

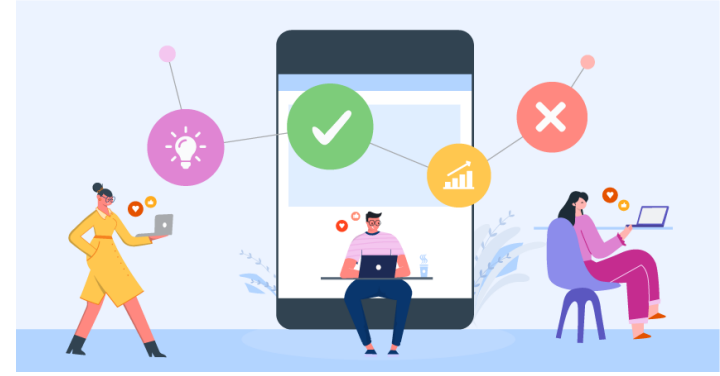
Decoding Social Media Signals

EFMA Panel on “Hype in Financial Markets”

J. Anthony Cookson

CU Boulder, Leeds School of Business

Motivation



Broad changes to the information environment in the last 10 years

- Social media has risen in importance
- Retail investing has risen substantially
- “Democratization of finance”
- An instrument for corporations, politicians, retail investors, etc...

An example from last month



Joe Weisenthal  @TheStalwart · 6m

*TRUMP SAYS EASIEST WAY TO SAVE MONEY IS TO
END MUSK'S CONTRACTS



Joe Weisenthal  @TheStalwart · 7m

\$TSLA -11.2%

14

68

317

29K



Joe Weisenthal  @TheStalwart · 5m



Donald J. Trump 
@realDonaldTrump

The easiest way to save money in our Budget, Billions and Billions
of Dollars, is to terminate Elon's Governmental Subsidies and
Contracts. I was always surprised that Biden didn't do it!

300 ReTruths 1.19k Likes

Jun 05, 2025, 2:37 PM

9

25

146

6.5K



Market Summary > Tesla Inc

275.75 USD

-56.30 (16.96%) ↓ today

Jun 5, 3:17 PM EDT • Disclaimer

1D

5D

1M

6M

YTD

1Y

5Y

Max



Notable, but not unusual



Roaring Kitty ✓
@TheRoaringKitty

Follow



2:00 AM · May 13, 2024 · **28.4M** Views

ALJAZEERA LIVE

Economy | Financial Markets

GameStop stock jumps as 'Roaring Kitty' shows big bet in Reddit post

Keith Gill, or 'Roaring Kitty', shared a screenshot on Reddit that showed he may hold five million shares of GameStop.



Symbol	Actions	Last Price \$	Change \$	Change %	Qty #	Price Paid \$	Day's Gain \$	Total Gain \$	Total Gain %	Value \$
GME		46.55	14.98	47.45%	5,000,000	21,274	74,900,000.00	126,379,884.00	118.81%	232,750,000.00
GME		27.02	14.625	117.94%	120,000	5,6754	175,500,000.00*	256,133,277.55	375.75%	324,300,000.00
Cash Total										\$29,408,005.00
Transfer money										
Total						\$174,536,838.45	\$250,400,000.00	\$382,513,161.55	219.38%	\$586,459,005.00



