Disentangling Demand and Supply of Media Bias: The Case of Newspaper Homepages

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4703294

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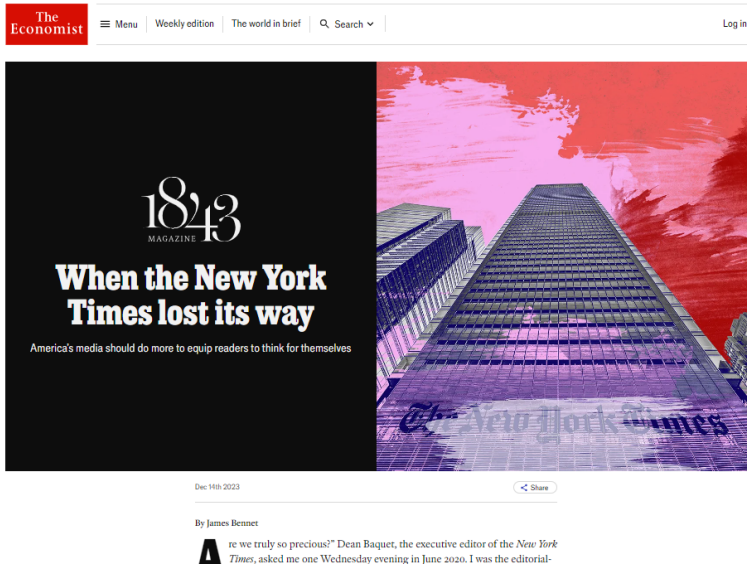
Wake Forest University

13 June 2024
@NASM2024

James Bennet: When the NYT lost its way



- NYT leaders caving to a culture of "illiberalism"
- silences debate and caters to the ideological whims of the paper's younger, left-leaning staffers
- while WSJ does not have such culture

Big Picture

- Media bias prevalent in the US. Among American adults,
  - 34% think media reporting news "fully, accurately, and fairly" (Gallup, 2022)
  - 2/3 perceive factual distortions in their news sources (Pew Research Center, 2020)
- Is media bias supply and demand driven?
  1. demand: readers perceive biased media to be more informative or more enjoyable
  2. supply: media management or labor are willing to sacrifice profits for political gain

- Theory debate: which channel to focus on Lit-Review
- Role of competition:
  - demand-driven: competition $\Rightarrow\uparrow$ biases that cater to these tastes (àla Hotelling)
  - supply-driven: competition $\Rightarrow\downarrow$ bias and improve welfare

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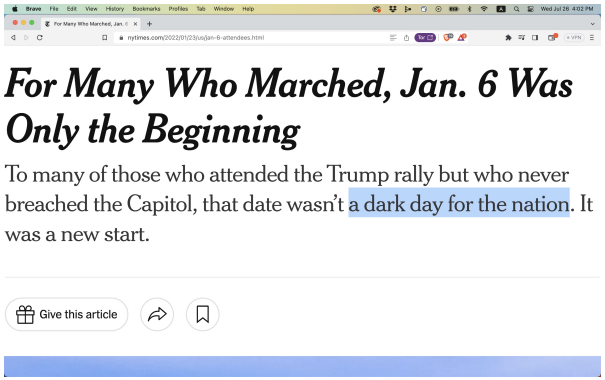
A Tale of Two Articles on NYT

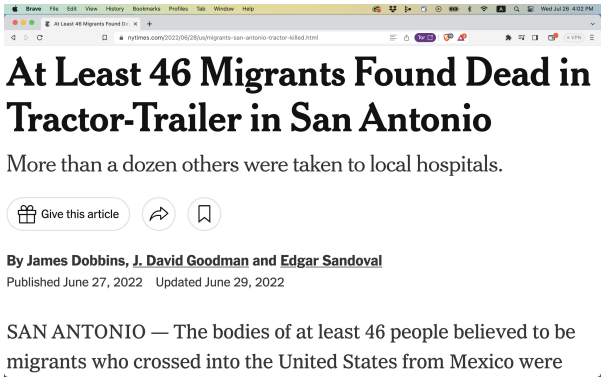


For Many Who Marched, Jan. 6 Was Only the Beginning

To many of those who attended the Trump rally but who never breached the Capitol, that date wasn't a dark day for the nation. It was a new start.

Give this article

(a) Pro-Democrat



At Least 46 Migrants Found Dead in Tractor-Trailer in San Antonio

More than a dozen others were taken to local hospitals.

