

Mass media, Information Demand, and Beliefs

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University of Copenhagen, CEBI

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PhD Course on Subjective Beliefs, Attention and Economic Behavior

Mass media and beliefs

- We are all interested in belief and expectations. Where do they come from?

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- Information plays an important role, and we acquire it from various sources
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 - Social interaction (yesterday's lecture, e.g. Bailey et al., 2017)
 - Education (formal, informal, professional)

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 - Social interaction (yesterday's lecture, e.g. Bailey et al., 2017)
 - Education (formal, informal, professional)
- But also: **Mass media**
 - Traditional media (“one-to-many” communication)
 - Social media (“many-to-many” communication)

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- Still substantial scope to learn more about underlying mechanism!

What if you are not interested in beliefs *per se*?

Mass media also highly relevant to important policy areas, such as:

- Political accountability
- Misinformation
- Polarization of society
- Mental health

Exciting moment to start studying mass media

- Classical approach: **Natural experiments**
 - Exogenous variation in the **availability** of media programs
(e.g. signal transmission and variation in topography, staggered expansion of networks, introduction of new technologies, ...)

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- More recently: Rapid increase in the number of **experimental studies**

Plan for today

Understand how we can use **experimental techniques** to study news consumption and the effects of mass media:

1. Field experiments

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Understand how we can use **experimental techniques** to study news consumption and the effects of mass media:

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2. Experiments as a complement to quasi-natural experiments
3. Survey experiments

Field experiments

King, Schneer, White (2017, Science): Media effects on public discourse?

- Collaborate with 48 small US media outlets
- Randomize outlets to publish stories about specific **policy issues at assigned dates**
- Measure number of Twitter posts on a related policy area

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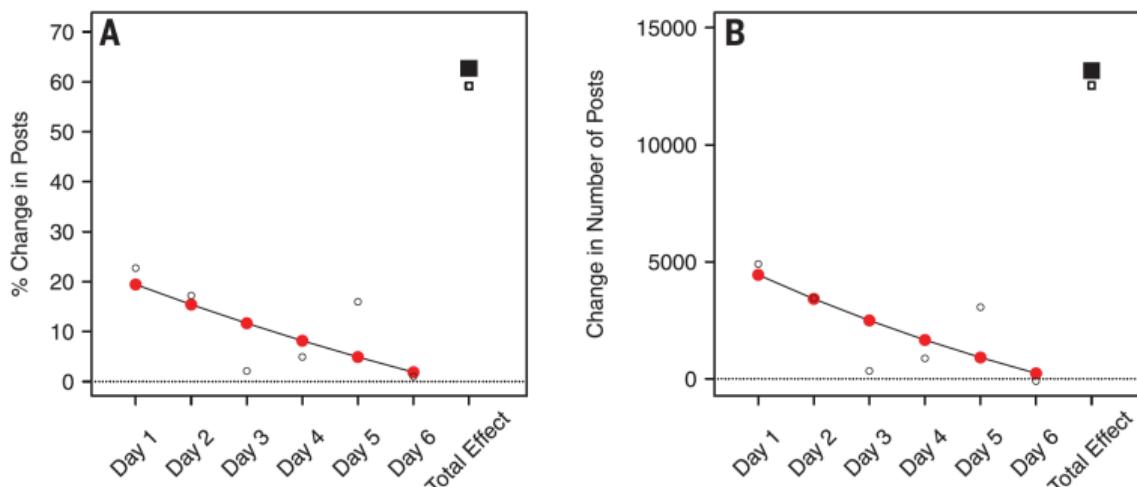


Fig. 2. Causal effect of the news media on public expression. (A and B) Effects are shown in terms of percent change (A) and absolute change (B) in numbers of social media posts in a broad policy area. Effects appear as the percent change in social media posts for each day of the week—estimated by our model-based estimator (solid red dots) and our model-free estimator (open circles)—and the total overall (solid and open squares, respectively).

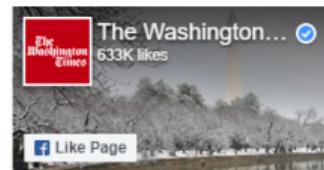
Levy (2021, AER): Social Media, News Consumption, and Polarization

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- Does the consumption of ideologically congruent news on social media exacerbate polarization?

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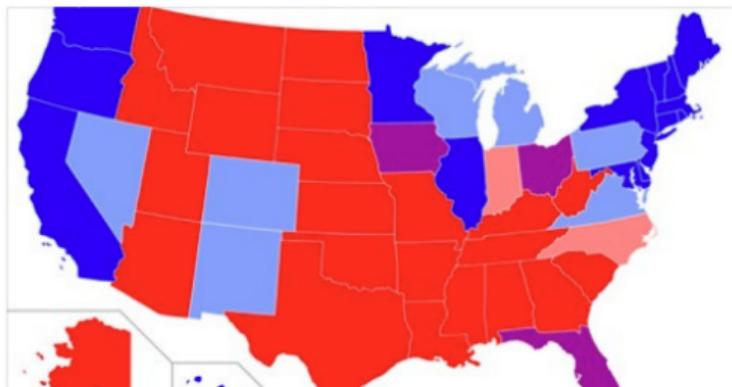
- Does the consumption of ideologically congruent news on social media exacerbate polarization?
- RCT: Encourage Facebook users to follow news outlets with liberal or conservative ideology
- Collect browser data with a Chrome extension
- Endline survey after two months:
Measure affective polarization



Recruiting respondents with Facebook ads



Participate in a short Yale University research survey and you can win an \$80 Amazon gift card



Interested in Politics?

Share your opinion!

YALESURVEY.QUALTRICS.COM

Learn More

103

87 Comments 38 Shares

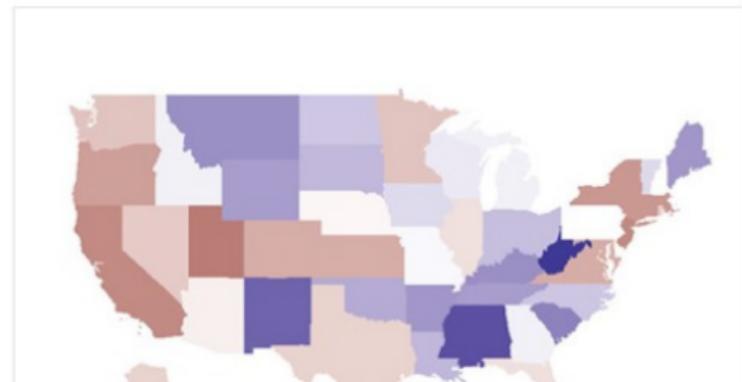
Like

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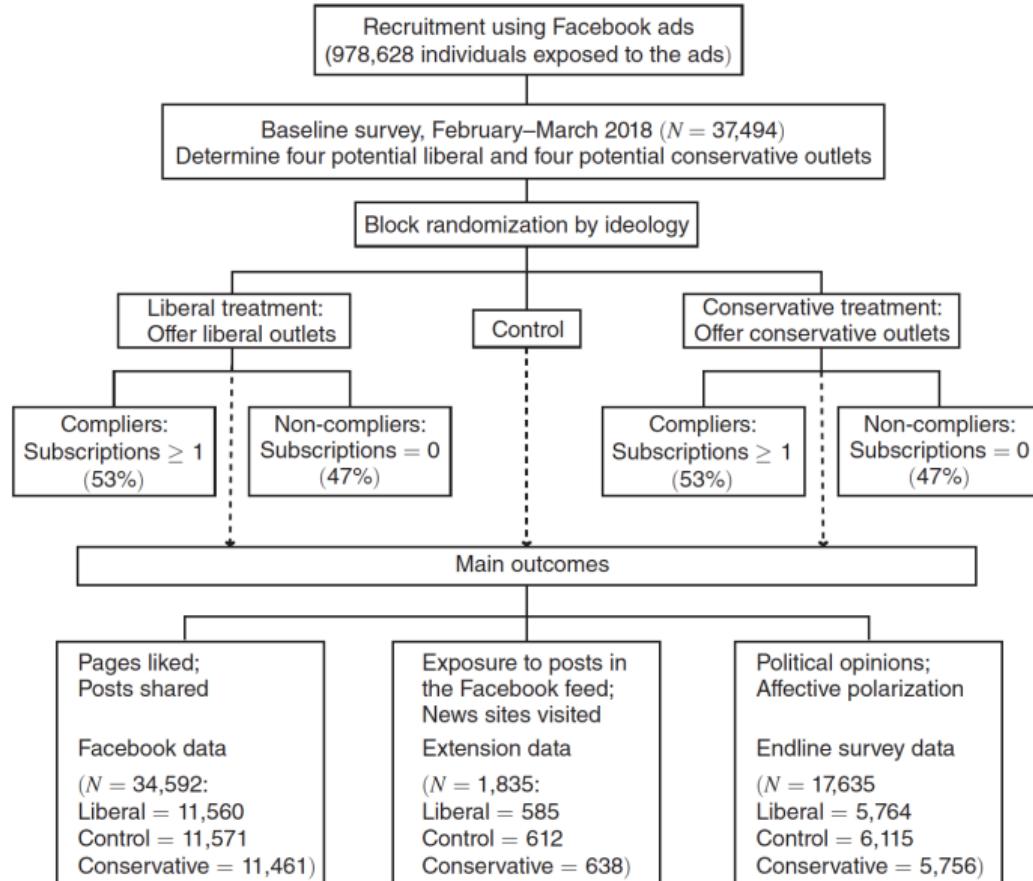
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Experimental design



Treatment: Instructions for the conservative treatment arm

Following a news or media page is a great way to learn about the news and hear other perspectives. Recently, researchers have suggested that subscribing to random sources can help burst the social media echo chamber.

By clicking like below, posts from randomly chosen popular Facebook pages may start appearing in your news feed. **To expand your horizons, please click "Like Page" on 1-4 of the pages below** (Facebook may ask you to confirm the like, you can always unlike the page later).

The pages were chosen randomly and therefore may all represent views you agree or disagree with. In any case, they present an opportunity to diversify your news feed.



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-
- Low-touch intervention: no reminder, no incentives (→ reduces demand concerns)
 - Naturalistic source of variation (→ external validity)

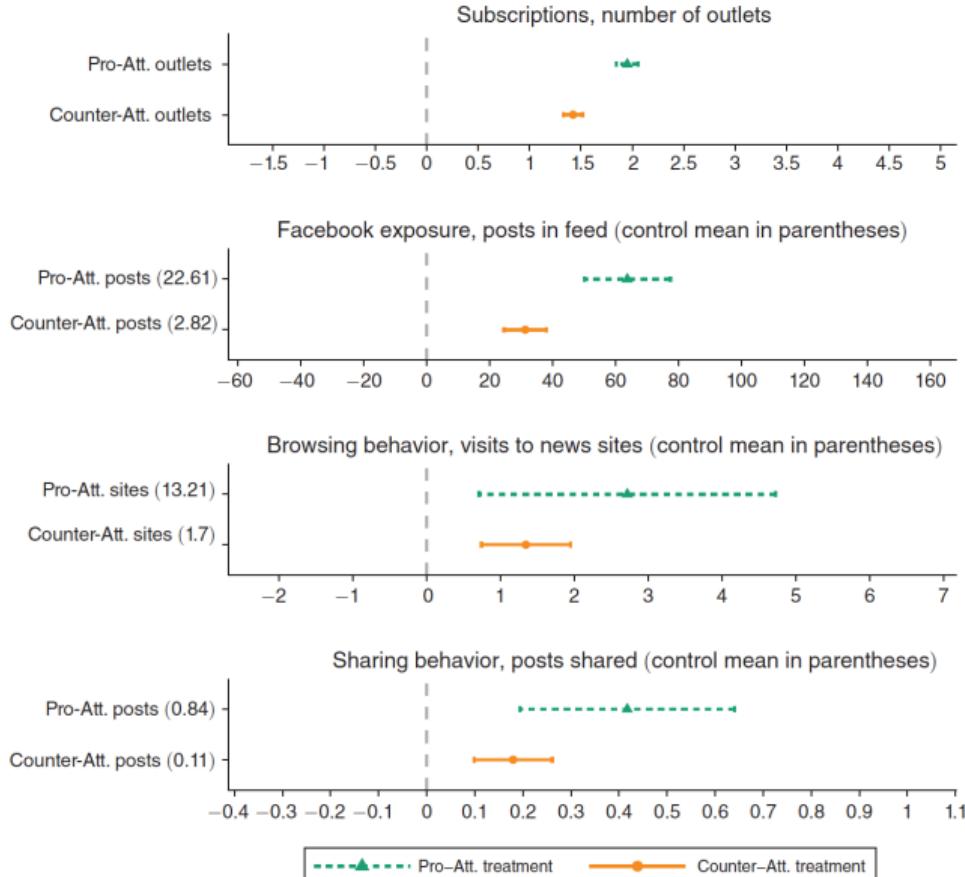
Individual browser data

- Recall-based survey measures of past news consumption exhibit substantial measurement error
- Concern that self-reported news consumption is more polarized than actual news consumption (Guess et al., 2017)

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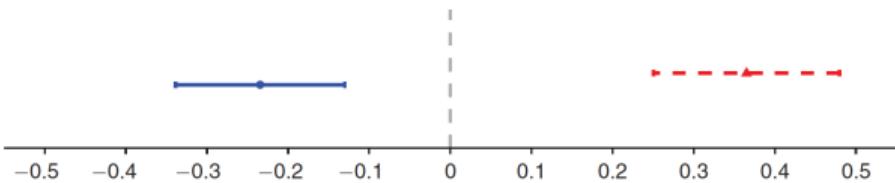
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- Levy (2021) collects individual browser data
 - Before treatment assigned at baseline: Offer 25% of respondents a small reward for installing a **Chrome extension**
 - ≈ 80% install the extension (only computer, no smartphones/secondary devices)
 - Extension monitors posts that participants saw while scrolling through their FB feed

Effects on news consumption

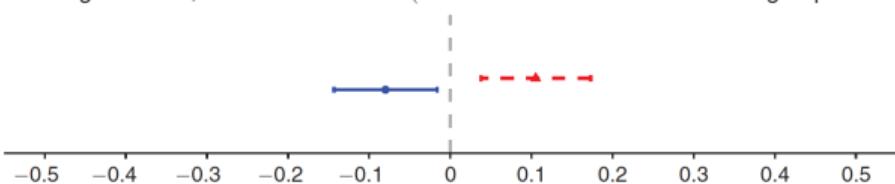


Effects on news consumption

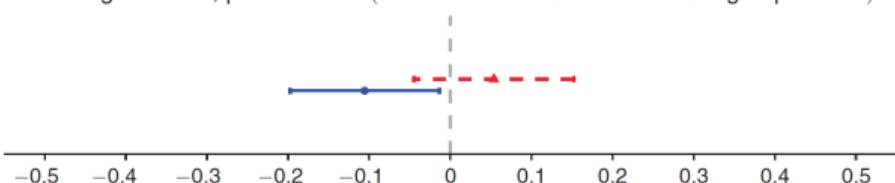
Facebook exposure, posts in feed (conservatives–liberals in control group = 1.67)



Browsing behavior, visits to news sites (conservatives–liberals in control group = 1.29)



Sharing behavior, posts shared (conservatives–liberals in control group = 1.51)



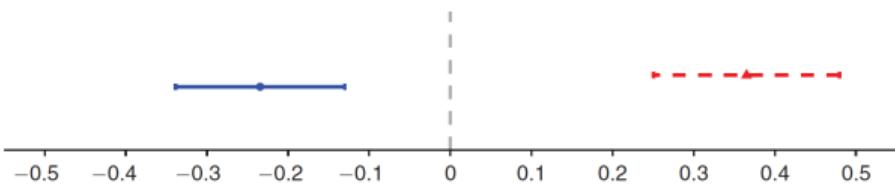
Slant, std. dev. (higher = more conservative)

Liberal treatment Conservative treatment

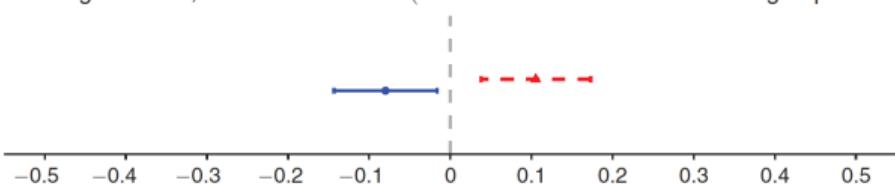
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Effects on news consumption

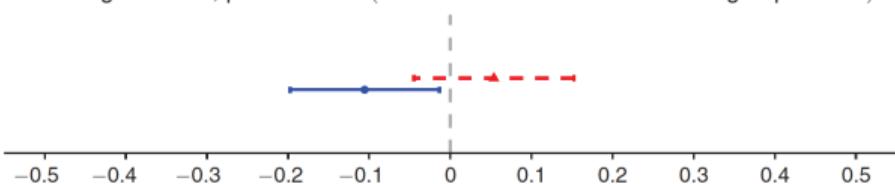
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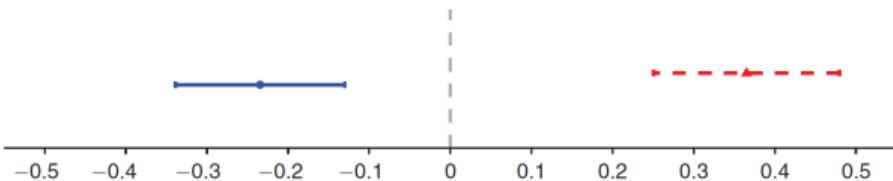
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Legend: Liberal treatment (blue line), Conservative treatment (red dashed line)

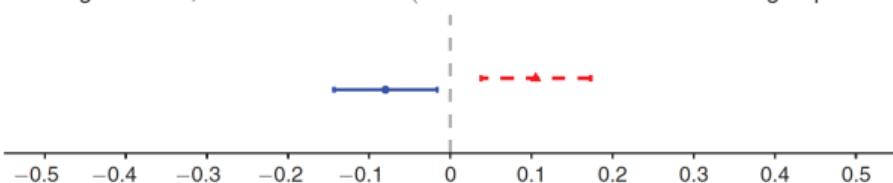
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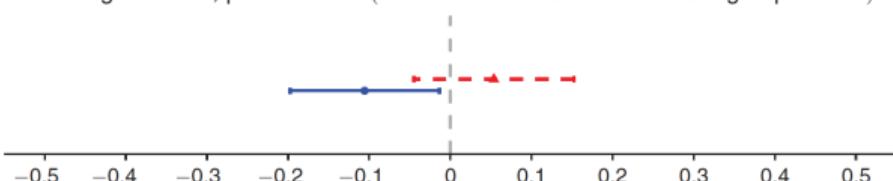
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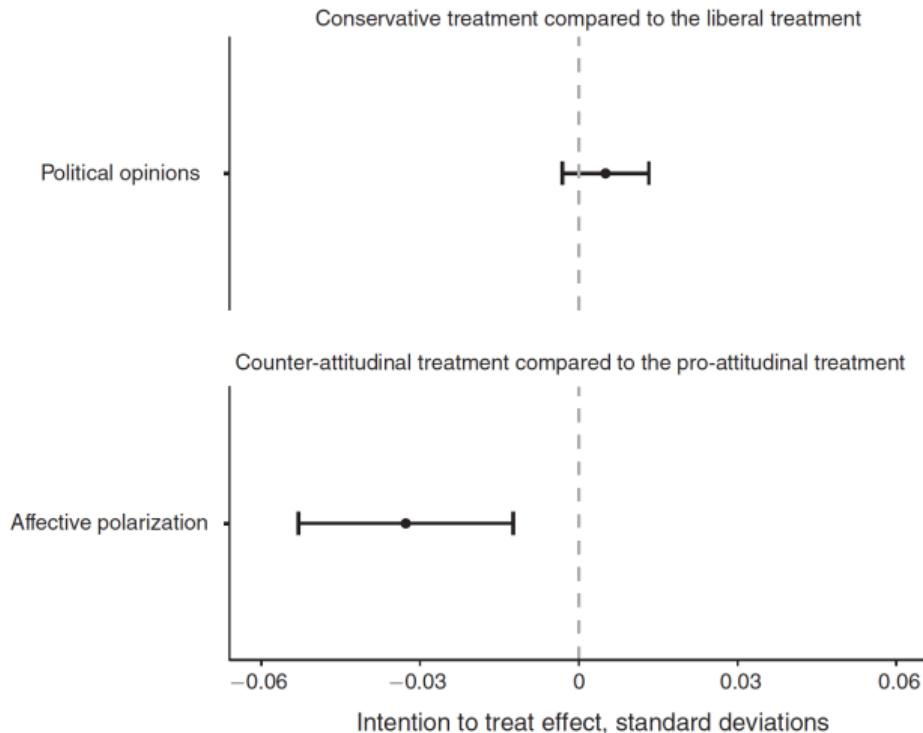


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— Liberal treatment - - - Conservative treatment