GameStop Corp



NYSE: GME

Overview

Compare

Financials

28,22 USD **+13.15 (87.26%)** ↑ past 6 months

Closed: 7 Jun, 20.00 GMT-4 • Disclaimer

After hours 27,16 **-1,06 (3,76 %)**

1D

5D

1M

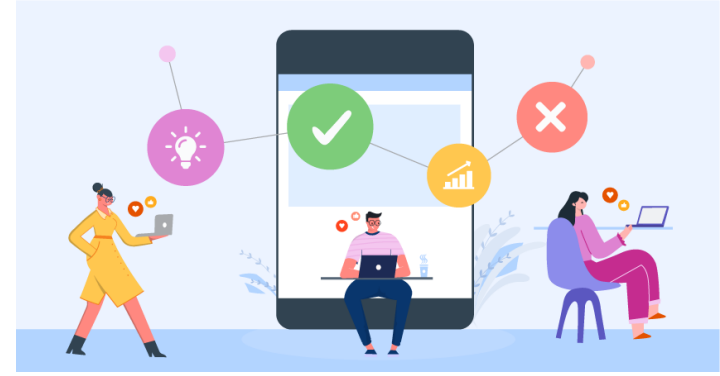
6M

YTD

5Y ▼



Motivation



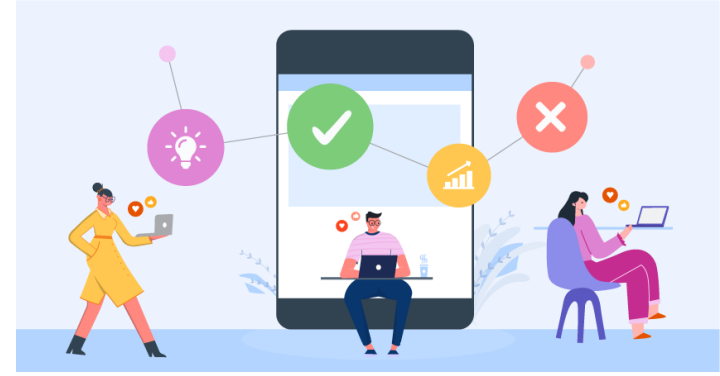
Broad changes to the information environment in the last 10 years

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Information abundance and fragmentation (a paradox?)

- Real-time information has never been more available
- But, there is too much information to know it all

Social media's rise



What does it mean for social media to be important?

- Information shifts from vetted sources to “the crowd”
- Finfluencers versus analysts
- More worries about “fake news” / automation by bots

My plan for this talk

I will uplift two key aspects of social media signals:

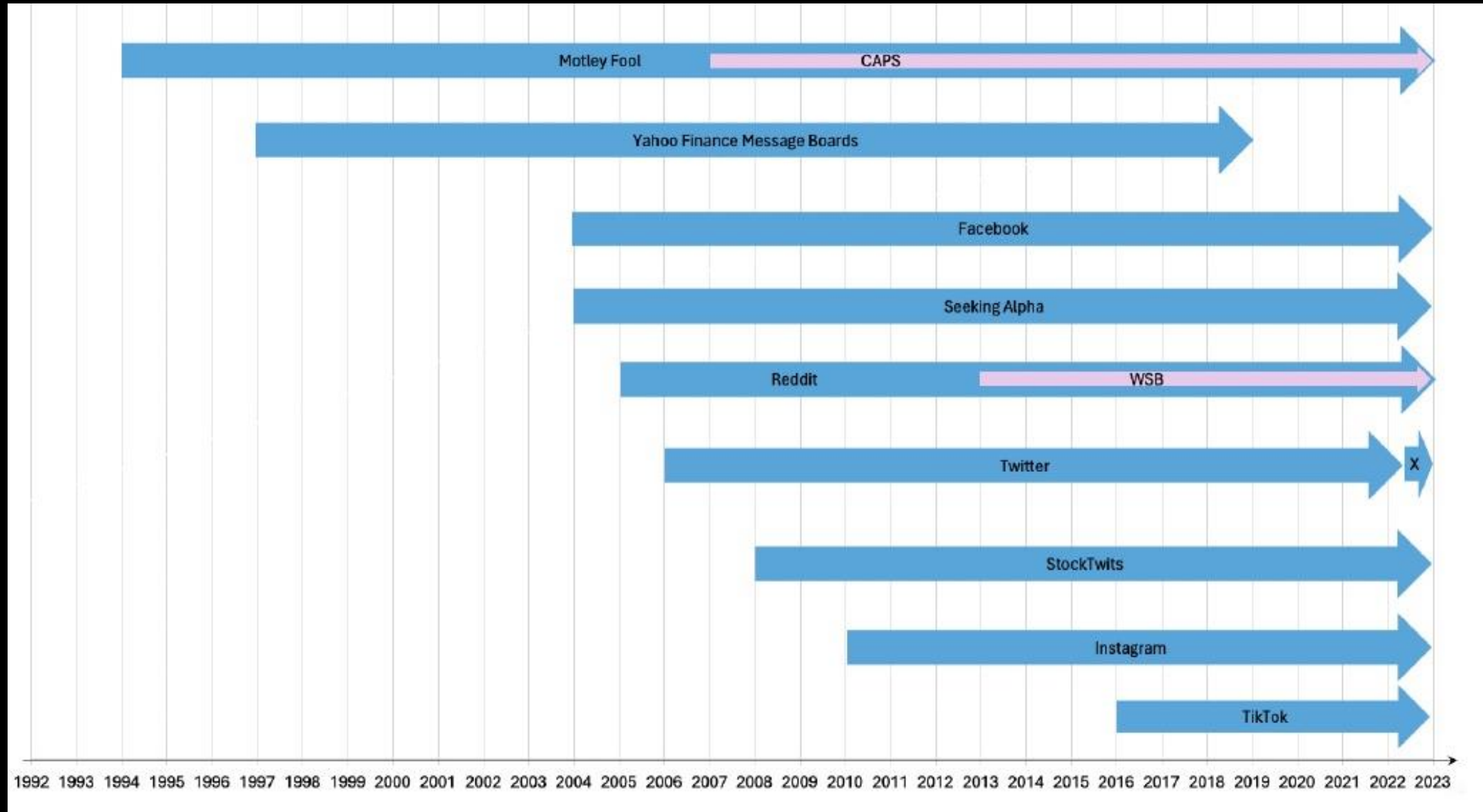
- Abundance vs fragmentation of information
- The role of aggregation

