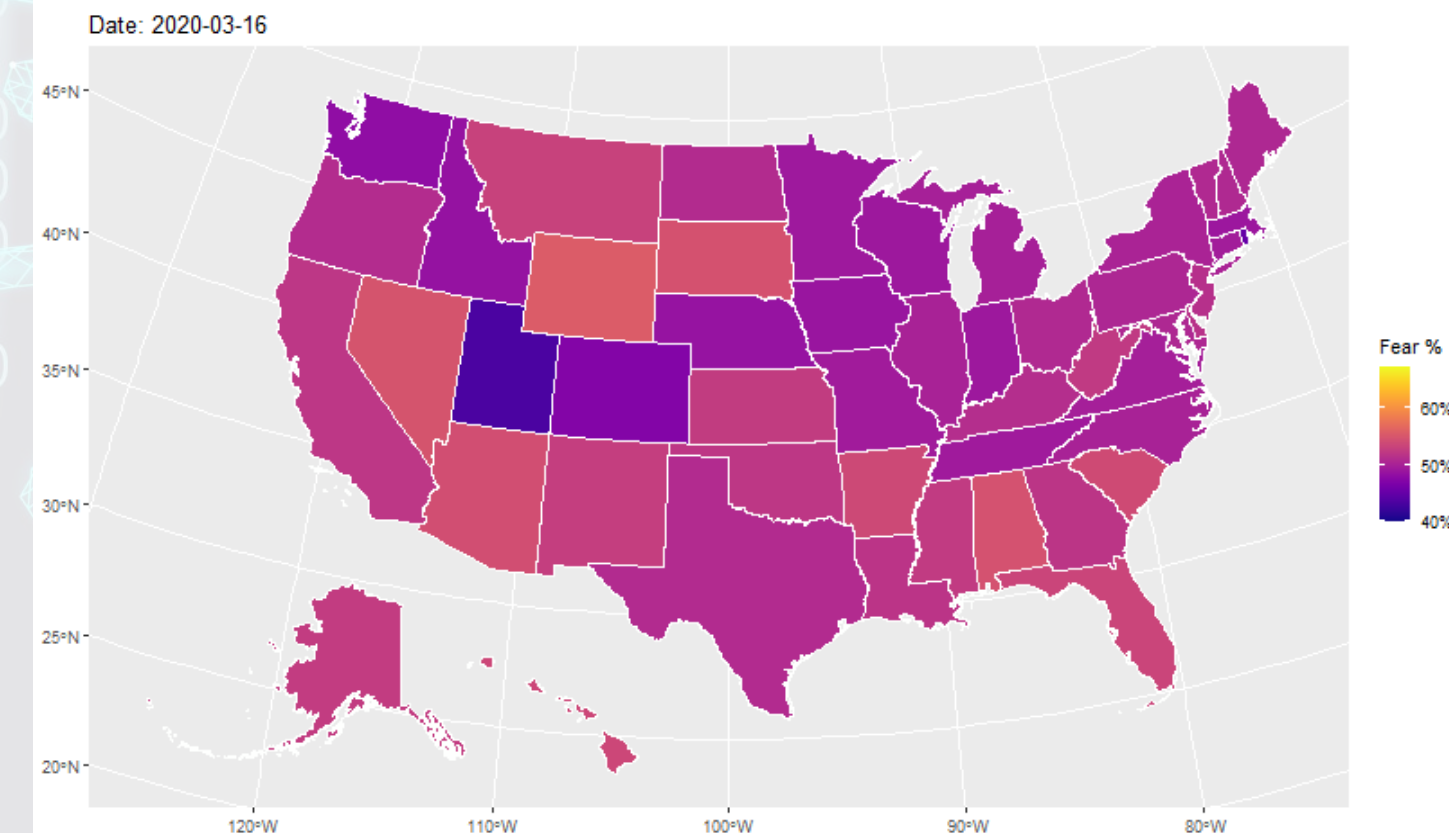
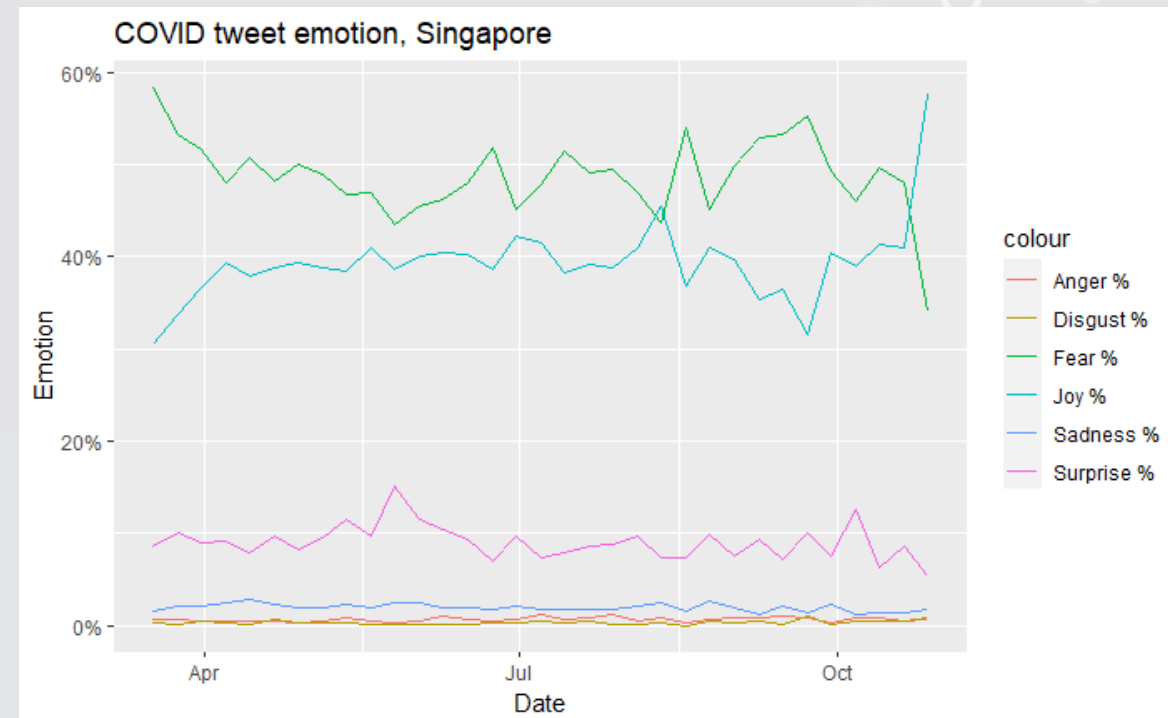
Reopening vs other discussion



