Executive Tweets

With Wenli Huang and Hai Lu

February 2020

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Motivation

Motivation

- Executive social media usage is important and understudied
  - *Explicitly allowed* by the SEC since 2013 for disclosure
    - Implicitly allowed since 2008
    - Increasingly more popular among executives
  - Significant increase in press coverage and legal scrutiny
  - *Minimal research on tweets by executives*

Why are executives on Twitter?

How do executives use Twitter?

What is the market impact of executive tweets?

Research questions

1. What drives executives to join Twitter?
    - What roll did the *2013 SEC release* play?
        - Reduced regulatory *uncertainty*
        - Highlighting *legal liability*
    - What types of executives are on Twitter?
2. Do executives tweet *investor-relevant information*?
    - What drives them to do so?
3. Do executive tweets impact stock returns?
    - Is the impact due to *information content* or *trust*

Background

Setting (2012-2013)

Reed Hastings
about 8 years ago

Congrats to Ted Sarandos, and his amazing content licensing team. Netflix monthly viewing exceeded 1 billion hours for the first time ever in June. When House of Cards and Arrested Development debut, we'll blow these records away. Keep going, Ted, we need even more!

287 2 44

- Posted on 2012 Jul 07
- Netflix stock rose **6.2%** that day

SEC response

- Wells notice on 2012 Dec 05
  - Reg FD violation?
- 2013 Apr 02: Investigation report released
  - No penalty for Netflix
  - Firms and executives receive green light to use social media
    - SEC suggests firms inform investors first

Setting (2008)

- In 2008, the SEC released *Guidance on the Use of Company Web Sites*
- Focused largely on firm website usage, but not a stretch to consider firms' social media pages as extensions of their websites
- Less clear if executives' social media pages are "firm websites"

> 2012/2013 investigation found that this guidance **was applicable** to social media, *including executive social media*

Setting (Present day)

Legal challenges

Ion Musk 
elonmusk

Am considering taking Tesla private at $420.
Funding secured.

♡ 90.3K 10:48 AM - Aug 7, 2018 

22.3K people are talking about this >

- Tesla stock jumps **12%**
- 2018 Aug 08: SEC inquiry
- 2018 Aug 10-14: 4 securities fraud lawsuits
- 2018 Aug 15: SEC subpoena
- 2018 Aug 16: SEC investigation
- 2018 Oct 16: SEC settlement
  - $40M in penalties

Common usage

April 2, 2019

Twitter to Announce First Quarter 2019 Results

SAN FRANCISCO, California - As previously announced, Twitter, Inc. (NYSE: TWTR) will release financial results for the first quarter 2019 on April 23, 2019, before the market open at approximately 4:00 a.m. Pacific Time (7:00 a.m. Eastern Time). On the same day, Twitter will host a conference call to discuss these financial results at 5:00 a.m. Pacific Time (8:00 a.m. Eastern Time).

The company will be following the conversation about the earnings announcement on Twitter. To have your questions considered during the Q&A, Tweet your question to @TwitterIR using #TWTR. To listen to a live audio webcast, please visit the company's Investor Relations page at investor.twitterinc.com. Twitter has used, and intends to continue to use, its Investor Relations website and the Twitter accounts of @jack, @nedsegal, @twitter and @TwitterIR as means of disclosing material non-public information and for complying with its disclosure obligations under Regulation FD.

About Twitter, Inc.
Twitter is what's happening in the world and what people are talking about right now. From breaking news and entertainment to sports, politics, and everyday interests, see every side of the story. Join the open conversation. Watch live streaming events. Available in more than 40 languages around the world, the service can be accessed via twitter.com, an array of mobile devices, and SMS. For more information, please visit about.twitter.com, follow @Twitter, and download both the Twitter and Periscope apps at twitter.com/download and periscope.tv.

Contacts

Investors:
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ir@twitter.com

Press:
Giovanna Falbo
press@twitter.com

Example exec tweets (Business)

Financial

mar Ishrak
MedtronicCEO

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

♡ 2 5:05 PM - Feb 19, 2013

See Omar Ishrak's other Tweets

ike Jackson
CEOMikeJackson

With ample credit, great products & strong Toyota & Honda inventory'we raised our '12 sales forecast to mid 14 million vehicles

♡ 6:00 AM - Apr 3, 2012

See Mike Jackson's other Tweets

Nonfinancial

Mark T. Bertolini
@mtbert

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)

♡ 10:12 AM - Feb 27, 2012

See Mark T. Bertolini's other Tweets

Carl Bass
@carlbass

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

♡ 10 7:28 PM - Apr 3, 2014

See Carl Bass's other Tweets

Example exec tweets (Non-business)

ony Thomas
TonyThomasWIN

Hail #uncool Mother Nature showing her fury

♡ 2 7:07 PM - Apr 19, 2015

See Tony Thomas's other Tweets

Carl Bass
@carlbass

Another great day of spring skiing in the Alps

♡ 6 10:59 AM - Apr 10, 2014

See Carl Bass's other Tweets

Prior literature on Twitter

- Twitter and stock prices
  - Tweets → Stock indices (Bollen et al. 2011, Mao et al. 2012)
  - Tweets about firms → Stock characteristics (Sprenger et al. 2014)
- Twitter and earnings
  - Earnings news → Twitter activity (Curtis et al. 2014)
  - Twitter activity → Earnings (Bartov et al. 2018)
- Twitter and firms' strategic use
  - Information asymmetry (Blankespoor et al. 2014)
  - Marketing (Kumar et al. 2013) and recalls (Lee et al. 2015)
  - Discretionary dissemination (Jung et al. 2018; CHL 2018; CHLL 2019)
- Why people use Twitter
  - Share and seek information (Java et al. 2007)
  - Intrinsic utility, image/perception effects (Toubia and Stephen 2013)
  - Peers on Twitter → Intrinsic utility (Lin and Lu 2011)

Hypotheses

H1: 2013 SEC guidance impact

> **H1**: The likelihood of executives joining Twitter decreases with the litigation risk of firms after the release of the 2013 SEC report

For

- 2013 SEC guidance increases perceived litigation
- Twitter is more work-oriented

Against

- 2008 guidance was ruled to be sufficient in 2013 (no impact)
- 2013 guidance explicitly allowed executive social media use (increased usage)
- Executives may use social media for non-business related purposes (no impact)

H2: Discretionary dissemination

> **H2**: Executives are more likely to post financial (all) tweets on days with major (non-financial) corporate events.

For

- Discretionary dissemination
  - Documented for firms on Twitter

Against

- Tweeting for intrinsic utility (Toubia and Stephen 2013)
- Tweeting due to peer pressure (Lin and Lu 2011)

> Testing explicitly for discretionary dissemination by executives

H3: Executive tweet impact

> **H3**: The market responds to executive financial tweets in addition to firm financial tweets.

For

- Results on H2
- Prior evidence that firm tweets and investor tweets impact stock returns

Against

- Executive tweets may not contain new or useful information

> Examining if executive tweets are *useful*

H4: Why executive tweets matter?

H4: The market responds more strongly to executives' tweets with content similar to their firms' tweets.

For

- Investors trust CEOs more than firms on social media (Elliott et al. 2018)

