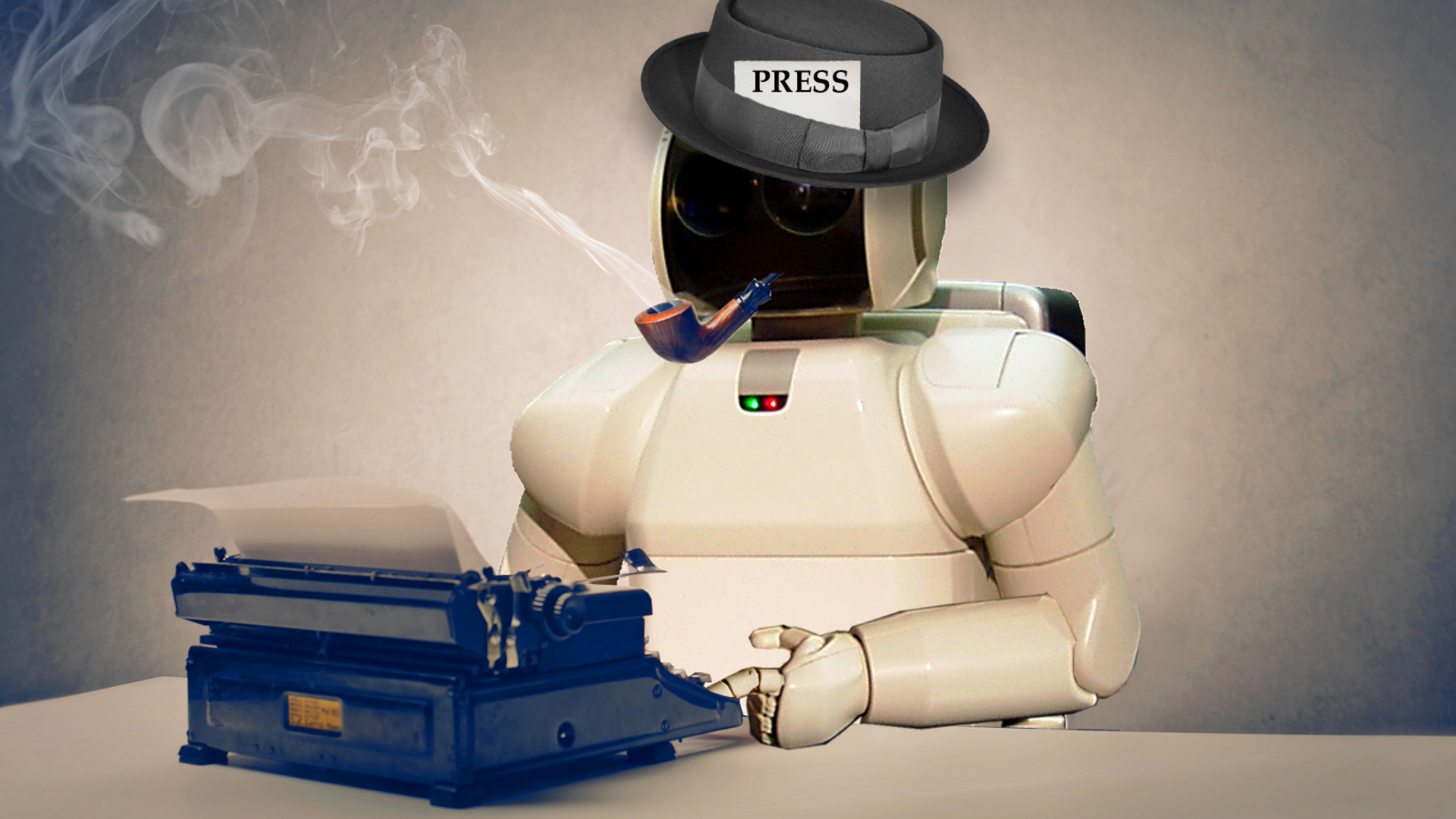


Media and Artificial Intelligence

Matthew Gentzkow



PRESS

Rite Aid posts 3Q profit

AP Associated Press January 3, 2018

CAMP HILL, Pa. (AP) _ Rite Aid Corp. (RAD) on Wednesday reported fiscal third-quarter net income of \$81 million.

The Camp Hill, Pennsylvania-based company said it had profit of 8 cents per share. Earnings, adjusted to account for discontinued operations, came to less than 1 cent on a per-share basis.

