Political Effects of Newspaper Paywalls

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Motivation

- **Information** for voters largely provided by **private actors**

  $\Rightarrow$ Shocks to news markets may affect **democratic outcomes**

  (e.g., Besley and Burgess 2002; Gentzkow 2006; DellaVigna and Kaplan 2007; Snyder Jr and Strömberg 2010; Falck et al. 2014; Gavazza et al. 2019; Zhuravskaya et al. 2020)

- Recent example: **Paywalls**:
  - 2000s: Newspapers put most content on website for free
  - 2010s: Newspapers start charging price for full access to website
  - 2020: $>$ 90% of Top 100 US newspapers have paywall

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  - 2010s: Newspapers start charging price for full access to website
  - 2020: $>$ 90% of Top 100 US newspapers have paywall

$\Rightarrow$ **Paywalls increase cost of obtaining information**

Did the introduction of paywalls on US newspapers websites affect political outcomes?

This paper

- **Staggered introduction of paywalls** across US newspapers and regions
- Measure **counties' exposure to paywalls** over time: Use print circulation to proxy which regions affected by paywalls
- Main outcomes from **large-scale survey** *(Cooperative Election Study)*:
  - Political knowledge (representatives, majorities)
  - Electoral participation
- **Contribution:** First evidence on political effects of paywalls

Roadmap

1. **Data**
2. **Effect on news consumption**
3. **Effect on knowledge**
4. **Effect on voting turnout**

Data

Data (1/3)

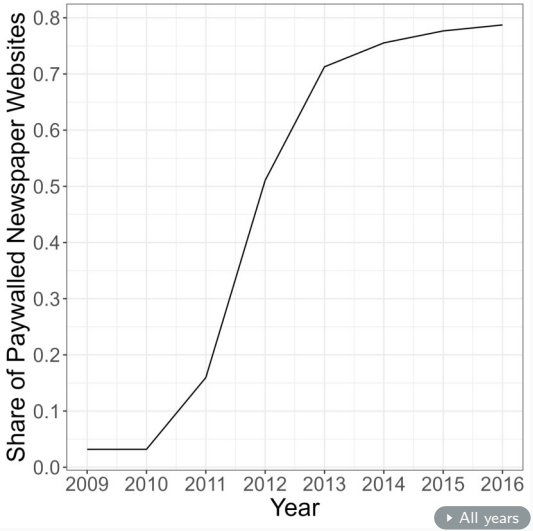
1. **Newspapers**
   - **Sample:** Top 100 US daily newspapers by print circulation in 2011
   - **Print circulation** from *Alliance for Audited Media*:
     - Number of print copies sold per newspaper and county in 2011 (301 newspapers)
   - **Page views** from *Alexa Internet*: (for Top 80)
     - Collected via *Alexa* browser toolbar (no mobile, no tablet)
     - Number of page views (clicks) to domain per million users
     - Daily, 2010–2017, globally (no user-level data)
   - **Characteristics:**
     - Mostly local, 3 National *(New York Times, USA Today, Wall Street Journal)*
     - No exits
     - 76% of total US print circulation in 2011 (based on AAM sample)
     - 1.5x the combined page views for ABC, CBS, NBC, Fox, AP, Reuters in 2010

Data (2/3)

2. Paywalls on newspaper websites

- Introduction dates, hand-collected (news coverage, website snapshots)
- Common characteristics (early 2010s):
  - Metered: *Any* first 5-20 clicks per month free
  - Leaky: Could circumvent with sufficient effort
- Here: Focus on *existence* of paywalls, abstract from *features*

▸ Subscription prices



▸ All years

Data (3/3)

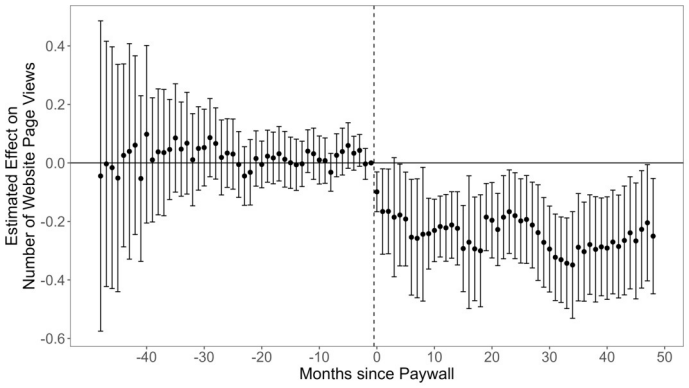
3. Survey: Cooperative Election Study (CES)

- 10-60k respondents per year, 2006–2021, by county, repeated cross section
- **Political Knowledge:** Questions about political representatives & party majorities
- **Electoral Participation:** Voting in elections: President, House, Senate, Governor (self-reported + validated)

Effects on online news consumption

Website page views decrease by 25-30% after paywall introduction

$$\log(\textit{Pageviews}_{n,t}) = \sum_{\tau \neq -1} \beta_\tau \, D^{\tau}_{n,t} + \textit{NewspaperFE}_n + \textit{YearMonthFE}_t + \delta' \mathbf{X_{n,t}} + \varepsilon_{n,t}$$



- TE $= -0.280^{***}$
- Not driven by selection or spillovers
- Substitution to print is rare (Pattabhiramaiah et al. 2019)
- Timing: Topic changes unlikely main driver

Estimated via Callaway-Sant'Anna. 55 Treated, 17 Control, 2010–2017, $N = 6,912$.
Controls x Year-Month: Population density, income, partisanship.
SE clustered by newspaper. Bars denote 95 percent confidence intervals.

▸ Sample ▸ Identification ▸ Control variables ▸ Estimators: Figure ▸ Estimators: Table ▸ Control group ▸ Spillovers

Effects on political knowledge

Outcome: Political Knowledge

- 8 knowledge questions:
  (based on respondent's place of residence)

  1. **Which party does [name of political representative] represent?**
     (4 Questions: Governor, House Representative, 2 Senators)
  2. **Which party has the majority in [legislative body]?**
     (4 Questions: House, Senate, State House, State Senate)

  ▸ Distribution ▸ By Question ▸ Trends ▸ Map

- **Compile into index:** Share of correctly answered questions
  (Robustness: 1^{st} Principal Component)

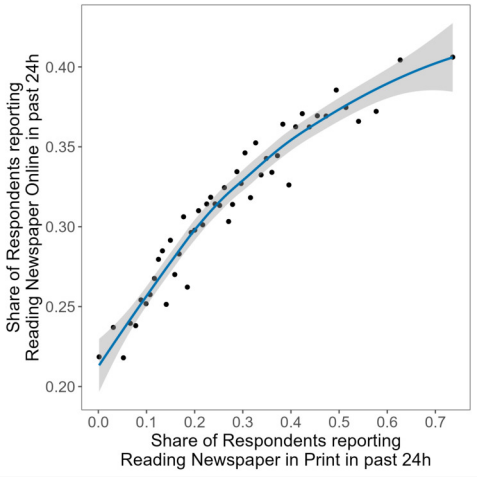
Treatment: Idea

Data challenge:

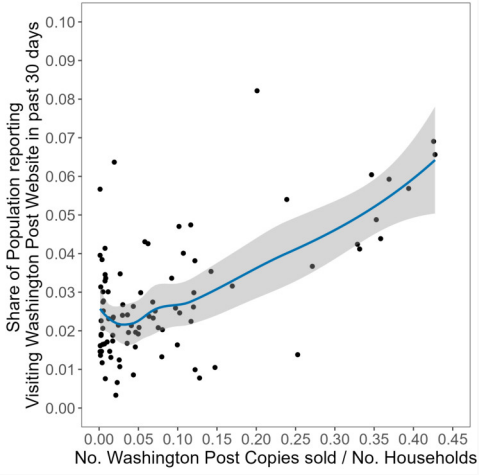
- **Goal:** Measure county-level exposure to paywalls over time
- **Ideal:** Measure *online* news consumption per newspaper on county-level
  $\Rightarrow$ Unavailable
- **Alternative:** Use print circulation as proxy for online readership
- **Intuition**: If print version of newspaper is relevant in county, then also online version is relevant
  (Most newspapers in sample are *local*)

Treatment: County-level print circulation predicts online readership

CES: More offline readers predicts more online readers



Washington Post: Higher print circulation predicts more website visits



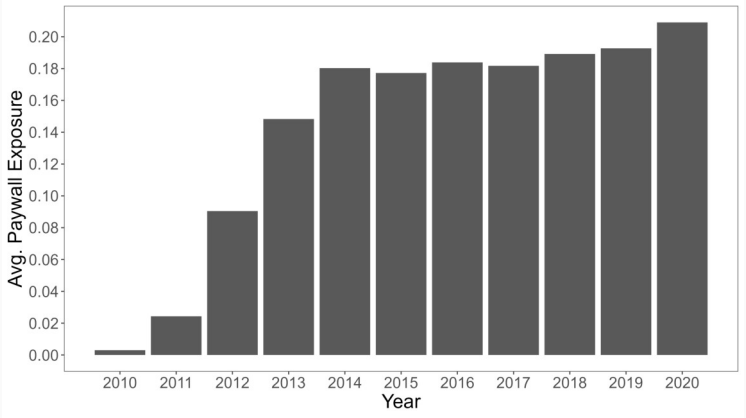
Treatment: County-level exposure to paywalls

$$\begin{aligned} \textit{Paywall Exposure}_{c,t} = & \text{ Per household circulation of newspapers} \\ & \text{ that have been affected by a paywall} \\ & \text{ by year } t \\ = & \sum_{n \in \textit{Newspapers}} \frac{\textit{Circulation}^{n}_{c,2010} \times I(\textit{Paywall}^{n}_{t})}{\textit{Households}_{c,2010}} \end{aligned}$$

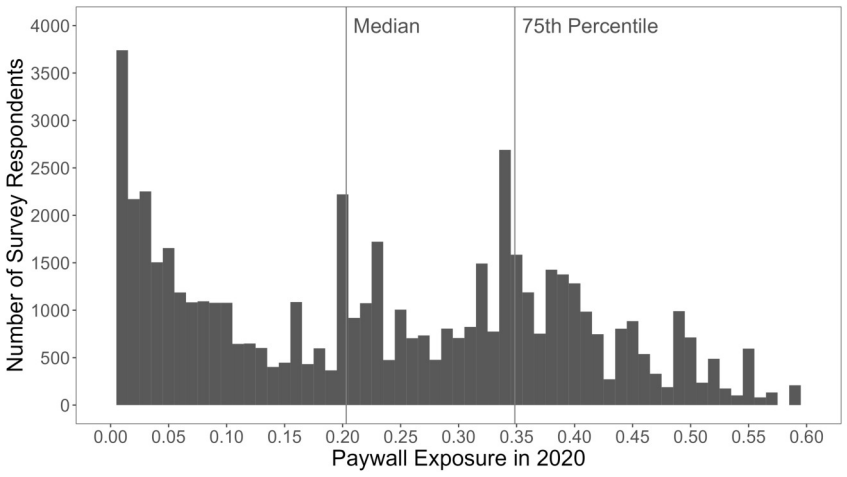
- $\textit{Circulation}^{n}_{c,2010}$: Circulation of newspaper n (in county c in 2010)
- $\textit{Households}_{c,2010}$: Number of households (in county c in 2010)
- $I(\textit{Paywall}^{n}_{t})$: Paywall indicator =1 if newspaper n has paywall in year t

$\Rightarrow$ **Proxy** for share of households affected by paywall

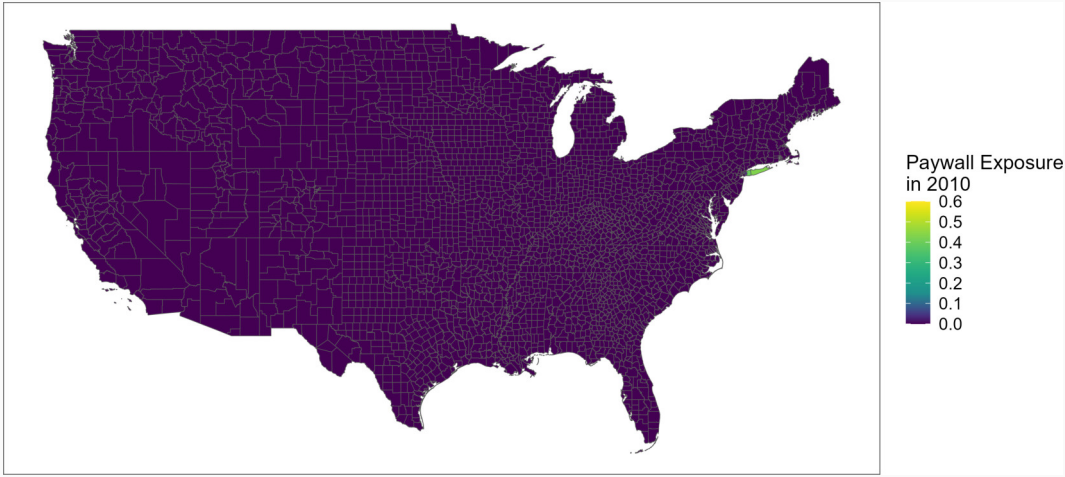
Paywall Exposure increases between 2010 and 2014



Large variation in Paywall Exposure in 2020



Paywalls affected all regions of the US (2010)