Against

- Market may react only to new disclosure content

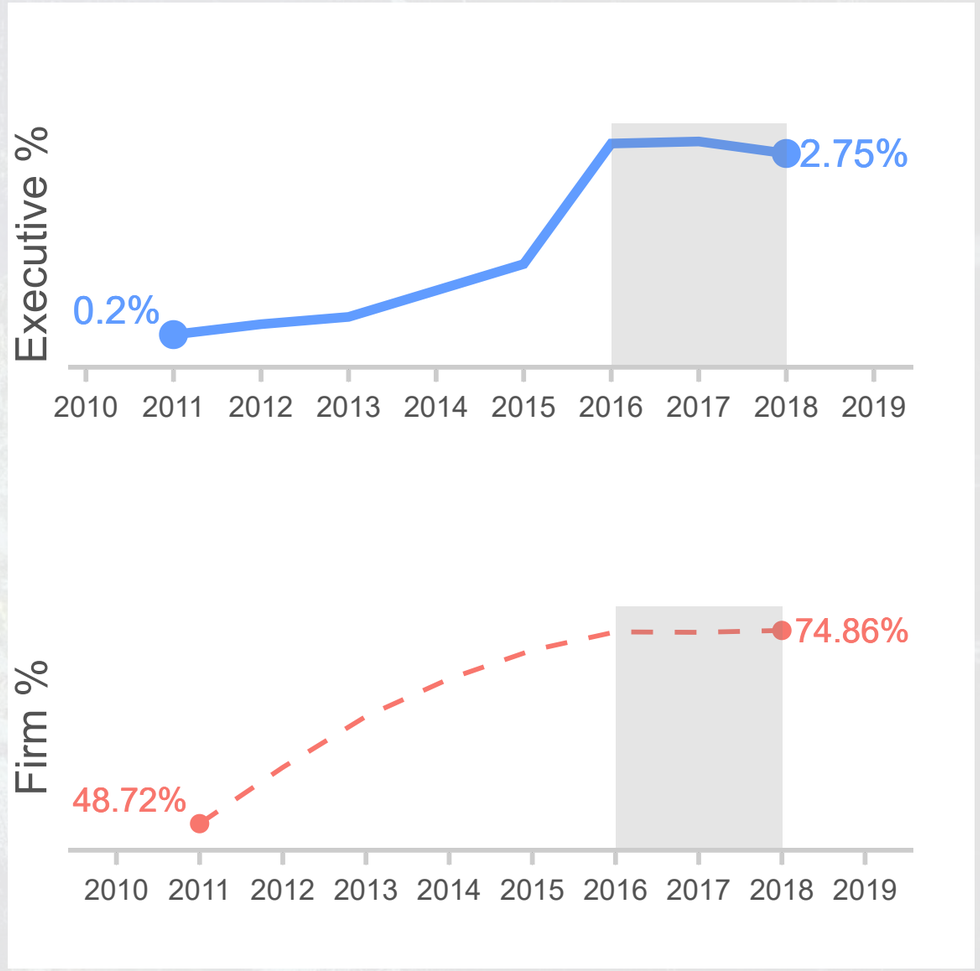
Determining a mechanism for H3

Approach

Twitter Data

- All Tweets 2011-2018 by select firms, CEOs and CFOs
  - S&P 1500 firms included between 2012 Jan 01 and 2016 Sept 30
- 1,433 firms and 200 executives
  - 1,300 firms and 107 executives with visible tweets
    - Executives tweeted *while at a firm in the sample*

> 6.98M (firm, executive, trading day) tuples

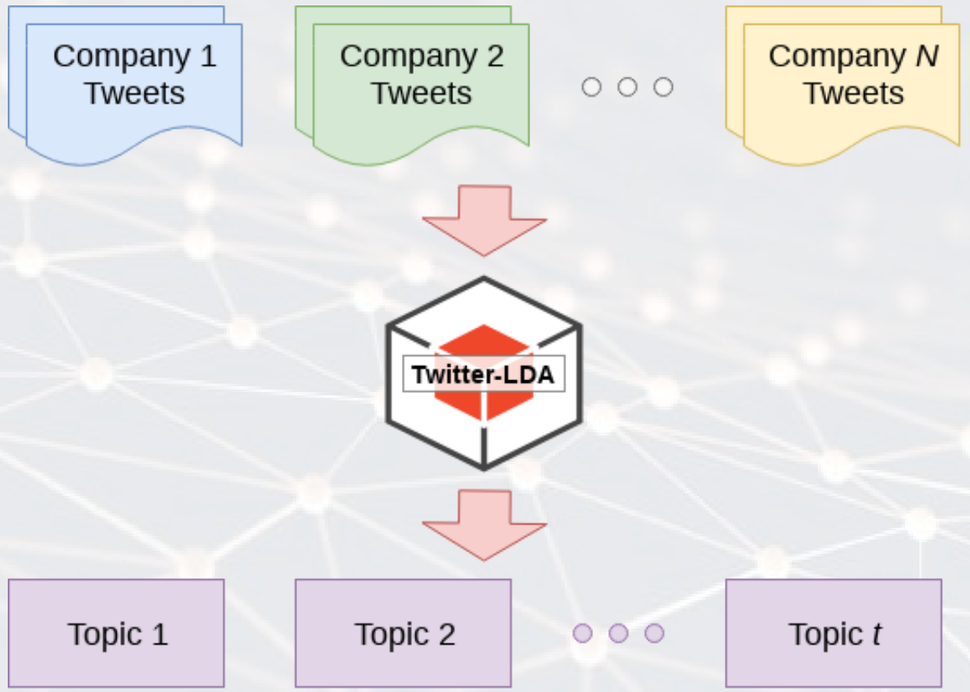


Other data

- Financial and stock data
  - Compustat Fundamentals Quarterly
  - CRSP
- Executive data
  - Execucomp
  - Street Events
- Event data (tracked to the second)
  - I/B/E/S (earnings announcements)
  - Capital IQ (earnings calls)
  - WRDS SEC Analytics Suit (SEC filing times)
  - Ravenpack PR edition (press releases)
  - Ravenpack Dow Jones edition (news articles)
- Lawsuits: SCAC

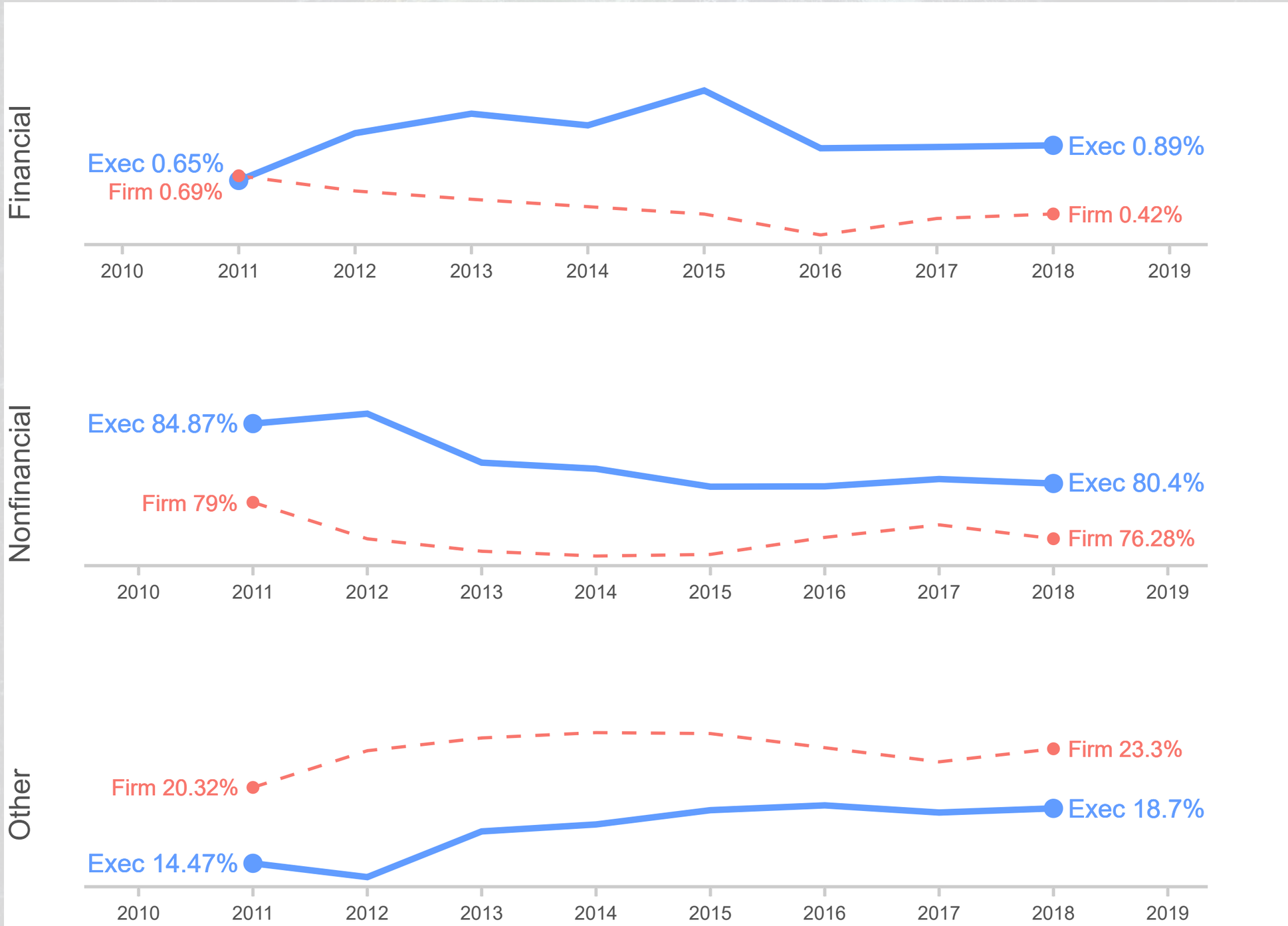
Classifying tweets

- Classify using Twitter-LDA
  - CHL 2018 and CHLL 2018
- Identify 100 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