The drugstore chain posted revenue of \$5.35 billion in the period.

In the final minutes of trading on Wednesday, the company's shares hit \$2.11. A year ago, they were trading at \$8.18.

This story was generated by Automated Insights (<http://automatedinsights.com/ap>) using data from Zacks Investment Research. Access a Zacks stock report on RAD at <https://www.zacks.com/ap/RAD>

The Washington Post

Game Summary:

The [Yorktown Patriots](#) triumphed over the visiting [Wilson Tigers](#) in a close game on [Thursday](#), 20-14.

The game began with a scoreless first quarter.

In the second quarter, The Patriots' Paul Dalzell was the first to put points on the board with a two-yard touchdown reception off a pass from quarterback William Porter.

Wilson was behind Yorktown 7-0 heading into the second half. Wilson's Anton Reed tied the score with a two-yard touchdown run. The Patriots took the lead from Wilson with a two-yard touchdown run by Tanner Wall. The Patriots scored again on Adam Luncher's 29-yard field goal.

Today's focus: **Demand side**

AI helping consumers...

Find what they want to see

Find what others (society, gov't,
advertisers) want them to see

Outline

1. Framework
2. AI & Matching
3. AI & Bias
4. AI & Capture

1

Framework

Media Goods

- Heterogeneous tastes (over consumers and over time)
- Quality learned through experience; sometimes not even then (e.g., truth)
- Many goods, low marginal costs
- *Key problem is matching consumers to content*

Sources of inefficiency

1. Consumers can't find what they want
 - Imperfect search, matching, recommendations
2. What consumers want isn't what's good for society
 - Fake news, bias, Kardashians, violence
3. Gov't, firms, etc. have other ideas
 - Censorship, capture, foreign manipulation, persuasive ads

Artificial Intelligence

Potential to dramatically improve decisions when we have:

- *Lots of data on prior cases*
- *Tightly specified decision problem*
- *Measurable, clearly defined objectives*

2

AI & Matching

NETFLIX

Problem:

Choose Netflix movie recommendations, Google search results, Facebook newsfeed content, or informative ads to maximize consumer utility

Lots of data on prior cases?

Tightly specified decision problem?

Measurable, clearly defined objectives?

Yes

Loads of data on historical viewing,
searches, browsing

Clicks, likes, time spent provide easily
quantifiable objectives

Matching content to consumers is a canonical high-impact application for AI

Yet...


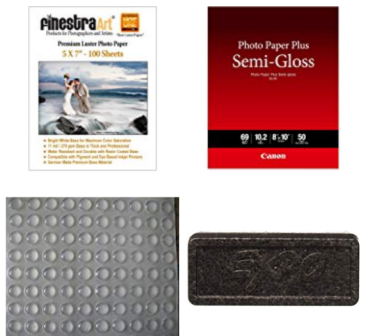




Hannak et al. (2017) “Measuring Personalization of Web Search”

- 90% of Google search results not personalized
- 10% that are *only* due to location and login status



Recommended for you, Matthew

 <p>Buy It Again in Health and Personal Care</p> <p>6 ITEMS</p>	 <p>Buy It Again in Office</p> <p>5 ITEMS</p>	 <p>Buy It Again in Other Categories</p> <p>16 ITEMS</p>	 <p>Science Fiction & Fantasy Books</p> <p>99 ITEMS</p>
--	--	---	--

NETFLIX

Top Picks for Matthew





Bakshy et al. (2015) “Exposure to ideologically diverse news and opinion on Facebook”

Conclusions:

- Most differences in what consumers see driven by what their friends share
- Role of algorithmic ranking beyond this relatively small

The Personalization Paradox

- In practice, personalization of search results, recommendations, etc. remains remarkably limited
- Where it's tried, quality is mostly poor

Why?