▸ Residualized by DMA-Year ▸ Correlation with observables

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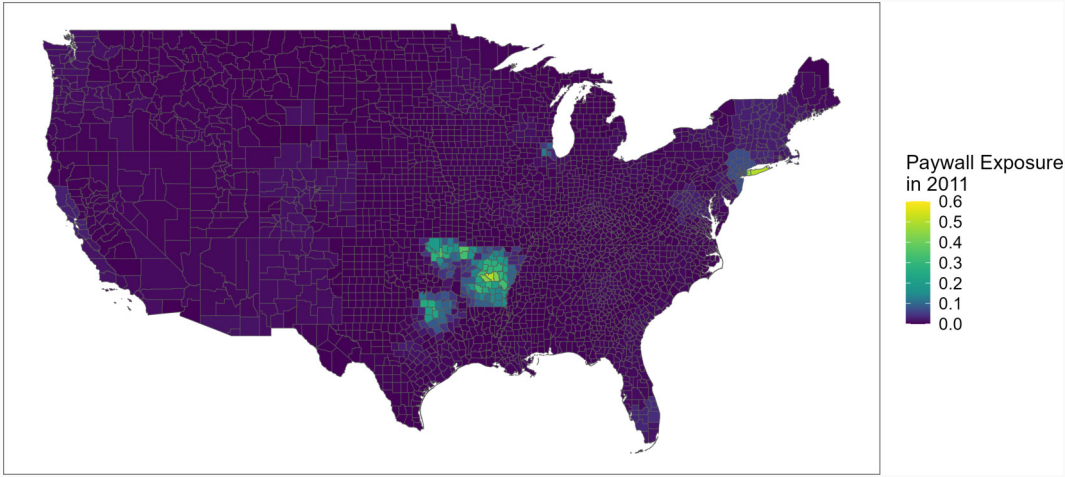
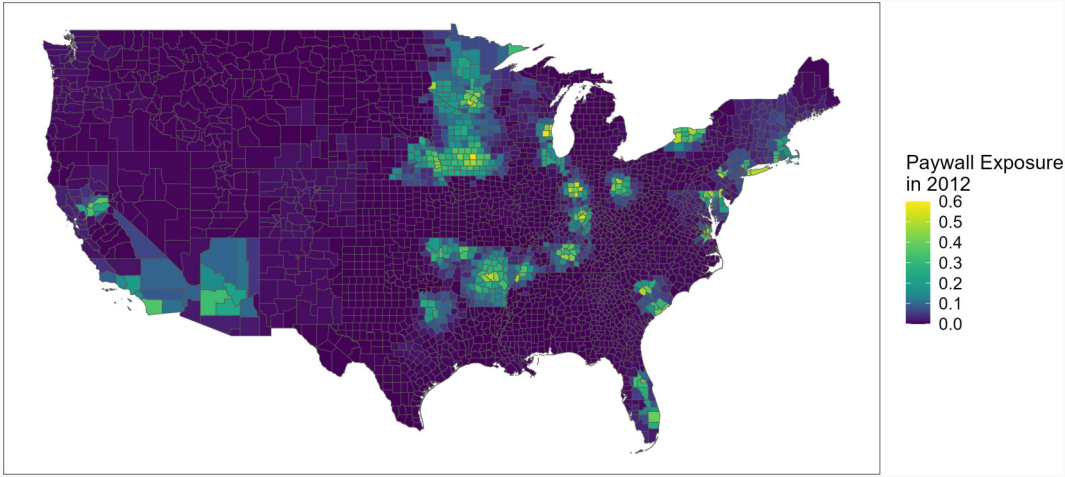


▸ Residualized by State-Year ▸ Correlation with observables

Paywalls affected all regions of the US (2012)



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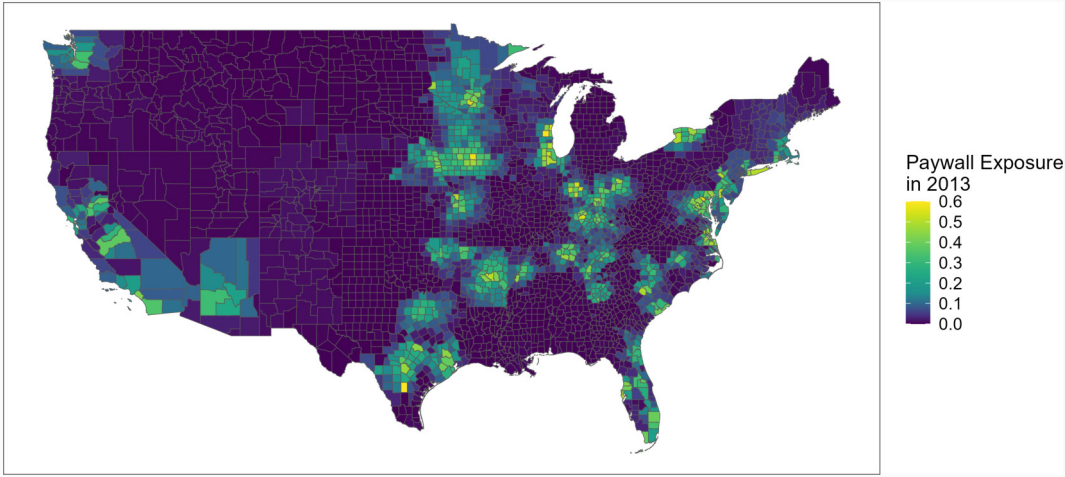

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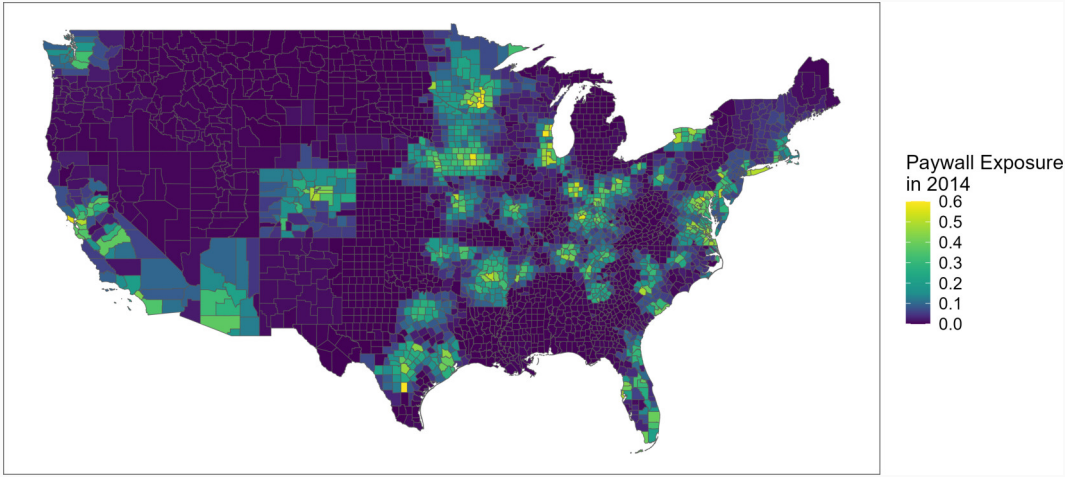
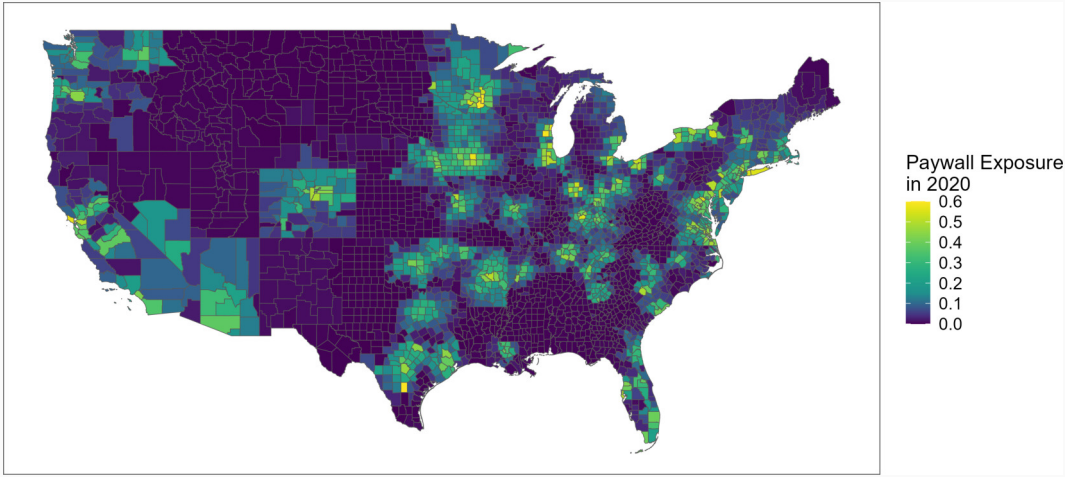
Paywalls affected all regions of the US (2014)



▸ Residualized by State-Year ▸ Correlation with observables

Paywalls affected all regions of the US (2020)



▸ Residualized by State-Year ▸ Correlation with observables

Empirical strategy

Staggered diff-in-diff:

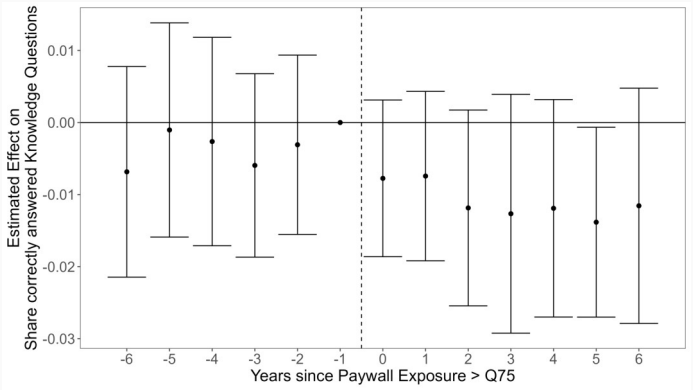
$$Knowledge_{i,c,t} = \sum_{\tau \neq -1} \beta_\tau D^\tau_{c,t} + \alpha_c + \gamma_{s(c),t} + \delta' \mathbf{X}_{i,c,t} + \varepsilon_{i,c,t}$$

- $Knowledge_{i,c,t}$: Share correct answers by survey respondent i in county c (state s) in year t
- $D^\tau_{c,t}$: Years since paywall exposure in county c first exceeds 75$^{\text{th}}$ percentile (end of sample) (See Guriev et al. 2021, QJE)
- $\mathbf{X}_{i,c,t}$: Individual controls
  (sex (2), age (5), ethnicity (2), education (6), employment (6), family income (5), children (2))
- **Robust estimator:** Callaway-Sant'Anna (Residualize on controls and FE first)

Identification

- **Identifying assumption:** Parallel trends of counties with high and low paywall exposure in absence of paywalls
- **Challenge:** Omitted variables correlated with both paywalls and knowledge / Measurement error in Paywall Exposure
  - $\Rightarrow$ Staggeredness
  - $\Rightarrow$ Individual characteristics x Year-FE
- **Other challenges:**
  - Correlation with regional politics ($\Rightarrow$ State-Year FE)
  - Heterogeneous effects ($\Rightarrow$ Robust estimator)
  - Selection of Newspapers ($\Rightarrow$ Sensitivity checks)
- **Remaining threats:** Variation within State-Year that is correlated with knowledge, but uncorrelated with individual characteristics

Paywalls reduce share correctly answered political knowledge questions by 1.6%



Estimated via Callaway-Sant'Anna. 2006–2021, $N = 518,867$
SE clustered by county. Bars denote 90 percent uniform confidence intervals.

▸ Control variables ▸ Continuous treatment ▸ Bins
▸ Thresholds ▸ Index decomposition ▸ Heterogeneity ▸ "Persuasion rate"

- TE $= -0.012^{**}$ (Baseline: 0.745)
- Interpretation:
  i) 1 more incorrect answer per 8 respondents
  ii) 1 in 46 respondents loses all knowledge
- Decreasing knowledge across all questions
- Driven by lower income and lower formal education

Decrease in knowledge entirely by individuals not paying for news

Estimated via Callaway-Sant'Anna. 2006–2021, $N = 518,867$
SE clustered by county. Bars denote 90 percent uniform confidence intervals.

▸ Prediction Performance ▸ Feature Importances ▸ External validity ▸ Control variables

- Individuals predicted to pay / not pay for news, based on large survey (2018 Pew-Ipsos Local News Survey, N=34,897)
- TE, not paying $= -0.015^{**}$
- TE, paying $= 0.002$

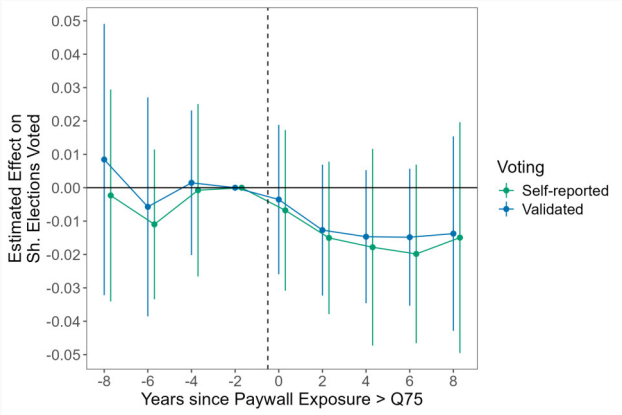
Effects on voting turnout

Outcome: Electoral participation

- **Participation** in 4 types of elections,
  both self-reported and validated:
  - President
  - House
  - Senate
  - Governor

- **Compile into index:** Share of elections voted in, among all held in year
  (Note: State-Year FE account for set of available elections)

Paywalls reduce voting in elections, among individuals unlikely to subscribe, in less partisan counties



Estimated via Callaway-Sant'Anna. 2008–2020, $N = 300,286$
SE clustered by county. Bars denote 90 percent confidence intervals.

▸ Table: Self-reported ▸ Table: Validated ▸ Index Decomposition

- TE, self-reported $= -0.0147^{***}$
- TE, validated $= -0.0115^{*}$
- Driven by all types of elections
- Full Sample: Less robust but qualitatively similar

Conclusion

Conclusion

- **Paywalls displace readers** from major regional newspaper websites
- **Declines in political knowledge** and **electoral turnout**
- Consistent with switch to news sources with less intensive coverage of politics

  $\Rightarrow$ Easy and equitable **access to information** is important for **democracy**

I'm looking forward to hearing your thoughts!

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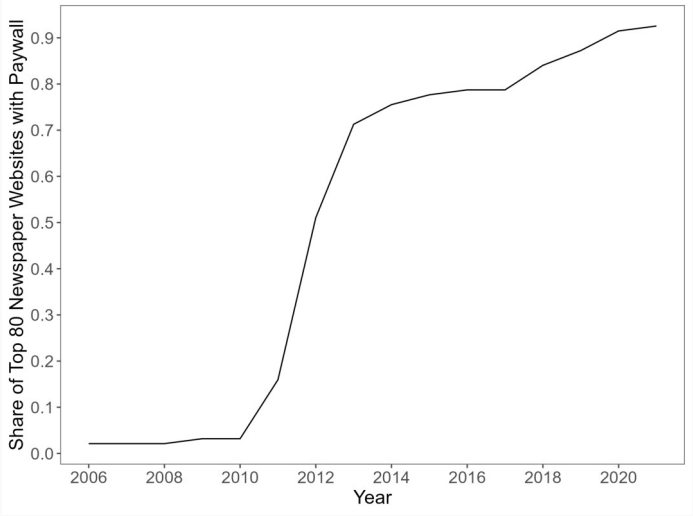
Appendix

Many paywalls introduced between 2010 and 2014



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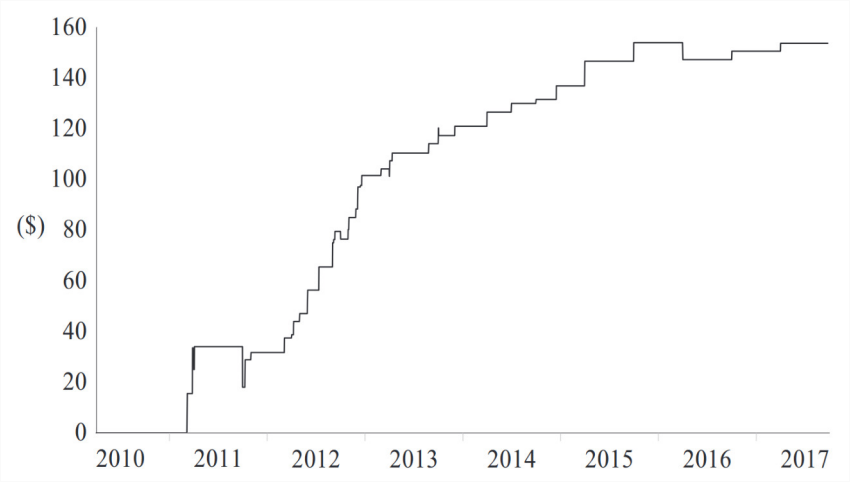
Price for yearly digital subscriptions to Top 42 US newspapers