Tweet content



Testing H1: Joining Twitter

- Quarterly logistic regression for all CEOs and CFOs of S&P 1500 firms

$$
\begin{aligned}
&logit\left(\mathbb{E}\left[Exec\ on\ Twitter_{t,e} | \ldots\right]\right) \\
&\quad = \alpha + \beta_1 Post\ SEC_t + \beta_2 Legal\ Risk_{t,f} + \beta_3 Post\ SEC_t \times Legal\ Risk_{t,f} \\
&\quad + \beta_4 Age_{t,e} + \beta_5 Female_e + \beta_6 Extraversion_e \\
&\quad + \Gamma \cdot Controls_{t,f} + FE + \varepsilon_{t,f,e}
\end{aligned}
$$

- $Post\ SEC$ (quarters starting after April 2, 2013)
- $Legal\ Risk$ follows Kim and Skinner (2012)
- Controls include:
  - Linear time trend
  - Financial controls: size, MTB, ROA, and debt ratio
  - Firm Twitter controls: on Twitter and log counts of followers, following, and tweets
- Fixed effect for industry (GICS Sector)

Measuring extraversion

- Follow Green et al. (2019 TAR)
- Collect all conference call Q&A text from StreetEvents per executive
  - Exact match on executive name + company to Execucomp
    - Leverage genealogy table nickname data from Old Dominion
    - Fuzzy + manual match on the rest
  - 163,099 observations, ~36/executive
  - 72.6% of executives match; 94% of executives on Twitter
- Apply an SVM model with linear kernel called *Personality Recognizer*
  - From Mairesse et al. (2007)
  - Average across calls per manager
  - Keep only executives with ≥3 call Q&As

> Also calculated other Big-5 traits: agreeableness, openness, conscientiousness, stability

Testing H2: Tweeting around events

- Daily PPML regressions for executives on Twitter

$$PPML(Exec\ topic\ tweets_{t,e}) = \alpha + \beta_1 Event_{t,f} + \Gamma \cdot Controls_{t,f,e} + FE + \varepsilon_{t,f,e}$$

  - Events include:
    - Earnings announcements and calls
    - SEC Filings (10-K, 10-Q, 8-K)
    - Press releases
    - News articles
  - Controls include:
    - Firm tweeting behavior
    - Executive age
    - Financial and Twitter controls for firm
    - Twitter controls for executive

Econometric methods

Poisson pseudo maximum likelihood regression (PPML)

- From Correia, Guimarães, and Zylkin (2019)
- Measures counts (or anything non-negative)
- Appropriate for sparse data
  - I.e., counts that are mostly 0
- Supports high-dimensional fixed effects

> PPML will allow us to examine tweet counts as a response to different events while controlling for *firm*, *executive*, *year*, and *month* fixed effects

Testing H3: Market reaction

$$\begin{aligned}\left|MM\ Return_{(+1)}\right| \\ = \alpha + \beta_1 Exec\ tweet_{t,e} + \beta_2 Firm\ tweet_{t,f} \\ + \Gamma \cdot Controls_{t,f,e} + FE + \varepsilon_{t,f,e}\end{aligned}$$

- Same controls as last test, with 2 additional:
  - If there was a financial event or business event
  - Day -1 absolute market model return
- Same fixed effects: Firm, executive, year, month

Testing H4: Mechanism

- If an executive's tweets have the same content as their firm's *prior* tweets, any reaction to the tweet…
  - **Should not** be due to *new* information
  - **Should** be due to trust of the information coming from the CEO

> We construct a measure of *content similarity* to address this

$$
\begin{aligned}
|MM\ CAR_{(+1)}| \\
&= \alpha + \beta_1 Exec\ tweet_{t,e} + \beta_2 Exec\ tweet_{t,e} \times Similarity_{t,f,e} \\
&+ \beta_3 Firm\ tweet_{t,f} + \beta_4 Firm\ tweet_{t,f} \times Similarity_{t,f,e} \\
&+ \Gamma \cdot Controls_{t,f,e} + FE + \varepsilon_{t,f,e}
\end{aligned}
$$