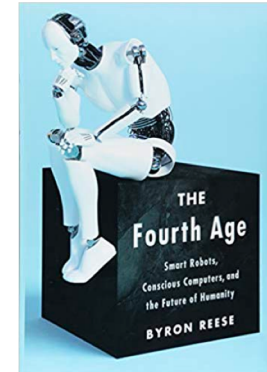
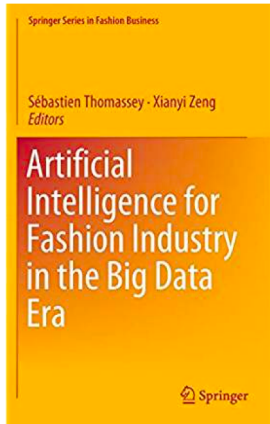
I don't know

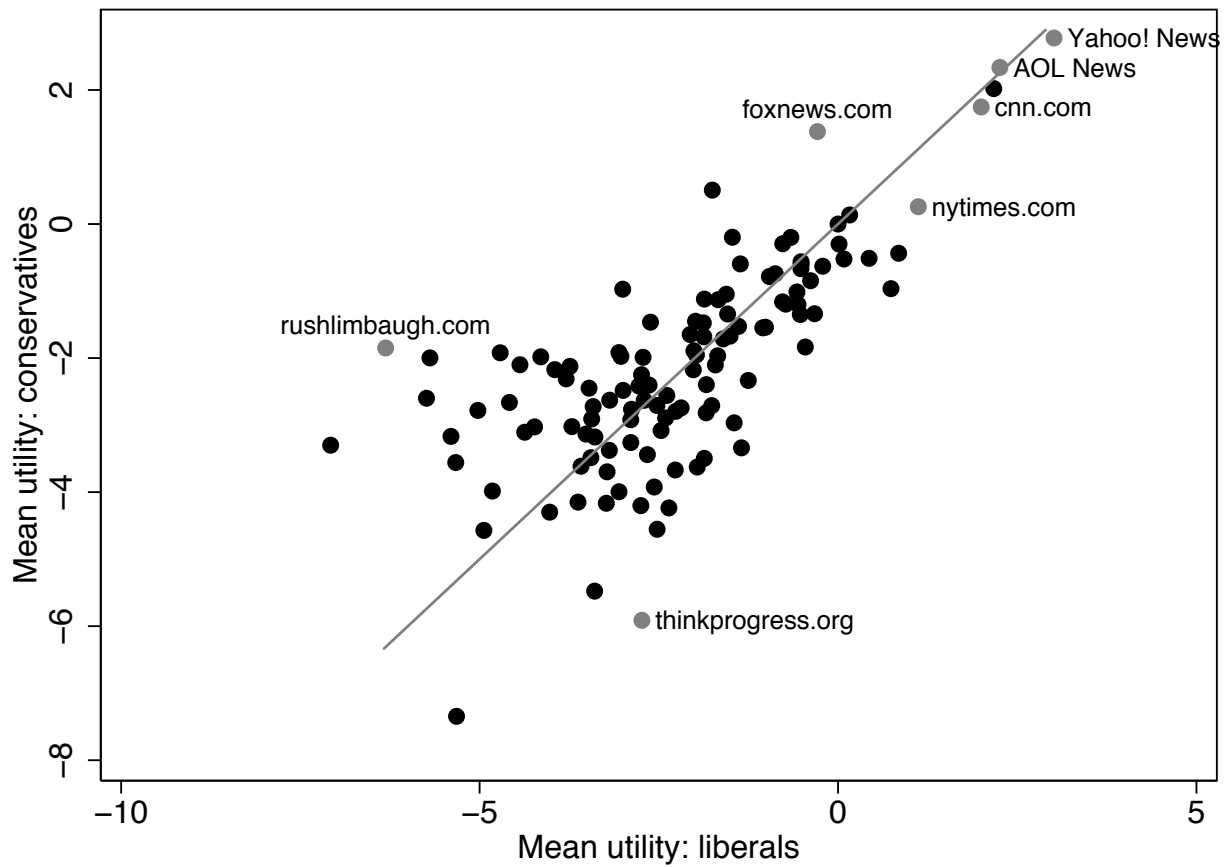
But here is one hypothesis...

Possible tasks for AI

1. Rank products by average utility
2. Parse queries (learn what consumers want right now)
3. Personalization (learn stable differences between consumers)

Which is most valuable?





3

AI & Bias



Problem:

Choose accurate, informative, socially valuable content instead of what consumers appear to want

Why might private and social utility diverge?

Externalities (Becker, Downs)

- Too little demand for information
- Demand for the wrong kind of information (biased, false, violent, etc.)

“Internalities”

- E.g., partisan content as a temptation good



Nothing can now be believed which is seen in a newspaper. Truth itself becomes suspicious by being put into that polluted vehicle. The real extent of this state of misinformation is known only to those who are in situations to confront facts... with the lies of the day.