Applications of broad measures to accounting

How does a populace's emotion about reopening with COVID impact economic recovery?

- Examine tweets to capture emotion at fine-grained geographic and temporal scales
 - State-day level variation in fear, sadness, anger, joy, and surprise

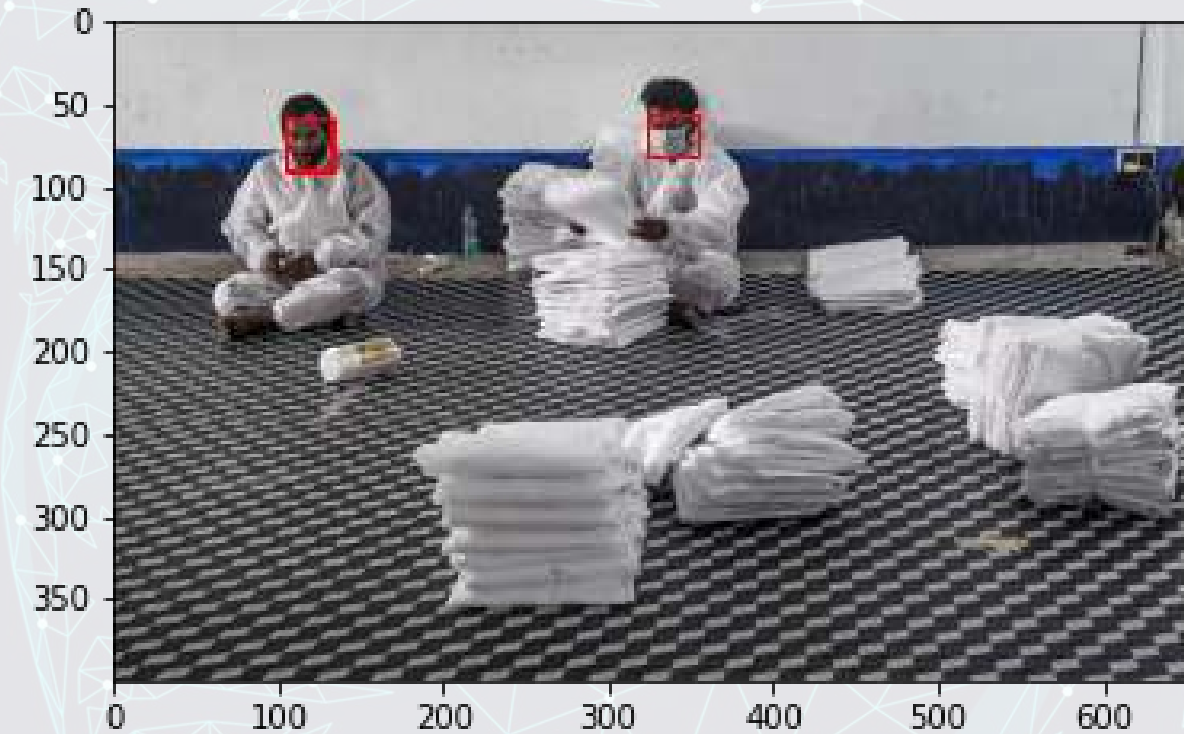


Mask depiction and emotions

- Tweets:
 - Feb-Oct 2020
 - Singapore-based users
 - English language text
 - Hashtag about COVID in the text

Over 13,000 images in this sample that include people in them

- Use computer vision to pick out masks
 - 3 class model: no mask, mask, or mask worn improperly



- E.g., per the model, the guy on the left has his mask on incorrectly

In SG, those that post pictures of people wearing masks properly exhibit ~5% less fear than those that post people without masks on ($t = 586$)

Wrap Up



Conclusion

- From an accounting perspective...
 1. Non-traditional information sources are common to use
 2. Companies are using Twitter to great effect for informing investors
 - Symmetrically disclosing both good and bad news
 3. Executives have substantial impact when disclosing financial information on Twitter
 - Due to investors' trust of the executives
- From a macro perspective...
 - Sources of public information such as Twitter provide an interesting set of insights into the reaction of individuals

We can leverage social media to understand macro phenomena or the environment
micro-econ phenomena occur in

Questions?

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Packages used for these slides

- dplyr
- ggplot2
- gridExtra
- kableExtra
- knitr
- revealjs