  - Same controls and fixed effects as H3 test

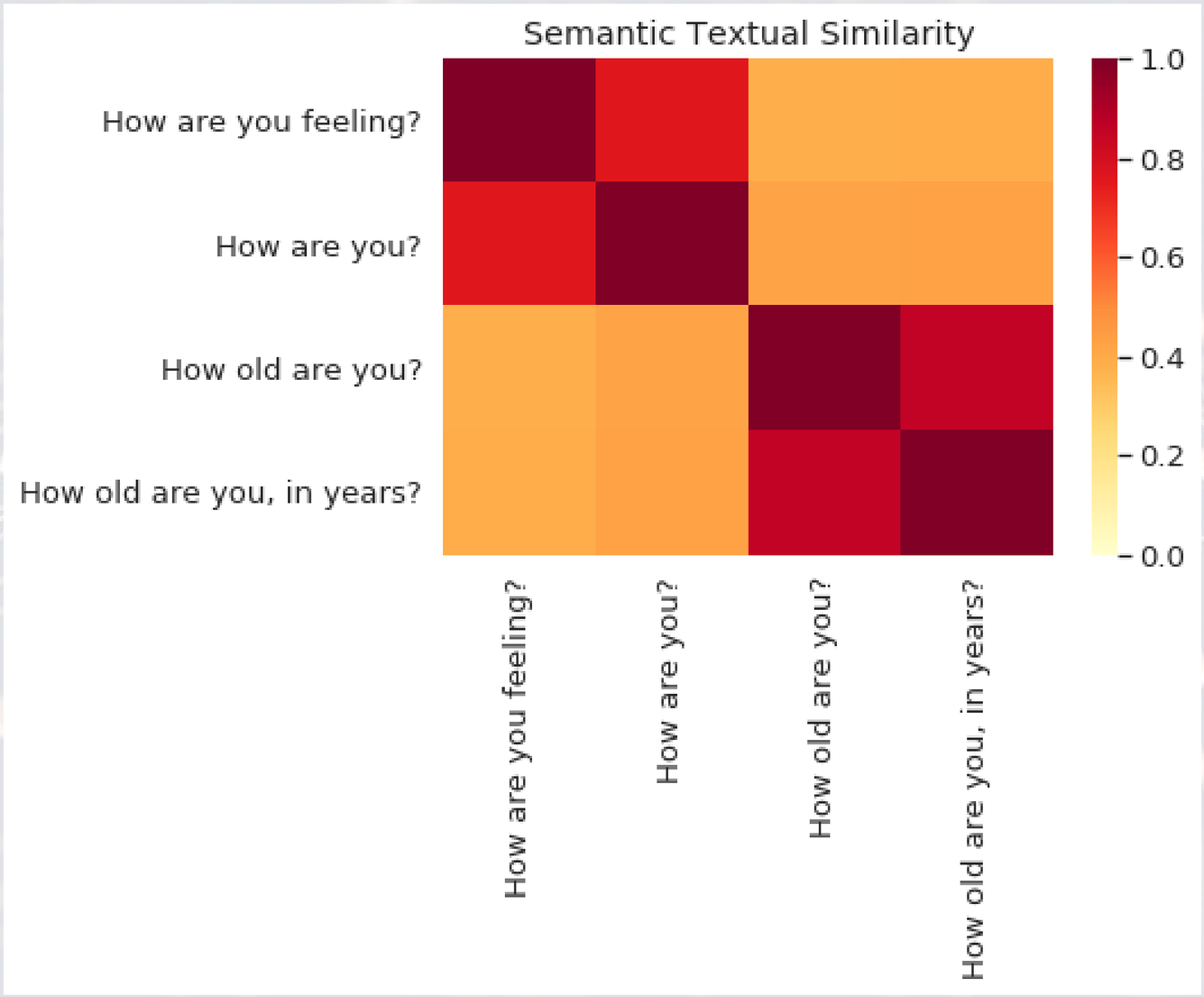
Measuring content similarity

> Difficulty: Tweets are short, so word choice isn't a reliable measure

Solution

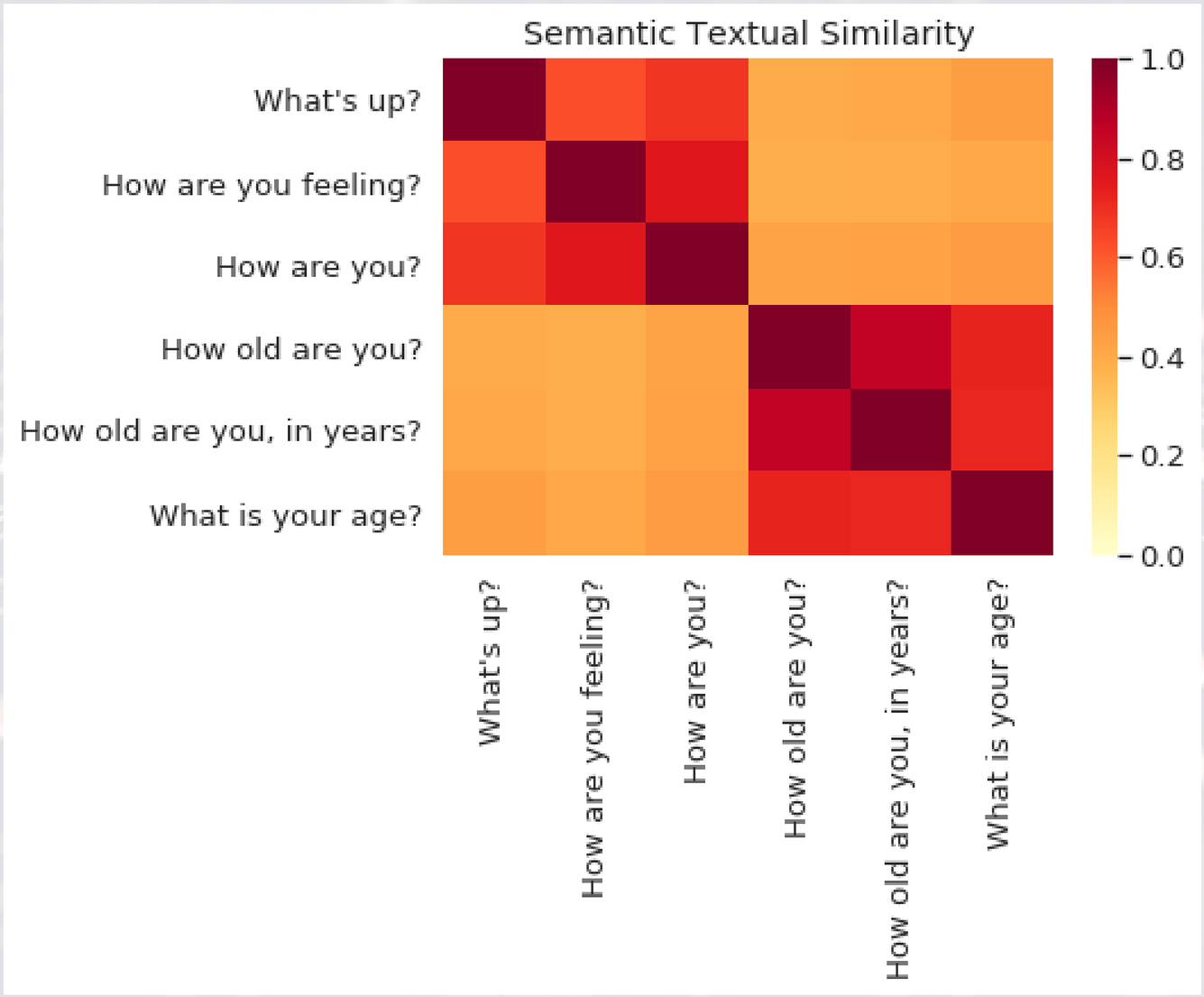
- Universal sentence encoder (USE, Cer et al. 2018)
  - Determines meaning of text based on **all** words in the text
  - A measure of meaning, *not word choice*
  - Neural network based (Deep Averaging Network)

USE Similarity



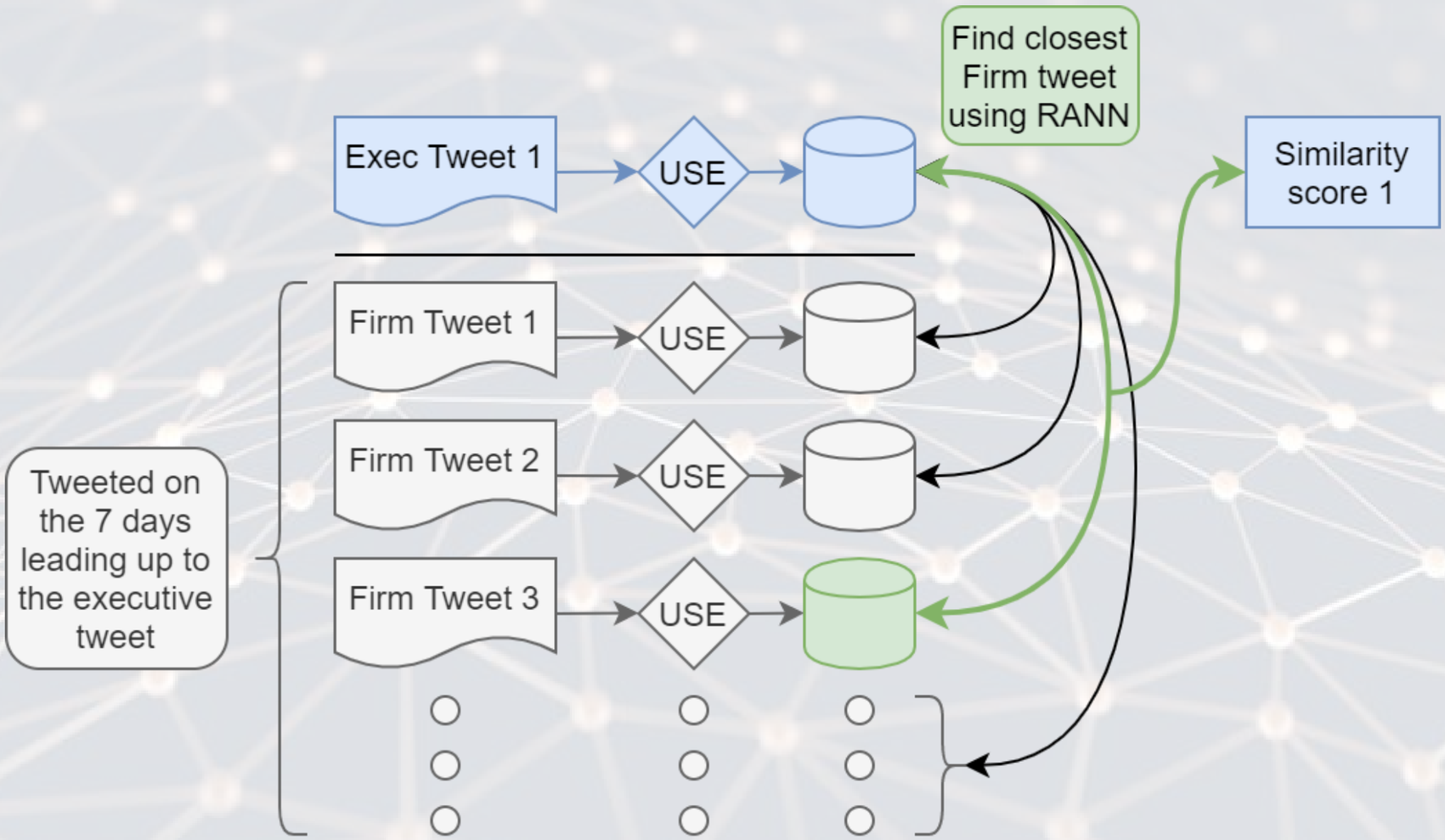
Note: All 4 contain “are you”