My goal is to provide a point of view, not an overview

Investor social media

Growth, abundance and fragmentation

Growth and fragmentation of social media forums



Motivation for studying “The Social Signal”



Literature uses each platform as “**social media**”

- Different user populations
- Different contributor incentives & formats
- Different timing

But how different is information across platforms?

- How connected is research using only 1 platform?
- Is social media info just traditional news?

Two views of investor social media

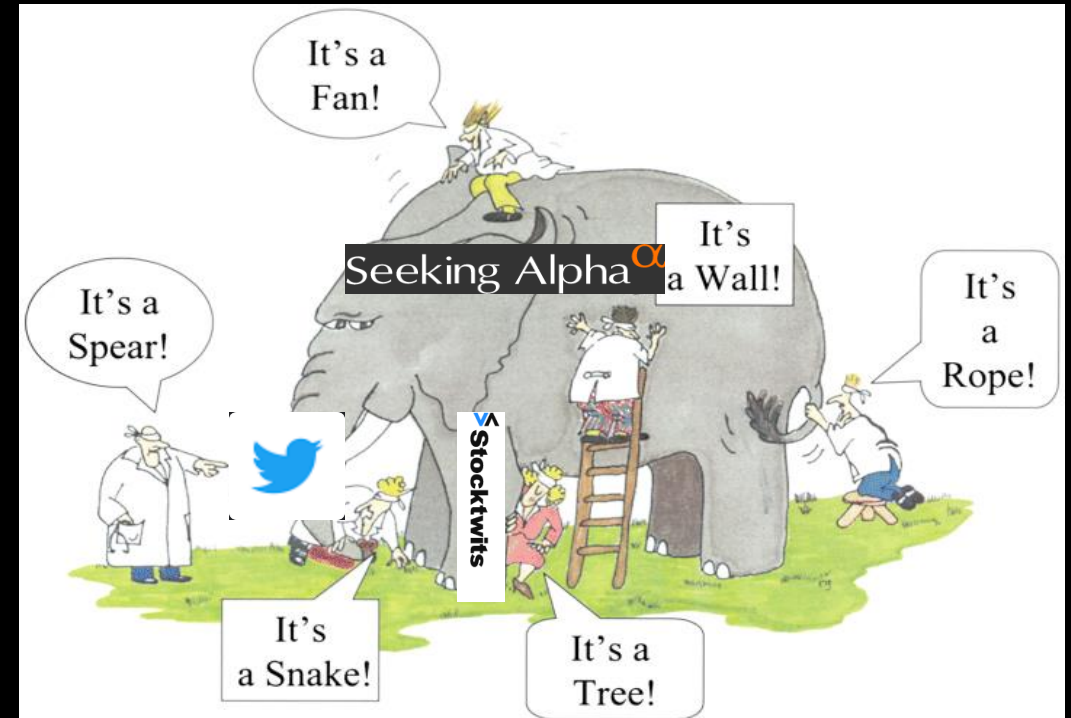
Monolith view

Platforms are substitutes



Idiosyncratic view

Platforms convey different info: complements



The Social Signal: We find that sentiment is idiosyncratic, attention is monolithic (mostly)

Our process:

1. **Measure** (average) firm-day sentiment and attention on Twitter, StockTwits, SeekingAlpha

Mostly relying on commercial signals, not our own NLP

2. **Purge** these signals of their relation to any news we can find + firm FE

3. **Correlate** purged signals with one another



A natural way to **correlate** three signals: Principal Components Analysis

Completely idiosyncratic first component == 33%

- Attention is to the same stocks
- Sentiment is different

Two lessons:

There's a common social media conversation, distinct from "news"

Table 1.1: How Common is the Social Signal across Platforms?
Residual Signals Controlling for News and Firm FEs

Panel A: Residualized Attention Signals

	Comp1	Comp2	Comp3
StockTwits	0.606	-0.428	0.671
Twitter	0.626	-0.264	-0.734
Seeking Alpha	0.491	0.864	0.108
Fraction of variation	63.9%	23.8%	12.3%


Panel B: Residualized Sentiment Signals

	Comp1	Comp2	Comp3
StockTwits	0.660	-0.288	0.694
Twitter	0.675	-0.178	-0.716
Seeking Alpha	0.330	0.941	0.077
Fraction of variation	38.2%	32.8%	29.0%

Does fragmentation end at the edge of a platform? **No!**

Even within platforms, people sort themselves into communities (“echo chambers”).