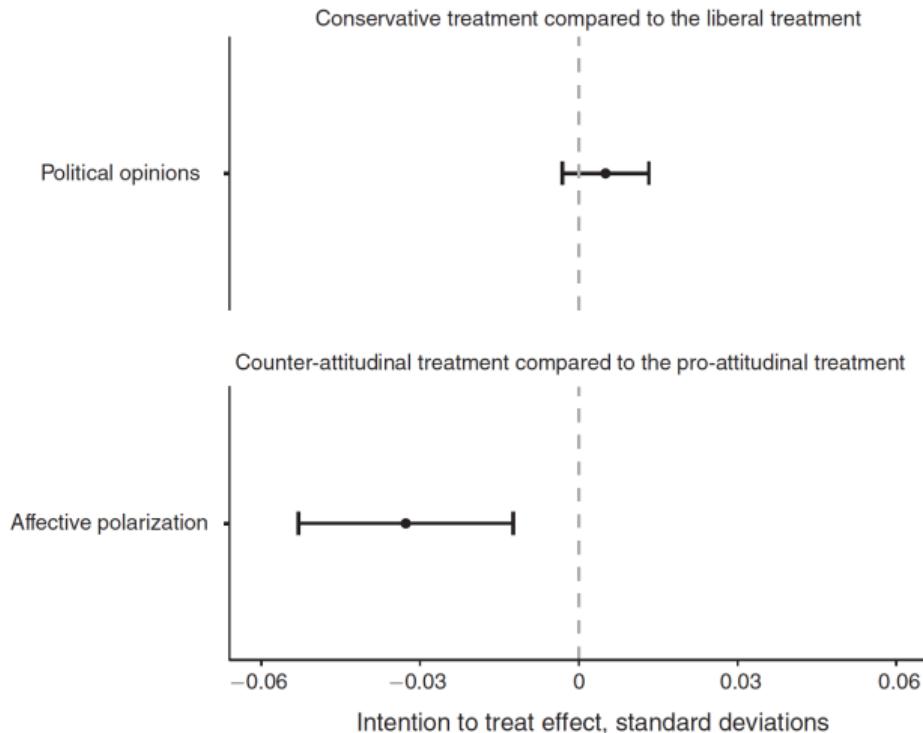
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3. Effects decrease over time, but are still positive and significant 8 weeks after the intervention

Result: Effects on polarization



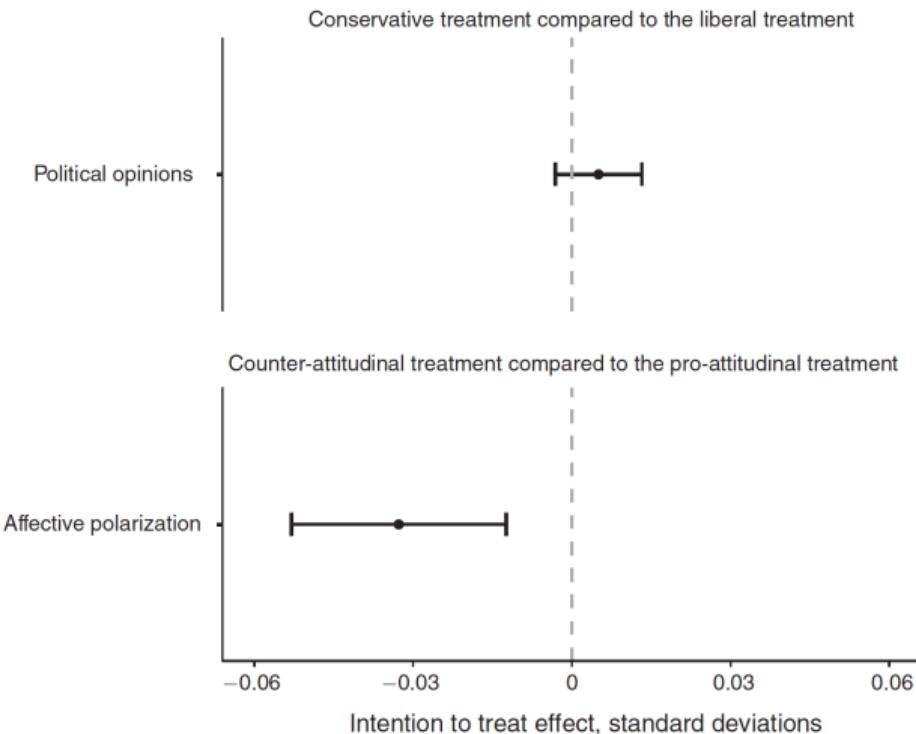
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Result: Effects on polarization



- Surprisingly, no effect on issue polarization
- But: Decrease in affective polarization
 - Decrease by 0.58 feeling thermometer points (on a 0-100 scale)
 - Feeling thermometer increased by 3.8-10.5 degrees over past 20 years

Result: Effects on polarization



- Surprisingly, no effect on issue polarization
- But: Decrease in affective polarization
 - Decrease by 0.58 feeling thermometer points (on a 0-100 scale)
 - Feeling thermometer increased by 3.8-10.5 degrees over past 20 years
 - 6-15% of recent change in affective polarization

Take away: Methods

- Recruiting study participants from social media sites
- Leveraging platform features (e.g. following a page) to generate exogenous variation in news consumption through an experimental manipulation
- Combining survey data with browsing behavior to study effects on beliefs and news consumption

Experiments as a complement to quasi-natural experiments

Media Persuasion and Consumption: Evidence from the Dave Ramsey Show

Felix Chopra

¹University of Copenhagen, CEBI

Motivation

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- Essential to understand what influences people's financial decision
- Popular financial advice is a potentially important factor influencing decisions (Choi, 2022)

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 - Obfuscated follow-up survey after one week
- Examine effects on **attitudes and norms** towards consumption & debt

Preview of main findings

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→ Entertainment programs can affect financial behaviors & attitudes

Contribution

1. Savings interventions

(Beshears et al., 2018, 2015; Carroll et al., 2009; Chetty et al., 2014; Fernandes et al., 2014; Hastings et al., 2013; Lusardi and Mitchell, 2007; Madrian and Shea, 2001)

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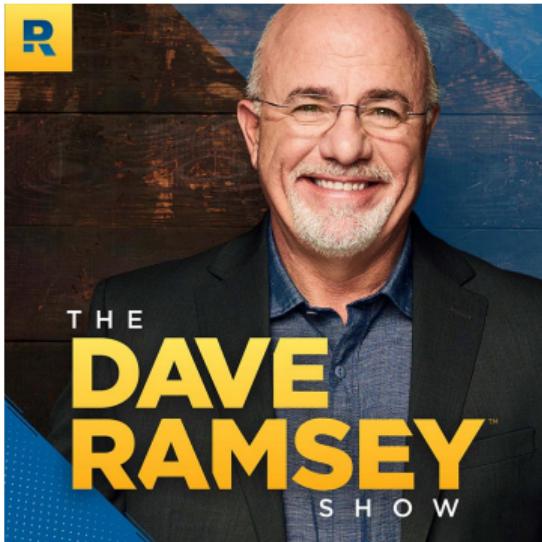
Outline

- 1. Setting**
- 2. Quasi-natural experiment**
- 3. Mechanism experiment**

The Dave Ramsey Show

The Dave Ramsey Show (1992 –)

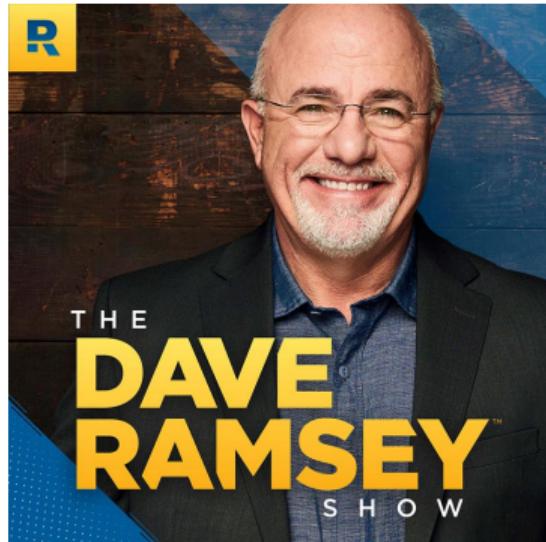
“Don’t even try keeping up with the Joneses – they’re broke.”



- Radio show about personal finances
 - ▷ Teaches heuristics and rules-of-thumb
 - ▷ Motivational and normative messages
 - Advises people to **spend less** and **save more**

The Dave Ramsey Show (1992 –)

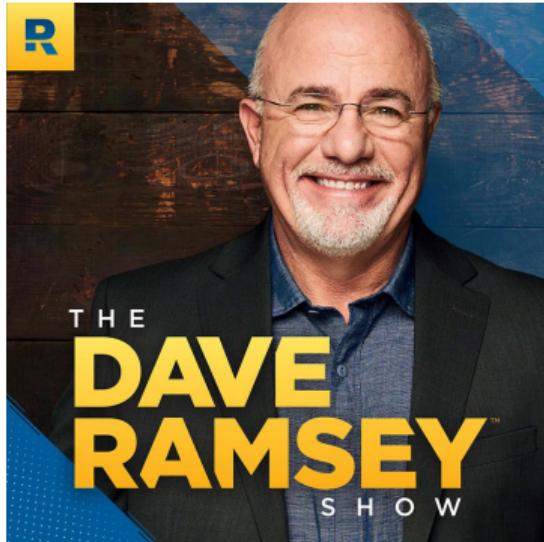
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 - ▷ Over 600 affiliated radio stations
 - ▷ Over 20,000 episodes

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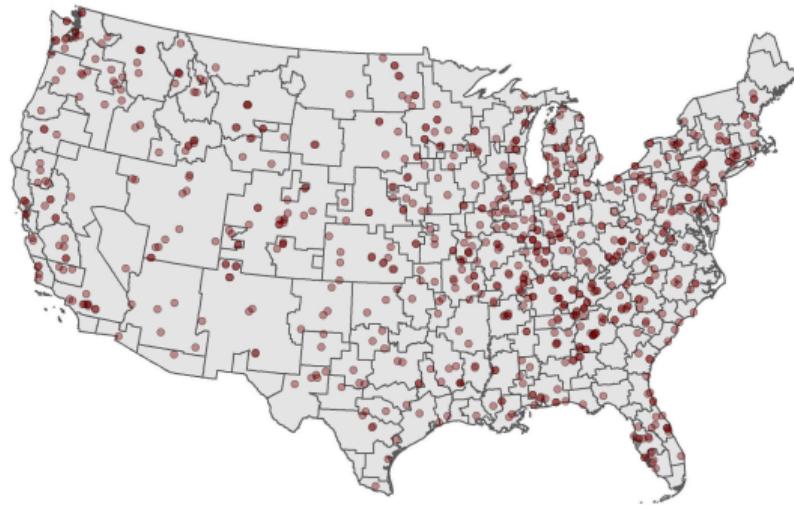
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- Talk radio show
 - ▷ Mo–Fr from 2pm to 5pm (ET)
 - ▷ Live conversations
 - ▷ People call Dave to ask for advice

Expansion of the radio show

-
- A vertical timeline chart with a black vertical line on the left. Four horizontal tick marks extend to the right from the line, each aligned with a year and a corresponding event description. The years are 1996, 2013, 2016, and 2019. The events are: Expansion starts (1996), YouTube channel (2013), Satellite radio (2016), and Available in 208/210 markets (2019). The text for each event is in a dark gray sans-serif font.
- 1996 • Expansion starts
 - 2013 • YouTube channel
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- 1996 Expansion starts
- 2013 YouTube channel
- 2016 Satellite radio
- 2019 Available in 208/210 markets

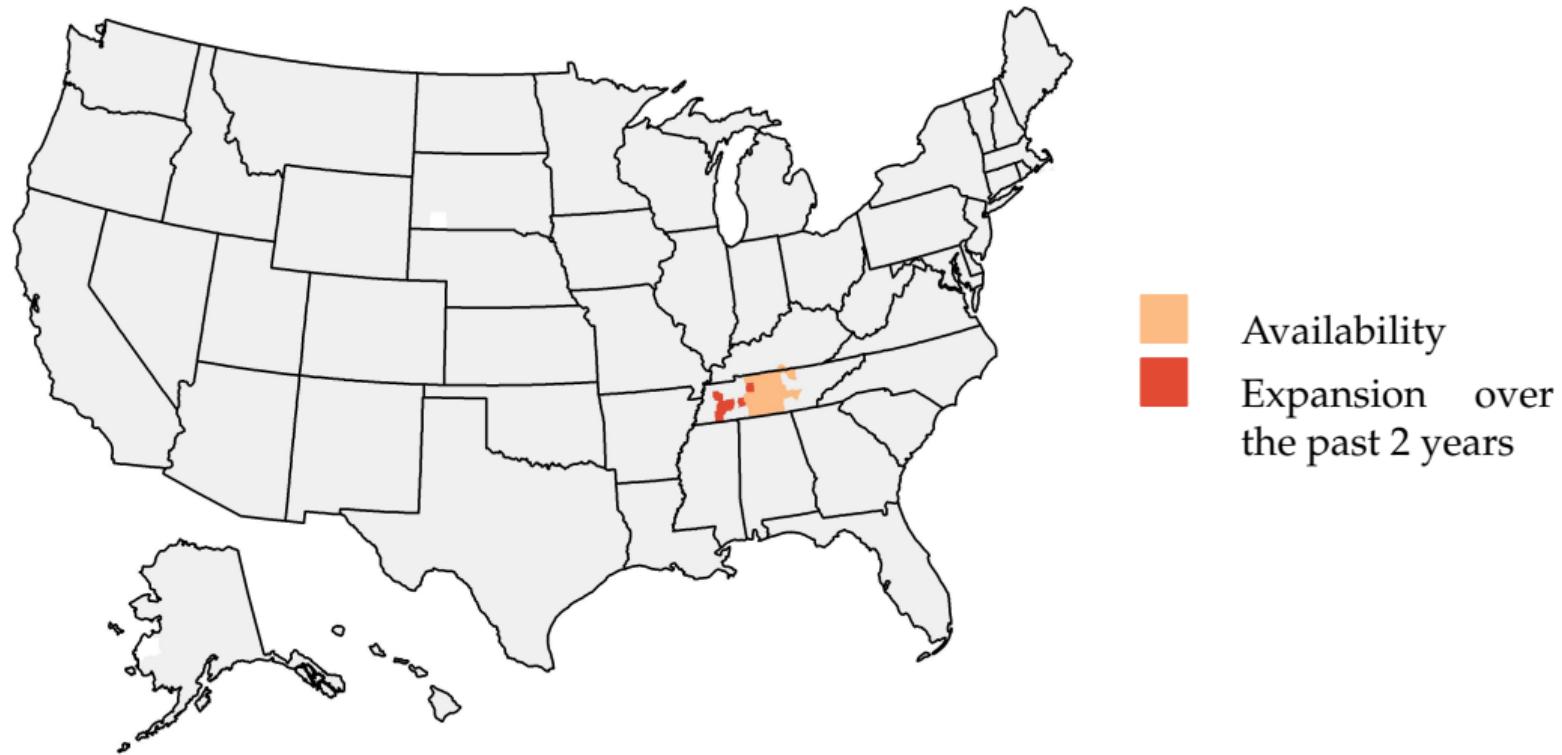


Data: Radio coverage

- Date of entry for all 670 stations
- Radio signal strength: *Irregular-Terrain Model*
- Dummy indicating radio coverage (by **zip code** and **month**)

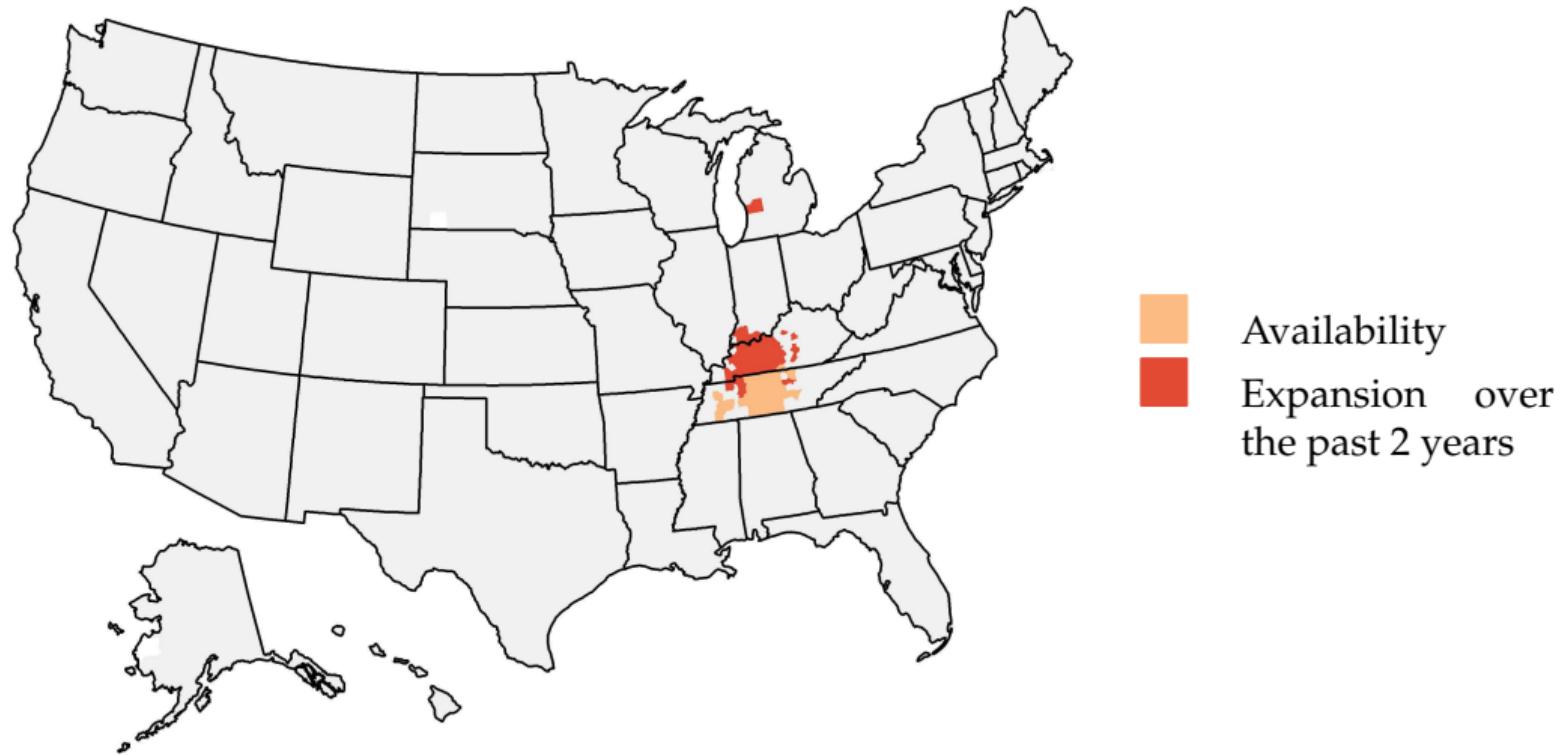
Details

Availability of the Dave Ramsey Show in 1996



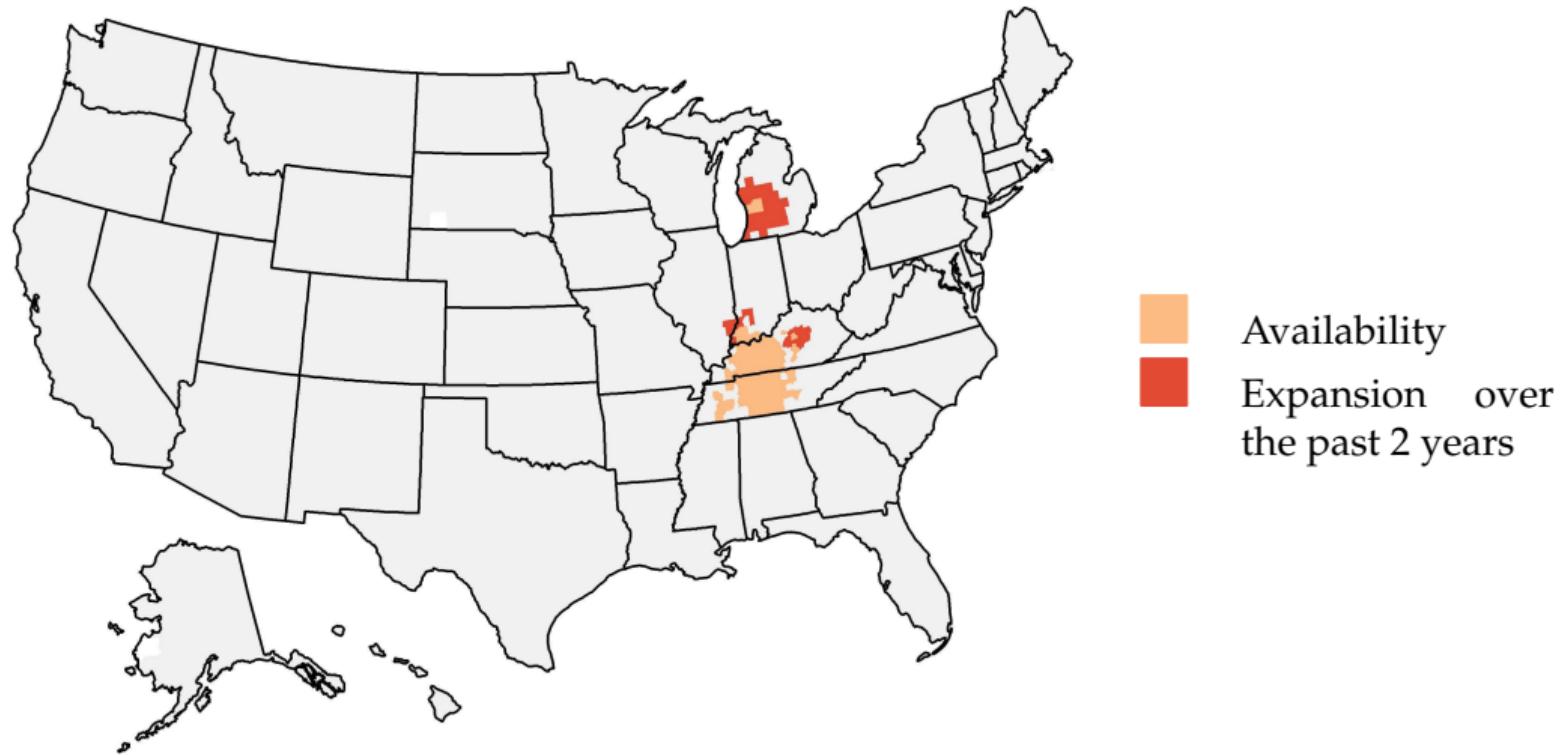
The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 1998