Give this article

By James Dobbins, J. David Goodman and Edgar Sandoval

Published June 27, 2022 Updated June 29, 2022

SAN ANTONIO — The bodies of at least 46 people believed to be migrants who crossed into the United States from Mexico were

(b) Pro-Republican

1. Left article (more pro-Democrat)
   - published on Jan 23, 2022 03:00
   - not initially popular
   - put on homepage in a few hours, remains 48+ hours ▸ Time-series
2. Right article (less pro-Democrat)
   - published on June 27, 2022 21:00
   - instantly popular
   - quickly put on homepage, but removed next hour ▸ Time-series

What We Do And What We Find

- We look at the NYT and WSJ's decision on
  1. when to take article down from homepage
  2. liberal vs conservative articles
- Data (Leung and Strumpf 2023):
  1. NYT (07/2021 to 05/2023): 82k articles with URLs, articles info, *and hourly data on whether on homepage or not*
  2. WSJ (10/2022 to 05/2023): 20k articles with similar data
  3. textual analysis on political slant (pro-Democrats vs pro-Republican)
  4. Twitter: tweets for all the articles with timestamp (22M tweets for NYT and 2M tweets for WSJ)
     - proxy for reader engagement (demand-side)
- Main results:
  1. homepage presence $\Rightarrow\uparrow$ tweets (35% for NYT and 162% for WSJ)
  2. survival analysis on homepage presence: liberal (conservative) articles have a longer homepage presence on NYT (WSJ), *even after controlling for demand factors, i.e. articles' tweets count*

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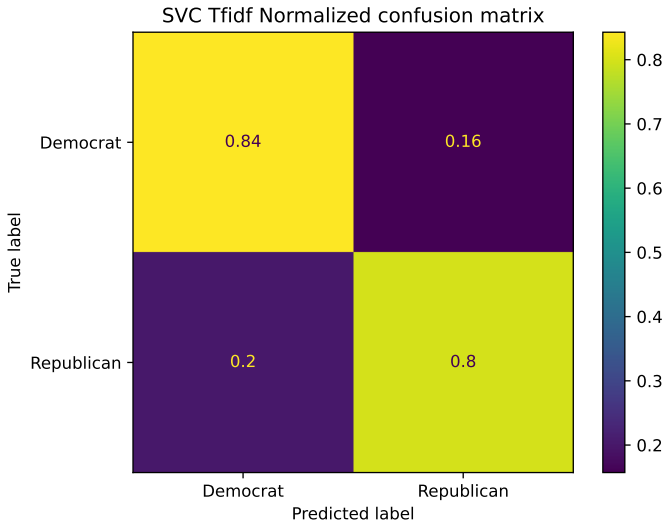
Data: NYT and WSJ Articles

- NYT (07/2021 to 05/2023):
  - Articles data from the archives
    - 82K articles (with URLs)
    - articles info including publication date, news tone, section, headline, keywords etc
    - hourly top 20 ranks in email, share, views
  - Scrapes the NYT homepage (Leung and Strumpf, 2023)
    - scraper runs every 1 min
    - 49K articles had been on homepage at some point
- WSJ (10/2022 to 05/2023):
  - Articles data from the archives
    - 20K articles (with URLs)
    - no news tone, top 20 ranks
  - Scrapes the WSJ homepage (Leung and Strumpf, 2023)
    - scraper runs every 15 sec
    - 14K articles had been on homepage at some point
- Political slant scores (2 slides later) and sentiment for headlines and abstracts

Twitter API

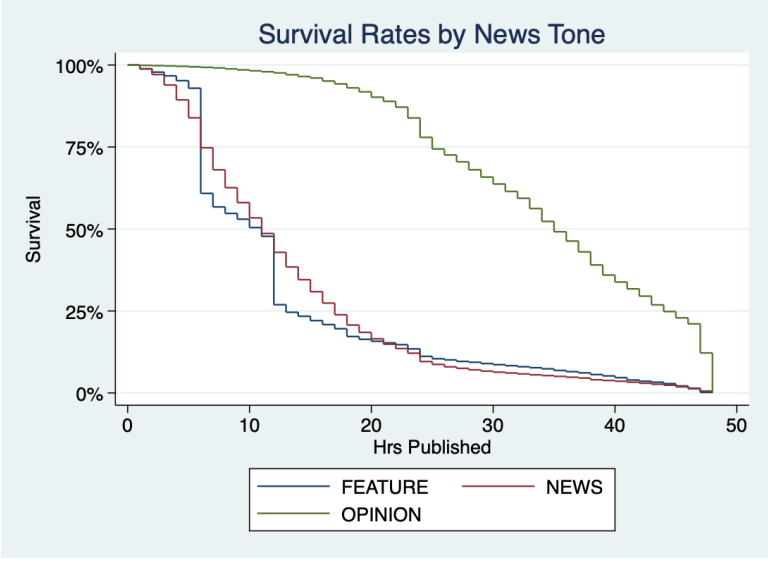
- Pew Research Center:
  - 23% of Americans use Twitter
  - 69% US Twitter users get news from Twitter
- Use Twitter API to extract all tweets containing the URLs of the NYT and WSJ articles in our sample
  - 22M tweets for NYT articles ($\approx$275 tweets/article)
  - 2M tweets for WSJ articles ($\approx$100 tweets/article)