This leads to **information siloing** where my newsfeed can differ, sometimes dramatically from yours.



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JOURNAL ARTICLE

Echo Chambers [Get access >](#)

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Abstract

We find evidence of selective exposure to confirmatory information among 400,000 users on the investor social network StockTwits. Self-described bulls are five times more likely to follow a user with a bullish view of the same stock than are self-described bears. Consequently, bulls see 62 more bullish messages and 24 fewer bearish messages than bears do over the same 50-day period. These “echo chambers” exist even among

On November 14, 2018, Two Users Post about Tesla

EVisthefuture

Oil giant BP gets its first Tesla Powerpack project, says could lead to more

DoctorBurry

Lots of great companies with strong mgmt teams, profits and cashflows on sale. Why would anyone buy into this \$TSLA fraud

EVisthefuture's November 15 Newsfeed (45 Bullish, 0 Bearish)

Rishesh Singh: \$TSLA bout to rip <https://www.bloomberg.com/news/articles/2018-11-14/china-is-leading-the-world-to-an-electric-car-future>

Rishesh Singh: \$TSLA Musk says Tesla acquired trucking capacity to ensure Model 3 delivery by Dec 31

Tesla Long: \$TSLA Bears you gonna lose. The arguments by these CNBC bears are idiotic! Andrew Left the bear camp hah <https://youtu.be/RJPpWHQc9p0>

Angry Panda: \$TSLA gonna be glorious tomorrow.... Powell was very optimistic about the economy.... reiterated twice.... I smell bear fear...

Dexter Wilson: \$TSLA Here is a great resource for Bulls, also maybe shorts can get a clue as to what they are in for! <https://twitter.com/nykchannel/status/1063128324711596038?s=21>

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DoctorBurry's November 15 Newsfeed (0 Bullish, 12 Bearish)

posicaprinia: \$TSLA Heed caution folks. 20%+ correction coming soon?
<https://twitter.com/EconguyRosie/status/1063159726324834306>

posicaprinia: \$TSLA Pray for the nasdaq tomorrow. NVDA down 14% AH

posicaprinia: \$TSLA not sure how they are going to get this to \$360 and keep it up there. Will take an intervention from the lord and savior (Elon Musk)

ThePatrickBateman1: \$TSLA only sold 20,000 vehicles last month but has one of greatest market caps of all autos. Total joke Big Short

ThePatrickBateman1 : @HeyGuy @DoctorBurry superior LOL LOL LOL \$TSLA doors and windows don't work in cold weather and spontaneously combust in hot weather

Back to “The Social Signal”

Shifts in the signal around GME short squeeze

- GME euphoria changed the composition and attitudes of retail investors (Jan 28, 2021)
- Goal: understand impact of new users and ideas