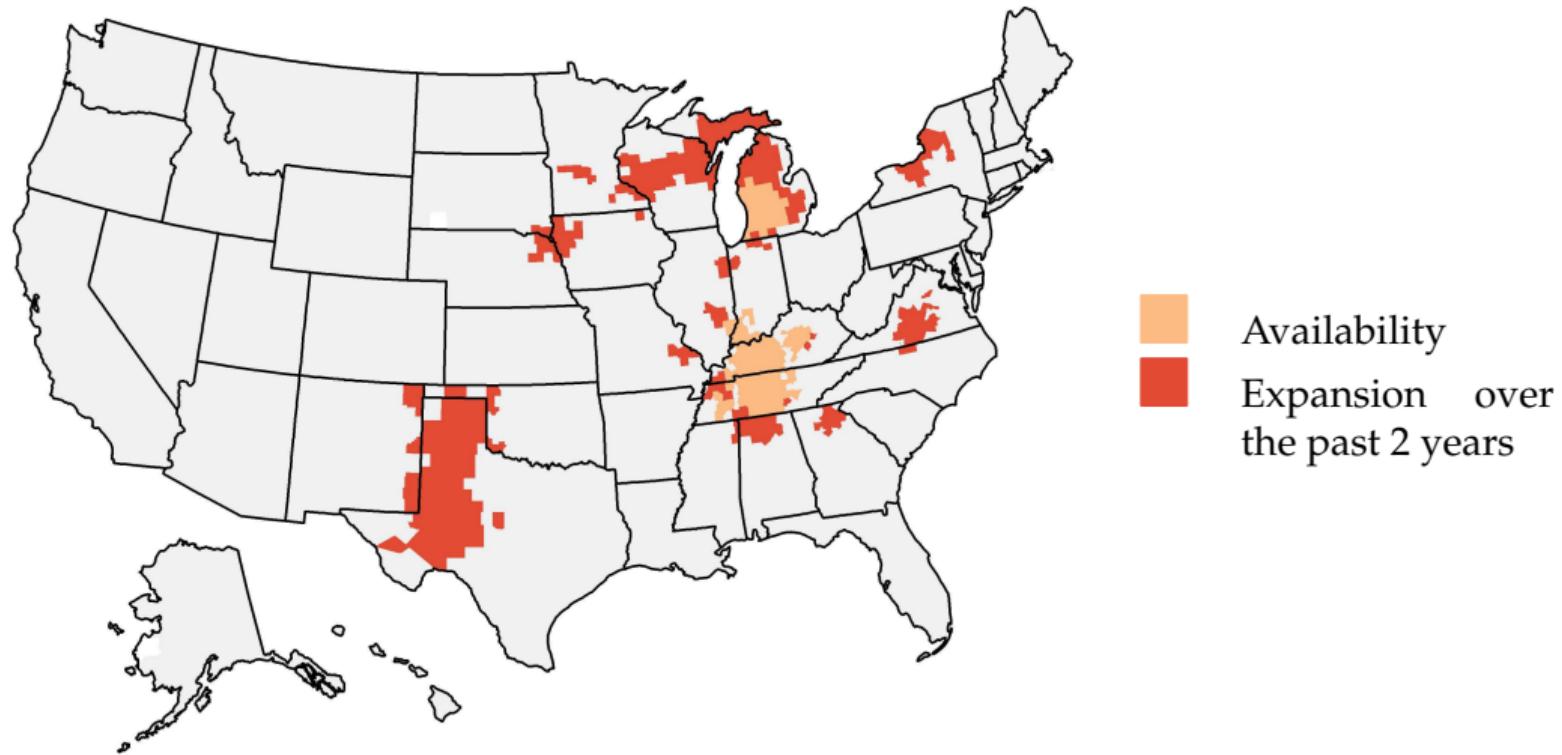
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Availability of the Dave Ramsey Show in 2000



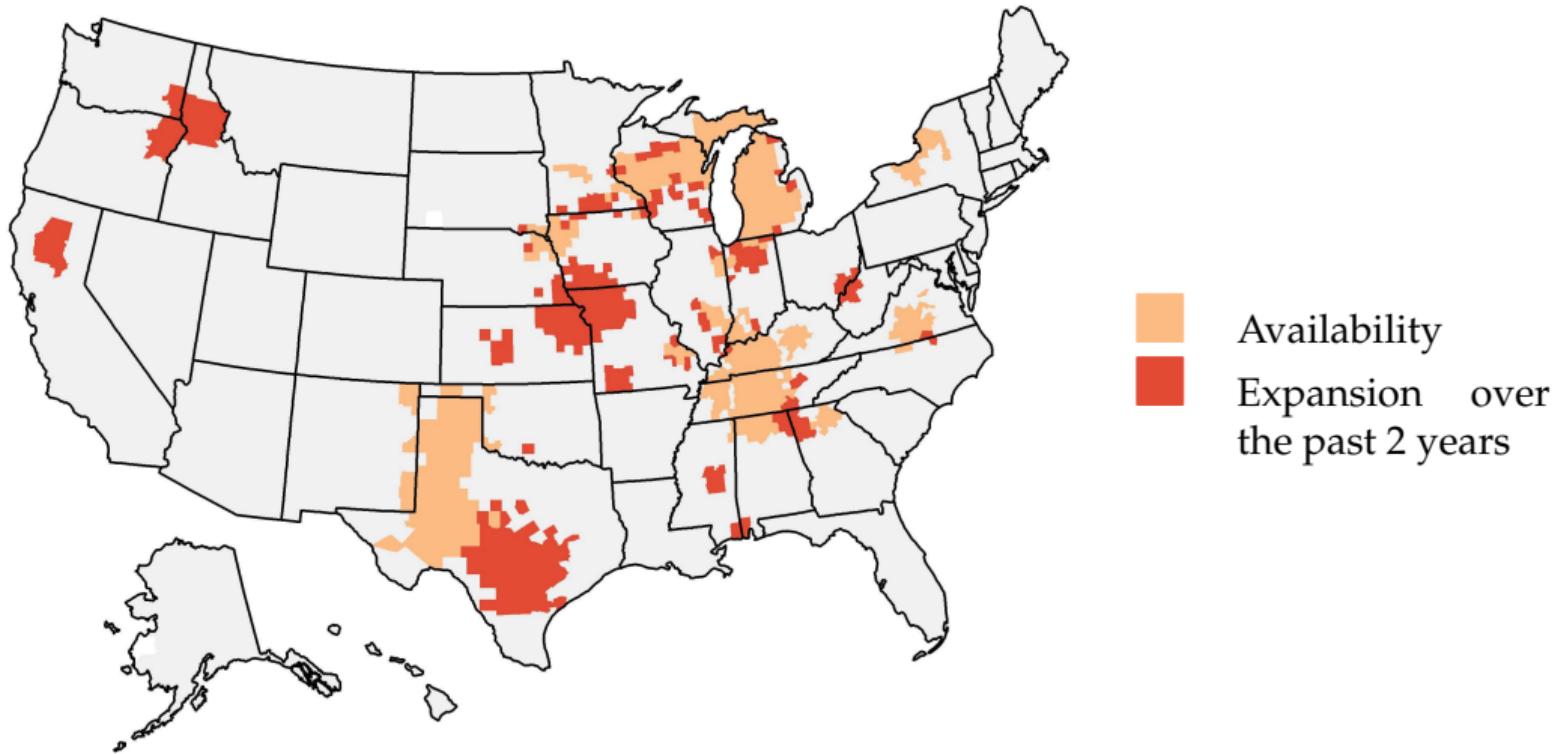
The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 2002



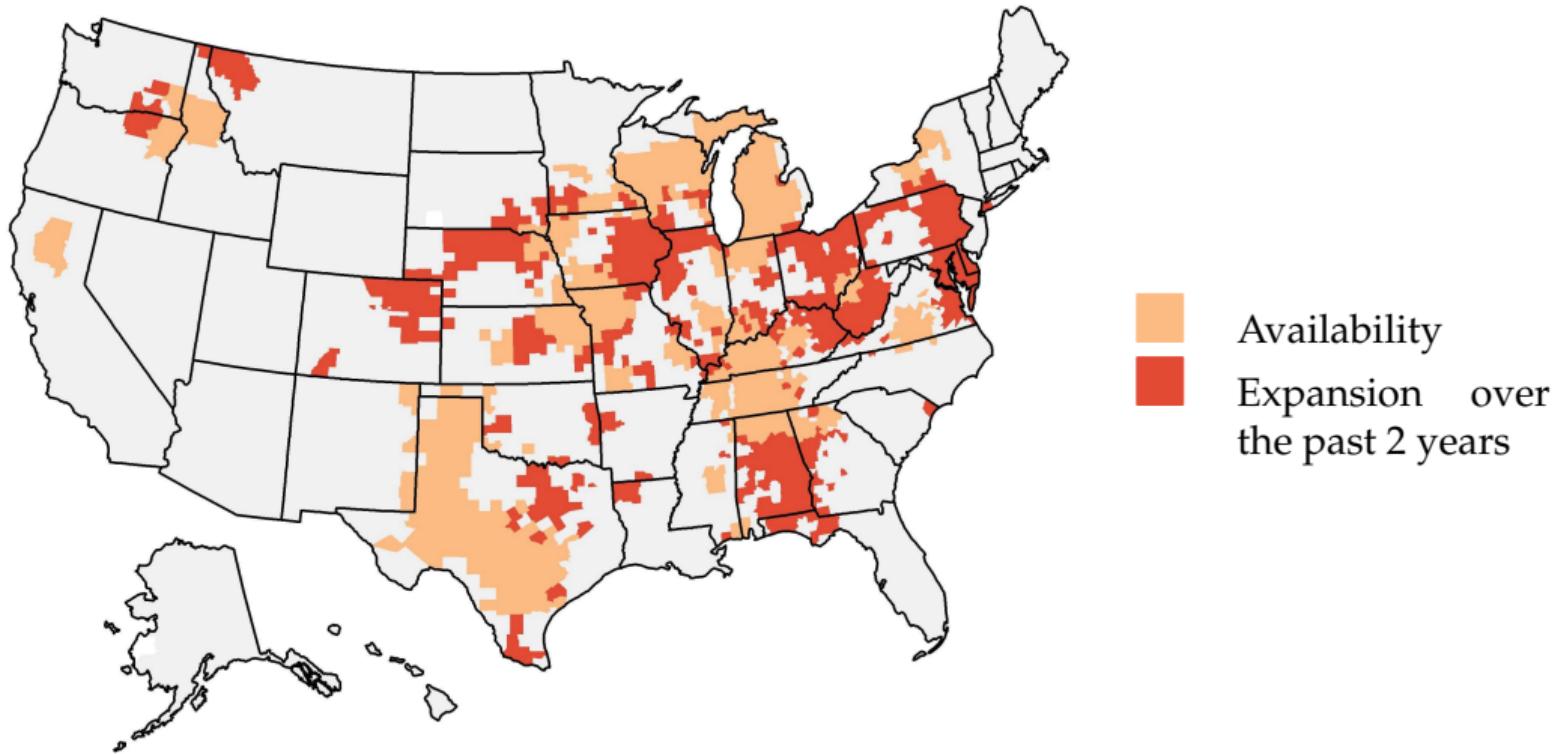
The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 2004



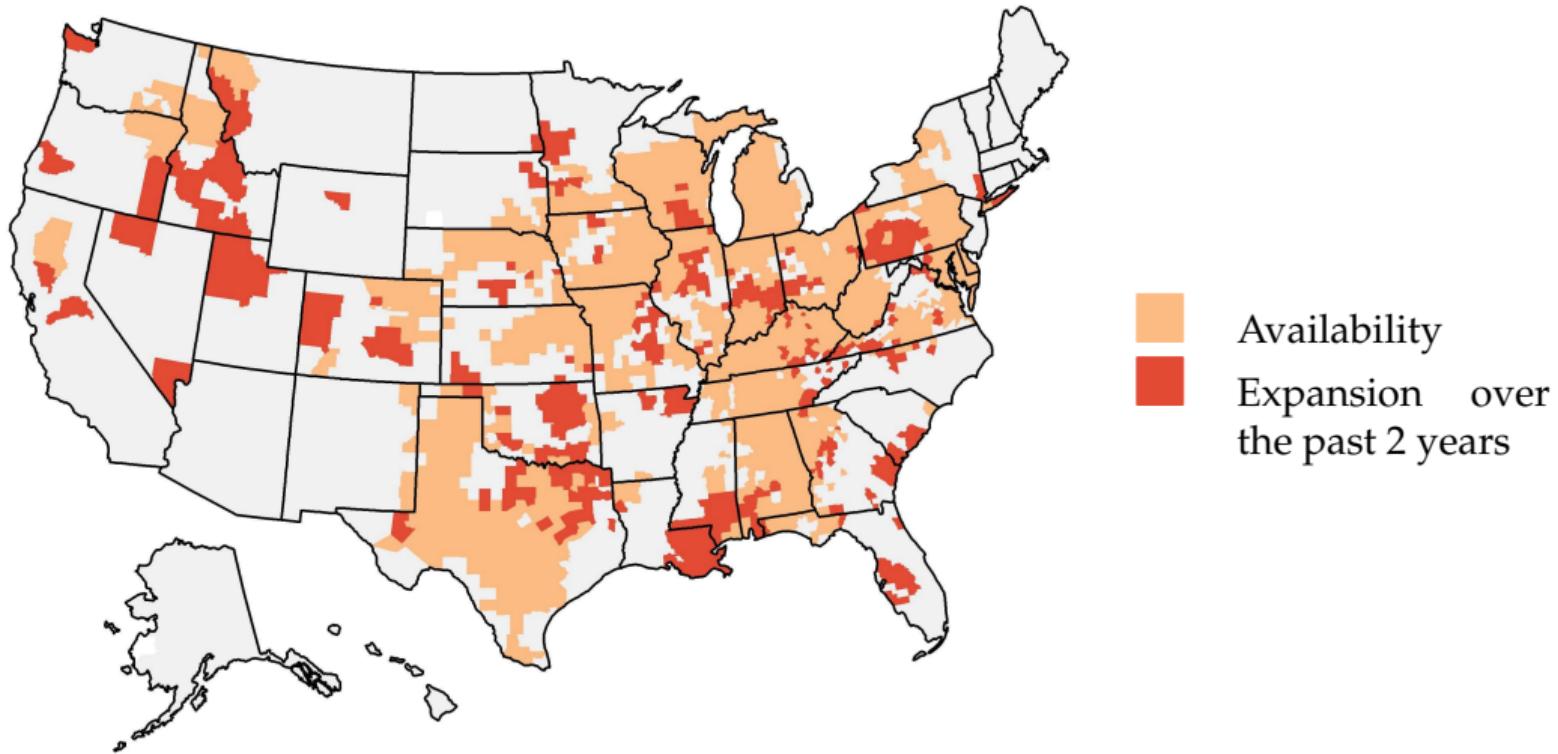
The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 2006



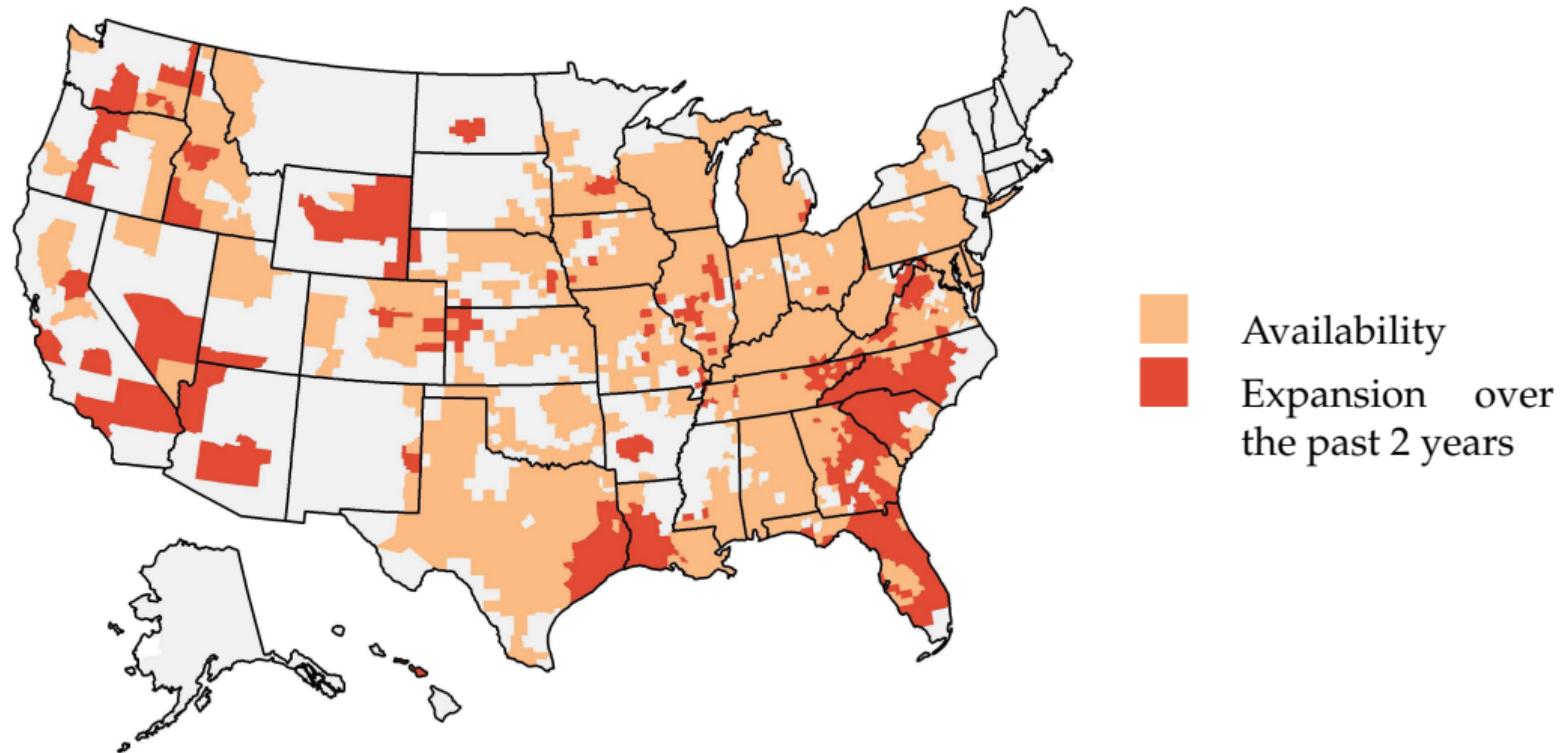
The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 2008



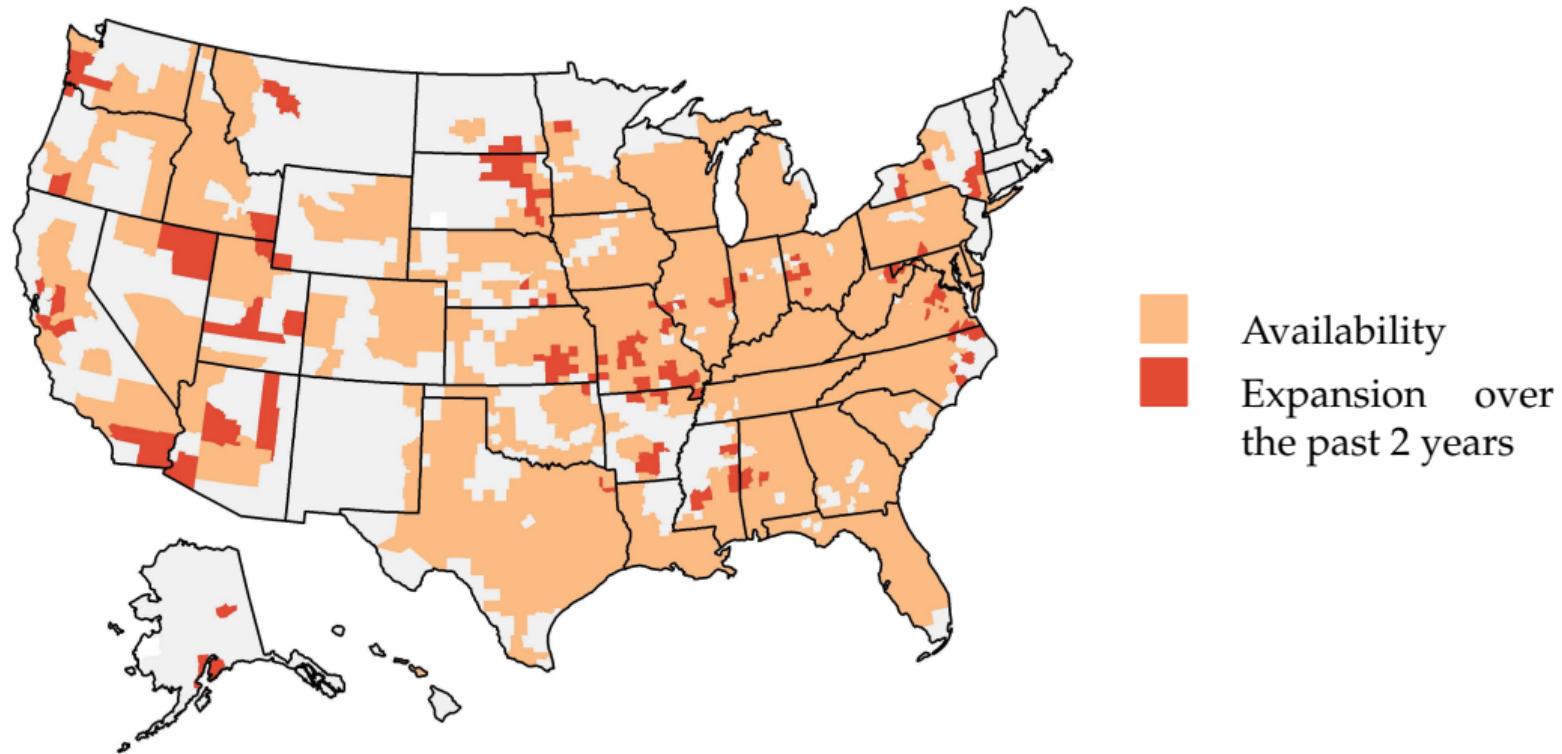
The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 2010