USE Similarity



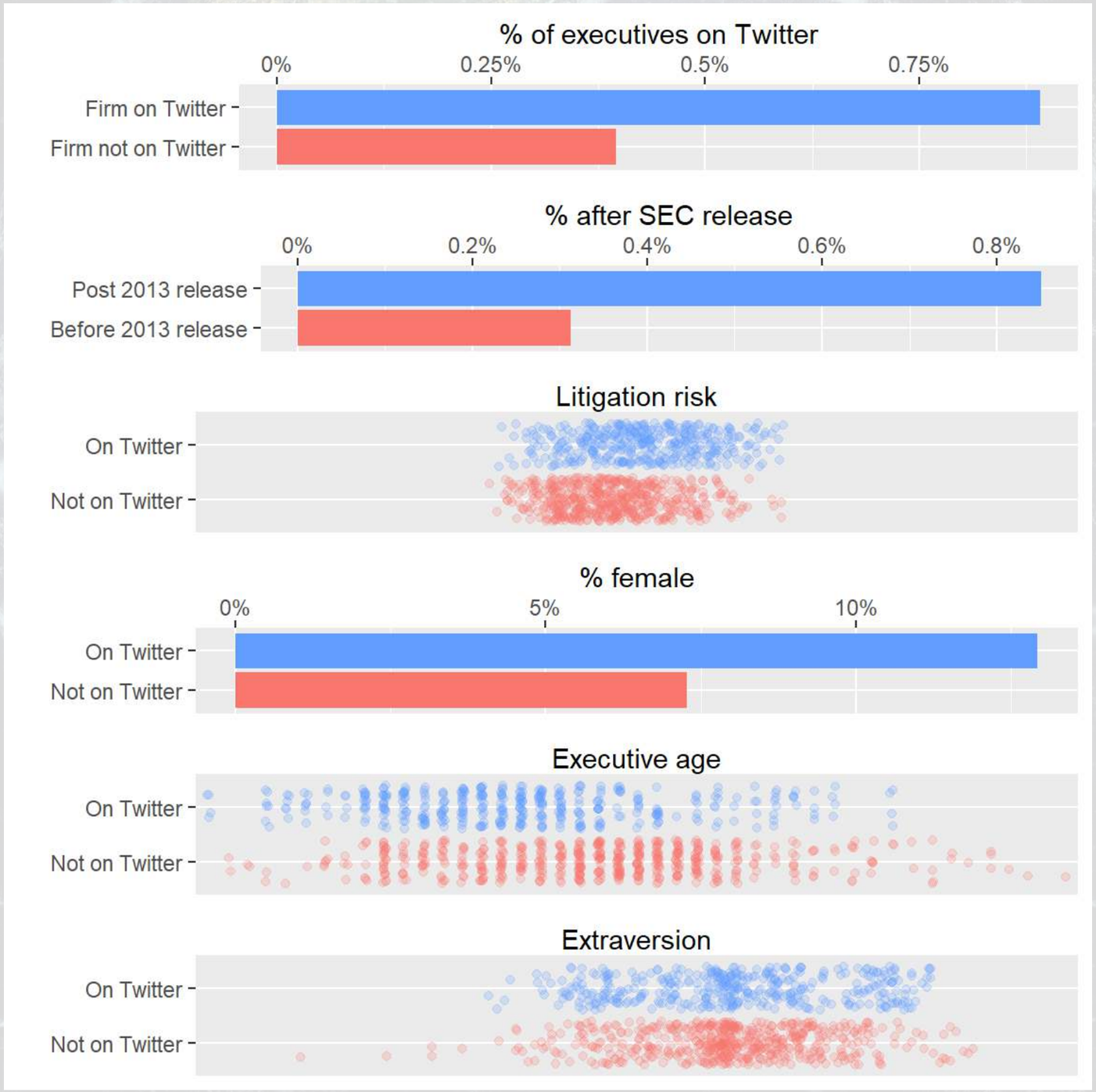
Note: USE can match phrases with **no** shared words

Applying USE



Results

Univariate stats [full]



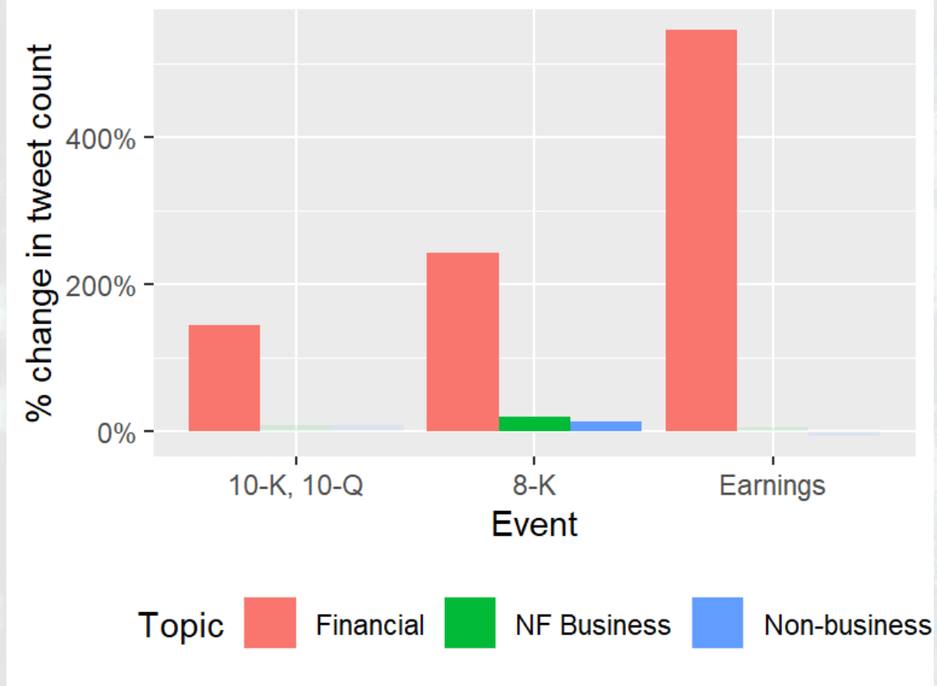
Executives joining Twitter (H1)

- No effect of 2013 SEC release (main effect)
- Effects from:
  - Litigation risk
  - Litigation risk after 2013 release
- Executive characteristics
  - Executive age
  - Female
  - Extraversion

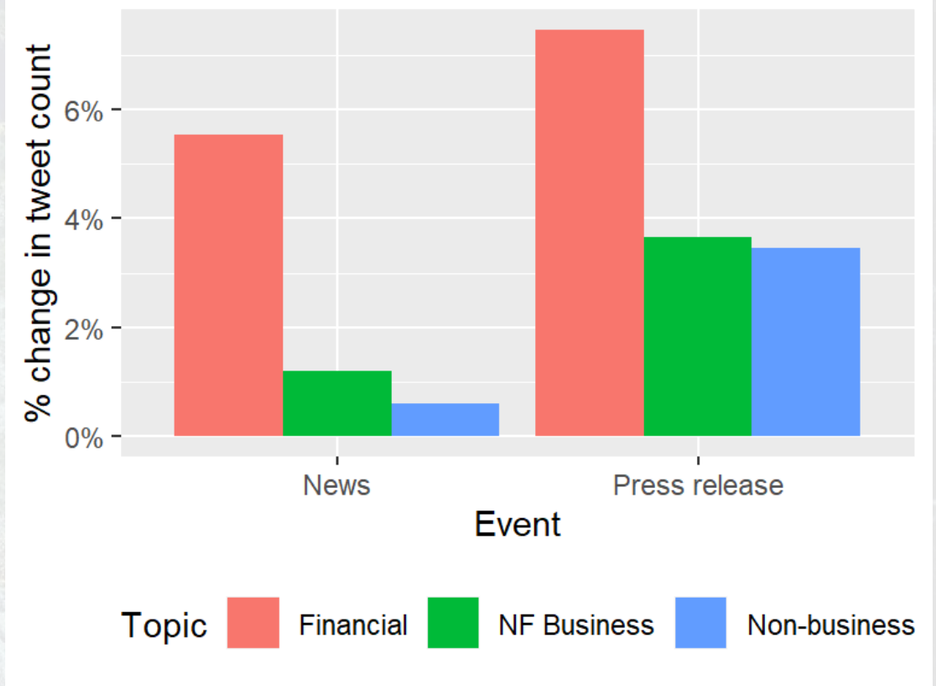
VARIABLES	**Full sample, fiscal quarters**	
Post SEC	1.137	1.178
	(1.57)	(1.59)
Legal risk	5.579***	5.155***
	(4.18)	(3.78)
Legal risk x Post SEC	-2.247*	-2.355*
	(-1.65)	(-1.70)
Executive age		-0.076***
		(-9.89)
Female		0.456***
		(2.90)
Extraversion		0.239**
		(2.36)
Pseudo R-sq	**0.0871**	**0.111**
Sample size	**47,492**	**47,492**

Executive tweets and firm events (H2)