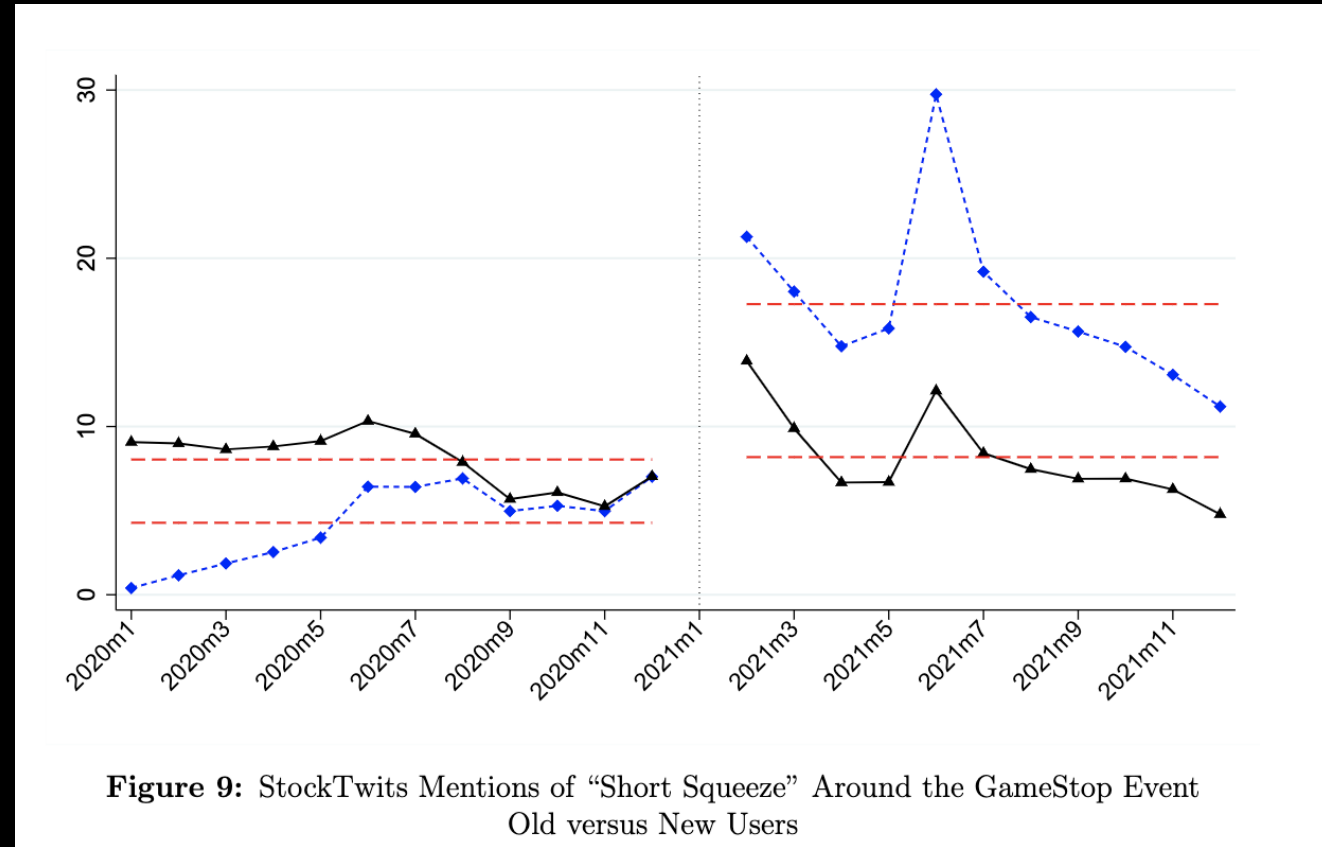
The GME hype changed people's minds

Investors on StockTwits mention “short squeezes” much more frequently after Jan 2021

- Bradley et al. (2022)

We define “new” users as joined after Jan 2020

Biggest increase in usage of “short” mentions is from “new” users (**blue**) vs. “old” users (**black**)



Pre/post GME

PC Sentiment (cols 1 and 2)

Sentiment's (PC1) ability to predict next day returns *falls to zero*

- PC2 and PC3 provide no marginal value

New vs old (cols 3-4, StockTwits)

- Effect concentrated among **new users**

	Dependent var.: $AR_{t+1}(\%)$			
	(1) PC signal	(2) PC signal	(3) StockTwits new	(4) StockTwits old
Post \times Sentiment (z)	-0.125*** (0.048)	-0.124*** (0.048)	-0.103** (0.043)	0.002 (0.034)
Post \times Attention (z)	0.001 (0.093)	-0.001 (0.094)	0.015 (0.107)	-0.019 (0.090)
Sentiment (z)	0.111*** (0.042)	0.111*** (0.042)	0.101** (0.039)	0.038 (0.028)
Attention (z)	-0.071 (0.056)	-0.070 (0.057)	-0.065 (0.065)	-0.065 (0.054)
Post \times Sentiment PC2 (z)		0.028 (0.033)		
Post \times Sentiment PC3 (z)		0.014 (0.030)		
Sentiment PC2 (z)		-0.004 (0.026)		
Sentiment PC3 (z)		0.022 (0.026)		
DJNW sentiment (z)	0.086*** (0.016)	0.081*** (0.016)	0.088*** (0.017)	0.087*** (0.016)
DJNW attention (z)	-0.058** (0.029)	-0.060** (0.029)	-0.064** (0.029)	-0.060** (0.029)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Date FE	Y	Y	Y	Y
Outcome Mean	-0.005	-0.005	-0.005	-0.005
Outcome SD	7.864	7.864	7.864	7.864
Observations	289,092	289,092	289,092	289,092
R^2	0.049	0.049	0.049	0.049