Source: Kim et al. (2020)

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Effect on pageviews: Sample

- **Sample:** 72 newspaper websites
- **Period:** January 2010 – December 2017, monthly
- **Treated:** 55 newspapers with paywall introduced in sample period
- **Control:** 2 earlier, 11 later, 4 never

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Identification

- **Identifying assumption:** Parallel trends between paywalled and non-paywalled page views in absence of paywall
- **Challenge 1: Selection**
  - ⇒ Pre-trends
  - ⇒ Time-varying audience controls
  - ⇒ Vary control group composition
- **Challenge 2: Spillovers**
  - ⇒ Regional segmentation
  - ⇒ Robustness against excluding largest paywalled / smallest control newspapers
  - ⇒ To do: Stacked event study, Local projection

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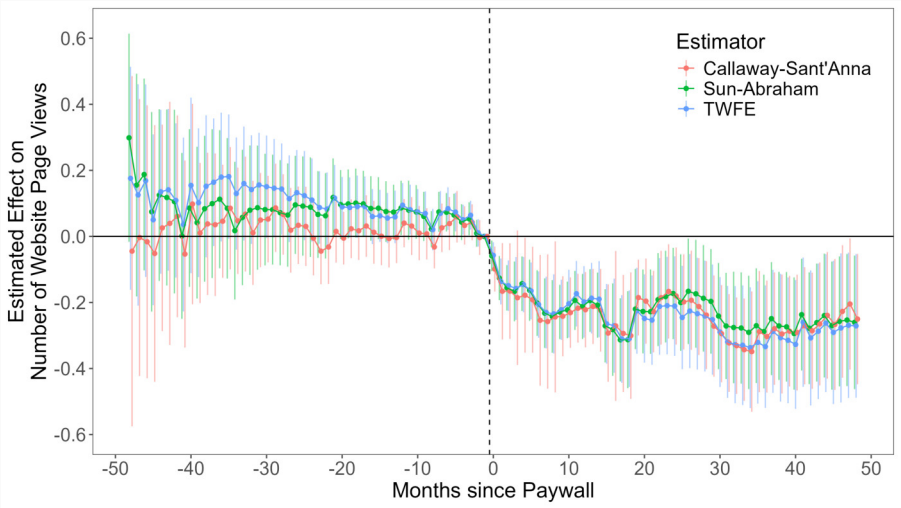
Results are robust to alternative estimators



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Page views decrease by 25-30% after paywall introduction

Dependent Variable:	Log(Pageviews)				
	(1)	(2)	(3)	(4)	(5)
Paywall	-0.257***	-0.291***	-0.302***	-0.280***	-0.310***
	(0.070)	(0.062)	(0.064)	(0.063)	(0.076)
Newspaper FE	✓	✓	✓	✓	✓
Month-Year FE	✓	✓	✓	✓	✓
Controls x Month-Year FE:					
Log(Population Density)		✓	✓	✓	✓
Sh. HH income $\leq 50k$			✓	✓	✓
Sh. HH income $> 100k$			✓	✓	✓
Partisanship index				✓	✓
Sh. college-educated					✓
Observations	6,912	6,912	6,912	6,912	6,912

Robust Callaway-Sant'Anna estimator. SE clustered by newspaper. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Back

Results are robust to alternative estimators

Dependent Variable:	Log(Pageviews)					
Estimator:	TWFE		Sun-Abraham		Callaway-Sant'Anna	
	(1)	(2)	(3)	(4)	(5)	(6)
Paywall	-0.258***	-0.273***	-0.267***	-0.279***	-0.257***	-0.280***
	(0.059)	(0.060)	(0.074)	(0.074)	(0.069)	(0.065)
Newspaper FE	✓	✓	✓	✓	✓	✓
Month-Year FE	✓	✓	✓	✓	✓	✓
Market Controls		✓		✓		✓
Observations	6,912	6,912	6,912	6,912	6,912	6,912
R^2	0.957	0.960	0.978	0.981		

Robust Callaway-Sant'Anna estimator. SE clustered by newspaper. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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Results are robust to definition of control group

Dependent Variable:	Log(Pageviews)			
Control group:	All	w/o Treated	w/o Earlier/Later	Only Later
	(1)	(2)	(3)	(4)
Paywall	-0.280***	-0.277***	-0.342***	-0.355***
	(0.067)	(0.070)	(0.068)	(0.068)
Newspaper FE	✓	✓	✓	✓
Month-Year FE	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Control group:				
Earlier Treated	✓	✓		
Treated (pre-treatment)	✓		✓	
Later Treated	✓	✓	✓	✓
Never Treated	✓	✓		
Observations	6,912	6,912	6,336	6,336

Robust Callaway-Sant'Anna estimator. SE clustered by newspaper. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

▸ Back

Results are robust to excluding national + largest newspapers

Dependent Var.:	Log(Pageviews)				
	Exclude Newspapers				Add Weights
	National	Top 15	Top 15 Paywalled	Bottom 5 Control	Weights
	(1)	(2)	(3)	(4)	(5)
Paywall	-0.282***	-0.332***	-0.357***	-0.320***	-0.273***
	(0.065)	(0.071)	(0.073)	(0.075)	(0.068)
Newspaper FE	✓	✓	✓	✓	✓
Month-Year FE	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓
Restricted Control Group			✓	✓	
Sample Weights					Log(Pageviews 2010)
Observations	6,624	5,472	5,472	6,432	6,912

Robust Callaway-Sant'Anna estimator. SE clustered by newspaper. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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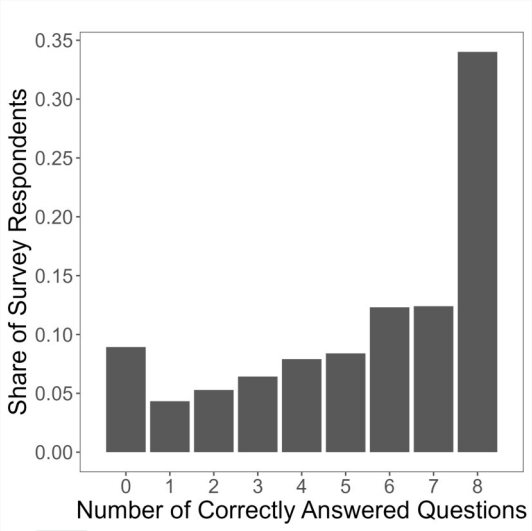
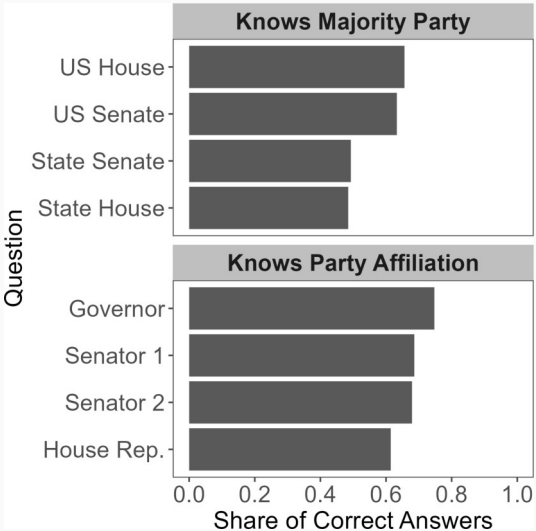
Distribution of Answers to Political Knowledge Questions