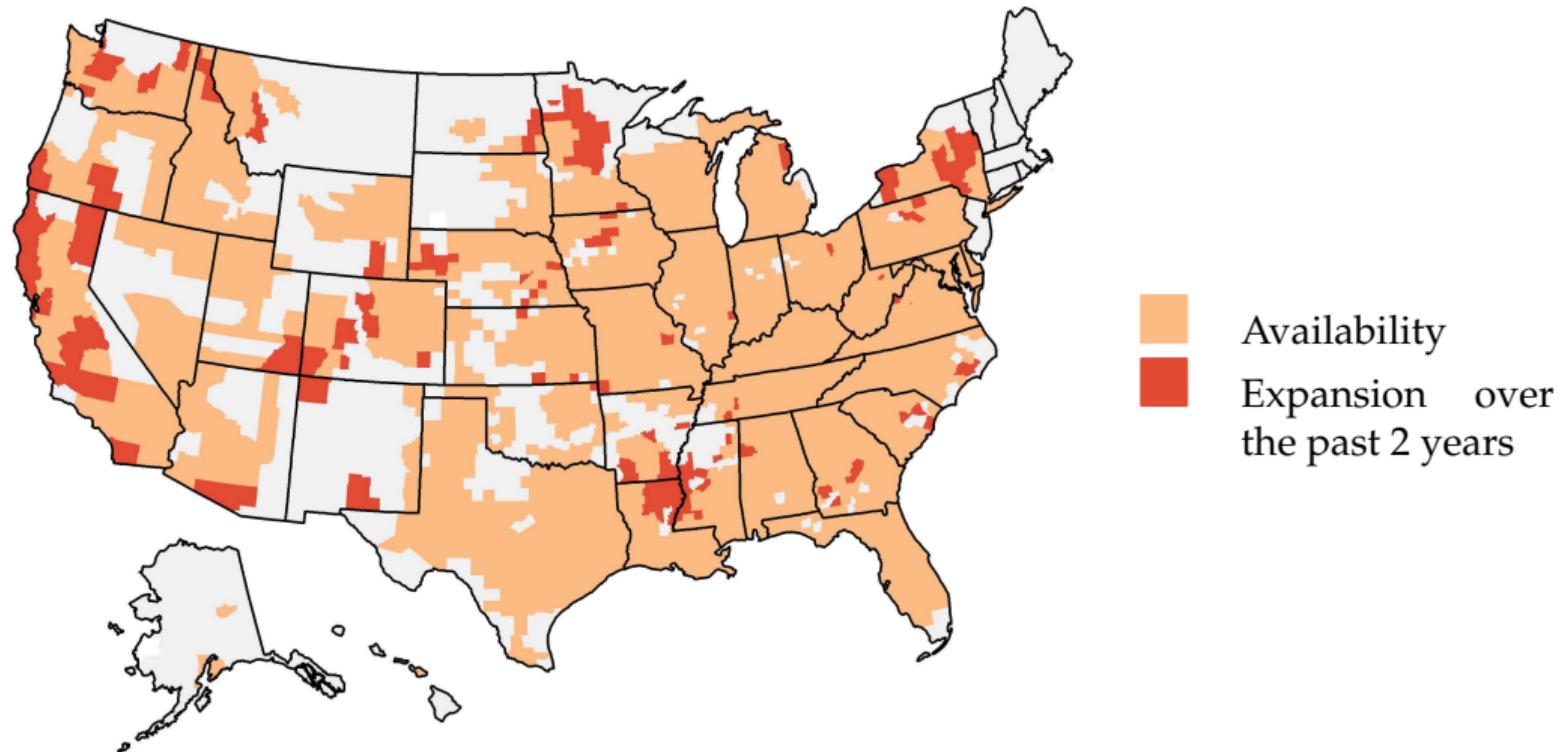
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Availability of the Dave Ramsey Show in 2012



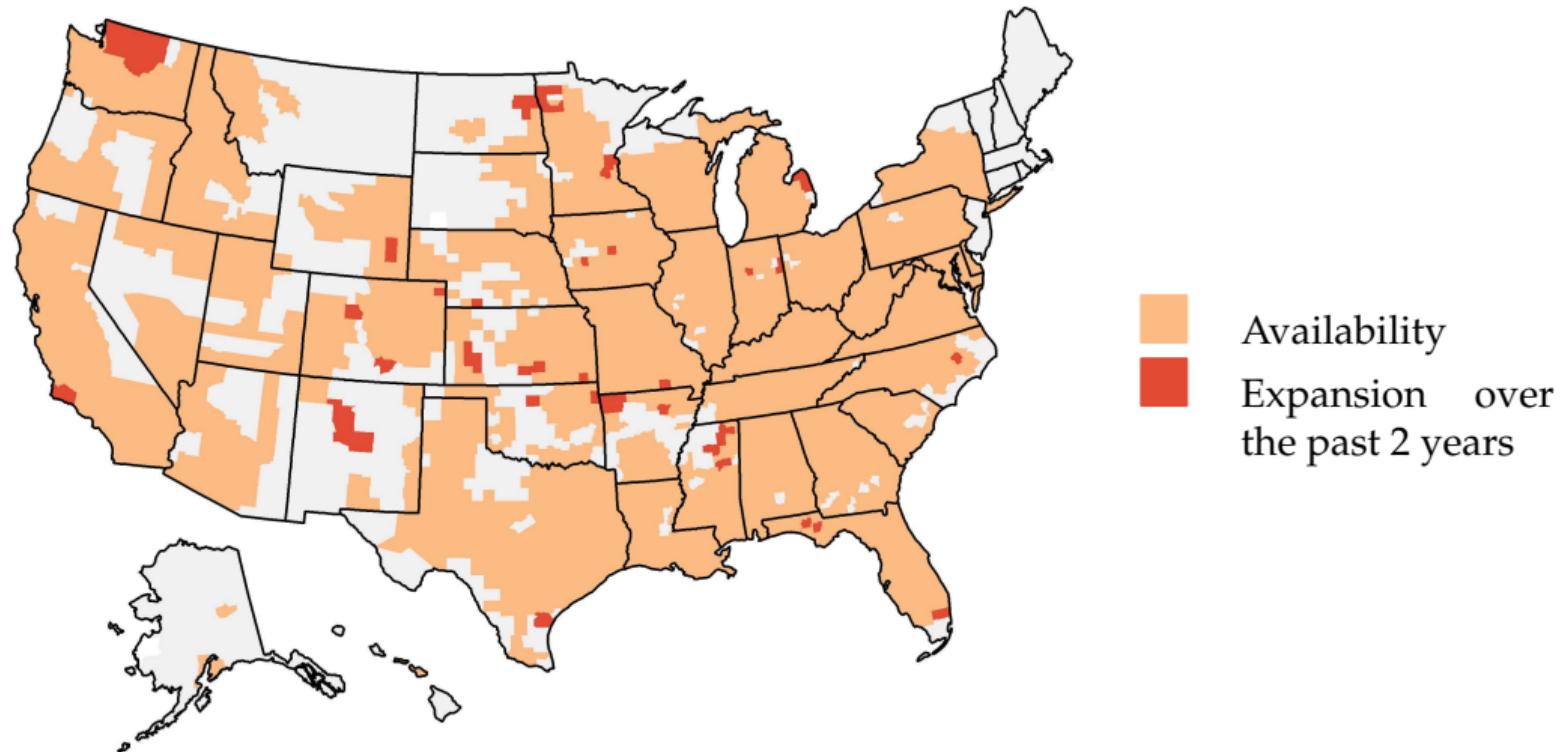
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Availability of the Dave Ramsey Show in 2014



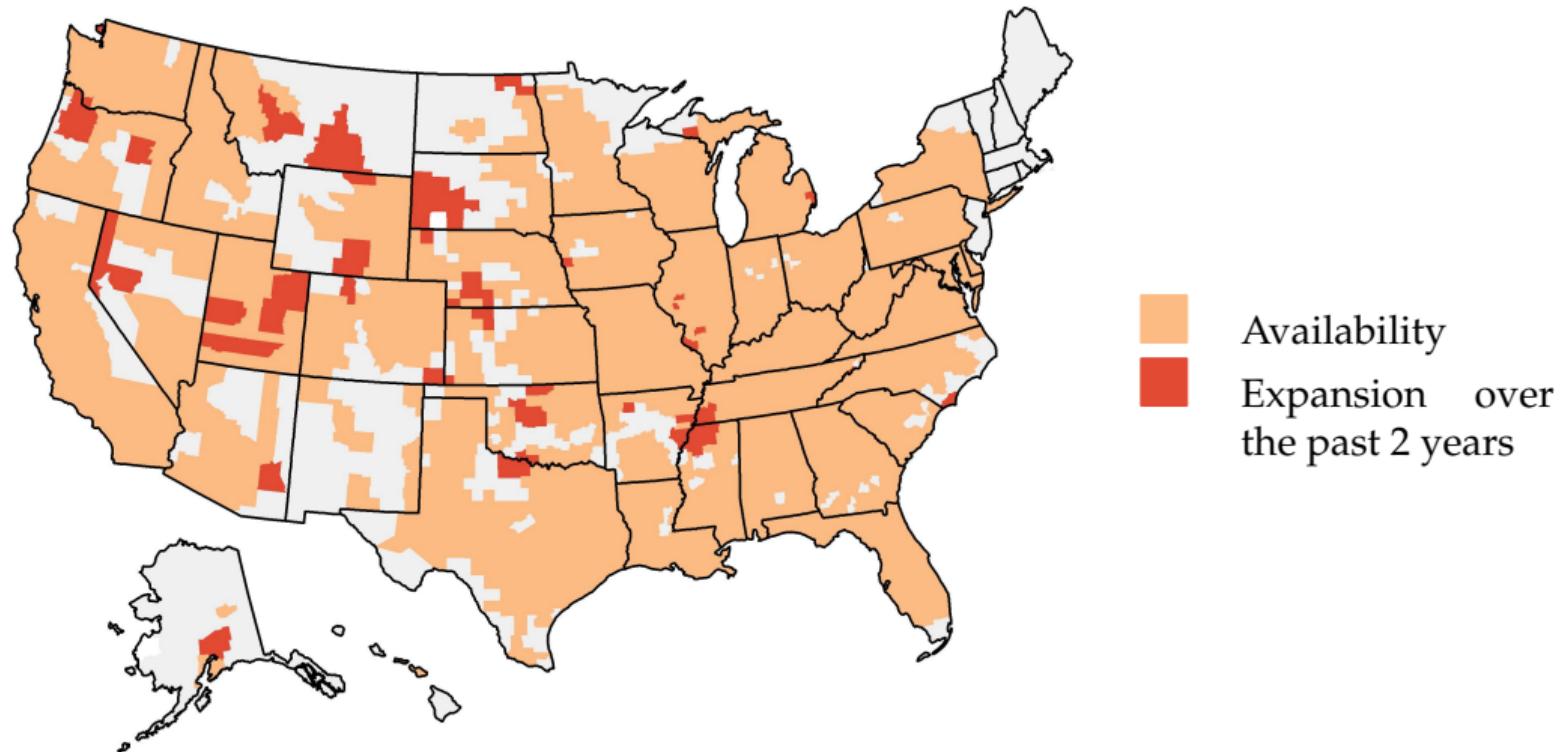
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Availability of the Dave Ramsey Show in 2016



The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Availability of the Dave Ramsey Show in 2018



The show is “available” in a county if the zip codes with a radio signal strength of at least $50 \text{ dB}\mu\text{V/m}$ capture at least 50% of the county’s total population.

Data

Expenditure data: Nielsen Homescan Panel (2004 – 2019)

- Panel of households who scan their **grocery purchases**
 - $N \approx 3.7$ million household-months across 10k+ zip codes
 - Observe prices, quantities, discounts of all purchased products
 - Household sociodemographics

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- **Main outcome:** Log grocery expenditures (by household, zip code, month)

Product departments

Geographic dispersion

Retail channels

Geographic dispersion

Exp by DMA

Empirical strategy

Empirical strategy

- Difference-in-differences using monthly household-level data

$$\log(\text{Expenditures}_{itz}) = \beta \text{ Radio show}_{zt} + \phi_i + \psi_{tr} + X'_{itz}\lambda + \varepsilon_{itz} \quad (1)$$

with

- ▶ Radio show_{zt} = dummy for radio coverage in zip code z in month t
- ▶ X_{itz} = time-varying controls (e.g. local house prices, u-rate)
- ▶ ψ_{tr} = region \times year-month fixed effects (e.g. state, media market)
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- Parameter-of-interest: Intent-to-treat effect β on grocery expenditures (in %)
 - ▶ Exposure to the show is unobserved
 - ▶ Availability = instrument for exposure

Empirical strategy: Identification

$$\log(\text{Expenditures}_{itz}) = \beta \text{ Radio show}_{zt} + \phi_i + \psi_{tr} + X'_{itz}\lambda + \varepsilon_{itz} \quad (2)$$

- **Identification:** Timing of the expansion is exogenous

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 - ✓ (Exploit only topography-driven variation)

Radio industry: What determines the **timing** of the expansion?

Interviews with the radio show's senior managers:

- **Dave Ramsey Show**
 - Goal: Max the number of affiliated radio stations

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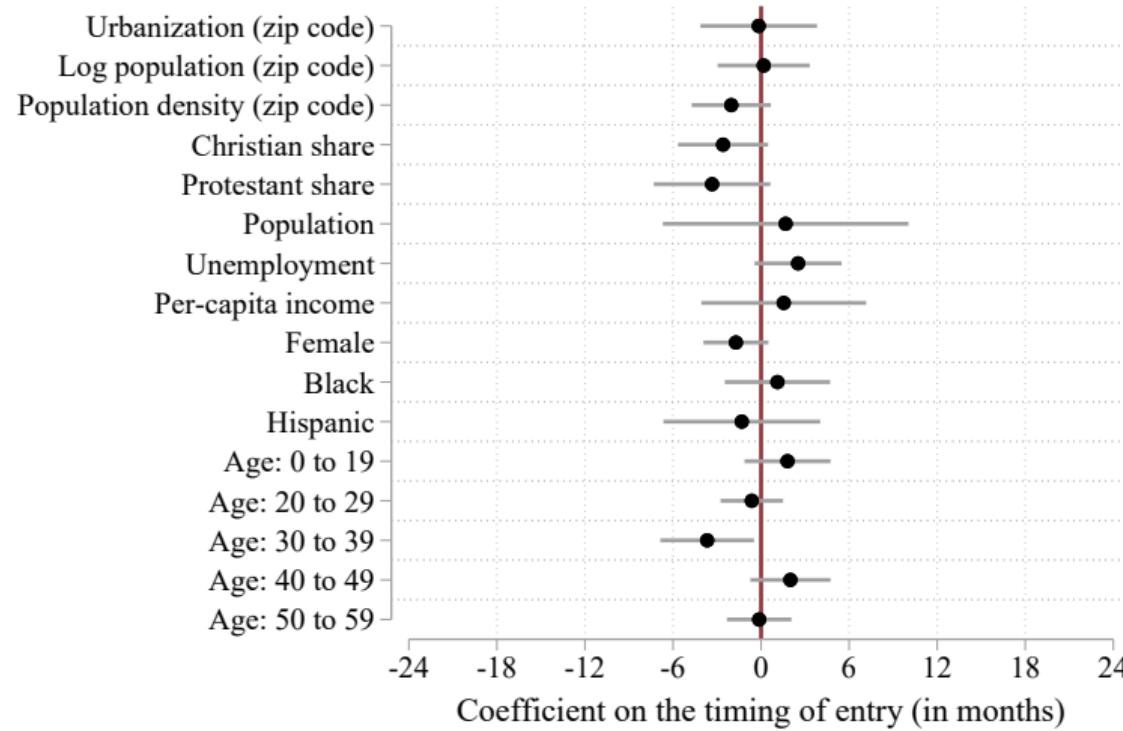
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 - Key performance metric
 - Number of affiliated stations
 - Radio show's audience size
 - **Decisions mainly based on out-of-market ratings**

Timing of the expansion is **uncorrelated** with local characteristics



Estimates from a regression of the first year-month of radio coverage on baseline covariates in the year 2000 (county or zip-code level regression). All baseline covariates are standardized. 95% CIs are shown.

Robustness check

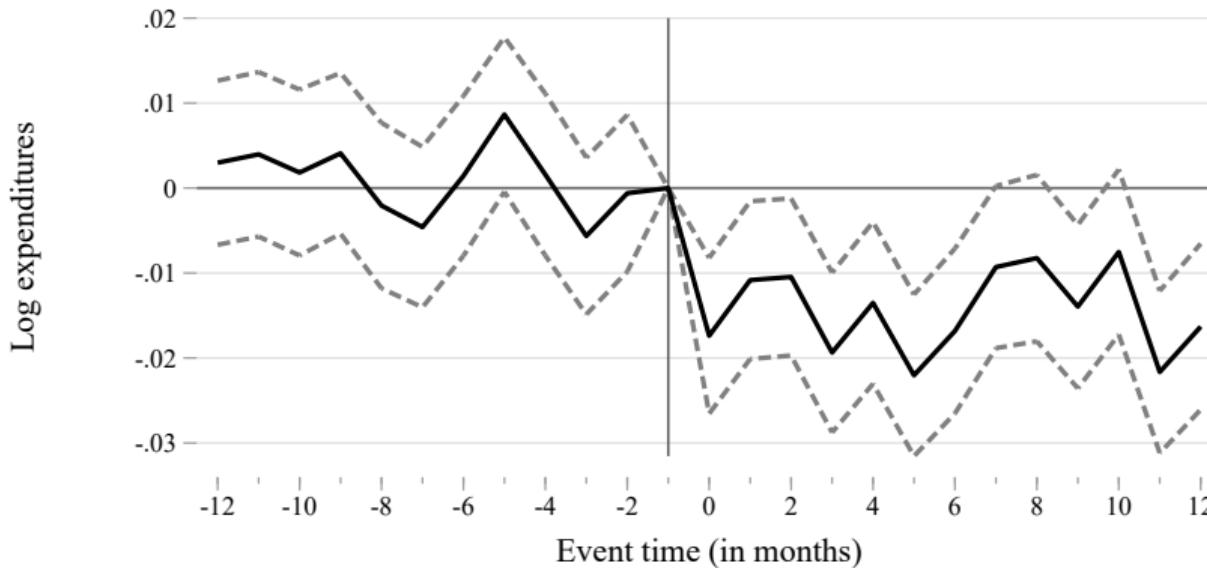
→ Machine learning methods **cannot** predict the expansion

[Details](#)

Results

Event study: Decrease in monthly grocery expenditures

$$\log(\text{Expenditures}_{itz}) = \sum_{\tau=-12}^{12} \beta_{\tau} \text{Radio show}_{zt\tau} + \phi_i + \psi_{tr} + X'_{itz} \lambda + \varepsilon_{itz} \quad (3)$$



Controls: log household income, household size, and age, married and labor market status indicators; local house prices and unemployment rate. 95% confidence intervals are shown.

Decrease in monthly grocery expenditures

$$\log(\text{Expenditures}_{itz}) = \beta \text{ Radio show}_{zt} + \phi_i + \psi_{tr} + X'_{itz}\lambda + \varepsilon_{itz} \quad (4)$$

Baseline: Household and time FEs (a)

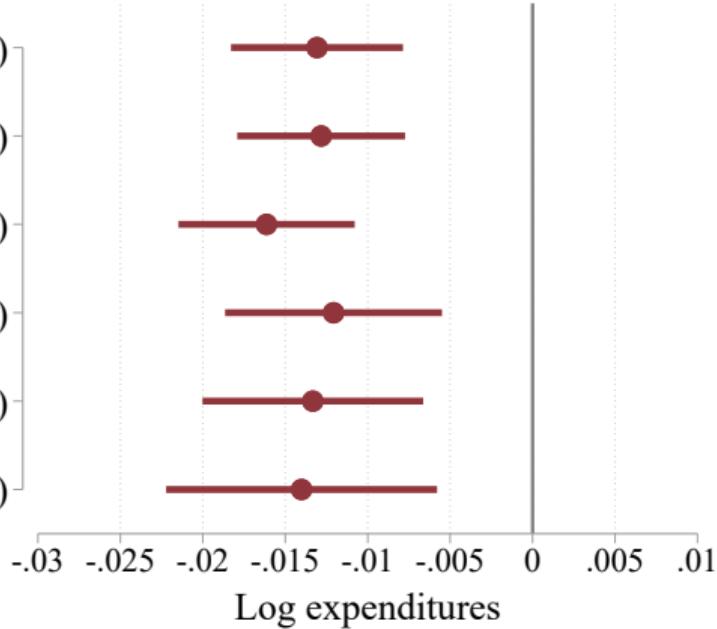
+ Household controls (b)

+ Economic controls (c)

+ State x time FEs (d)

+ Baseline covariates x time FEs (e)

+ **Media market x time FEs (f)**



Household controls: log income, size, age, marriage and employment indicators. Economic controls: house prices, unemployment. Baseline covariates: white and Christian share, log per-capita income, log population.