Investor social media

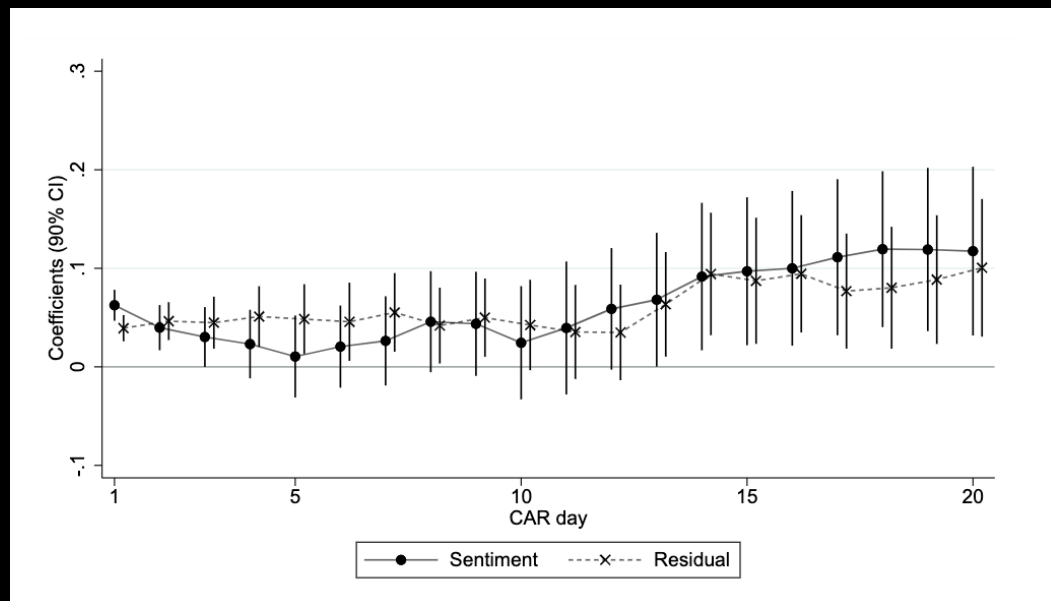
What happens when we aggregate?

Firm-specific hype is very different from market-level emotion

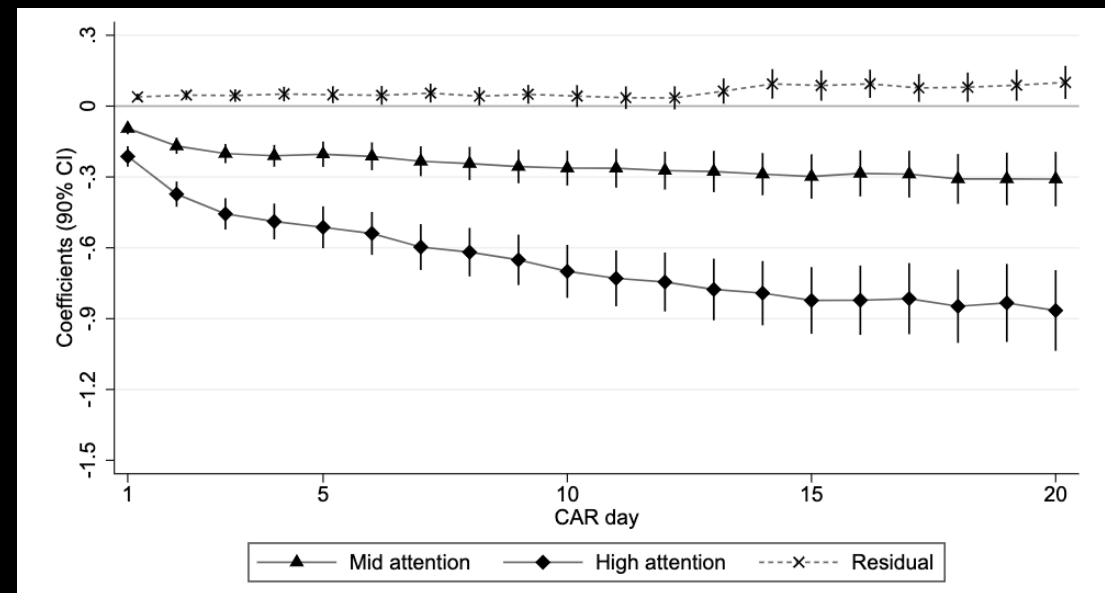
Firm-day: In social signal, we find that sentiment forecast (slight) positive returns, but attention spikes ~ swift reversal