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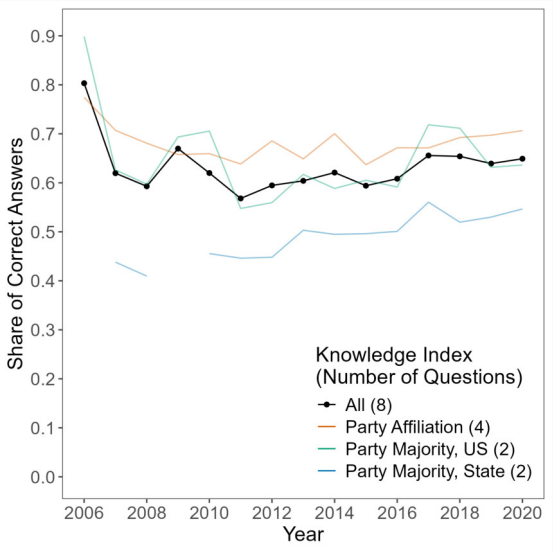
Number Correctly Answered Political Knowledge Questions by Year



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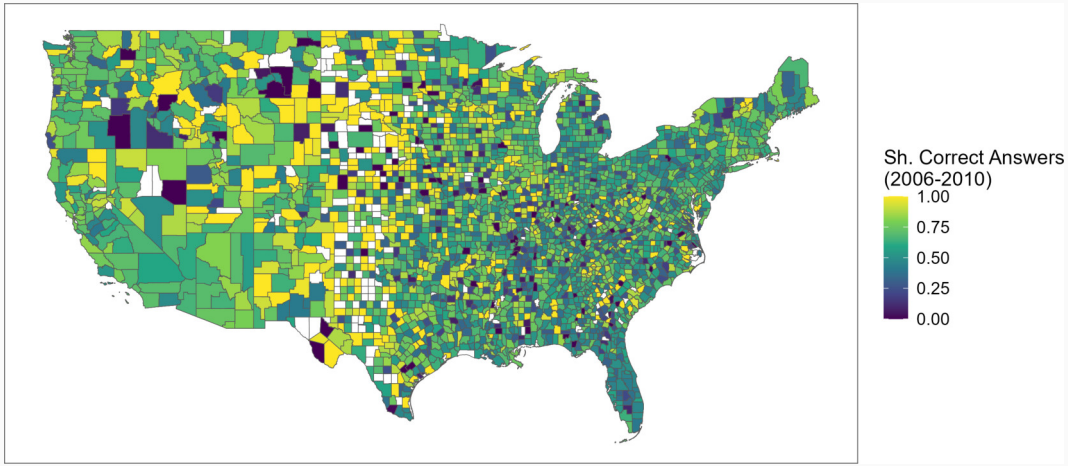
Sh. Correctly Answered Political Knowledge Questions by County



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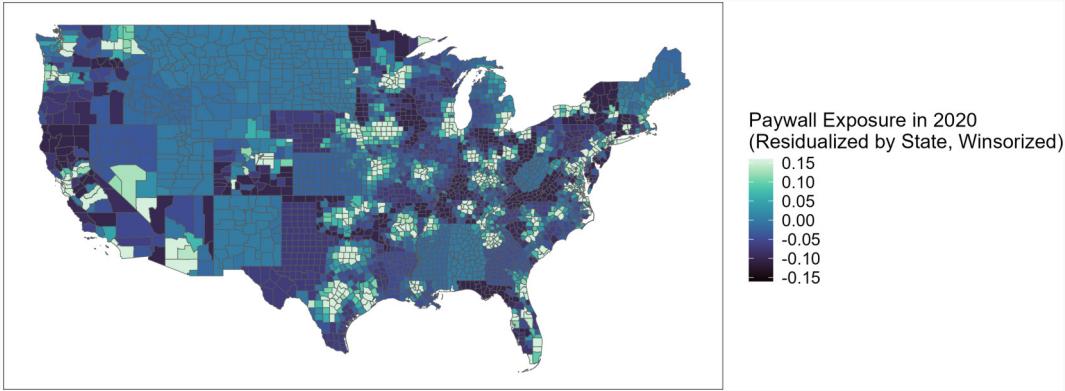
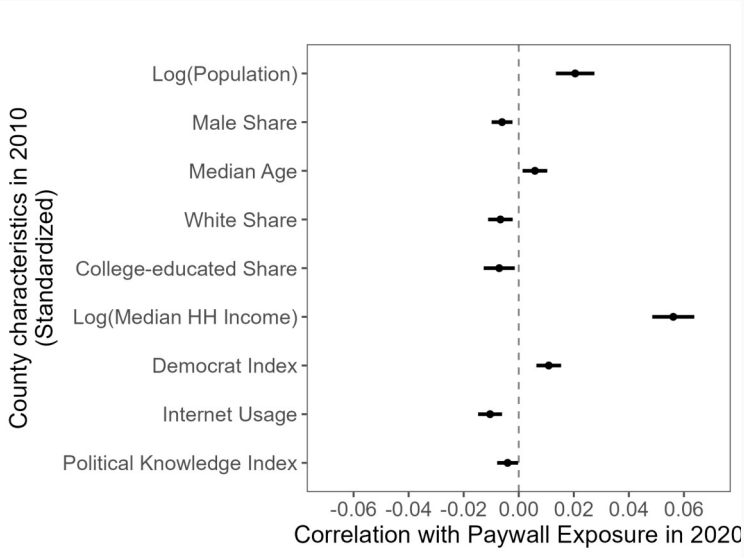
Paywall Exposure by county in 2020, residualized by State-Year



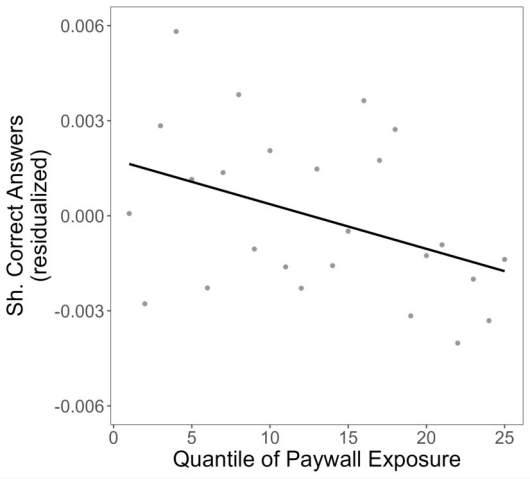
Back: 2020

County variables in 2010 correlated with Paywall Exposure in 2020



Back: Map 2020

Paywalls reduce online news consumption



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Paywalls reduce online news consumption

Dependent Variable:	Share Correct Answers					
	(1)	(2)	(3)	(4)	(5)	(6)
Paywall Exposure	-0.047***	-0.025**	-0.022**	-0.024*	-0.016*	-0.016*
	(0.013)	(0.011)	(0.011)	(0.013)	(0.009)	(0.010)
Dep. Var. Mean	0.745	0.745	0.745	0.745	0.745	0.745
County FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓			
State-Year FE				✓	✓	✓
Indiv. Demographics		✓			✓	
Indiv. Demographics x Year FE			✓			✓
Observations	529,409	517,924	517,924	529,409	517,924	517,924
R^2	0.080	0.329	0.320	0.091	0.338	0.328