Internal events



External events



Executives tweet around *firm events*

- Robustness: Signed news events

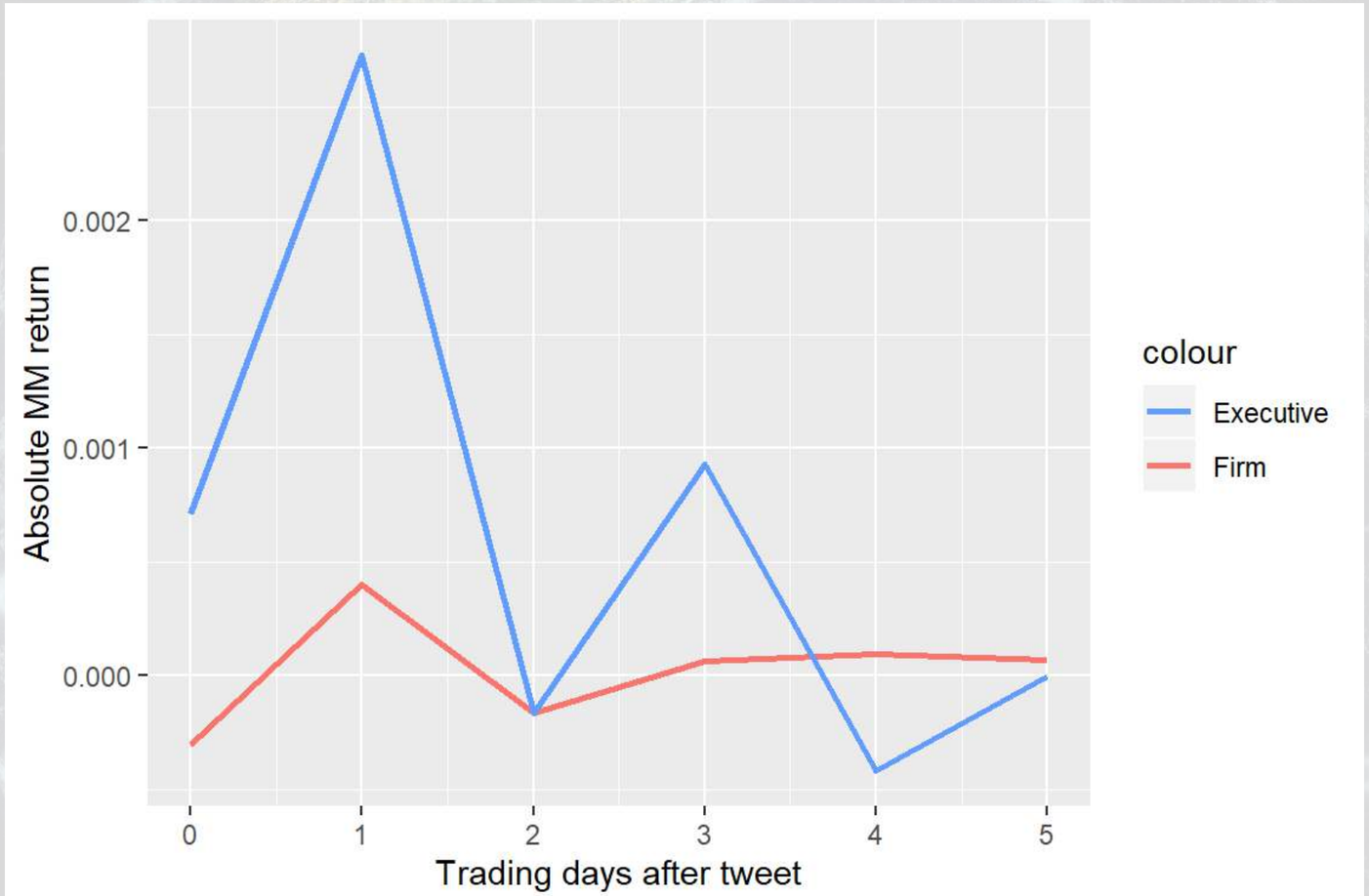
Investor reaction to executive tweets (H3)

	$\lvert MMR_{(+1)} \rvert$		
VARIABLES	***Financial***	***Non-Fin. Business***	***Non-business***
Exec topic tweets	0.003***	-0.000	-0.000
	(2.99)	(-1.53)	(-1.06)
Firm topic tweets	0.000**	-0.000	0.000
	(2.57)	(-1.53)	(0.77)
$\lvert MMR_{(-1)} \rvert$	0.074***	0.074***	0.074***
	(6.79)	(6.80)	(6.79)
Financial event	0.015***	0.015***	0.015***
	(17.26)	(17.42)	(17.42)
Business event	0.001***	0.001***	0.001***
	(7.91)	(8.00)	(7.97)
Adj R-Sq	**0.134**	**0.134**	**0.134**
Observations	**70,440**	**70,440**	**70,440**

- Executive financial tweets have a **6.8** times larger effect per tweet
- Firms only tweet financial information **6.5** as often

> When both executive and firm are on Twitter, over 50% of the stock reaction comes from the executive's account!

Investor reaction timeframe



Reaction is largely 1 trading day after the tweet

Reaction mechanism (H4)

VARIABLE	|MMR$_{(+1)}$|	t-value
Exec topic tweets	-0.015	(-1.57)
Tweet similarity x Exec financial tweets	0.038*	(1.91)
Firm topic tweets	-0.006***	(-2.78)
Tweet similarity x Firm financial tweets	0.006***	(3.00)
Adj R-Sq	**0.135**	
Observations	**70,214**	

- Main effect of executive tweets is subsumed
- Effect comes from executive tweets that are *similar* to firm tweets
- This effect seems to encourage reaction to firm tweets as well

> *Consistent with effect coming from trust*; inconsistent with an information story

  - Robust to other definitions of the similarity measure

Is it repetition?

> A potential confounding factor is that information is repeated. Rule out by flipping the order. ✓

Firm tweets second

VARIABLE	abs_MMR	t.value
Exec fin tweets	0.003*	(1.79)
Firm second sim x Exec fin tweets	0.001	(0.50)
Firm fin tweets	0.015	(1.33)
Firm second sim x Firm fin tweets	-0.031	(-1.38)

Both orders

VARIABLE	abs_MMR	t.value
Exec fin tweets	-0.017	(-1.64)
Exec second sim x Exec fin tweets	0.048**	(2.13)
Firm second sim x Exec fin tweets	-0.002	(-0.52)
Firm fin tweets	0.028	(1.07)
Firm second sim x Firm fin tweets	-0.012	(-0.58)
Firm second sim x Firm fin tweets	-0.035	(-1.49)

Why trust?

- More *followers* ⇒ CEO may be psychologically closer ✓
- More *personal tweets* ⇒ psychologically closer ✓
- *Institutional investors* less affected by trust ✗

VARIABLES	↓Followers	↑Followers	↓Personal	↑Personal	↓Inst	↑Inst
Exec fin tweets	0.007	-0.015	-0.012	-0.018**	0.017	-0.020*
	(0.43)	(-1.36)	(-0.49)	(-2.05)	(0.86)	(-1.96)
Exec second sim x Exec fin tweets	-0.016	0.040*	0.031	0.045**	-0.037	0.049**
	(-0.43)	(1.74)	(0.058)	(2.54)	(-0.95)	(2.31)
Firm fin tweets	-0.005	-0.005**	-0.005*	-0.006***	-0.001	-0.009***
	(-1.45)	(-2.49)	(-1.79)	(-2.80)	(-0.43)	(-2.74)
Exec second sim x Firm fin tweets	0.006*	0.005***	0.006**	0.006***	0.001	0.011***
	(1.73)	(2.65)	(2.00)	(2.87)	(0.49)	(3.13)

Other robustness

1. All results hold using only CEOs
2. Impact of positive vs negative news
   - Positive news: Executives tweet financial and business information
   - Negative news: Executives also tweet non-business
     - Distracting from bad news?

Conclusion

Summary

- We document that…
  1. The 2013 SEC guidance dampened interest in Twitter for executives at high litigation risk firms
  2. Executives tweet financial information around financial disclosures by their firm, and both financial and business information around business disclosure or dissemination
  3. The stock market appears to value executives' financial tweets more than their firms' tweets
  4. The stock market reaction seems to be driven by trust in executives' accounts over their firms' accounts

Thanks!