Measuring Political Slant from Machine Learning

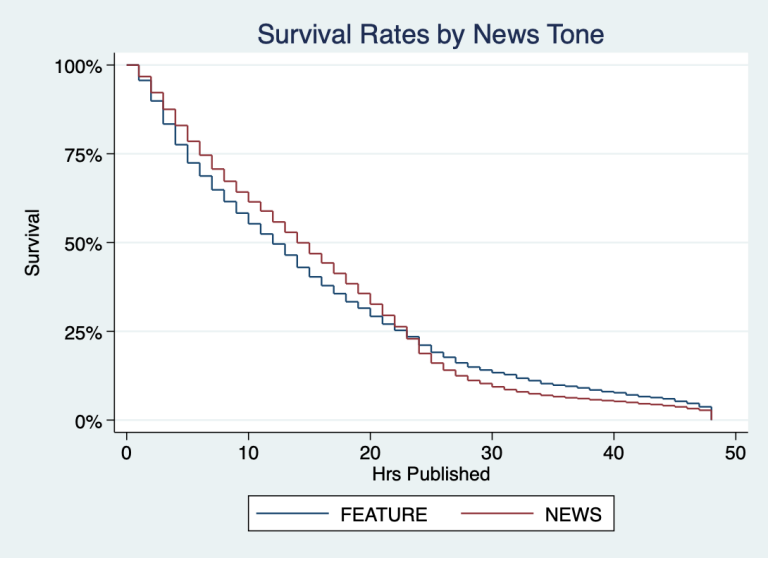


- 4.2 M tweets from 2,100 politicians' accounts tracked by ProPublica
  - 2.2 M (1.9 M) tweets by Democrats (Republicans)
  - 2/3 as training data, 1/3 as testing data
  - model achieves 82% accuracy on the leave-out validation dataset
- Then apply the predictions on the NYT and WSJ articles' abstract
  - pro-Democrat scores (0-1)

Survival Rates on Homepage by News Tone



(a) NYT



(b) WSJ

- $>$ 5% of articles taken off from homepage within 2 hours
- $>$ 20% within 6 hours, and $>$ 80% within 24 hours
- Op-ed in NYT stays much longer

Table 3: Summary Stats for NYT and WSJ Articles

	New York Times		Wall Street Journal	
	Homepage Ever (No)	Homepage Ever (Yes)	Homepage Ever (No)	Homepage Ever (Yes)
Sentiment Scores (Abstract)	0.0690 (0.392)	-0.0140 (0.454)	0.0348 (0.387)	0.01610 (0.423
Pro-Dem. Scores (Abstract)	0.603 (0.205)	0.598 (0.215)	0.519 (0.213)	0.539 (0.209)
Tweets Count	63.46 (537.2)	404.3 (1501.7)	46.06 (225.8)	138.8 (1032.7)
N	33191	48501	6357	14250

Mean coefficients; SD in parentheses

- 60-70% of articles made it to homepage at some point
- NYT articles liberal, WSJ more neutral
- NYT more than twice as popular as WSJ in terms of tweets
- Homepage articles
  - more popular in terms of tweets
  - comparable partisan distribution

Table 4: NYT Articles' Rank and Hourly Tweets Count

	Views	Share	Email
Outside Top 20	4.894	4.538	5.007
	(46.66)	(40.90)	(45.53)
Rank 11-20	13.20	16.03	12.33
	(71.65)	(114.8)	(92.24)
Rank Top 10	14.96	24.32	17.01
	(66.20)	(48.25)	(87.11)

Mean coefficients; SD in parentheses

- Tweets count positively correlated with NYT own ranking

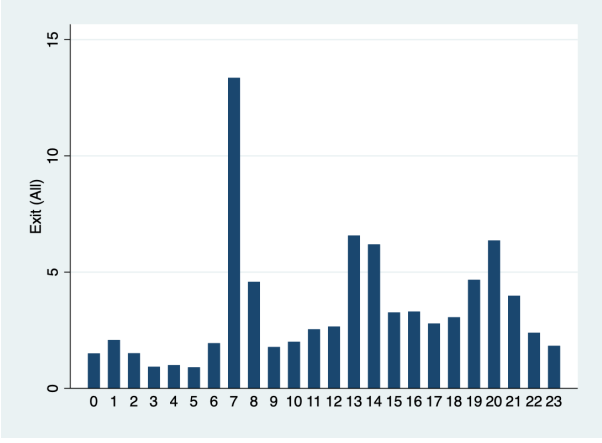
(1) Impact of Homepage Presence on Tweets Count

$$\ln Y_{it} = \beta_0^H Homepage_{it} + \beta_1^H X_{it}^H + \phi_i + \varepsilon_{it}$$