SE clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

▸ Back

Paywalls reduce online news consumption

Dependent Variable:	Share Correct Answers					
	(1)	(2)	(3)	(4)	(5)	(6)
Paywall Exposure, 2nd Tercile	-0.001	-0.004	-0.002	-0.002	-0.003	-0.004
	(0.005)	(0.004)	(0.004)	(0.006)	(0.005)	(0.005)
Paywall Exposure, 3rd Tercile	-0.009	-0.008*	-0.007	-0.007	-0.008	-0.009*
	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
Dep. Var. Mean	0.745	0.745	0.745	0.745	0.745	0.745
County FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓			
State-Year FE				✓	✓	✓
Indiv. Demographics		✓			✓	
Indiv. Demographics x Year FE			✓			✓
Observations	437,835	437,039	437,039	437,835	437,039	437,039
R^2	0.066	0.326	0.312	0.075	0.334	0.320

SE clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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Paywalls reduce share of correctly answered political knowledge questions

Dependent Variable:	Share Correct Answers				
	(1)	(2)	(3)	(4)	(5)
Paywall Exposure > Q75	-0.018*	-0.017***	-0.018**	-0.012**	-0.015***
	(0.008)	(0.005)	(0.006)	(0.004)	(0.004)
Dep. Var. Mean	0.745	0.745	0.745	0.745	0.745
County FE	✓	✓	✓	✓	✓
Year FE	✓	✓		✓	
State-Year FE			✓		✓
Individual Controls		✓		✓	
Individual Controls x Year			✓		✓
Observations	530,372	518,867	518,867	518,867	518,867

Notes: Standard errors (in parentheses) are clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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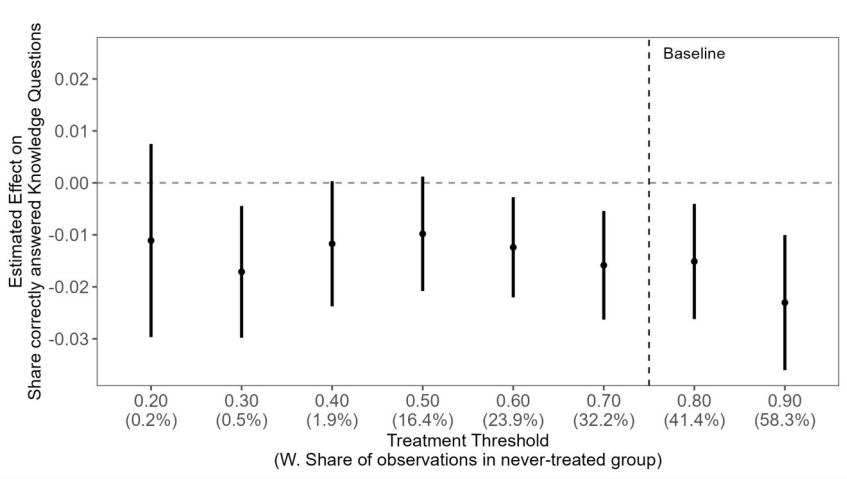
Results are robust to choice of threshold



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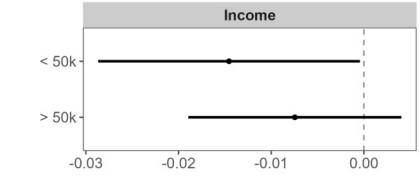
Driven by individuals with lower income and education



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Driven by individuals with lower income and education

Dependent Variable:	Share Correct Answers					
Subsample:	Income		Education		Age	
	$\leq$ 50k	$>$ 50k	No College	College	18-55	56+
	(1)	(2)	(3)	(4)	(5)	(6)
Paywall Exposure $>$ Q75	-0.015**	-0.007	-0.015*	-0.007*	-0.012**	-0.011
	(0.007)	(0.006)	(0.009)	(0.004)	(0.006)	(0.006)
Dep. Var. Mean	0.555	0.759	0.621	0.764	0.552	0.746
County FE	✓	✓	✓	✓	✓	✓
State-Year FE	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓
Observations	215,551	247,899	160,579	358,288	307,134	211,733

Notes: Callaway-Sant'Anna estimator. Sample weights are included. Standard errors (in parentheses) are clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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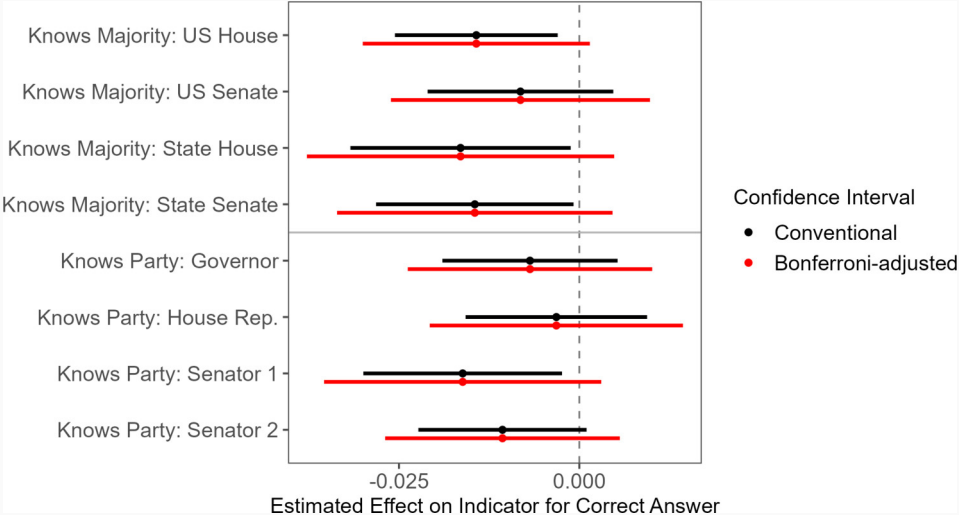
Knowledge decreases for both federal- and state-level politics



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"Persuasion rate" is moderate

Definition: Share of individuals who switched from correct to incorrect answer because of paywalls, among those exposed to paywalls:

Back-of-envelope calculation: (DellaVigna and Gentzkow, 2010)

$$\begin{aligned} f &= \frac{y_T - y_C}{e_T - e_C} \frac{1}{1 - y_0} \\ &= \frac{0.012}{0.5 * 0.5} \frac{1}{0.745} \\ &= 0.048 \end{aligned}$$

- $y_T - y_C$: Effect of paywalls on knowledge
- $e_T - e_C$: $0.5 \approx$ (Share US adults reading news online 2010–2017)
  $\times\ 0.5 \approx$ (Differential paywall exposure between treated and control)
- $1 - y_0$: Baseline knowledge

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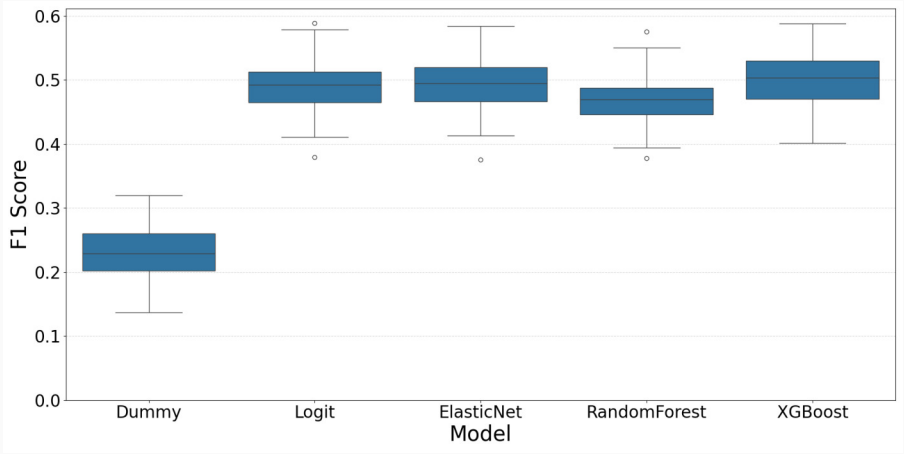
Paying for News: Prediction Performance