- both ~ big return spikes on day t

sentiment



attention



In new work, we study market-level signals

“Market signals from social media” with Lu, Mullins and Niessner

Our market-level process (using the “social signal” firm-level dataset):

1. **Purge** signals of any news we can find
2. **Aggregate** residualized signals with market-value weights to daily indexes
3. **Combine** daily indexes together into one market-level index

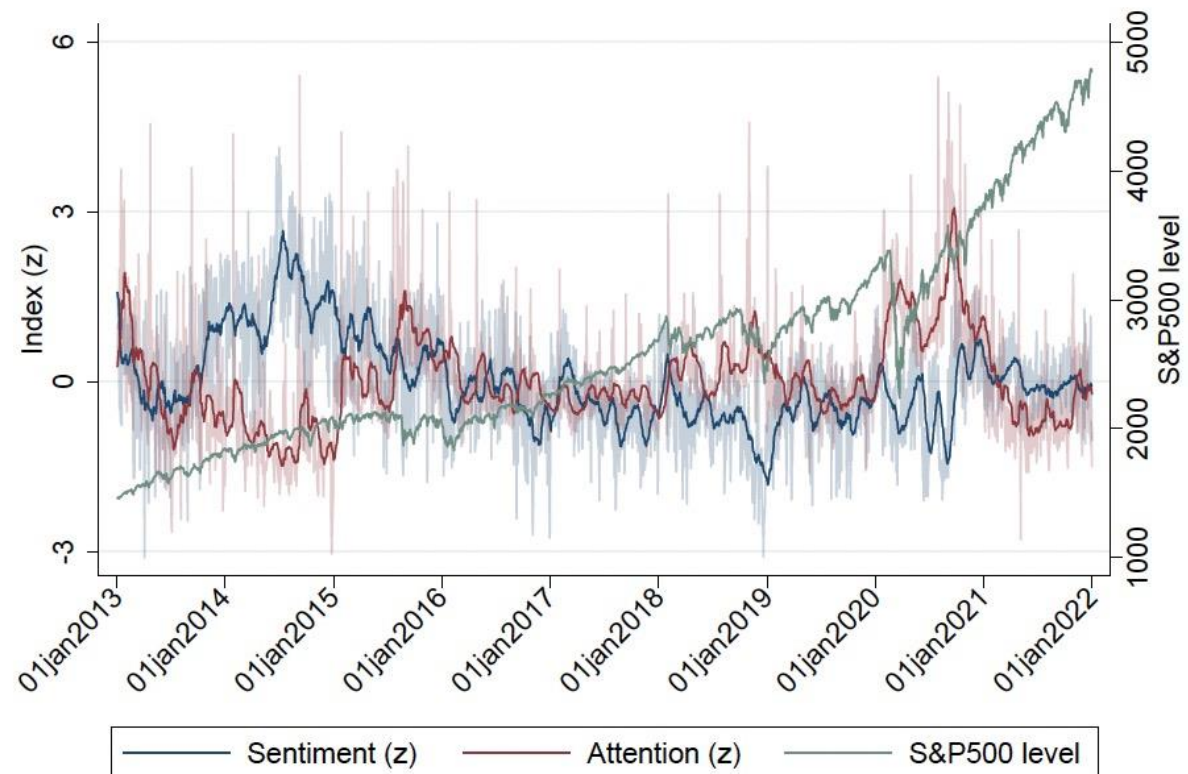
Market indexes give interesting high and low frequency patterns

Captures 2014 Bull Run,
2018 China Trade War,
Covid...