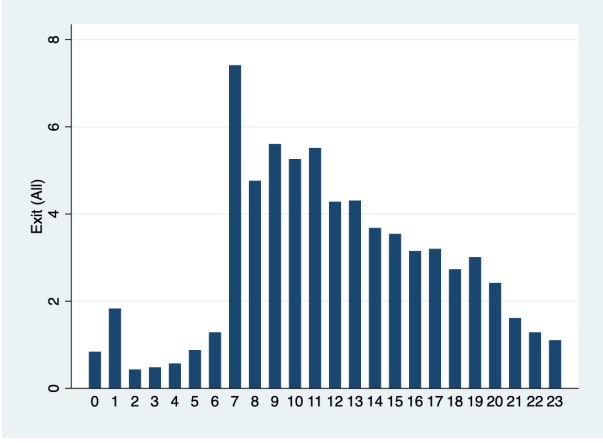
- $\ln Y_{it}$: natural log of zero-inflated tweets of article i at time t
- $Homepage_{it}$: indicator on whether i is on homepage at t
- X_{it}^H: a set of controls accounting for article popularity
  - $\ln Y_{it-1}$
  - number of hours since i's publication
  - a set of time fixed effects
- ϕ_i: article fixed effects
- $Homepage_{it}$ is endogenous
  - more popular/trendy articles stay on homepage longer

Instruments for $Homepage_{it}$

Figure 1: Articles Withdrawal by Hours of Day



(a) NYT



(b) WSJ

- Spikes in article withdrawal in certain hours
  - NYT: 7am, 8am, 1pm, 2pm, 7pm, 8pm
  - WSJ: 7am, 1am
- Homepage entry distribution looks similar
- These spikes most likely driven by routine editorial practices rather than inherent demand for specific articles

Table 5: Impact of Homepage Presence on Tweets Count

	New York Times			Wall Street Journal	
	News	Opinion	Feature	News	Feature
	Second Stage. Dependent variable is Ln Tweets				
Homepage	0.320***	0.764***	0.263***	1.496***	2.070***
	(0.0386)	(0.171)	(0.0215)	(0.144)	(0.319)
N	384512	223509	141749	141749	46921
Full Controls	Yes	Yes	Yes	Yes	Yes
	First Stage. Dependent variable is Homepage				
Withdrawal Hours	-0.0716***	-0.0190***	-0.170***	-0.0497***	-0.0432***
	(0.00109)	(0.000807)	(0.00179)	(0.00251)	(0.00468)
Full Controls	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

- First stage: article withdrawal more likely during specific withdrawal hours, for both NYT and WSJ
- Second stage: homepage presence important for views:
  - NYT: homepage presence $\Rightarrow\uparrow$ 26-76% tweets
  - WSJ: homepage presence $\Rightarrow\uparrow$ 150-207% tweets
- Decay rate tweet count not function of partisan slant ▸ here

(2) Homepage Survival Analysis

$$h(t^i; X_{it}, \beta, \lambda, \alpha) = \alpha\lambda(t^i\lambda)^{\alpha-1}\exp(\beta X_{it})$$

- h: hazard function on the risk of removal at any given time
- t^i: number of hours since publication of i
- λ and $\alpha > 0$: scale and shape parameter
- X_{it}: a set of (potentially) time-varying controls for article i
  - ln Y_{it-1} (demand)
  - pro-Democrat scores of article i (supply)
  - sentiment scores of i
  - a bunch of time fixed effects

Question: Conditional on being on the homepage, and controlling for demand factors (ln Y_{it-1}), do liberal (conservative) articles stay on NYT (WSJ) homepage longer?

Table 6: Homepage Survival Analysis (Hazard Ratios)

	New York Tiimes			Wall Street Journal	
	News	Opinion	Feature	News	Feature
Ln Tweets	0.918***	0.717***	1.035***	0.874***	0.795***
	(0.00399)	(0.0114)	(0.0104)	(0.00956)	(0.0174)
Sentiment Scores	0.944***	0.934**	0.989	0.867***	0.965
	(0.0111)	(0.0310)	(0.0200)	(0.0381)	
Pro-Dem. Scores	0.923***	0.887**	0.866***	0.974	0.909
	(0.0228)	(0.0537)	(0.0385)	(0.0467)	(0.0768)
# of New Articles	1.042***	1.250***	1.015***	1.072***	1.044***
	(0.00198)	(0.00910)	(0.00339)	(0.00436)	(0.00780)
N	384488	223499	137890	141491	46784
Time FE	Yes	Yes	Yes	Yes	Yes