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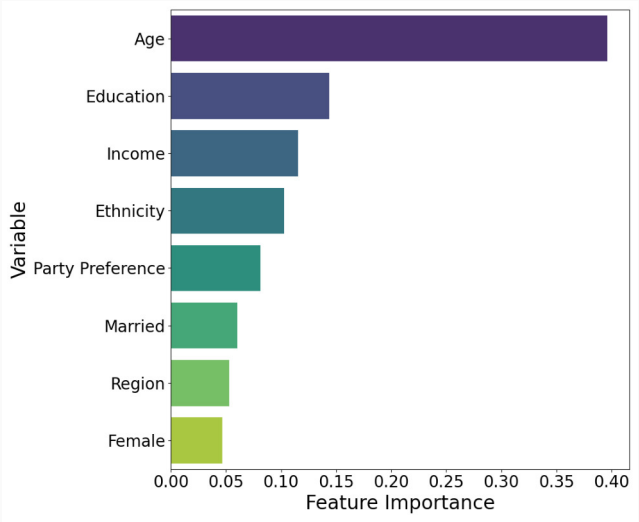
Paying for News: Feature Importance



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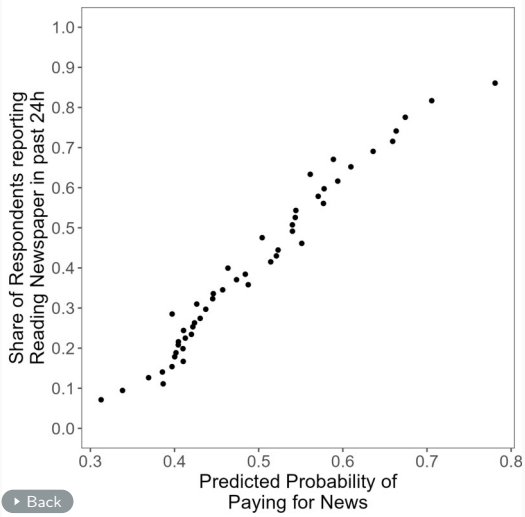
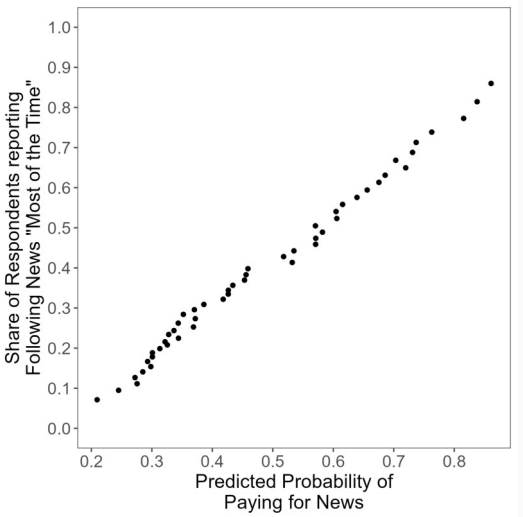
Paying for News: External Validity

(a) Read newspaper in past 24h



(b) Follow news "most of the time"



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Decrease in knowledge entirely by individuals not paying for news

Dependent Variable:	Share Correct Answers			
Paying for News (Pred.):	No		Yes	
	(1)	(2)	(3)	(4)
Paywall Exposure > Q75	-0.019**	-0.015**	-0.001	0.002
	(0.006)	(0.005)	(0.007)	(0.007)
Dep. Var. Mean	0.635	0.635	0.842	0.842
County FE	✓	✓	✓	✓
Year FE	✓		✓	
State-Year FE		✓		✓
Individual Controls	✓	✓	✓	✓
Observations	413,797	413,797	105,070	105,070

Notes: Callaway-Sant'Anna estimator. Sample weights are included. Standard errors (in parentheses) are clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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Paywalls reduces voting in elections among individuals unlikely to subscribe

Dependent Variable:	Participation in Elections, self-reported			
Paying for News (Pred.):	All		No	
County Partisanship Index:	All			0.3-0.7
	(1)	(2)	(3)	(4)
Paywall Exposure > Q75	-0.0092	-0.0056	-0.0119**	-0.0147***
	(0.0068)	(0.0049)	(0.0060)	(0.0055)
Dep. Var. Mean	0.6072	0.6072	0.5736	0.5739
County FE	✓	✓	✓	✓
Year FE	✓			
State-Year FE		✓	✓	✓
Individual Controls	✓	✓	✓	✓
Observations	418,328	418,328	330,193	279,457

Notes: Callaway-Sant'Anna estimator. Sample weights are included. Standard errors (in parentheses) are clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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Paywalls reduce voting in elections among individuals unlikely to subscribe

Dependent Variable:	Participation in Elections, validated			
Paying for News (Pred.):	All		No	
County Partisanship Index:	All			0.3-0.7
	(1)	(2)	(3)	(4)
Paywall Exposure > Q75	-0.0142**	-0.0055	-0.0090	-0.0115*
	(0.0064)	(0.0051)	(0.0057)	(0.0063)
Dep. Var. Mean	0.5089	0.5089	0.4798	0.4814
County FE	✓	✓	✓	✓
Year FE	✓			
State-Year FE		✓	✓	✓
Individual Controls	✓	✓	✓	✓
Observations	383,040	383,040	300,286	253,940

Notes: Callaway-Sant'Anna estimator. Sample weights are included. Standard errors (in parentheses) are clustered by county. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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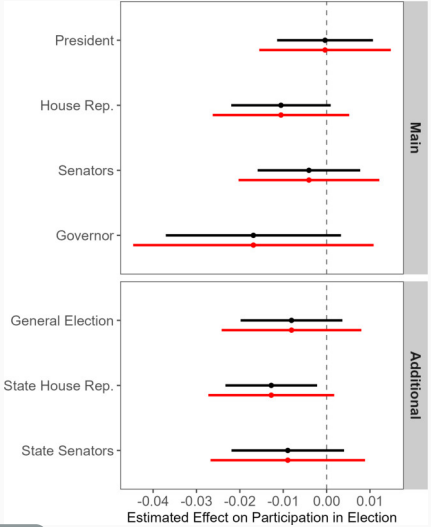
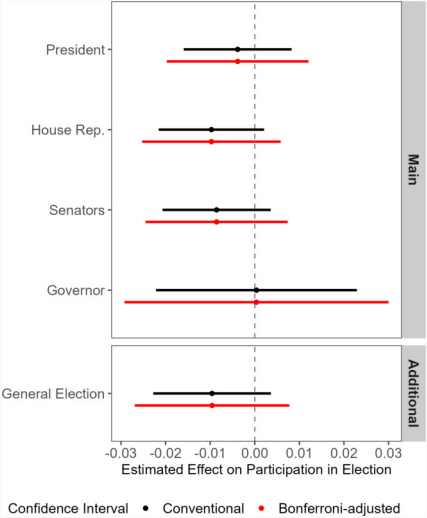
Turnout decreases for federal and state elections





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