Magnitude of the ATT: Back-of-the-envelope calculation

$$\text{ATT} = \frac{-1.3\% \text{ ITT effect}}{\text{Local listenership share}} \quad (5)$$

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- 20 million unique listeners **per week**
 - 60% regular listeners
 - 40% new listeners

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- **Average effect on listeners** \approx 8% decrease in grocery expenditures

Additional results

Heterogeneity

Figure

- Effects driven by households with initially **high grocery expenditure share**
- No effects among low-expenditure households

Additional results

Heterogeneity

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Savings channel

Details

- **Extensive margin:** Households purchase 1.7% fewer products

Additional results

Heterogeneity

Figure

- Effects driven by households with initially **high grocery expenditure share**
- No effects among low-expenditure households

Savings channel

Details

- **Extensive margin:** Households purchase 1.7% fewer products
- **Intensive margin:** Economically small effects on buying strategies
 - Effects explain **at most 15%** of the decrease in expenditures

Details

Mechanism experiment

Why do households decrease their expenditures?

- The Dave Ramsey Show is an **omnibus treatment**
- Unclear how to isolate the marginal contribution of different features

Why do households decrease their expenditures?

- The Dave Ramsey Show is an **omnibus treatment**
- Unclear how to isolate the marginal contribution of different features
- **Here:** Can the show foster **attitudes and norms** supportive of savings efforts?
 - Borrowing money is portrayed as morally wrong
 - Conspicuous consumption is regularly criticized

Experimental design: Treatment arms

Logistics

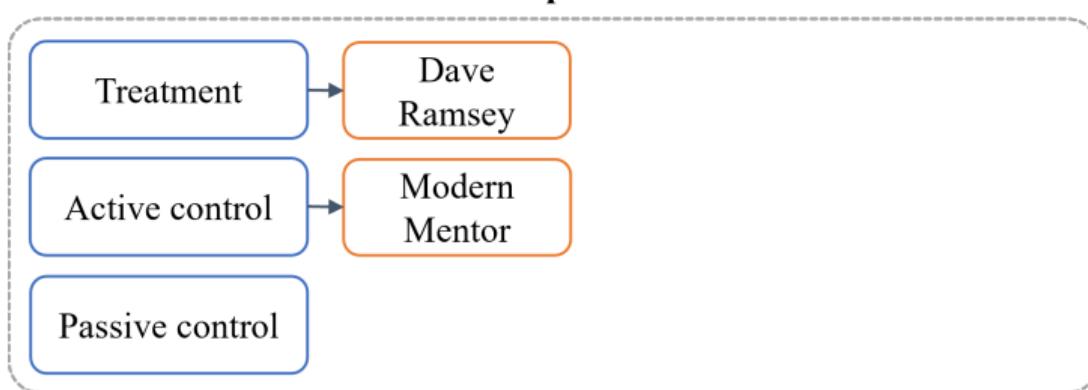
Main experiment



- **Randomly assign** respondents to one of three conditions

Experimental design: Treatment arms

Logistics



- **Treatment:** Listens to **5 min** of the *Dave Ramsey Show*
- **Active control:** Listens to **5 min** of the *Modern Mentor*
- **Passive control:** No audio

Transcript

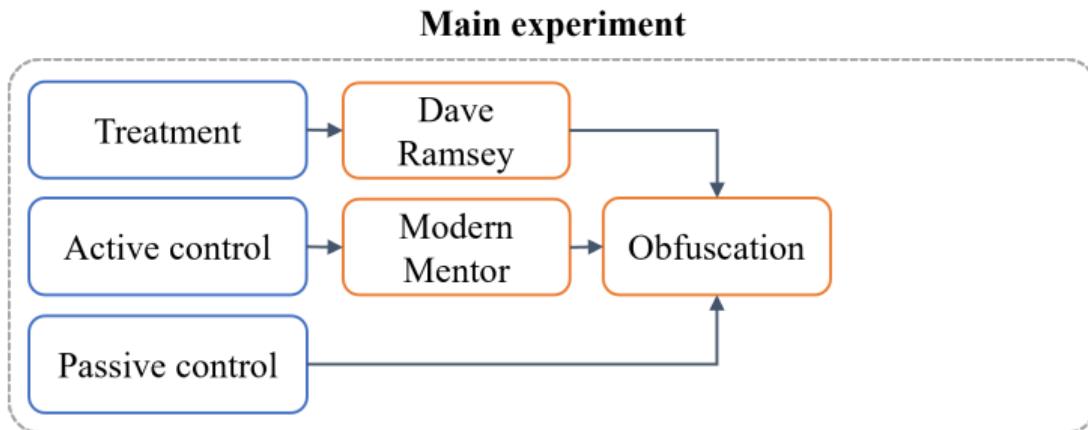
Audio screener

Transcript

Test of balance

Experimental design: Obfuscation

Logistics



Obfuscation

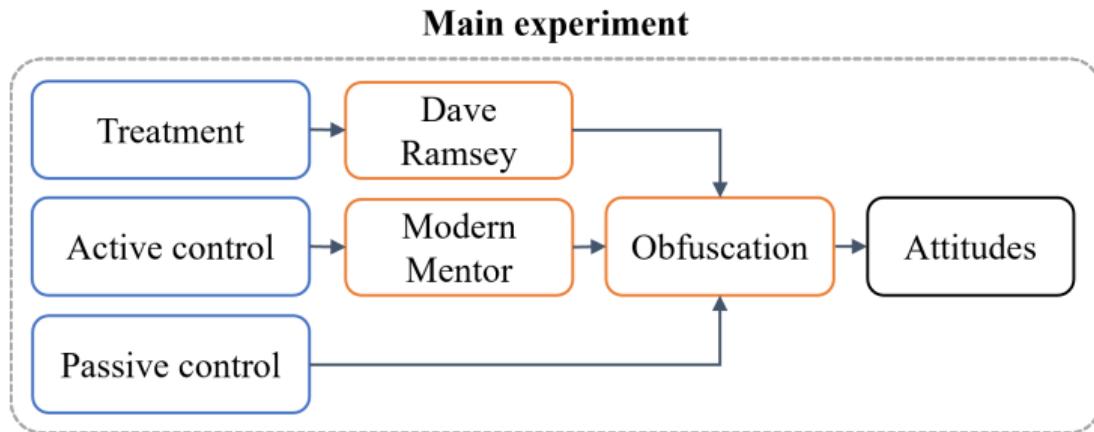
- Consumer research survey
- Measure financial literacy, info demand, beliefs

Instructions

Instructions

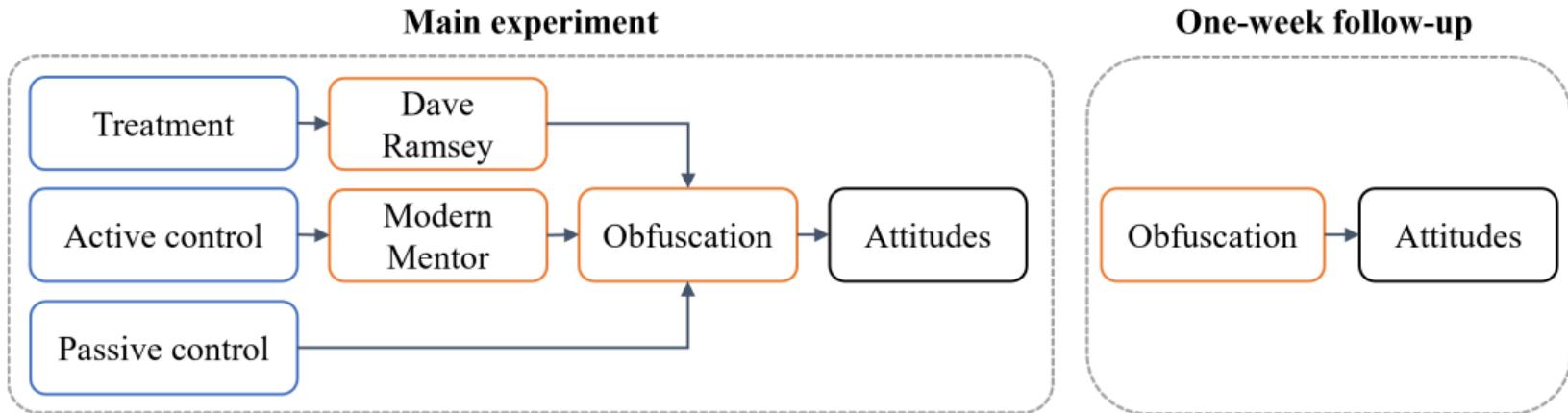
Experimental design: Main outcome

Logistics



Experimental design: Obfuscated follow-up survey

Logistics



Obfuscation: Follow-up

- New consent form
- New survey layout
- Satisfaction with primary bank

Main outcome: Attitudes

Elicit agreement with the following items on a 5-point Likert scale:

1. Materialistic attitudes (Richins and Dawson, 1992)

Instructions

- I admire people who own expensive homes, cars, and clothes
- The things I own say a lot about how well I'm doing in life

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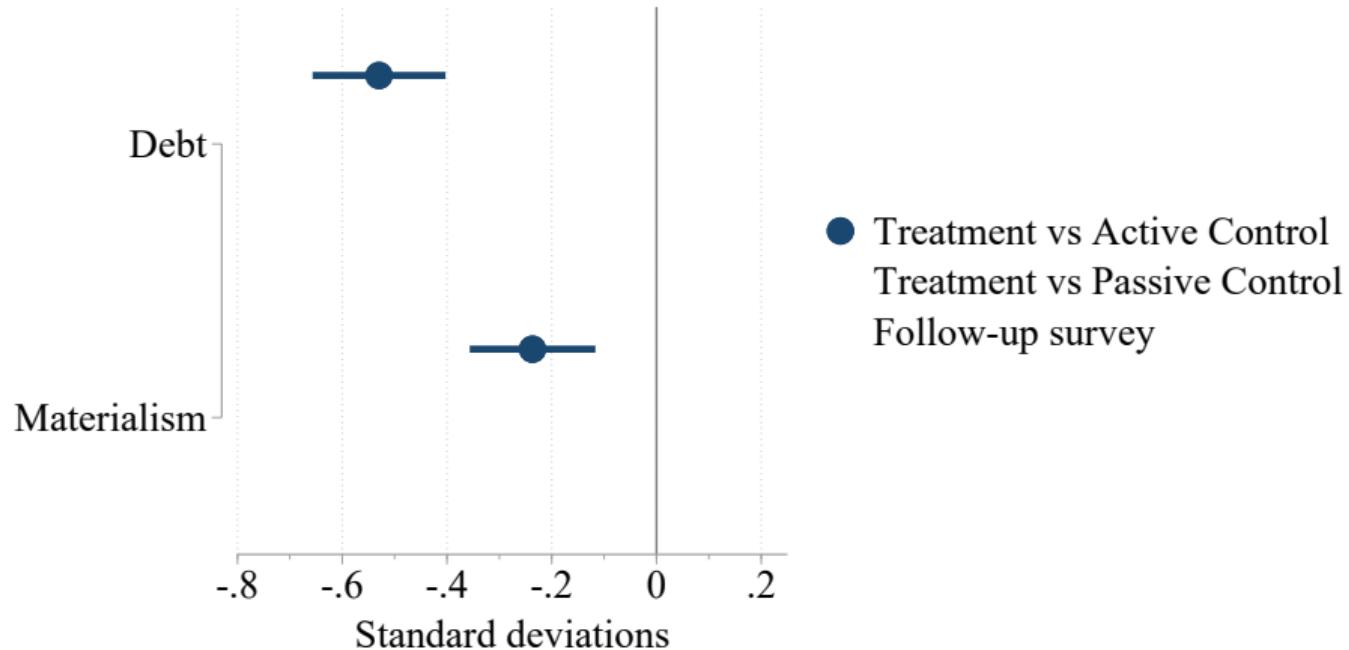
- I admire people who own expensive homes, cars, and clothes
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2. Debt attitudes (Davies and Lea, 1995)

Instructions

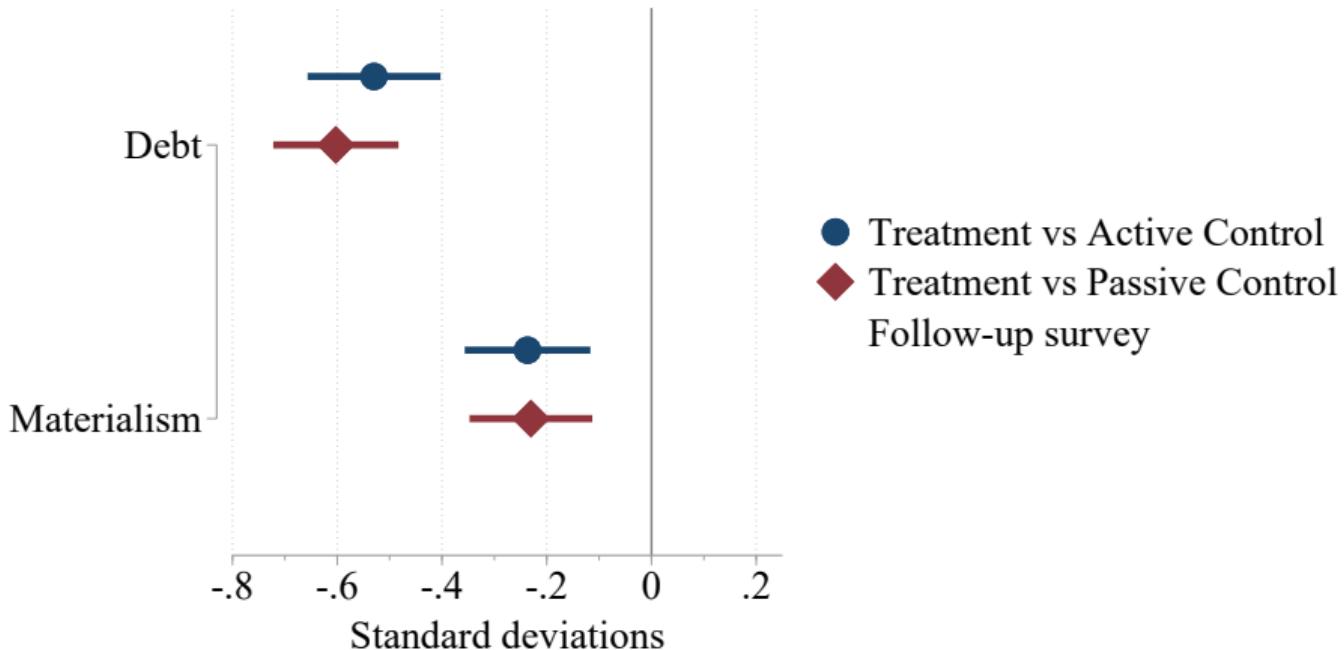
- There is no excuse for borrowing money
- You should always save up first before buying something
- You can live a good life without borrowing money
- All in all, borrowing money is not worth the cost

Effects on attitudes: Treatment vs active control



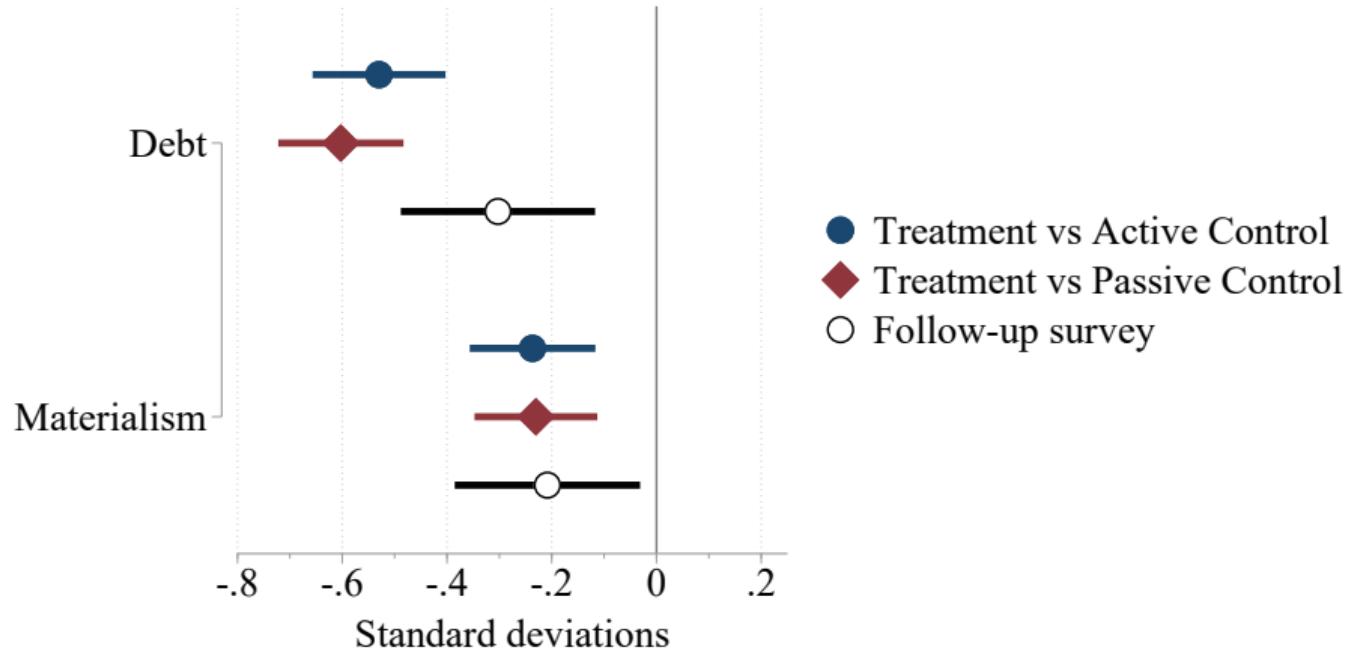
Indices are standardized using the mean and std. dev. of the respective control group; and oriented such that larger values indicate to more positive attitudes towards the construct. 95% confidence intervals are shown.

Effects on attitudes: Treatment vs passive control



Indices are standardized using the mean and std. dev. of the respective control group; and oriented such that larger values indicate to more positive attitudes towards the construct. 95% confidence intervals are shown.

Effects on attitudes: Follow-up survey



Indices are standardized using the mean and std. dev. of the respective control group; and oriented such that larger values indicate to more positive attitudes towards the construct. 95% confidence intervals are shown.

Conclusion

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Main findings

- Entertainment programs can affect **financial decisions**
 - The Dave Ramsey Show has immediate effects on grocery expenditures
 - Behavioral effects persist over the next 12 months
- Entertainment programs can foster **attitudes supportive of savings efforts**

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Policy

- Entertainment programs can reach millions of people at **low marginal cost**
- **Self-help shows** dedicated to behavioral change can be persuasive

Disclaimer

Researcher(s)' own analyses calculated (or derived) based in part on data from Nielsen Consumer LLC and marketing databases provided through the NielsenIQ Datasets at the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business. The conclusions drawn from the NielsenIQ data are those of the researcher(s) and do not reflect the views of NielsenIQ. NielsenIQ is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.

References I

- Bailey, Michael, Ruiqing Cao, Theresa Kuchler, and Johannes Stroebel**, "The Economic Effects of Social Networks: Evidence from the Housing Market," *Journal of Political Economy*, 2017.
- Banerjee, Abhijit, Eliana La Ferrara, and Victor H. Orosco-Olvera**, "The Entertaining Way to Behavioral Change: Fighting HIV with MTV," *Working paper*, 2020.
- Berg, Gunhild and Bilal Zia**, "Harnessing emotional connections to improve financial decisions: Evaluating the impact of financial education in mainstream media," *Journal of the European Economic Association*, 2017, 15 (5), 1025–1055.
- Beshears, John, James J. Choi, David Laibson, and Brigitte C. Madrian**, "Behavioral Household Finance," in "Handbook of Behavioral Economics," Vol. 1, Elsevier B.V., 2018, pp. 177–276.
- , —, —, —, and Katherine L. Milkman, "The Effect of Providing Peer Information on Retirement Savings Decisions," *The Journal of Finance*, 2015, 70 (3), 1161–1201.
- Bjorvatn, Kjetil, Alexander W. Cappelen, Linda Helgesson Sekei, Erik Ø. Sørensen, and Bertil Tungodden**, "Teaching Through Television: Experimental Evidence on Entrepreneurship Education in Tanzania," *Management Science*, 6 2020, 66 (6), 2308–2325.

References II

- Borusyak, Kirill, Xavier Jaravel, and Jann Spiess**, "Revisiting Event Study Designs: Robust and Efficient Estimation," *Work in Progress*, 2021, pp. 1–48.
- Bursztyn, Leonardo and Davide Cantoni**, "A Tear in the Iron Curtain: The Impact of Western Television on Consumption Behavior," *Review of Economics and Statistics*, 2016, 98 (1), 25–41.
- Carroll, Gabriel D., James J. Choi, David Laibson, Brigitte C. Madrian, and Andrew Metrick**, "Optimal Defaults and Active Decisions*," *Quarterly Journal of Economics*, 112009, 124 (4), 1639–1674.
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez**, "Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States," *Quarterly Journal of Economics*, 2014, 129 (4), 1553–1623.
- Choi, James J.**, "Popular Personal Financial Advice versus the Professors," *Journal of Economic Perspectives*, November 2022, 36 (4), 167–92.
- Davies, Emma and Stephen E.G. Lea**, "Student attitudes to student debt," *Journal of Economic Psychology*, 12 1995, 16 (4), 663–679.

References III

- DellaVigna, Stefano and Ethan Kaplan**, "The Fox News effect: Media bias and voting," *Quarterly Journal of Economics*, 2006.
- Dubé, Jean-Pierre, Günter J. Hitsch, and Peter E. Rossi**, "Income and Wealth Effects on Private-Label Demand: Evidence from the Great Recession," *Marketing Science*, 1 2018, 37 (1), 22–53.
- Fernandes, Daniel, John G. Lynch, and Richard G. Netemeyer**, "Financial Literacy, Financial Education, and Downstream Financial Behaviors," *Management Science*, 8 2014, 60 (8), 1861–1883.
- Ferrara, Eliana La, Alberto Chong, and Suzanne Duryea**, "Soap Operas and Fertility: Evidence from Brazil," *American Economic Journal: Applied Economics*, 2012, 4 (4), 1–31.
- Griffith, Rachel, Ephraim Leibtag, Andrew Leicester, and Aviv Nevo**, "Consumer Shopping Behavior: How Much Do Consumers Save?," *Journal of Economic Perspectives*, 4 2009, 23 (2), 99–120.
- Guess, Andrew, Brendan Nyhan, and Jason Reifler**, "You're fake news!": Findings from the Poynter Media Trust Survey," *The Poynter Institute*, St. Petersburg, FL.
<https://poyntercdn.blob.core.windows.net/files/PoynterMediaTrustSurvey2017.pdf>, 2017.