Exponentiated coefficients; Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

- hazard ratio < 1 (> 1) means covariate slows (increases) exit rate
- Demand: $\uparrow$ tweets $\Rightarrow$ stay longer on homepage
  - NYT: $\uparrow$ 10% tweets $\Rightarrow\downarrow$ 0.7% hazard
  - WSJ: $\uparrow$ 10% tweets $\Rightarrow\downarrow$ 1.4% hazard
- Supply:
  - NYT: $\uparrow$ 1 s.d. pro-Dem. score $\Rightarrow\downarrow$ 2% hazard
  - WSJ: supply side bias seems negligible

Table 7: Homepage Survival Analysis by Major Tags (Hazard Ratios)

	New York Times				
	Politics	Coronavirus	Race/Gender	Abortion	Immigration
Pro-Dem. Scores	0.881***	0.884*	1.094	0.635**	0.567***
	(0.0355)	(0.0627)	(0.0868)	(0.126)	(0.0860)

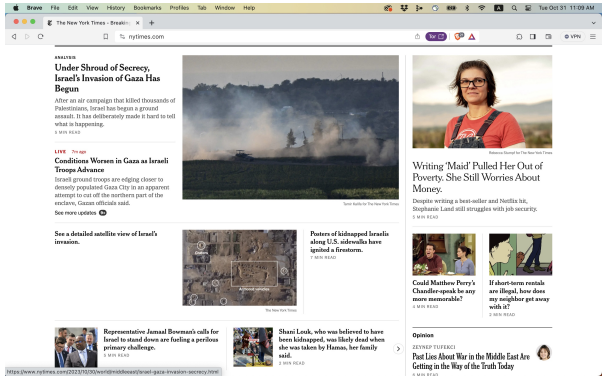
	Wall Street Journal				
	Politics	Coronavirus	Race/Gender	Abortion	Immigration
Pro-Dem. Scores	1.203***	1.027	1.714***	1.233	0.901
	(0.0567)	(0.196)	(0.260)	(0.537)	(0.581)

Exponentiated coefficients; Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

- Subsamples of articles tagged with major keywords
- NYT: more liberal articles tend to stay longer on homepage
- WSJ: more conservative articles tend to stay longer
- Similar results when dividing samples by news sections
- Robustness: similar results when restrict to positive sentiment tweets

(3) Leading News on Homepage



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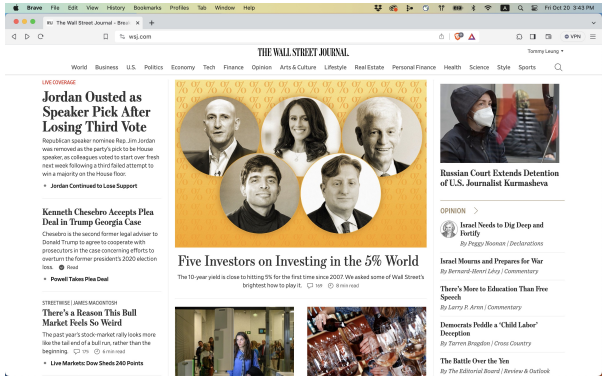

(b) WSJ

- Focus on leading news on homepage ($\sim$ 10 articles positioned at the top of the homepage)
- Repeat survival analysis for News articles (Op-ed and Feature articles rarely are Leading)
  - supply bias exist among World news ▸ here
  - also among Politics and Coronvirus news ▸ here

(4) Matched NYT and WSJ articles

- Concern: Differences in news content driving differences between papers
- Solution: match articles between papers (like Google News story cluster)

1. Approach:
   - group NYT and WSJ articles by day (Oct 2022 - May 2023)
   - matched article pair: cosine similarity (headline, abstract) 0.2+
2. Estimates: here
   - Dependent variable: NYT − WSJ homepage survival for matched pair
   - Key Regressor: article political slant (average, each paper)
   - Result: More liberal slant increases relative homepage duration on NYT (1 std dev increase slant → one hour longer duration)

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(5) Editorial Decisions on Print Edition and Podcasts

- Gentzkow et al (2015); Puglisi and Snyder (2015):
  - ↑ competition ⇒↓ bias
- ↑ demand elasticity ⇒↓ bias

1. Print edition (NYT only)
   - demand inelastic (who still subscribe to print edition today?)
   - more liberal more likely to be included in print edition here
     - esp. "Business", "US", "Arts", "Style" sections
2. Podcast (both NYT and WSJ)
   - NYT chief: "[The podcast] is helpful in driving affinity to the brand."
   - audience on average much younger and demand more elastic
   - article's political slant has no impact on whether it will feature in NYT's "The Daily" or WSJ's "The Journal" here

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(6) Print Front Page (not yet in paper)


The New York Times

U.S. ATTACKED

HIJACKED JETS DESTROY TWIN TOWERS AND HIT PENTAGON IN DAY OF TERROR

A CREEPING HORROR

President Vows to Exact Punishment for 'Evil'


THE WALL STREET JOURNAL.