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Appendix

Packages used for these slides

- curl
- htmltools
- jsonlite
- kableExtra
- knitr
- magrittr
- plotly
- revealjs
- tidyverse

Custom code

```
# Pull tweets using the Twitter oembed API
library(curl)
library(jsonlite)
library(htmltools)
#id should be a string to ensure proper tweet is picked
getTweet <- function(id) {
  if(has_internet()) {
    con <- curl(paste0('https://publish.twitter.com/oembed?url=https://twitter.com/i/status/',id,'?maxwidth=320?dnt=true'))
    open(con)
    tweet_response <- readLines(con)
    close(con)
    parsed_response <- fromJSON(tweet_response)
    saveRDS(parsed_response, paste0(id,'_response.rds'))
  } else {
    parsed_response <- readRDS(paste0(id,'_response.rds'))
  }
  browsable(parsed_response[['html']])
}
```

Full Tables

Table 1

Variable	Not on Twitter Mean	Not on Twitter S.D.	On Twitter Mean	On Twitter S.D.	On Twitter minus not on Twitter Difference	On Twitter minus not on Twitter t-stat
Post SEC	0.739	0.439	0.886	0.319	0.147***	(6.69)
Legal risk	0.427	0.100	0.478	0.106	0.051***	(10.2)
Executive age	54.5	7.25	50.8	6.82	-3.71***	(-10.2)
Female	0.073	0.260	0.129	0.336	0.057***	(4.33)
Extraversion	3.90	0.542	3.99	0.581	0.082**	(3.01)
Time trend	4.03	1.46	4.71	1.24	0.685***	(9.36)
Size	8.26	1.72	8.10	1.99	-0.155	(-1.80)
ROA	0.010	0.028	0.009	0.035	-0.001	(-0.527)
MTB	1.29	1.29	1.75	1.47	0.456***	(7.08)
Debt	0.579	0.241	0.529	0.253	-0.050***	(-4.14)
Firm on Twitter	0.634	0.482	0.796	0.403	0.162***	(6.74)
$log(Followers_{Firm})$	5.38	4.54	7.14	4.72	1.77***	(7.77)
$log(Following_{Firm})$	3.83	3.33	5.13	3.51	1.30***	(7.80)
$log(Total\ tweets_{Firm})$	4.68	3.87	6.08	3.97	1.39***	(7.19)
Observations	**56,203**		**402**			

	Exec not on Twitter	Exec on Twitter	Total
Firm not on Twitter	40.70%	0.13%	40.83%
Firm on Twitter	58.68%	0.48%	59.17%
Total	99.38%	0.62%	100%

Table 2

VARIABLES	**Full sample, fiscal quarters**	
Post SEC	1.137	1.178
	(1.57)	(1.59)
Legal risk	5.579***	5.155***
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Executive age		-0.076***
		(-9.89)
Female		0.456***
		(2.90)
Extraversion		0.239**
		(2.36)
Time trend	0.360***	0.379***
	(6.63)	(6.92)
Size	0.105**	0.098**
	(2.54)	(2.35)
ROA	-0.157	-0.077
	(-0.10)	(-0.05)
MTB	0.064*	0.059
	(1.79)	(1.59)
Debt	-0.230	-0.266
	(-0.99)	(-1.15)
Firm on Twitter	0.302	0.186
	(1.21)	(0.75)
$log(Followers_{Firm})$	-0.006	-0.037
	(-0.14)	(-0.89)
$log(Following_{Firm})$	0.137***	0.146***
	(3.14)	(3.22)
$log(Total\ tweets_{Firm})$	-0.108*	-0.072
	(-1.73)	(-1.14)
Constant	-9.516***	-6.319***
	(-11.30)	(-6.54)
Industry FE	Yes	Yes
Pseudo R-sq	**0.0871**	**0.111**
Sample size	**47,492**	**47,492**

Table 3

Variable	N	Mean	S.D.	p5	p50	p95
Exec financial tweets	70,828	0.009	0.112	0	0	0
Exec non-fin. business tweets	70,828	0.753	3.01	0	0	4
Exec non-business tweets	70,828	0.171	0.828	0	0	1
Firm financial tweets	70,828	0.059	0.376	0	0	0
Firm non-fin. business tweets	70,828	16.3	87.5	0	2	50
Firm non-business tweets	70,828	4.64	30.8	0	0	12
Executive age	70,828	52.5	6.89	41	52	63
Female	70,828	0.114	0.318	0	0	1
Extraversion	70,828	4.23	0.550	3.15	4.23	5.02
CEO	70,828	0.630	0.483	0	1	1
CFO	70,828	0.372	0.483	0	0	1
Size	70,828	8.76	2.01	5.29	8.85	11.8
ROA	70,828	0.008	0.035	-0.024	0.011	0.049
MTB	70,828	1.90	1.91	0.167	1.21	5.56
Debt	70,828	0.592	0.251	0.155	0.623	0.974
Firm on Twitter	70,828	0.854	0.353	0	1	1
$log(Followers_{Firm})$	70,828	8.58	4.56	0	9.75	14.6
$log(Following_{Firm})$	70,828	5.93	3.22	0	6.66	10.35
$log(Total\ tweets_{Firm})$	70,828	7.20	3.74	0	8.45	11.03
$log(Followers_{Exec})$	70,828	6.94	2.78	2.89	7.03	11.9
$log(Following_{Exec})$	70,828	4.83	1.46	2.40	5.08	6.96
$log(Total\ tweets_{Exec})$	70,828	5.31	1.90	1.95	5.37	8.12

Table 4

Panel A: Executive tweets and earnings announcements/conference calls

VARIABLES	*Financial*	*Non-Fin. Business*	*Non-business*
Earnings Event	1.865***	0.051	-0.065
	(11.92)	(0.74)	(-0.55)
All Controls	Yes	Yes	Yes
Firm, Exec, year, & month FE	Yes	Yes	Yes
Pseudo R-sq	**0.190**	**0.533**	**0.442**

Panel B: Executive tweets and SEC filings

VARIABLES	*Financial*	*Non-Fin. Business*	*Non-business*
10-K and 10-Q filing	0.894***	0.081	0.086
	(3.79)	(0.88)	(0.75)
8-K filings	1.230***	0.188***	0.122**
	(10.29)	(4.28)	(2.14)
All Controls	Yes	Yes	Yes
Firm, Exec, year, & month FE	Yes	Yes	Yes
Pseudo R-sq	**0.199**	**0.533**	**0.442**

Panel C: Executive tweets and press releases

VARIABLES	*Financial*	*Non-Fin. Business*	*Non-business*
Press Releases	0.072***	0.036***	0.034***
	(8.53)	(9.60)	(7.54)
All Controls	Yes	Yes	Yes
Firm, Exec, year, & month FE	Yes	Yes	Yes
Pseudo R-sq	**0.185**	**0.535**	**0.443**

Panel D: Executive tweets and news articles

VARIABLES	*Financial*	*Non-Fin. Business*	*Non-business*
News articles	0.054***	0.012***	0.006***
	(9.39)	(8.89)	(3.56)
All Controls	Yes	Yes	Yes
Firm, Exec, year, & month FE	Yes	Yes	Yes
Pseudo R-sq	**0.202**	**0.534**	**0.442**

Table 5

	$\lvert MMR_{(+1)} \rvert$		
VARIABLES	***Financial***	***Non-Fin. Business***	***Non-business***
Exec topic tweets	0.003***	-0.000	-0.000
	(2.99)	(-1.53)	(-1.06)
Firm topic tweets	0.000**	-0.000	0.000
	(2.57)	(-1.53)	(0.77)
$\lvert MMR_{(-1)} \rvert$	0.074***	0.074***	0.074***
	(6.79)	(6.80)	(6.79)
Financial event	0.015***	0.015***	0.015***
	(17.26)	(17.42)	(17.42)
Business event	0.001***	0.001***	0.001***
	(7.91)	(8.00)	(7.97)
Executive age	0.000	0.000	0.000
	(1.42)	(1.48)	(1.49)
Size	-0.001***	-0.001***	-0.001***
	(-3.81)	(-3.79)	(-3.78)
ROA	0.001	0.001	0.001
	(0.15)	(0.17)	(0.18)
MTB	-0.001***	-0.001***	-0.001***
	(-7.60)	(-7.58)	(-7.57)
Debt	0.001	0.001	0.001
	(0.88)	(0.88)	(0.89)
Firm on Twitter	-0.005***	-0.005***	-0.005***
	(-2.80)	(-2.88)	(-2.83)
$log(Followers_{Firm})$	0.001***	0.001***	0.001***
	(2.67)	(2.64)	(2.62)
$log(Following_{Firm})$	-0.000	-0.000	-0.000
	(-1.34)	(-1.15)	(-1.26)
$log(Total\ tweets_{Firm})$	-0.001*	-0.001*	-0.001*
	(-1.74)	(-1.72)	(-1.69)
$log(Followers_{Exec})$	0.001	0.001	0.001
	(1.53)	(1.58)	(1.60)
$log(Following_{Exec})$	-0.000	-0.000	-0.000
	(-0.25)	(-0.05)	(-0.06)
$log(Total\ tweets_{Exec})$	-0.003***	-0.003***	-0.003***
	(-5.03)	(-5.00)	(-5.02)
Constant	0.016	0.014	0.014
	(1.00)	(0.89)	(0.88)
Firm FE	Yes	Yes	Yes
Exec FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Adj R-Sq	**0.134**	**0.134**	**0.134**
Observations	**70,440**	**70,440**	**70,440**