References IV

- Hastings, Justine S., Brigitte C. Madrian, and William L. Skimmyhorn**, "Financial Literacy, Financial Education, and Economic Outcomes," *Annual Review of Economics*, 8 2013, 5 (1), 347–373.
- Jensen, Robert and Emily Oster**, "The Power of TV: Cable Television and Women's Status in India," *The Quarterly Journal of Economics*, 2009, 124 (3), 1057–1094.
- Levy, Ro'ee**, "Social Media, News Consumption, and Polarization: Evidence from a Field Experiment," *American Economic Review*, March 2021, 111 (3), 831–70.
- Lusardi, Annamaria and Olivia S. Mitchell**, "Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth," *Journal of Monetary Economics*, 1 2007, 54 (1), 205–224.
- Madrian, Brigitte C. and Dennis F. Shea**, "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior*," *Quarterly Journal of Economics*, 11 2001, 116 (4), 1149–1187.
- Malmendier, Ulrike and Stefan Nagel**, "Depression Babies: Do Macroeconomic Experiences Affect Risk-taking?," *The Quarterly Journal of Economics*, 2011, 126 (1), 373–416.

References V

- Olken, Benjamin A.** "Do Television and Radio Destroy Social Capital? Evidence from Indonesian Villages," *American Economic Journal: Applied Economics*, 2009, pp. 1–33.
- Rest, Kévin Le, David Pinaud, Pascal Monestiez, Joël Chadoeuf, and Vincent Bretagnolle**, "Spatial leave-one-out cross-validation for variable selection in the presence of spatial autocorrelation," *Global Ecology and Biogeography*, 7 2014, 23 (7), 811–820.
- Richins, Marsha L. and Scott Dawson**, "A Consumer Values Orientation for Materialism and Its Measurement: Scale Development and Validation," *Journal of Consumer Research*, 12 1992, 19 (3), 303.
- Yanagizawa-Drott, David**, "Propaganda and Conflict: Evidence from the Rwandan Genocide," *The Quarterly Journal of Economics*, 11 2014, 129 (4), 1947–1994.

Example: FCC engineering record for WWTN 99.7, TN

WWTN TN HENDERSONVILLE USA FM LIC

Licensee: CUMULUS LICENSING LLC To WWTN Public Files

Service Designation: FM 'Full Service' FM station or application
Channel/Class: 259C0 Frequency: 99.7 MHz Licensed
File No.: BLH-20080428AAL Facility ID number: 31476

LMS Application ID: 3981ef19eb064ac7af26c1b6063ebef7 (Assigned numerical ID: 1243953)
Licensed date: 2008-06-03

List associated FM translators and boosters that relay this station (if any)

Technical Data Links & Maps

| | | | |
|---|-------------------------|---|--|
| 35° 49' 03.20" N Latitude 86° 31' 24.00" W Longitude (NAD 83) Use NAD83 for FM CP and license filings | 35.817556 -86.523333 | Previous NAD27 coordinates: 35° 49' 03.00" 86° 31' 24.00" | WWTN's first license was granted 11-08-1962. |
|---|-------------------------|---|--|

Polarization: Horizontal Vertical
Effective Radiated Power (ERP): 100. 100. kW ERP
Antenna radiation center Height Above Average Terrain: 395. 395. meters HAAT - Calculate HAAT
Antenna radiation Center Height Above Mean Sea Level: 604. 604. meters AMSL
Antenna radiation center Height Above Ground Level: 399.5 399.5 meters AGL

Non-Directional Antenna ID: bd241a844d94458d9e21c1b6063ebef7
Antenna Make: ERI Antenna Model: FMH-5
No. of antenna sections: 5

Additional Individual Tower Information from the Antenna Structure Registration database.
(Use the Registration Number link for detailed information.)

| ASRN | Site | Overall Height Elevation Above Ground (meters) | Overall Height Above Mean Sea (meters) | NAD 83 Tower Coordinates | | | Convert to NAD 27 | FAA Study No. 1988-ASO-1168-0E |
|---------|-------|--|--|--------------------------|------------------|----------------------------|----------------------|-----------------------------------|
| | | | | Latitude | Longitude | Height W 86° 31' 24.00" | | |
| 1063908 | 204.5 | 404.8 | 609.3 | N 35° 49' 3.00" | W 86° 31' 24.00" | To NAD27 | 1988-ASO-1168-0E | |

FAA links: Open [Obstruction / Airport Airspace searches](#) then try FAA Study No. [1988-ASO-1168-0E](#)

◀ Return

Retail channels covered by Nielsen Homescan

| | | |
|-----------------------------|---------------------------|-------------------------|
| All Other Stores | Department Store | News/Book Store |
| Apparel Stores | Discount Store | Office Supplies Store |
| Athletic Footwear | Dollar Store | Online Shopping |
| Automotive Store | Drug Store | Optical Store |
| Bakery | Electronics Store | Party Supply Store |
| Barber/Salon | Fish Market | Pet Store |
| Beauty Supply Store | Free Sample/Gift | Pizzeria |
| Beverage Store | Fruit Stand | Pro Shop |
| Bodega | Garden Stores | Quick Serve Restaurants |
| Camera Shop | Grocery | Restaurant |
| Candy Store | Hardware/Home Improvement | Service Station |
| Catalog Showroom | Health Food Store | Shoe Store |
| Cheese Stores | Home Delivery | Sporting Goods |
| Close Out Store | Home Furnishings | Stationery Store |
| Coffee Store/Gourmet Coffee | Home Inventory | Swap meet Flea Market |
| Computer Store | Hypermarket | TV/Home Shopping |
| Convenience Store | Kennel/Vet | Tobacco Store |
| Coop/Farm/Feed | Liquor Store | Toy Store |
| Craft Stores | Mail Order | Vending Machine |
| Dairy Store | Manufacturer Outlet | Video Store |
| Delicatessen | Military Store | Warehouse Club |

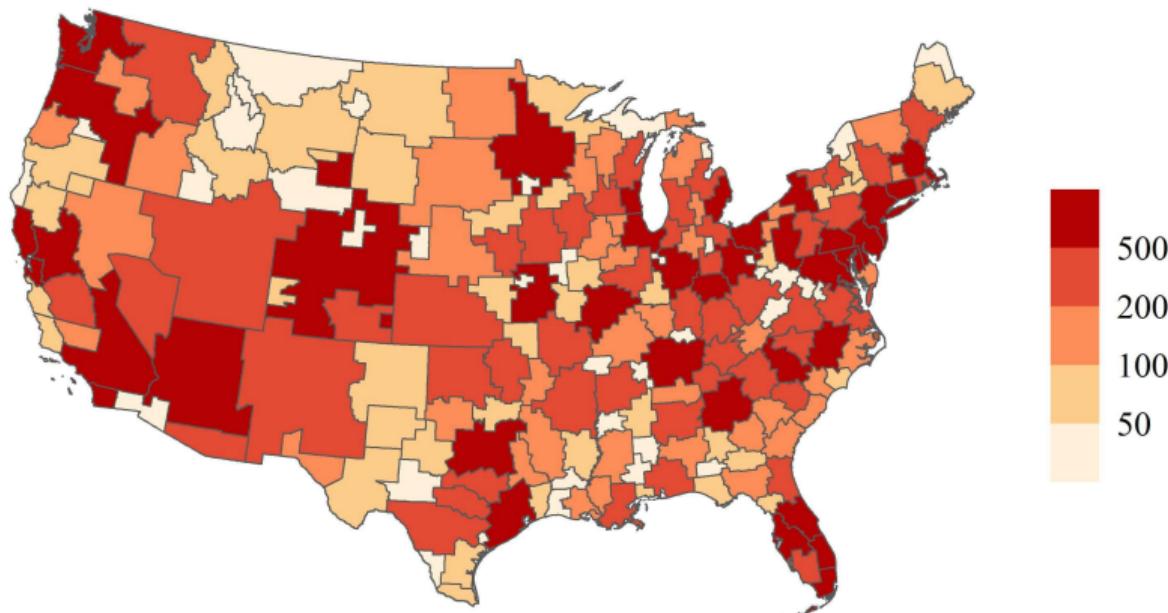
◀ Return

Nielsen Homescan: Product departments

| Product department | Modules | Examples |
|----------------------|---------|--|
| Health & Beauty Aids | 21 | baby care, cosmetics, cough/cold remedies, deodorant, hair care, oral hygiene, pain remedies, skin care, shaving |
| Dry Grocery | 41 | baby food, baking mixes, bottled water, candy, carbonated beverages, cereal, coffee, condiments, crackers, pet food, prepared foods, snacks, soup, canned vegetables |
| Frozen Foods | 12 | ice cream, frozen pizza, frozen vegetables |
| Dairy | 12 | cheese, eggs, yogurt |
| Deli | 1 | |
| Packaged meat | 1 | |
| Fresh produce | 1 | |
| Non-Food Grocery | 12 | detergent, diapers, fresheners/deodorizers, household cleaners, laundry supplies, pet care |
| Alcohol | 4 | beer, wine, liquor, coolers |
| General Merchandise | 19 | batteries/flashlights, candles, computer/electronic, cookware, film/cameras, insecticides, lawn/garden, motor vehicle, office supplies |
| Other / Magnet | 1 | |

◀ Return

Geographic distribution of Nielsen panelists across DMAs



◀ Return

Experiment

Attention check

The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This compromises the results of research studies. **To show that you are reading the survey carefully, please choose both “Very strongly interested” and “Not at all interested” as your answer to the next question.**

Given the above, how interested are you in politics?

Very strongly interested

Very interested

A little bit interested

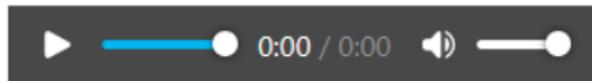
Not very interested

Not at all interested

◀ Return

Verifying the playback functionality pre-treatment

As part of this survey, you will listen to an audio recording. You can only participate in this survey if your device can play audio recordings. To see if this works, please try to play the audio below.



Which color was mentioned in the audio recording?

◀ Return

Transcript of the treatment audio I

If you wanna to win with money, let me give you a good idea. Figure out what most people are doing and run in the other direction. *Run* in the other direction. Most people are broke. Most people look good, and their broke. They spend more than they have coming in. They don't act their wage. They don't live on a plan. They don't agree on spending with their spouse. Their only hope for retirement is that the government, which is well known for its ability to handle money, will take care of them. They don't have money set aside for emergencies. They run credit card debt and student loans and car debt all day, every day. They spend like they're in Congress. Most people are stupid when it comes to money.

70% of Americans are living paycheck to paycheck. The bankruptcy rate is at an all-time high, and foreclosures are rising again. Credit card debt continues to climb, and we have a trillion dollars of student loan debt out there. The average car payment in America today now is 496 dollars over 84 months. That's stupid. Normal in America is broke and stupid. You don't wanna be normal. You wanna be weird. One of the greatest compliments you can get on this show if you call up and I say, "Man, you're weird. I'm looking at weird people. You guys are weird", which means that you're contrary. You are a contrarian. You're perpendicular to the culture. When the culture has lost its way the best thing you can do is be opposite.

Figure out whatever they're doing and do the other thing, right? Because you're not gonna get...you're only going to get what they're getting when you do what they're doing. This is not hard to figure out. If you keep doing what you've been doing, you're gonna keep getting what you've been getting. You do reap what you sow. You live in a cause-and-effect world, baby. There is no way around this. So your goal... When I went broke, my goal is to be weird. My goal was to be different. And personal finances is 80% behavior, it's only 20% head knowledge. So, this not some math formula that you have a problem with, this is a person in your mirror.

Transcript of the treatment audio II

I figured out if I can make the guy in my mirror behave, he can be skinny and rich. He's got issues. And once we realize that behavior is what causes people to handle their money poorly or handle it well, then what we've got to decide is our behaviors. And if you have the same behaviors as broke people have in when it comes to money, you're gonna have the same results as broke people. You're just gonna be another broke person.

And some of you are making 250,000 dollars a year and you're broke. You've got no money at all. You've got a mess. Loans coming out your ears. You can't breathe. You run, run, run, run, run, run like a rat in a wheel, have a heart attack and die and wonder what happened. This is no way to live. Buying things you can't afford with money you don't have to impress people you don't really like. Some of you spend an unbelievable amount of money on a car payment to impress someone at a stop light you will never be introduced to. The buddy you felt cool there for about, what, three and a half seconds? Fool.

I've been that fool, that's why I know who he is. I've been that guy, I've been that shallow where I thought that my car actually mattered to somebody. Give me a break. Nobody gives a rip about your car. It, listen, you know what I drive right now?

Anything I want. You know why? Because I drove crap for a long time. I drove cars like nobody else would drive. Now I get to drive whatever I wanna drive, and I don't drive them for you. I drive them because I like them. I couldn't give a... care less what you think about what I drive. It's not my problem. It's not your problem either by the way.

I'm gonna enjoy. Boy, I like nice cars. But I'm not gonna have a nice car with a stupid car payment on it. It's ridiculous. If your self-esteem is so screwed up that you're doing that then you're gonna struggle with money. You're normal. People spending a bunch of money to act like they're something they're not. What they call in Texas "big hat, no cattle." You need to decide: I don't care what other people think and I'm gonna be weird. Whatever you're doing with money, I'm going to do the opposite thing. And when you decide that, you will start winning with money.

[◀ Return](#)

Transcript of the control audio I

They say you should choose your battles wisely. That makes sense. Consider Napoleon. He chose to fight at Waterloo, and that didn't work out well for him. If he'd chosen more wisely, he might have chosen to fight at Gettysburg. He would have given the Gettysburg Address and had a movie made about him, only instead of starring Daniel-Day Lewis, it would have starred Daniel DeVito. One unwisely-chosen battle centuries ago changed the entire course of the Academy Awards centuries later. In our daily lives, choosing battles unwisely means we can waste a lot of time and energy on the wrong thing.

This very evening, listener Emily proclaimed on her Facebook wall that she was thrilled that a business celebrity sent her a message. Imagine my surprise to find out she was talking about me! I could have spent time arguing that I'm certainly not a celebrity, and I'm far too humble and modest to deserve such acclaim and adoration. But what would have been the point? I'm sure you'll agree it makes much more sense to accept her statement at face value—as simply a statement of fact—and save my energy for an important battle.

Where in your life and work do you fight battles? Why? Are those the right battles? Let's explore how you can make sure you fight less and win more. I know this sounds obvious, but before going into battle, ask yourself honestly whether you can win. I know you feel you can win but think it through. A coaching client was furious that his biggest customer had stolen some of his technology. He wanted to fight it out in court, but if he won the lawsuit, he'd lose the customer and go out of business. This battle couldn't be won.

It's like trying to get your boyfriend, girlfriend, husband, wife, spousal equivalent, or polyamorous family unit to put the toilet paper roll on with the paper facing the other direction. Not only will you lose that battle, but you'll end up bringing home flowers for a month to repair the damage you made with that foolish, foolish request. You cannot win that battle. So why try? If you do win, make sure you'll get some benefit from the win.

Transcript of the control audio II

I know people who spend years obsessing over how they were right and Jordan Dinklebert was wrong, but Jordan wouldn't listen and insulted them in front of the entire team. Now they're just waiting for a chance to take revenge. They spend years plotting, and the day they're named employee of the year, halfway through their acceptance speech, they say, "And it's no thanks to Jordan Dinklebert. I was right, you were wrong, and you're really just a big poopie head. So there!" Uh, huh. A poopie head. Well, that little bit of revenge was certainly worth the wait.

Revenge is usually a battle that takes up a lot of resources, and even if you win, you don't really benefit. In Star Trek II: The Wrath of Kahn, Kahn declares, "Revenge is a dish best served cold." Really? Who wants a cold dinner? Revenge is not a dish best served cold. Oreo ice cream cake is a dish best served cold. So what's the lesson here? Even if you benefit, make sure you benefit enough to be worth the fight. Take this example: A non-profit organization owned a parcel of undeveloped land. A developer wanted it. He sued the non-profit with a frivolous lawsuit and offered to settle if the non-profit would sell the developer the land for \$100,000, which was market price.

The non-profit, on principle, didn't want to give in. But they weren't using the land for anything. And in America, it can cost \$20,000 to get a frivolous lawsuit thrown out of court. And the developer, with lawyers on staff, could just sue again. The non-profit realized that even though they could win and keep the land, that win would cost them \$20,000. If they didn't fight, they would walk away with \$100,000. Were they getting shafted? Yes. But were they smart? Definitely. They chose not to fight a battle that wasn't worth the fight.

Last but not least, consider how else you could spend your time. Even for a battle you can win that is worth the fight, there may be better ways to use your time. One of my clients was spending a lot of time and energy pursuing a contractor who had done shoddy work to his home, defrauding him out of \$50,000.

Transcript of the control audio III

When we explored the decision to pursue the case in court, and figured that, given the contractor's resources, my client would recover \$25,000 at most, if he won. It would probably take him a day a week for six months, which is 26 days. An entire work month. And that's the best-case scenario. We looked seriously at all the other opportunities in my client's life and work and realized that he had some business development opportunities that would bring in a six-figure contract if he could work on them full time.

The battle with the contractor? He could win. He'd benefit. It would be worth it. But he could spend the same time doing business development instead and make even more money. He chose to forgo the battle and spend his time doing business development. Smart. Next time you start gearing up for a fight, stop. Make sure it's a battle you can win. Make sure you'll benefit if you win it. Make sure the benefit is large, and finally, that there isn't something else you could do instead to get even more benefit elsewhere in your life.

◀ Return

Obfuscation: Consumer research survey

- Did you enjoy listening to the content?
- Imagine a local radio station near you would feature content like this. Would you be more or less likely to listen to this station?
- How would you rate the production quality of the content?
- How would you rate the novelty of the content?
- What is the name of the radio show that you just listened to?
- On how many days do you listen to the radio in a typical week?
- Which, if any, of the following radio programs have you listened to in the past?
Please select all that apply.

[Savage Nation, Sean Hannity Show, Dave Ramsey Show, Marketplace, BBC World Service, Howard Stern Show, Mark Levin Show, Coast to Coast, Morning Edition, I don't listen to these radio shows]

◀ Return

Obfuscation module: Secondary outcomes

- **Financial literacy: Big 5**
 - Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?
[More than \$102, Exactly \$102, Less than \$102]
 - Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
[More than today, Exactly the same, Less than today]
 - If interest rates rise, what will typically happen to bond prices?
[They will rise, They will fall, They will stay the same, There is no relationship between bond prices and the interest rate]
 - A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. [True, False]
 - Buying a single company's stock usually provides a safer return than a stock mutual fund. [True, False]
- **Information demand:** Would you like to receive free information on how to manage your personal finances and pay off your debt? [Yes, No]

◀ Return

Treatment effect on secondary outcomes

| | (1) Information demand | (2) Financial literacy | (3) Belief: Average debt | (4) Belief: Any debt |
|--|------------------------------|------------------------------|--------------------------------|----------------------------|
| Panel A: Audio control group | | | | |
| Treatment | 0.052* (0.029) | 0.159* (0.082) | 3.231 (3.463) | 5.457*** (1.404) |
| Constant | 0.253*** (0.020) | 3.034*** (0.058) | 75.376*** (2.337) | 60.223*** (1.067) |
| N | 962 | 962 | 962 | 962 |
| Panel B: Robustness control group | | | | |
| Treatment | -0.004 (0.029) | -0.086 (0.080) | 6.047* (3.266) | 2.841** (1.267) |
| Constant | 0.309*** (0.020) | 3.279*** (0.055) | 72.560*** (2.034) | 62.840*** (0.880) |
| N | 1,030 | 1,030 | 1,030 | 1,030 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Comparison of the survey sample to the general US population

| Variable | Survey sample | American Community Survey (2019) |
|---------------------------------------|---------------|----------------------------------|
| Female | 50% | 51% |
| Age: 18–34 | 30% | 30% |
| Age: 35–54 | 30% | 32% |
| Age: 55+ | 40% | 38% |
| Education: Bachelor's degree or above | 30% | 31% |
| Region: Northeast | 19% | 17% |
| Region: Midwest | 21% | 21% |
| Region: South | 43% | 38% |
| Region: West | 17% | 24% |

◀ Return

Correlation between attitudes and past behavior

| | Log debt | | Debt-free | | Log spending | |
|----------------------|--------------------|---------------------|----------------------|----------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Debt attitudes | 0.391** (0.152) | 0.398*** (0.151) | -0.045*** (0.015) | -0.047*** (0.015) | -0.049 (0.049) | -0.037 (0.046) |
| Consumption attitude | 0.171 (0.145) | 0.213 (0.152) | -0.015 (0.015) | -0.015 (0.016) | 0.169*** (0.042) | 0.107*** (0.039) |
| N | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 |
| Mean of dep. var. | 6.178 | 6.178 | 0.301 | 0.301 | 4.805 | 4.805 |
| Controls | No | Yes | No | Yes | No | Yes |