TERRORISTS DESTROY WORLD TRADE CENTER, HIT PENTAGON IN RAID WITH HIJACKED JETS

Nation Stands In Disbelief And Horror

What's News—

Death Toll, Source of Devastating Attacks Remain Unclear; U.S. Vows Retaliation as Attention Focuses on bin Laden

- Physical newspaper frontpage of interest:
  - (lack of) digitization
  - removal occurs once per day only
  - inelastic readers + outsize importance (even years later)
- Data
  - NYT: A1 articles available via archive
  - WSJ removes list on three month moving average (collect from Internet Archive)
- Estimates:
  - Dep var = Indicator whether article makes print frontpage
  - Little impact article's partisan score prob. on print frontpage
  - News sections ▸ NYT ▸ WSJ
  - Features sections are similar

Conclusion

- Unique dataset on NYT and WSJ's editorial decisions on when to take articles off the homepage
  - homepage presence matters
  - supply side bias in homepage decision
- Things to do:
  1. a simple model?
  2. do newspapers react to one another?
  3. suggestions?

Literature

- Determinants of media bias:
  - Demand (Gentzkow and Shapiro, 2010; Puglisi and Snyder, 2011; Larcinese et al, 2011)
  - Supply (Demsetz and Lehn, 1985; Baron, 2006; Larcinese et al, 2011; Ansolabehere et al, 2006; Stanley and Niemi, 2013)
  - Competition (Mullainathan and Shleifer, 2005; Gentzkow and Shapiro, 2006)
- Social media and news:
  - competition for attention (de Corniére and Sarvary, 2022; Jeon and Nasr, 2016)
  - social media on news production (Cagé et al, 2022)
  - social media on fake news (Allcot and Gentzkow, 2017)
- Platform bias:
  - Amazon's "frequently bought together" recommendations (Raval, 2022; Cure et al, 2022)
  - measure platform bias in search ranking (Farronato et al, 2023; Aguiar et al, 2021; Reimers and Waldfogel, 2023; Teng, 2022; Lam, 2023)

Go Back

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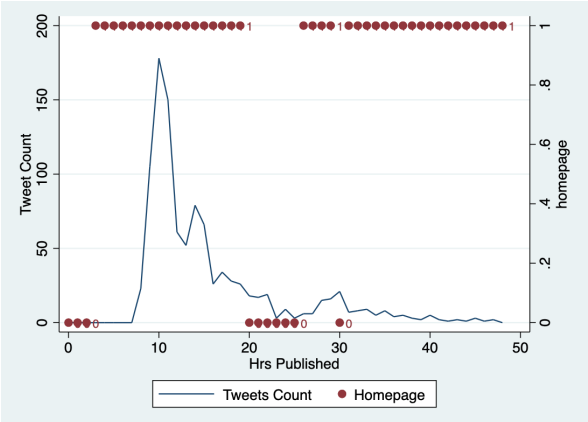
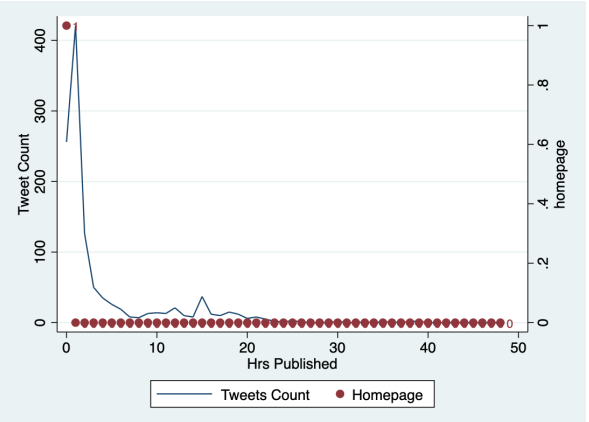


(a) "For Many Who Marched, Jan 6 Was Only the Beginning"



(b) "At Least 46 Migrants Found Dead in Tractor-Trailer in San Antonio"

1. Left article (more pro-Democrat)
   - abstract pro-Dem. scores: 0.93
   - 178 tweets share during peak
   - not taken off after 48 hours (zero tweet share at that point)
2. Right article (less pro-Democrat)
   - abstract pro-Dem. scores: 0.22
   - immediately on homepage, 256 tweets share within 1st hour
   - taken off from homepage next hour