Our paper focuses mostly
on daily indexes

- My own naive null hypothesis: Relation to returns would be the same

Figure 1: Time Series of Sentiment and Attention Indexes

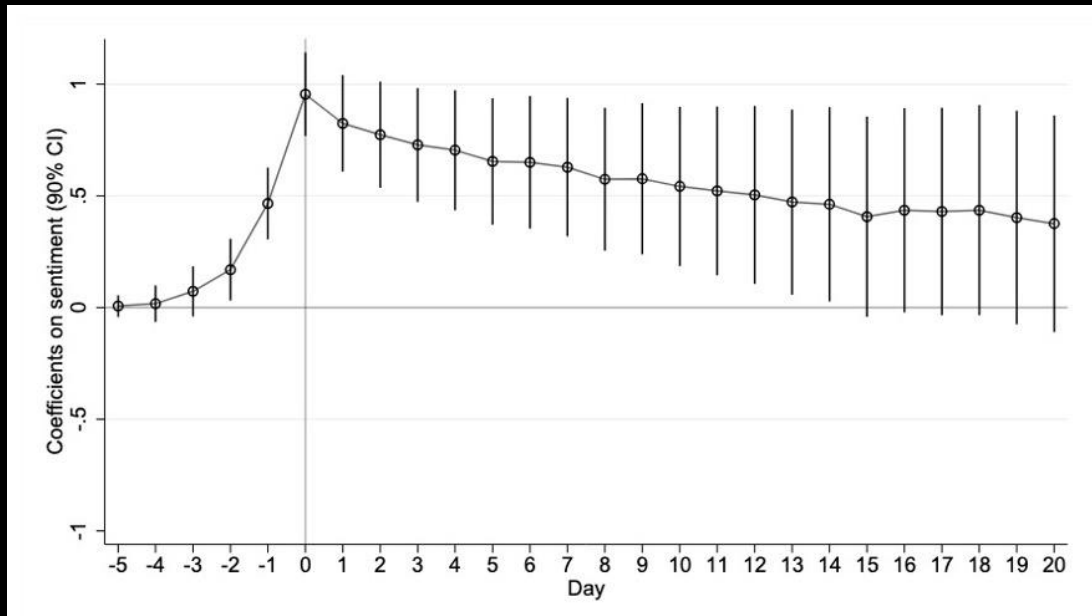


Yet, it is completely different!

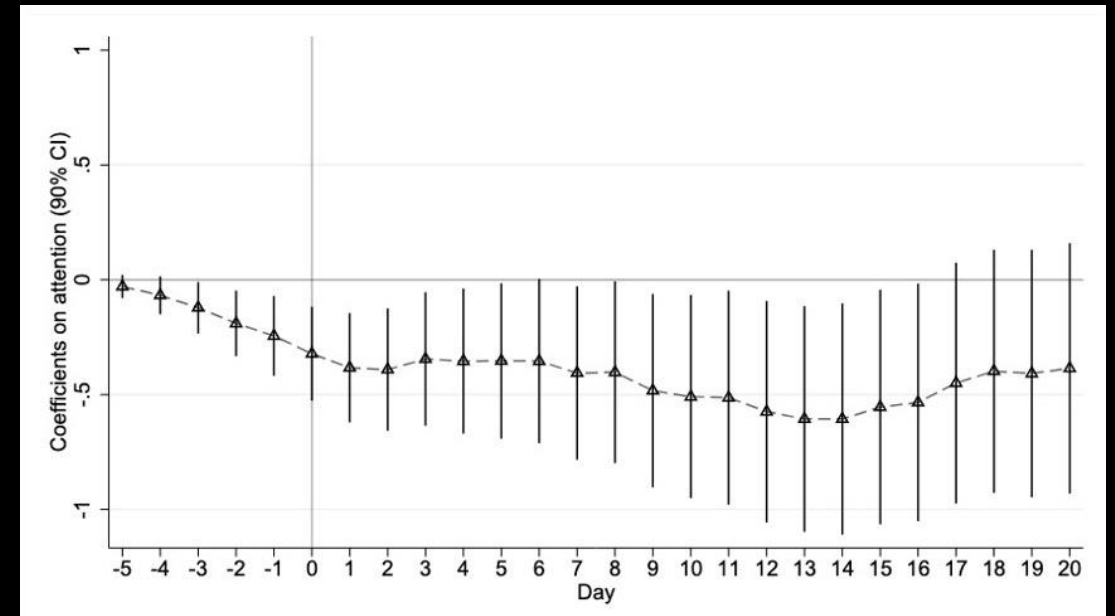
Market-level: In market signals, we find that sentiment exhibits strong **reversal**, but attention exhibits a **continuation**

- At date 0, both predict negative returns (sentiment more so)

sentiment



attention



Why are market and firm signals different?

Aggregating matters!

Sentiment

- High firm-level sentiment → *information*
- Concurrent high sentiment about many firms → *emotion*
 - *At market-level, sentiment overreacts*

Attention

- High firm-level attention → *herding, mania, hype*
- Concurrent high attention about many firms → *anxiety, fear*
 - *At market-level, attention builds and spreads*

Concluding:

Two salient social media perspectives

Investor centric, firm-level perspective:

- Platforms are highly fragmented
- Information is abundant
- Our biases tend to focus on familiar information rather than extract systematic signals
- Clearly a venue for hype, herding and behavioral dynamics

Market-level perspective:

- Aggregate signals are qualitatively different from firm-specific
- More Keynes' animal spirits, less Barber-Odean
- Dynamics are behavioral, but phenomena are emergent