Note: This table shows OLS regression estimates using respondents from the main study, excluding respondents in the treatment group. The debt attitude index and the consumption attitude index are constructed as described in the main text and oriented such that larger values correspond to more positive attitudes towards the object. Robust standard errors shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Main experiment – Treatment effects on attitudes by item

| | Debt attitudes | | | | Consumption attitudes | |
|--|---|--|---|--|---|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| There is no excuse for borrowing money | You should always save up first before buying something | You can live a good life without borrowing money | All in all, borrowing money is not worth the cost | I admire people who own expensive homes, cars, and clothes | The things I own say a lot about how well I'm doing in life | |
| Panel A: Active control | | | | | | |
| Treatment | 0.318*** (0.066) | 0.270*** (0.062) | 0.363*** (0.061) | 0.507*** (0.064) | -0.134** (0.064) | -0.257*** (0.066) |
| N | 962 | 962 | 962 | 962 | 962 | 962 |
| z-scored | Yes | Yes | Yes | Yes | Yes | Yes |
| Panel B: Passive control | | | | | | |
| Treatment | 0.452*** (0.065) | 0.292*** (0.059) | 0.352*** (0.057) | 0.590*** (0.061) | -0.221*** (0.063) | -0.176*** (0.064) |
| N | 1,030 | 1,030 | 1,030 | 1,030 | 1,030 | 1,030 |
| z-scored | Yes | Yes | Yes | Yes | Yes | Yes |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Follow-up survey – Test for differential attrition across treatment arms

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|-----------------------|--------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
| | Age | Female | College | Log income | Log debt | Democrat | Republican | Financial literacy | Savings ability | Northeast | Midwest | South |
| Treatment | -0.40 (1.21) | 0.01 (0.03) | -0.03 (0.03) | 0.01 (0.06) | 0.45 (0.30) | 0.03 (0.03) | 0.01 (0.03) | 0.04 (0.10) | 0.03 (0.03) | 0.05* (0.03) | 0.00 (0.03) | -0.05 (0.03) |
| Follow-up | 4.04*** (1.18) | 0.01 (0.03) | -0.06* (0.03) | -0.10* (0.06) | 0.63** (0.30) | 0.03 (0.03) | 0.03 (0.03) | 0.04 (0.09) | -0.05 (0.03) | -0.01 (0.02) | 0.01 (0.03) | 0.03 (0.03) |
| Treatment x Follow-up | 0.54 (2.04) | -0.02 (0.06) | 0.09 (0.06) | 0.05 (0.10) | -0.94* (0.53) | -0.04 (0.06) | -0.00 (0.05) | 0.24 (0.16) | 0.03 (0.06) | -0.00 (0.05) | -0.05 (0.05) | 0.02 (0.06) |
| Constant | 46.64*** (0.70) | 0.49*** (0.02) | 0.47*** (0.02) | 10.64*** (0.04) | 5.96*** (0.18) | 0.41*** (0.02) | 0.27*** (0.02) | 4.56*** (0.05) | 0.62*** (0.02) | 0.17*** (0.01) | 0.21*** (0.02) | 0.43*** (0.02) |
| N | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |

Note: This table shows OLS regression estimates using baseline demographic characteristics as dependent variable. Each regression includes the full interaction between the binary treatment indicator and a binary dummy indicating whether a respondent is part of the follow-up sample. Robust standard errors are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

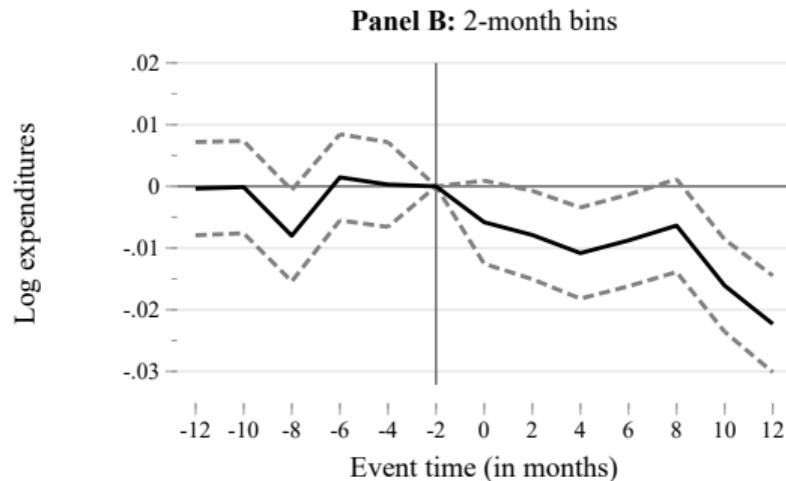
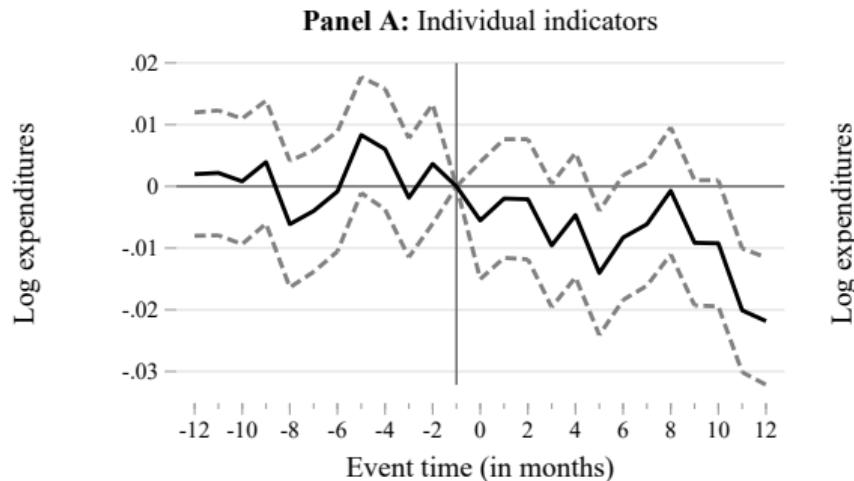
◀ Return

[◀ Return](#)

| | Means (std. dev.) | | | Differences (<i>p</i> -values) | | |
|---|---------------------|--------------------|---------------------|---------------------------------|-------------------|--------------------|
| | Treatment group (T) | Active control (A) | Passive control (P) | T - A | T - P | A - P |
| Age | 47.825 (17.763) | 48.015 (17.504) | 48.071 (18.351) | -0.190 (0.868) | -0.245 (0.828) | 0.056 (0.961) |
| Female | 0.494 (0.500) | 0.504 (0.501) | 0.491 (0.500) | -0.010 (0.749) | 0.003 (0.918) | -0.014 (0.668) |
| College degree | 0.445 (0.497) | 0.447 (0.498) | 0.446 (0.498) | -0.002 (0.958) | -0.001 (0.975) | -0.001 (0.982) |
| Log income | 10.628 (0.891) | 10.558 (0.930) | 10.646 (0.889) | 0.070 (0.232) | -0.018 (0.750) | 0.088 (0.126) |
| Log debt | 6.302 (4.538) | 6.170 (4.461) | 6.186 (4.539) | 0.133 (0.647) | 0.117 (0.680) | 0.016 (0.954) |
| Democrat | 0.437 (0.497) | 0.417 (0.494) | 0.429 (0.495) | 0.020 (0.532) | 0.008 (0.805) | 0.012 (0.693) |
| Republican | 0.297 (0.457) | 0.285 (0.452) | 0.283 (0.451) | 0.012 (0.691) | 0.014 (0.616) | -0.003 (0.928) |
| Subjective financial literacy | 4.699 (1.405) | 4.523 (1.452) | 4.619 (1.295) | 0.176* (0.057) | 0.080 (0.341) | 0.096 (0.270) |
| Savings ability | 0.638 (0.481) | 0.587 (0.493) | 0.608 (0.489) | 0.051 (0.105) | 0.030 (0.315) | 0.021 (0.507) |
| Region: Northeast | 0.222 (0.416) | 0.160 (0.367) | 0.178 (0.383) | 0.062** (0.015) | 0.043* (0.084) | 0.019 (0.426) |
| Region: Midwest | 0.205 (0.404) | 0.191 (0.394) | 0.242 (0.428) | 0.014 (0.592) | -0.036 (0.163) | 0.050* (0.055) |
| Region: South | 0.396 (0.490) | 0.472 (0.500) | 0.416 (0.493) | -0.076** (0.017) | -0.020 (0.514) | -0.056* (0.074) |
| Region: West | 0.177 (0.382) | 0.177 (0.382) | 0.164 (0.370) | 0.000 (0.992) | 0.013 (0.572) | -0.013 (0.583) |
| <i>p</i> -value of joint <i>F</i> -test | | | | 0.313 | 0.796 | 0.689 |
| Observations | 492 | 470 | 538 | 962 | 1,030 | 1,008 |

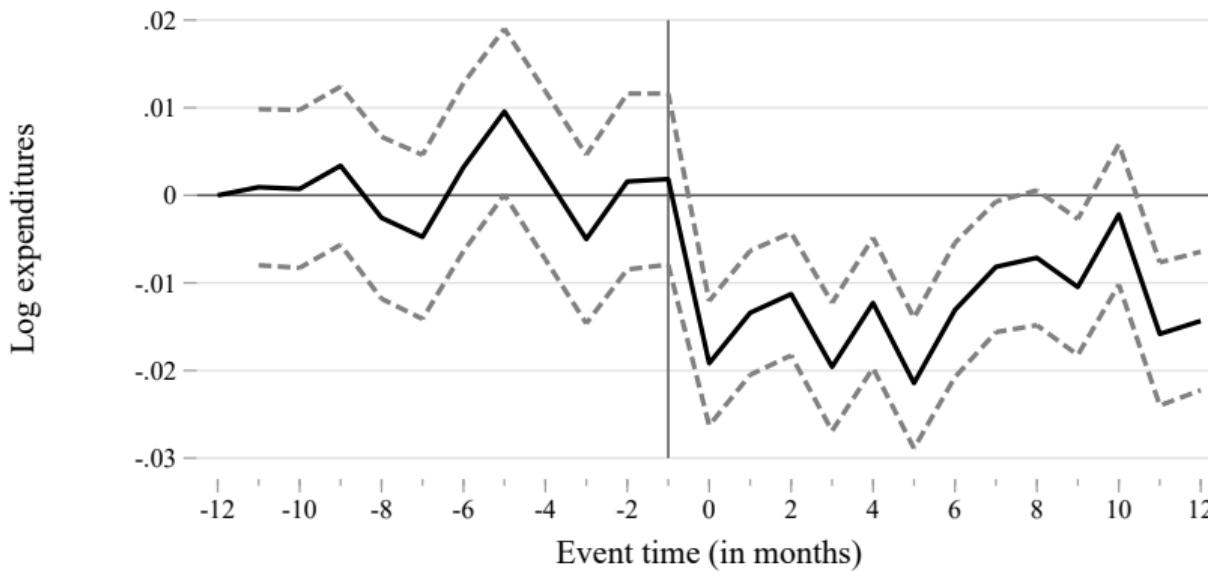
Robustness checks

Robustness: Balanced sample around the event window



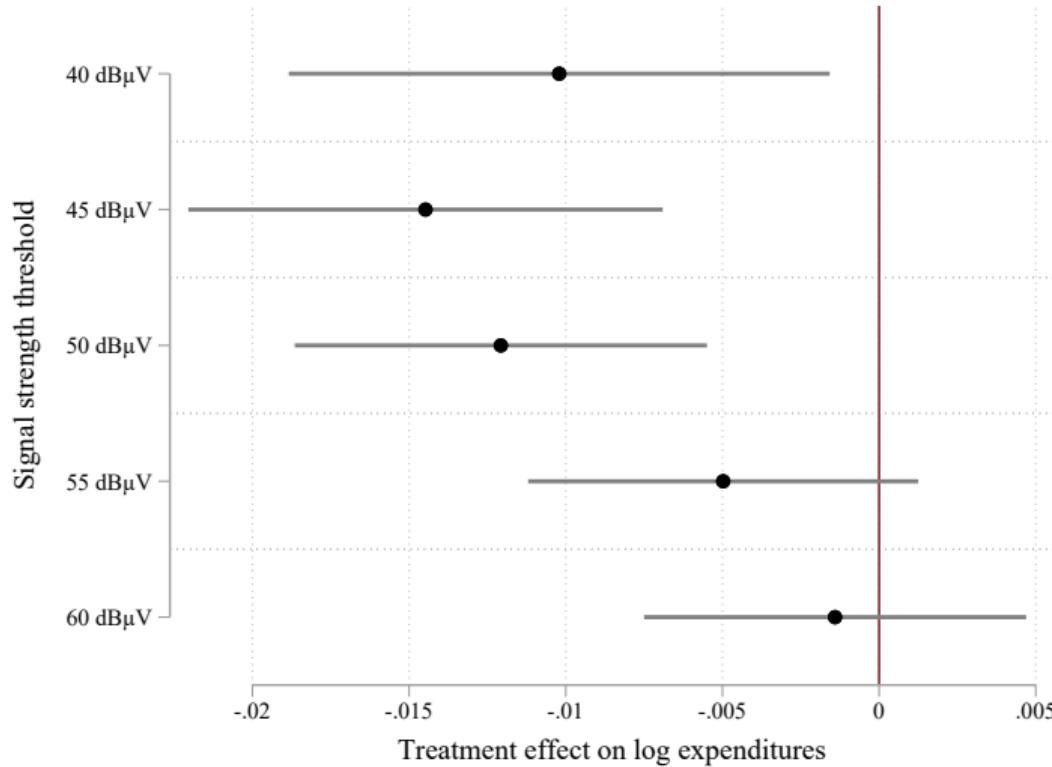
Notes: The omitted category is 12 months before market entry (Panel A) or the two months before market entry (Panel B). 95% confidence intervals are constructed from robust standard errors clustered at the zip code level.

Robustness: Borusyak et al. (2021) imputation estimator



Notes: The omitted category is 12 months before market entry. Estimates of the treatment effect dynamics are obtained from the imputation estimator proposed by Borusyak et al. (2021). The estimator includes household and year-month fixed effects. 95% confidence intervals are constructed from robust standard errors clustered at the zip code level.

Alternative signal strength thresholds



Notes: This figure plots estimates of the baseline model (equation 1) using alternative thresholds to binarize the continuous signal strength measure. The dependent variable are log household expenditures.

Table: Alternative measures of household expenditures

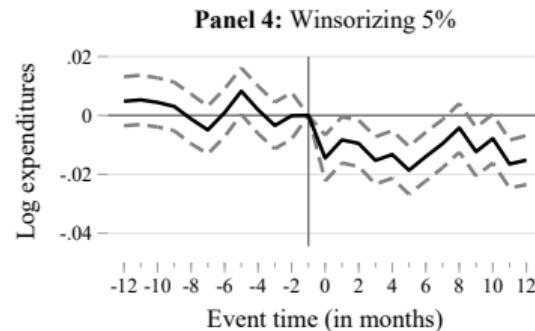
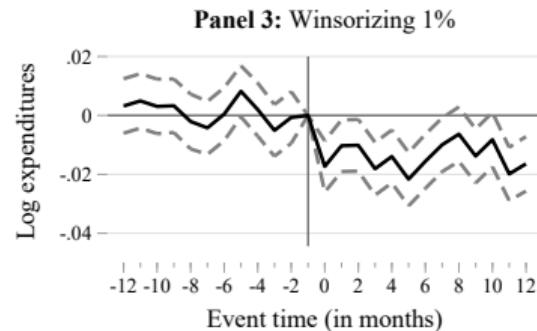
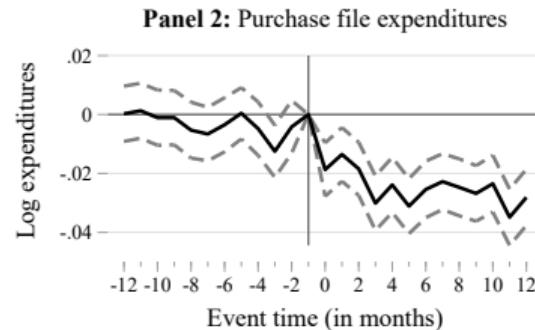
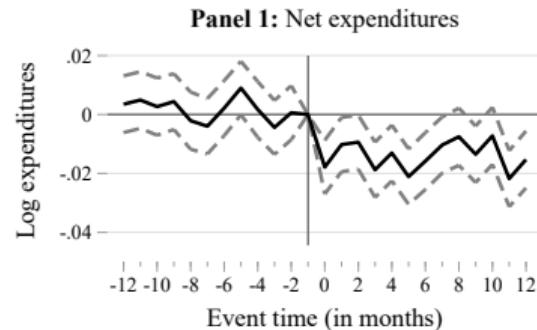
| | (1) Net expenditures | (2) Purchase file expenditures | (3) Winsorizing 1% | (4) Winsorizing 5% |
|---------------------------|----------------------------|--------------------------------------|--------------------------|--------------------------|
| Radio coverage | -0.016*** (0.003) | -0.032*** (0.003) | -0.016*** (0.003) | -0.015*** (0.002) |
| N | 3,399,591 | 3,399,566 | 3,407,700 | 3,407,700 |
| R ² | 0.527 | 0.551 | 0.537 | 0.549 |
| Mean of dep. var. | 6.169 | 5.639 | 6.190 | 6.201 |
| Household & Time FEs | Yes | Yes | Yes | Yes |
| Household controls | Yes | Yes | Yes | Yes |
| Local economic conditions | Yes | Yes | Yes | Yes |

Note: Column 1 uses monthly expenditures net of the value of redeemed coupons. Column 2 uses the sum of all expenditures recorded in the Nielsen Homescan purchase files, excluding data supplied to Nielsen from retailers. Columns 3 and 4 winsorize the household expenditures at the 1% and 5% level, respectively. Robust standard errors clustered at the zip code level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

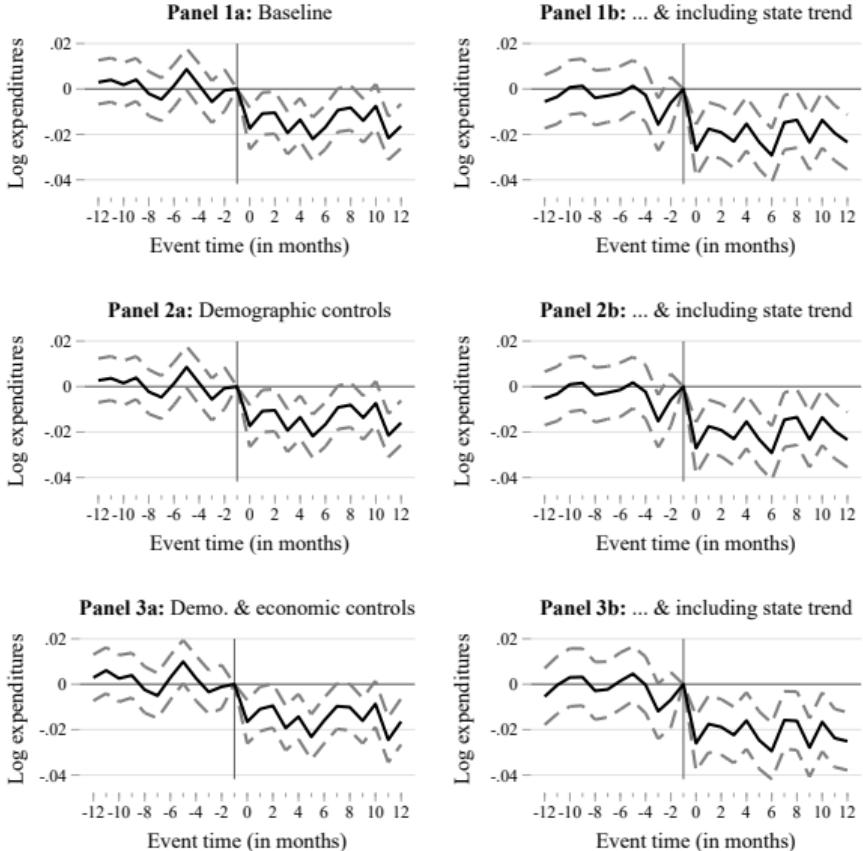
◀ Return

Event study: Alternative measures of household expenditures

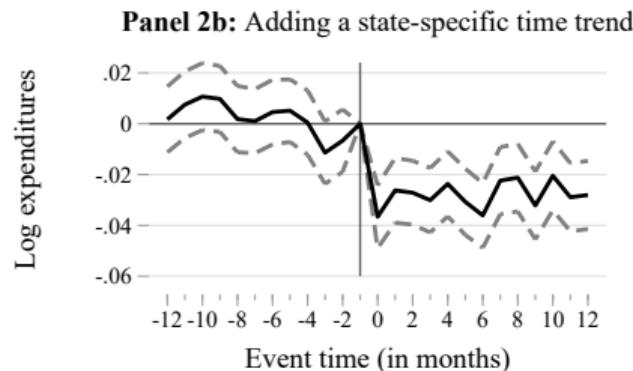
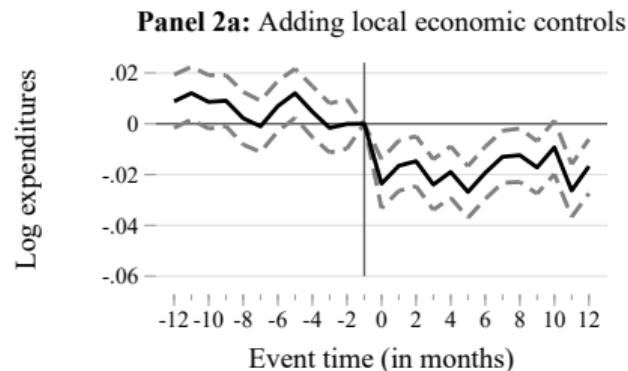
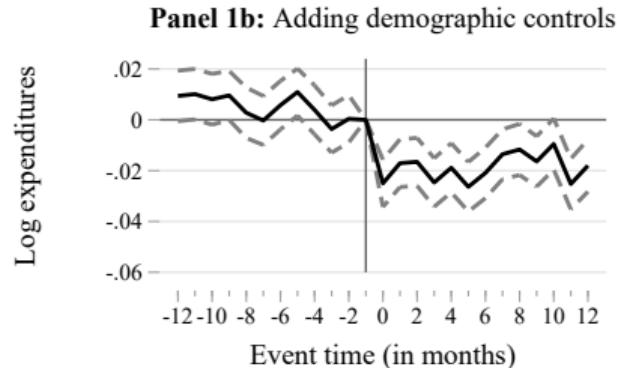
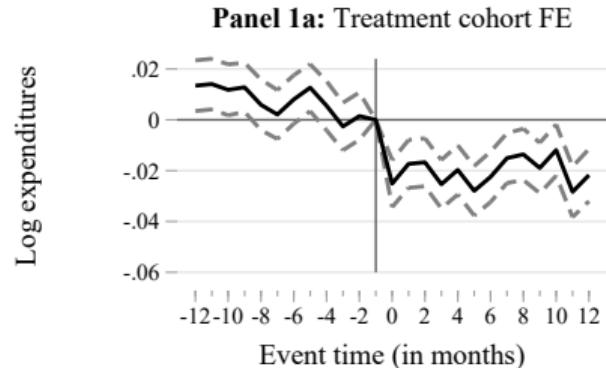