Go Back

Table 10: Log Difference (Tweets) Regressions

	NYT				WSJ		
	News	Opinion	Feature	All	News	Feature	All
Sentiment Scores (Abstract)	0.000123	-0.000479	-0.000436	0.000134	-0.000791	0.00196	-0.0000164
	(0.00102)	(0.00290)	(0.00121)	(0.000761)	(0.00204)	(0.00268)	(0.00163)
Pro-Dem. Scores (Abstract)	0.0000312	0.00179	0.000121	0.0000425	0.00236	0.00502	0.00313
	(0.00205)	(0.00538)	(0.00252)	(0.00153)	(0.00406)	(0.00541)	(0.00326)
Homepage	0.339***	0.244***	0.203***	0.289***	0.118***	0.0687***	0.103***
	(0.00290)	(0.00742)	(0.00336)	(0.00212)	(0.00524)	(0.00680)	(0.00418)
Homepage (Last Hour)	-0.353***	-0.282***	-0.204***	-0.297***	-0.145***	-0.0904***	-0.128***
	(0.00284)	(0.00725)	(0.00337)	(0.00209)	(0.00518)	(0.00669)	(0.00413)
Hours Published	0.000509***	-0.00132***	0.00182***	0.000899***	0.000941***	0.000808***	0.000906***
	(0.0000364)	(0.000101)	(0.0000363)	(0.0000252)	(0.0000763)	(0.0000885)	(0.0000584)
# of New Articles	0.00101***	0.0137***	0.00195***	0.000964***	0.0000274	-0.00119**	-0.000794**
	(0.000162)	(0.00105)	(0.000172)	(0.000117)	(0.000415)	(0.000568)	(0.000369)
Constant	-0.0520***	0.00619	-0.0725***	-0.0446***	-0.0608***	-0.0464***	-0.0603***
	(0.00367)	(0.0102)	(0.00409)	(0.00296)	(0.00655)	(0.00808)	(0.00516)
Observations	2214816	324240	1305408	3844464	497136	236352	733488
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 11: Leading News Survival Analysis (Hazard Ratios)

	New York Times			Wall Street Journal		
	Business	US	World	Business	US	World
Ln Tweets	0.875***	0.888***	0.875***	0.819***	0.843***	0.872***
	(0.0165)	(0.00797)	(0.0122)	(0.0246)	(0.0226)	(0.0244)
Sentiment Scores (Abstract)	1.118**	1.158***	0.987	0.934	1.086	1.074
	(0.0602)	(0.0307)	(0.0356)	(0.0672)	(0.0745)	(0.0757)
Pro-Dem. Scores (Abstract)	1.009	0.856***	0.650***	0.980	0.950	1.610***
	(0.0987)	(0.0468)	(0.0550)	(0.132)	(0.137)	(0.268)
# of New Articles	1.054***	1.031***	1.032***	1.096***	1.074***	1.058***
	(0.00808)	(0.00432)	(0.00609)	(0.0123)	(0.0127)	(0.0128)
Observations	17901	70081	35486	13909	12347	12037
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes

Exponentiated coefficients; Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 12: Leading News Survival Analysis by Major Tags (Hazard Ratios)

	New York Times				
	Politics	Coronavirus	Race/Gender	Abortion	Immigration
Pro-Dem.	0.877**	0.774***	1.183	0.884	0.976
Scores	(0.0460)	(0.0745)	(0.164)	(0.203)	(0.223)

	Wall Street Journal				
	Politics	Coronavirus	Race/Gender	Abortion	Immigration
Pro-Dem.	1.179**	2.879***	2.201***	1.018	1.105
Scores	(0.0903)	(0.807)	(0.552)	(1.006)	(1.959)

Exponentiated coefficients; Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 13: OLS Regression of Survival Difference (NYT - WSJ)

	(1) Avg	(2) NYT	(3) WSJ	(4) Pro-Dem Dif. < 0.1	(5) Pro-Dem Dif. < 0.05
Pro-Dem. Scores	4.791***	2.424*	3.958***	4.918*	6.830*
(Abstract)	(1.653)	(1.334)	(1.360)	(2.574)	(3.940)
Tweets Dif.	0.000886***	0.000904***	0.000897***	0.000953**	0.00128*
(NYT- WSJ)	(0.000250)	(0.000250)	(0.000250)	(0.000424)	(0.000687)
Observations	2031	2031	2031	626	306
Day FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 14: NYT Print Edition Regression

	Business	US	World	Arts	Life	Style
Ever on Homepage	0.277***	0.461***	0.540***	-0.0406***	0.152***	0.0322*
	(0.0137)	(0.00977)	(0.0104)	(0.00875)	(0.0141)	(0.0183)
ln Tweets Count	0.0656***	0.0659***	0.0602***	0.0232***	0.0163***	0.0422***
	(0.00498)	(0.00265)	(0.00391)	(0.00437)	(0.00581)	(0.00838)
Sentiment Scores (Abstract)	0.0452***	0.0390***	-0.0287***	-0.0134	0.0141	-0.0286
	(0.0138)	(0.00798)	(0.00906)	(0.00936)	(0.0147)	(0.0219)
Pro-Dem. Scores (Abstract)	0.0571**	0.0350**	-0.0121	0.170***	-0.0304	0.101**
	(0.0257)	(0.0154)	(0.0208)	(0.0208)	(0.0309)	(0.0422)
Observations	4967	12252	7761	8736	4874	2531
Day FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 15: Podcast Regression