Thomas Jefferson

Lots of data on prior cases?

Tightly specified decision problem?

Measurable, clearly defined objectives?

No

Externalities are not easily measurable

Truth is not easily measurable

Both are *contested*

Two Worlds

1. Consumers *want to know the truth*, but can't tell what sources or information they can trust, or are tempted by partisan content
2. Consumers *don't care about the truth*, and just want to be told they're right

Two Worlds

1. Consumers *want to know the truth*, but can't tell what sources or information they can trust, or are tempted by partisan content
 2. Consumers *don't care about the truth*, and just want to be told they're right
- The positive impact of AI likely bigger in World 1 than in World 2

Trends in the Diffusion of Misinformation on Social Media

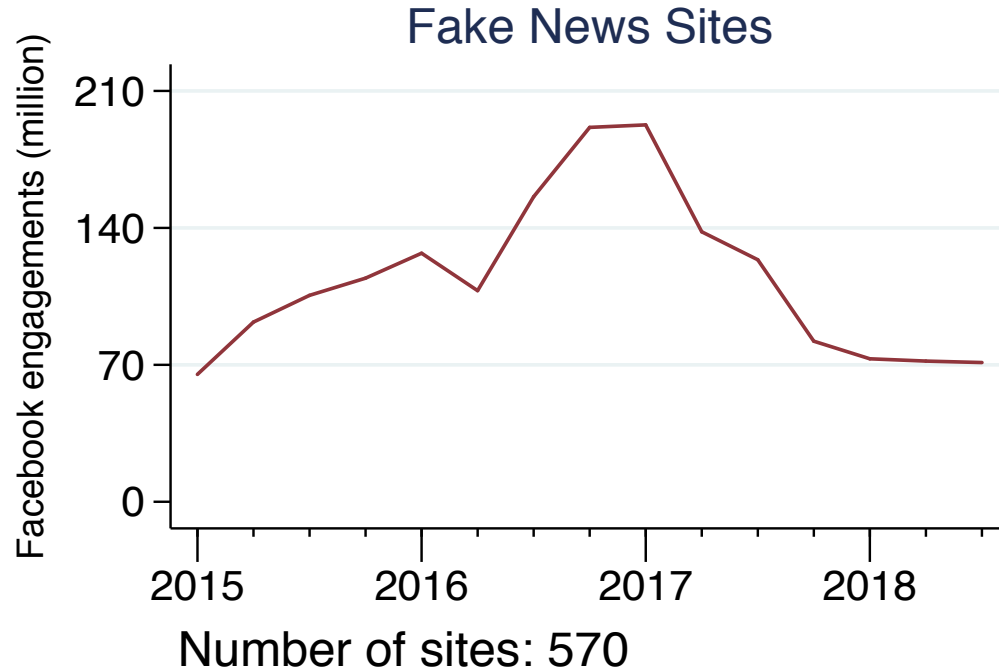
Hunt Allcott, *New York University, Microsoft Research, and NBER**