Table 6

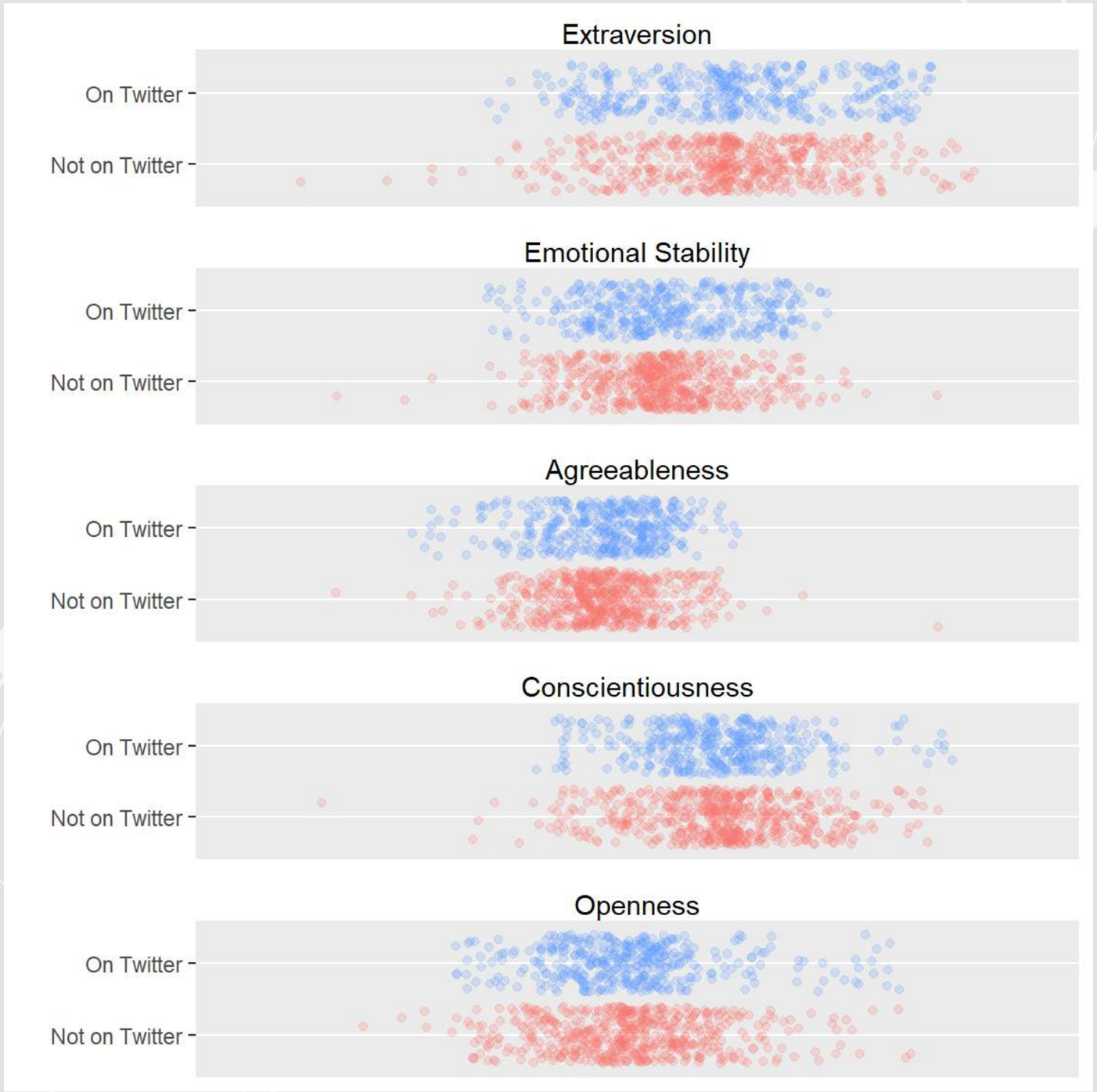
VARIABLES	$\lvert MMR_{(0)} \rvert$	$\lvert MMR_{(+1)} \rvert$	$\lvert MMR_{(+2)} \rvert$	$\lvert MMR_{(+3)} \rvert$	$\lvert MMR_{(+4)} \rvert$	$\lvert MMR_{(+5)} \rvert$
Exec financial tweets	0.001	0.003***	-0.000	0.001*	-0.000	-0.000
	(1.18)	(2.99)	(-0.34)	(1.67)	(-1.17)	(-0.01)
Firm financial tweets	-0.000**	0.000**	0.000	0.000	0.000	0.000
	(-2.05)	(2.57)	(0.64)	(0.57)	(0.84)	(0.71)
$\lvert MMR_{(-1)} \rvert$	0.140***	0.074***	0.051***	0.041***	0.039***	0.038***
	(5.65)	(6.79)	(9.62)	(7.69)	(7.58)	(7.39)
Financial event	0.022***	0.015***	0.002***	0.000	-0.000	-0.001***
	(21.49)	(17.26)	(6.63)	(0.60)	(-0.94)	(-3.45)
Business event	0.003***	0.001***	-0.000	-0.000	-0.000*	-0.000*
	(16.80)	(7.91)	(-1.24)	(-0.05)	(-1.75)	(-1.77)
Executive age	0.000	0.000	0.001**	0.001***	0.001***	0.000
	(0.69)	(1.42)	(2.35)	(2.61)	(2.70)	(1.20)
Size	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-4.06)	(-3.81)	(-3.50)	(-3.55)	(-3.42)	(-3.30)
ROA	0.001	0.001	0.000	-0.000	-0.001	-0.001
	(0.18)	(0.15)	(0.01)	(-0.03)	(-0.21)	(-0.19)
MTB	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-7.09)	(-7.60)	(-7.40)	(-7.46)	(-7.35)	(-7.33)
Debt	0.001	0.001	0.001	0.001	0.002	0.001
	(0.74)	(0.88)	(0.87)	(0.96)	(1.06)	(1.05)
Firm on Twitter	-0.004***	-0.005***	-0.006***	-0.006***	-0.006***	-0.005***
	(-2.61)	(-2.80)	(-3.19)	(-3.31)	(-3.21)	(-3.01)
$log(Followers_{Firm})$	0.001**	0.001***	0.001***	0.001***	0.001***	0.001***
	(2.42)	(2.67)	(2.94)	(3.12)	(3.02)	(2.85)
$log(Following_{Firm})$	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-1.40)	(-1.34)	(-1.11)	(-1.21)	(-1.11)	(-1.31)
$log(Total\ tweets_{Firm})$	-0.001	-0.001*	-0.001**	-0.001**	-0.001**	-0.001*
	(-1.62)	(-1.74)	(-2.08)	(-2.11)	(-2.10)	(-1.83)
$log(Followers_{Exec})$	0.001	0.001	0.001	0.001	0.001	0.001
	(1.23)	(1.53)	(1.53)	(1.51)	(1.54)	(1.59)
$log(Following_{Exec})$	-0.000	-0.000	-0.000	-0.000	-0.000	0.000
	(-0.11)	(-0.25)	(-0.15)	(-0.19)	(-0.12)	(0.10)
$log(Total\ tweets_{Exec})$	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.004***
	(-4.47)	(-5.03)	(-5.06)	(-5.04)	(-5.07)	(-5.15)
Constant	0.025	0.016	0.002	-0.002	-0.004	0.014
	(1.62)	(1.00)	(0.12)	(-0.11)	(-0.24)	(0.67)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Exec FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	**0.177**	**0.134**	**0.110**	**0.108**	**0.109**	**0.109**
Observations	**70,494**	**70,440**	**70,274**	**70,164**	**70,054**	**69,944**

Table 7

VARIABLE	$\lvert MMR_{(+1)} \rvert$	t-value
Exec topic tweets	-0.015	(-1.57)
Tweet similarity x Exec financial tweets	0.038*	(1.91)
Firm topic tweets	-0.006***	(-2.78)
Tweet similarity x Firm financial tweets	0.006***	(3.00)
$\lvert MMR_{(-1)} \rvert$	0.074***	(6.74)
Financial event	0.015***	(17.18)
Business event	0.001***	(8.01)
Executive age	0.000	(1.42)
Size	-0.001***	(-3.85)
ROA	0.000	(0.11)
MTB	-0.001***	(-7.64)
Debt	0.001	(0.83)
Firm on Twitter	-0.005***	(-2.82)
$log(Followers_{Firm})$	0.001***	(2.59)
$log(Following_{Firm})$	-0.000	(-1.18)
$log(Total\ tweets_{Firm})$	-0.001*	(-1.73)
$log(Followers_{Exec})$	0.001	(1.51)
$log(Following_{Exec})$	-0.000	(-0.40)
$log(Total\ tweets_{Exec})$	-0.003***	(-5.00)
Constant	0.016	(1.03)
Firm, Exec, Year, & Month FEs	Yes	
Adj R-Sq	**0.135**	
Observations	**70,214**	

Other analyses

Big-5 personality traits



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