	New York Times			Wall Street Journal		
	NEWS	FEATURE	All	NEWS	FEATURE	All
Ever on Homepage	0.000801	0.000355	0.000741	0.000138	-0.00305	-0.00275
	(0.00137)	(0.000561)	(0.000818)	(0.00413)	(0.00334)	(0.00238)
ln Tweets Count	0.00670***	0.00165***	0.00510***	0.0143***	0.0116***	0.00926***
	(0.000403)	(0.000234)	(0.000260)	(0.00108)	(0.00109)	(0.000628)
Sentiment Scores	-0.00353***	-0.000792	-0.00275***	-0.00454	-0.000527	-0.00307
(Abstract)	(0.00124)	(0.000614)	(0.000776)	(0.00303)	(0.00333)	(0.00201)
Pro-Dem. Scores	-0.000248	-0.00126	-0.000293	0.00383	-0.0109	-0.000277
(Abstract)	(0.00247)	(0.00127)	(0.00155)	(0.00603)	(0.00679)	(0.00392)
Observations	41241	22957	70287	10289	4630	17755
Day FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Tone FE	No	No	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 16: Linear Reg of Print Dummy (NYT, News)

	A1				A1 Plus			
	News	Business	US	World	News	Business	US	World
ln Tweets Count	0.0375***	0.0283***	0.0439***	0.0432***	0.0330***	0.0431***	0.0256***	0.0240***
	(0.000804)	(0.00228)	(0.00170)	(0.00236)	(0.000956)	(0.00312)	(0.00171)	(0.00271)
ln Tweets Count	-0.0183***	-0.00722	-0.0310***	-0.0162*	-0.00128	-0.00320	-0.00402	-0.00160
(Comp)	(0.00343)	(0.00853)	(0.00733)	(0.00836)	(0.00407)	(0.0117)	(0.00738)	(0.00959)
Num. of Same Day	-0.00306**	-0.00372	-0.00639**	-0.000622	0.000211	0.000814	0.00126	-0.00380
A1	(0.00120)	(0.00298)	(0.00258)	(0.00293)	(0.00143)	(0.00407)	(0.00260)	(0.00337)
Sentiment Scores	-0.0124***	-0.000545	0.00283	-0.0163**	-0.00549*	-0.00388	0.00491	-0.0212***
(Abstract)	(0.00276)	(0.00725)	(0.00573)	(0.00640)	(0.00328)	(0.00990)	(0.00577)	(0.00734)
Pro-Dem. Scores	-0.0174***	-0.0876***	-0.00178	-0.000217	0.00657	0.0357*	0.0152	0.0217
(Abstract)	(0.00556)	(0.0135)	(0.0112)	(0.0149)	(0.00661)	(0.0184)	(0.0113)	(0.0170)
Observations	42992	5851	13702	9095	42992	5851	13702	9095
Published Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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Table 17: Linear Reg of Print Dummy (WSJ, News)

	A1				A1 Plus			
	News	Business	US	World	News	Business	US	World
ln Tweets Count	0.0682***	0.0760***	0.0471***	0.0725***	0.0366***	0.0444***	0.0479***	0.0241***
	(0.00258)	(0.00554)	(0.00444)	(0.00524)	(0.00415)	(0.00836)	(0.00870)	(0.00810)
ln Tweets Count (Comp)	-0.0178**	-0.0224	-0.0129	-0.0226	0.00484	-0.0124	0.0216	-0.0158
	(0.00742)	(0.0156)	(0.0130)	(0.0160)	(0.0119)	(0.0235)	(0.0255)	(0.0248)
Num. of Same Day A1	0.00179	-0.00727	0.00286	-0.00931	-0.00781	0.00322	0.00580	0.00391
	(0.00739)	(0.0150)	(0.0139)	(0.0165)	(0.0119)	(0.0226)	(0.0271)	(0.0255)
Sentiment Scores (Abstract)	0.000816	0.0104	-0.00897	0.00369	-0.0214**	0.0172	0.00396	-0.0619***
	(0.00667)	(0.0166)	(0.0117)	(0.0137)	(0.0107)	(0.0251)	(0.0230)	(0.0212)
Pro-Dem. Scores (Abstract)	0.00217	-0.00638	-0.0102	0.0467	0.0234	0.0259	0.0333	-0.0109
	(0.0133)	(0.0293)	(0.0224)	(0.0298)	(0.0214)	(0.0442)	(0.0438)	(0.0461)
Observations	7148	1801	1720	1776	7148	1801	1720	1776
Published Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

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