Matthew Gentzkow, *Stanford University and NBER*

Chuan Yu, *Stanford University*

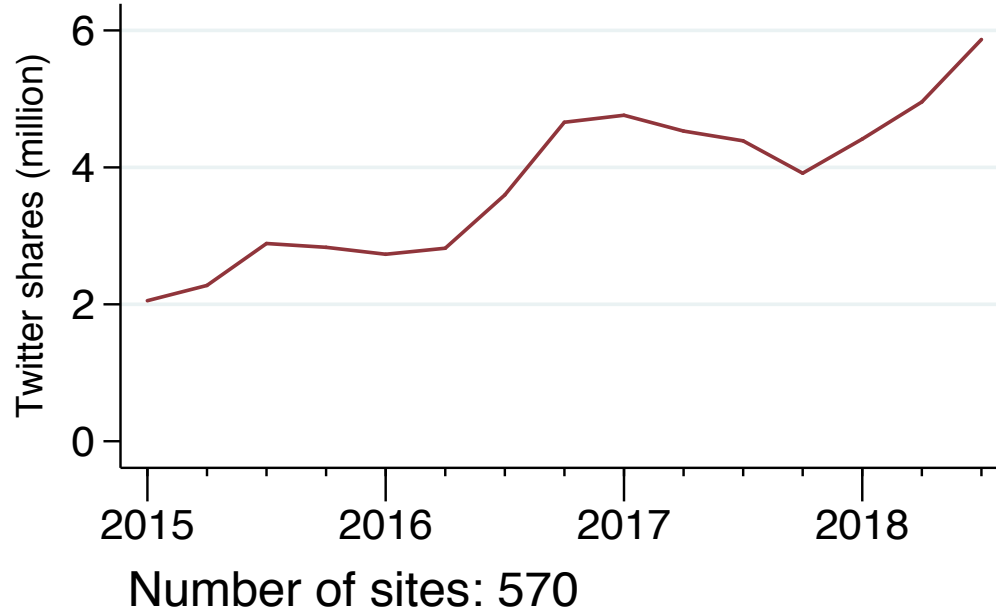
September 2018

- Sample of 570 sites identified by others as sources of false stories
- Measure Facebook engagements and Twitter shares Jan 2015 – July 2018
- Major news, small news, and business / culture sites as comparison groups

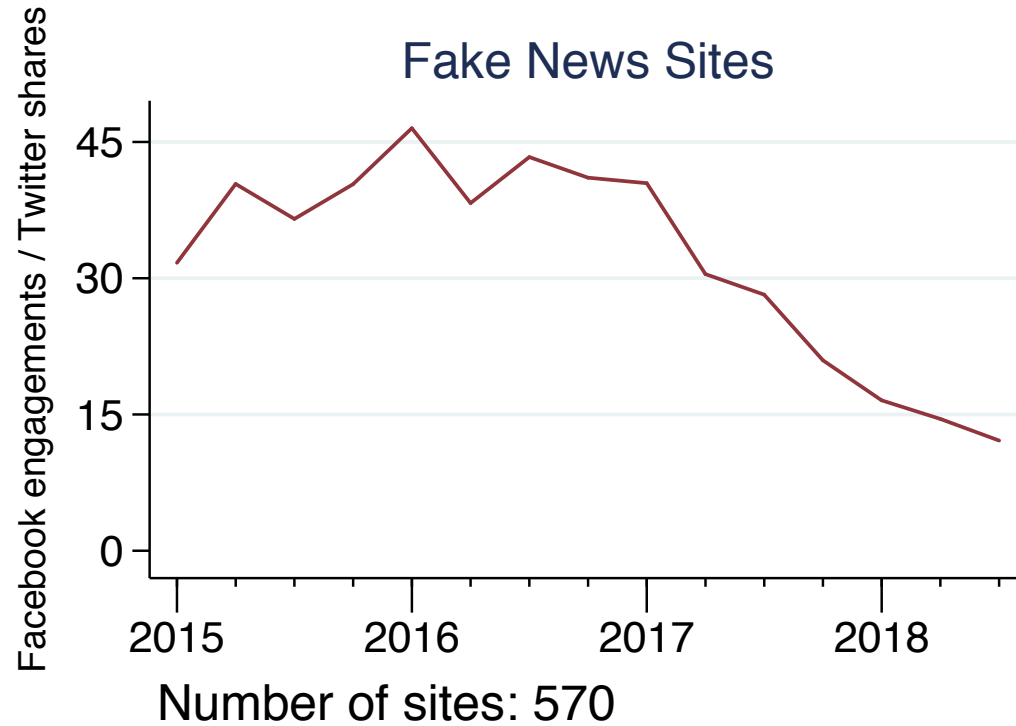


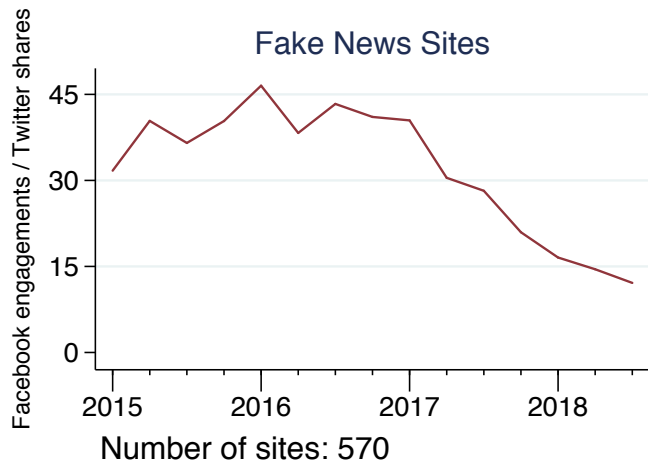
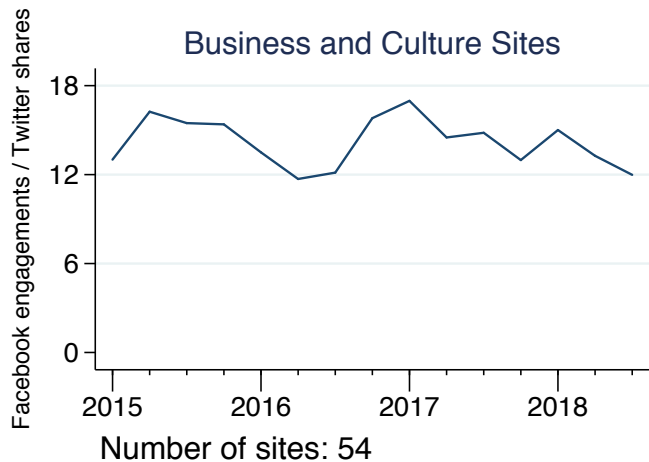
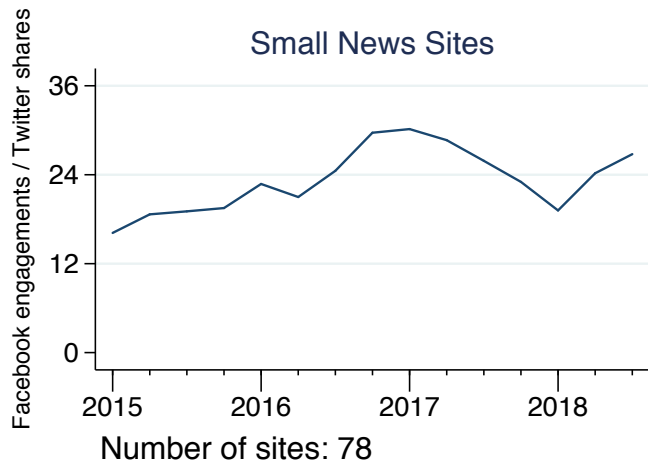
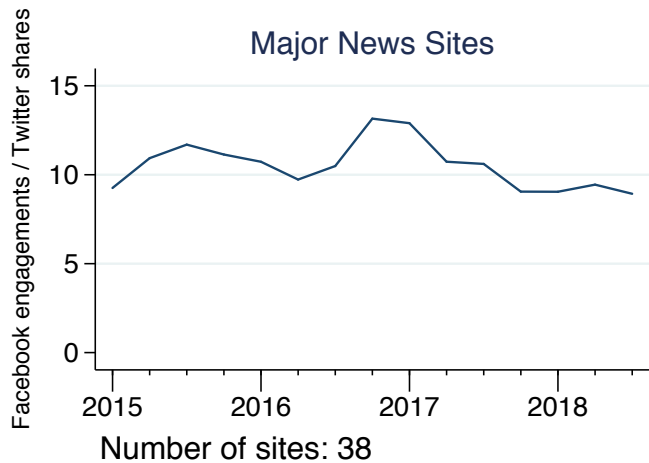


Fake News Sites



Ratio





- Consistent with the view that FB's efforts since the election have been at least somewhat successful
- However
 - Absolute level remains high
 - Most effective strategies not mainly about AI

4

AI & Capture



Problem:

Governments, firms, and other third parties want to use media to *manipulate* consumers

Can AI make them more effective?

Can AI be used to stop them?

Lots of data on prior cases?

Tightly specified decision problem?

Measurable, clearly defined objectives?

Yes, but on both sides

- Targeting ads and propaganda, surveillance, censorship
- Filtering out ads and propaganda, evading surveillance and censorship, detecting Russian robots

Why Does China Allow Freer Social Media? Protests versus Surveillance and Propaganda

Bei Qin, David Strömberg, and Yanhui Wu

On one hand: Discussion of sensitive topics, collective action, remains common and difficult to suppress

On the other hand: AI/ML applied to social media content can be a very effective surveillance tool

5

Conclusion

The impact of AI on
media markets will be
large

It will be most effective at helping match consumers to the content they (really) want

Broader impact depends on the extent to which this is also what's good for society