◀ Return

Event study: Robustness to controls



Robustness: Treatment cohort instead of household fixed effects



◀ Return

Clustering of standard errors

| Robust standard errors clustered at the level of: | | | | |
|---|------------------------|------------------------|------------------------|------------------------|
| | (1) Zip code | (2) County | (3) DMA | (4) State |
| Panel A: Log expenditures | | | | |
| Radio coverage | -0.0131*** (0.0027) | -0.0131*** (0.0032) | -0.0131*** (0.0036) | -0.0131*** (0.0028) |
| N | 3,744,066 | 3,744,066 | 3,744,066 | 3,744,066 |
| R ² | 0.518 | 0.518 | 0.518 | 0.518 |
| Mean of dep. var. | 6.185 | 6.185 | 6.185 | 6.185 |
| Household FEes | Yes | Yes | Yes | Yes |
| Time FEes | Yes | Yes | Yes | Yes |
| Panel B: Log items | | | | |
| Radio coverage | -0.0168*** (0.0029) | -0.0168*** (0.0035) | -0.0168*** (0.0041) | -0.0168*** (0.0038) |
| N | 3,734,881 | 3,734,881 | 3,734,881 | 3,734,881 |
| R ² | 0.541 | 0.541 | 0.541 | 0.541 |
| Mean of dep. var. | 4.189 | 4.189 | 4.189 | 4.189 |
| Household FEes | Yes | Yes | Yes | Yes |
| Time FEes | Yes | Yes | Yes | Yes |

◀ Return

Nielsen's post-stratification weights

| | (1) | (2) | (3) | (4) |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|
| Panel A: Log expenditures | | | | |
| Radio coverage | -0.0110*** (0.0040) | -0.0099** (0.0039) | -0.0156*** (0.0041) | -0.0155*** (0.0051) |
| N | 3,683,294 | 3,683,294 | 3,353,738 | 3,353,738 |
| R ² | 0.530 | 0.533 | 0.535 | 0.538 |
| Mean of dep. var. | 6.145 | 6.145 | 6.148 | 6.148 |
| Household & Time FEs | Yes | Yes | Yes | Yes |
| Household controls | | Yes | Yes | Yes |
| Local economic conditions | | | Yes | Yes |
| State x Time FEs | | | | Yes |
| Panel B: Log items | | | | |
| Radio coverage | -0.0169*** (0.0043) | -0.0152*** (0.0042) | -0.0232*** (0.0045) | -0.0250*** (0.0054) |
| N | 3,674,329 | 3,674,329 | 3,345,823 | 3,345,823 |
| R ² | 0.555 | 0.558 | 0.559 | 0.562 |
| Mean of dep. var. | 4.158 | 4.158 | 4.156 | 4.156 |
| Household & Time FEs | Yes | Yes | Yes | Yes |
| Household controls | | Yes | Yes | Yes |

◀ Return

Excluding households based on when they receive radio coverage

| Excluded treatment cohorts: | | | | | | | | |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) 04/05 | (2) 06/07 | (3) 08/09 | (4) 10/11 | (5) 12/13 | (6) 14/15 | (7) 16/17 | (8) 18/19 |
| Radio coverage | -0.013*** (0.003) | -0.015*** (0.003) | -0.012*** (0.003) | -0.012*** (0.003) | -0.011*** (0.003) | -0.012*** (0.003) | -0.012*** (0.003) | -0.013*** (0.003) |
| N | 3,744,066 | 3,020,964 | 3,462,420 | 3,583,859 | 3,641,719 | 3,511,737 | 3,720,165 | 3,696,707 |
| R ² | 0.518 | 0.520 | 0.518 | 0.518 | 0.518 | 0.517 | 0.518 | 0.517 |
| Household FEs | Yes |
| Time FEs | Yes |

Note: This table shows OLS regression estimates where the unit of observation is a household-month. The dependent variable in all regressions are log household expenditures. Robust standard errors clustered at the zip code level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Robustness: Log expenditures – Varying the sample of DMAs

| Dependent variable: log (Expenditures) | | | | | | | |
|--|---------------------|----------------------|----------------------|----------------------|----------------------|---------------------|-------------------|
| | Excluded DMA ranks | | | | Included DMA ranks | | |
| | (1) 1–50 | (2) 51–100 | (3) 101–150 | (4) 150–210 | (5) 1–50 | (6) 51–100 | (7) 101–210 |
| Radio coverage | -0.010** (0.005) | -0.012*** (0.003) | -0.015*** (0.003) | -0.013*** (0.003) | -0.014*** (0.003) | -0.015** (0.006) | -0.002 (0.008) |
| N | 1,209,747 | 3,006,281 | 3,447,726 | 3,568,444 | 2,534,319 | 737,785 | 471,962 |
| R ² | 0.521 | 0.517 | 0.518 | 0.518 | 0.517 | 0.523 | 0.517 |
| Household FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Time FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: This table shows OLS regression estimates where the unit of observation is a household-month. The dependent variable in all regressions are log household expenditures. Robust standard errors clustered at the zip code level and shown in parentheses. Nielsen DMA market rankings are from 2017.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Robustness: Log items – Varying the sample of DMAs

| Dependent variable: log (Number of purchased items) | | | | | | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|
| | Excluded DMA ranks | | | | Included DMA ranks | | |
| | (1) 1–50 | (2) 51–100 | (3) 101–150 | (4) 150–210 | (5) 1–50 | (6) 51–100 | (7) 101–210 |
| Radio coverage | -0.024*** (0.005) | -0.013*** (0.003) | -0.017*** (0.003) | -0.017*** (0.003) | -0.014*** (0.003) | -0.030*** (0.007) | -0.014* (0.008) |
| N | 1,206,284 | 2,998,991 | 3,439,762 | 3,559,606 | 2,528,597 | 735,890 | 470,394 |
| R ² | 0.538 | 0.540 | 0.542 | 0.542 | 0.541 | 0.542 | 0.532 |
| Household FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Time FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: This table shows OLS regression estimates where the unit of observation is a household-month. The dependent variable in all regressions is the log of the number of purchased products per month. Robust standard errors clustered at the zip code level and shown in parentheses. Nielsen DMA market rankings are from 2017.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Robustness: Availability of the radio show on other channels

[◀ Return](#)

| Excluding years after joining: | | |
|--------------------------------|------|------|
| (1) | (2) | (3) |
| 2016 | 2015 | 2013 |

Panel A: Log expenditures

| | | | |
|-------------------|----------------------|----------------------|----------------------|
| Radio coverage | -0.011*** (0.003) | -0.010*** (0.003) | -0.010*** (0.003) |
| N | 3,248,939 | 2,935,565 | 2,604,519 |
| R ² | 0.528 | 0.534 | 0.541 |
| Mean of dep. var. | 6.182 | 6.180 | 6.175 |
| Household FE | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes |

Panel B: Log items

| | | | |
|-------------------|----------------------|---------------------|---------------------|
| Radio coverage | -0.010*** (0.003) | -0.007** (0.003) | -0.006** (0.003) |
| N | 3,240,312 | 2,927,445 | 2,597,187 |
| R ² | 0.557 | 0.566 | 0.575 |
| Mean of dep. var. | 4.188 | 4.188 | 4.190 |
| Household FE | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes |

Robustness: Expenditures – Excluding counties with affiliates

| Dependent variable: log (Expenditures) | | | | | | |
|--|-----------------------------------|----------------------|---------------------------------------|---------------------|-------------------------|---------------------|
| | Drop zip codes close to Nashville | | Drop counties with affiliate stations | | Apply both restrictions | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Radio coverage | -0.013*** (0.003) | -0.012*** (0.004) | -0.013*** (0.003) | -0.009** (0.004) | -0.013*** (0.004) | -0.011** (0.005) |
| N | 3,345,355 | 3,048,109 | 2,314,720 | 2,036,495 | 2,050,384 | 1,804,011 |
| R ² | 0.519 | 0.525 | 0.520 | 0.527 | 0.521 | 0.529 |
| Mean of dep. var. | 6.190 | 6.191 | 6.186 | 6.187 | 6.191 | 6.192 |
| Household & Time FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Household controls | | Yes | | Yes | | Yes |
| Local economic conditions | | Yes | | Yes | | Yes |
| State x Time FEs | | Yes | | Yes | | Yes |

Note: Columns 1–2 exclude households residing in zip codes within 500 km of Nashville, Tennessee.
Columns 3–4 exclude all households that reside in a county with a radio station that broadcasts the *Dave Ramsey Show* at some point.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Robustness: Log items – Excluding counties with affiliates

| Dependent variable: log (Number of purchased products) | | | | | | |
|--|-----------------------------------|----------------------|---------------------------------------|----------------------|-------------------------|----------------------|
| | Drop zip codes close to Nashville | | Drop counties with affiliate stations | | Apply both restrictions | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Radio coverage | -0.016*** (0.003) | -0.021*** (0.004) | -0.019*** (0.004) | -0.020*** (0.005) | -0.017*** (0.004) | -0.019*** (0.005) |
| N | 3,337,267 | 3,040,998 | 2,309,039 | 2,031,659 | 2,045,509 | 1,799,901 |
| R ² | 0.542 | 0.549 | 0.542 | 0.551 | 0.542 | 0.550 |
| Mean of dep. var. | 4.182 | 4.179 | 4.204 | 4.201 | 4.198 | 4.194 |
| Household & Time FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Household controls | | Yes | | Yes | | Yes |
| Local economic conditions | | Yes | | Yes | | Yes |
| State x Time FEs | | Yes | | Yes | | Yes |

Note: Columns 1–2 exclude households residing in zip codes within 500 km of Nashville, Tennessee.
Columns 3–4 exclude all households that reside in a county with a radio station that broadcasts the *Dave Ramsey Show* at some point.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Placebo: Presidential elections: Turnout and voting behavior

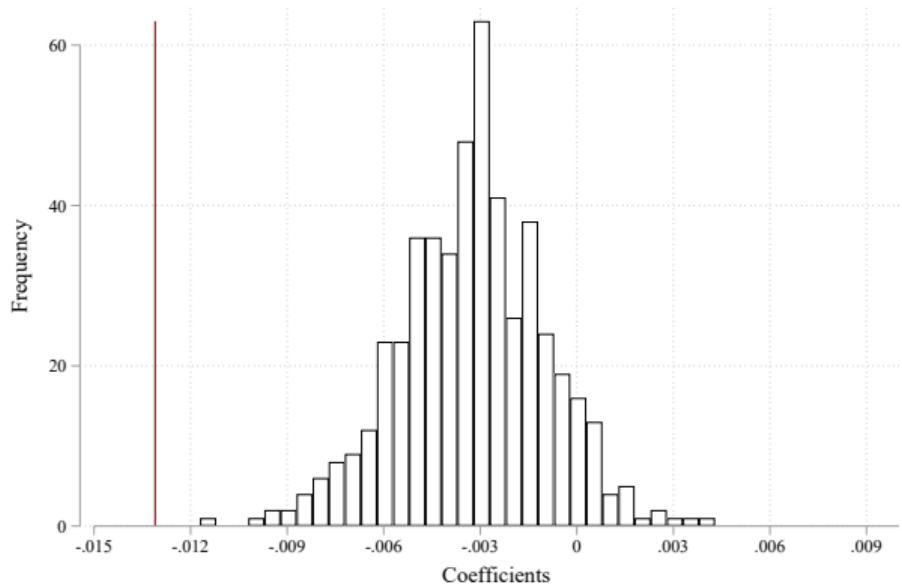
| | Turnout in Presidential election | | | Republican vote share | | |
|----------------------------|----------------------------------|-------------------|------------------|-----------------------|------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Radio coverage | -0.009 (0.007) | -0.005 (0.005) | 0.003 (0.003) | 0.008** (0.004) | 0.002 (0.003) | 0.004 (0.002) |
| N | 15415 | 15415 | 15410 | 15415 | 15415 | 15410 |
| R ² | 0.937 | 0.963 | 0.977 | 0.943 | 0.954 | 0.977 |
| Mean of dep. var. | 0.470 | 0.470 | 0.471 | 0.563 | 0.563 | 0.563 |
| County FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Baseline covar. x Year FEs | | Yes | Yes | | Yes | Yes |
| State x Year FEs | | | Yes | | | Yes |

Note: This table shows OLS regression estimates using electoral outcomes from the Presidential elections in 2000–2016. Turnout is measured as the ratio of cast votes to the voting age population. Radio coverage is the share of the county population with radio coverage. Observations are weighted by the voting age population. Baseline county characteristics in 2000 include the percent of females, blacks, Hispanics and age group shares in 10 year bins. Robust standard errors clustered at the state level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Counter-factual timing of market entry

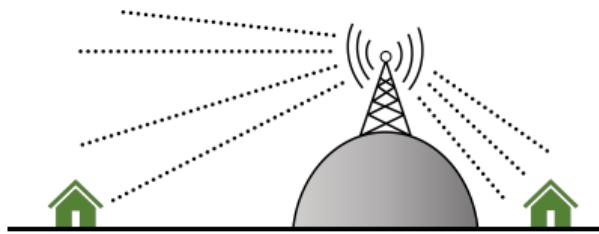


Notes: I repeatedly ($N = 500$) assign a randomly chosen counterfactual market entry date to each zip code. If a zip codes is outside the actual coverage area of all affiliated radio stations, the zip code is always assigned to the control group without any market entry. Based on the counterfactual timing of market entry, I apply equivalent sample restrictions, and re-estimate the baseline equation.

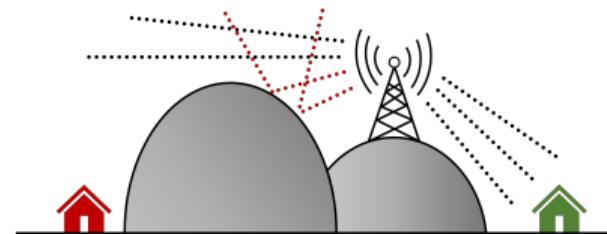
[◀ Return](#)

Exploiting topography-driven variation in exposure

Free line of sight



Topographic obstruction



- Exploit only **residual variation** in signal strength driven by topography
- Regress expenditures on the continuous radio signal and its “free-space” analog:

$$\log (\text{Expenditures})_{itz} = \beta \text{Signal}_{zt} + \gamma \text{SignalFree}_{zt} + \phi_{iz} + \psi_t + X'_{itz} \lambda + \varepsilon_{itz}$$

Exploiting topographic variation in signal strength for identification

| | | Dependent variable: log (Expenditures) | | | | |
|---------------------------|-----|--|------------------------|------------------------|------------------------|-----------------------|
| | | (1) | (2) | (3) | (4) | (5) |
| Signal | | -0.0056*** (0.0016) | -0.0096*** (0.0027) | -0.0088*** (0.0027) | -0.0098*** (0.0028) | -0.0082** (0.0037) |
| SignalFree | | | 0.0049* (0.0028) | 0.0039 (0.0028) | 0.0044 (0.0029) | 0.0092** (0.0039) |
| N | | 3,599,959 | 3,599,959 | 3,599,959 | 3,272,490 | 3,272,490 |
| R ² | | 0.521 | 0.521 | 0.524 | 0.525 | 0.527 |
| Mean of dep. var. | | 6.185 | 6.185 | 6.185 | 6.186 | 6.186 |
| Household & Time FEs | Yes | | Yes | Yes | Yes | Yes |
| Household controls | | | | Yes | Yes | Yes |
| Local economic conditions | | | | | Yes | Yes |
| State x Time FEs | | | | | | Yes |

Note: "Signal" is the continuous measure of signal strength and "SignalFree" is the signal strength in free space. Both signal measures are standardized to have mean zero and standard deviation one.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Extensive margin: Households purchase fewer goods

| Dependent variable: log (Number of purchased products) | | | | | | |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Radio show | -0.0168*** (0.0029) | -0.0161*** (0.0028) | -0.0210*** (0.0030) | -0.0217*** (0.0036) | -0.0232*** (0.0036) | -0.0204*** (0.0046) |
| N | 3,734,881 | 3,734,881 | 3,399,597 | 3,399,597 | 3,347,655 | 3,346,664 |
| R ² | 0.541 | 0.545 | 0.546 | 0.548 | 0.549 | 0.553 |
| Mean of dep. var. | 4.189 | 4.189 | 4.186 | 4.186 | 4.184 | 4.184 |
| Household & Time FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Household controls | | Yes | Yes | Yes | Yes | Yes |
| Local economic conditions | | | Yes | Yes | Yes | Yes |
| State x Time FEs | | | | Yes | Yes | |
| County controls x Time FEs | | | | | Yes | Yes |
| DMA x Time FEs | | | | | | Yes |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Poisson regression: Number of purchased items

| | Dependent variable: Number of purchased products | | | |
|---------------------------|--|------------------------|------------------------|------------------------|
| | (1) | (2) | (3) | (4) |
| Radio show | -0.0187*** (0.0031) | -0.0182*** (0.0031) | -0.0224*** (0.0031) | -0.0240*** (0.0035) |
| N | 3,744,054 | 3,744,054 | 3,407,688 | 3,407,688 |
| Pseudo R^2 | 0.517 | 0.520 | 0.521 | 0.523 |
| Mean of dep. var. | 83.30 | 83.30 | 83.06 | 83.06 |
| Household & Time FEs | Yes | Yes | Yes | Yes |
| Household controls | | Yes | Yes | Yes |
| Local economic conditions | | | Yes | Yes |
| State x Time FEs | | | | Yes |

Note: This table shows Poisson regression estimates using 2004–2019 Nielsen Homescan data at the household-by-month level.

The dependent variable is the number of purchased items per month.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Effect on bulk purchases and on-sale products

| | Dependent variable: Expenditures share of | | | | | |
|---------------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Large packages | | | On-sale products | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Radio coverage | 0.0043*** (0.0007) | 0.0047*** (0.0007) | 0.0064*** (0.0008) | 0.0035*** (0.0009) | 0.0029*** (0.0010) | 0.0043*** (0.0012) |
| N | 3,734,872 | 3,399,588 | 3,399,588 | 3,734,881 | 3,399,597 | 3,399,597 |
| R ² | 0.460 | 0.463 | 0.465 | 0.714 | 0.714 | 0.716 |
| Mean of dep. var. | 0.290 | 0.290 | 0.290 | 0.299 | 0.305 | 0.305 |
| Household & Time FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Household controls | | Yes | Yes | | Yes | Yes |
| Local economic conditions | | Yes | Yes | | Yes | Yes |
| State x Time FEs | | | Yes | | | Yes |

Note: "Large size" is the share of expenditures accounted for by items in the top quintile of the package size distribution. "Sale" is the share of expenditures accounted for on-sale products.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

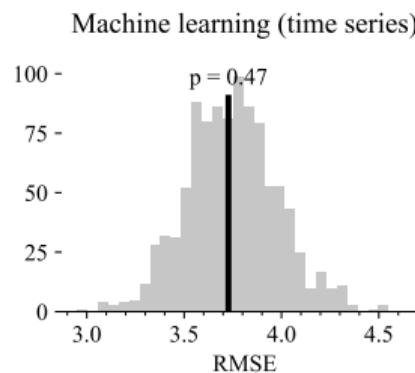
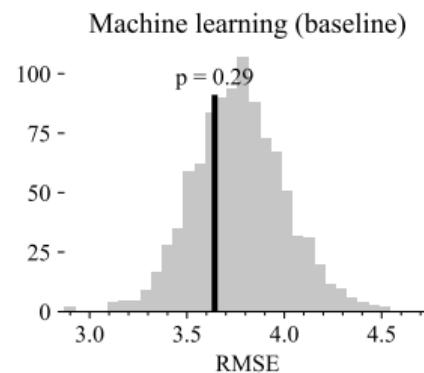
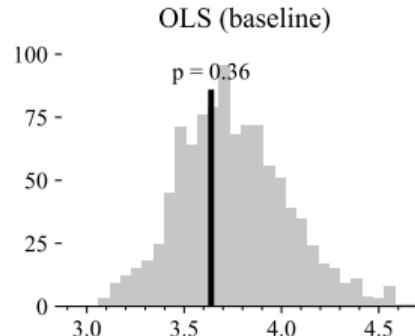
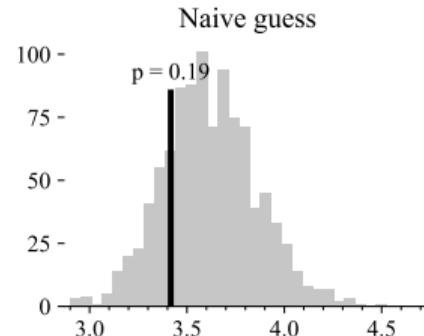
◀ Return

Implied effect of intensive margin changes in shopping efforts

- Bulk purchases
 - Effect: 0.5–0.6 percentage point higher expenditure share
 - Griffith et al. (2009): 16% average savings from bulk purchases
- On-sale products
 - Effect: 0.3–0.4 percentage point higher expenditure share
 - Griffith et al. (2009): 20% average savings from bulk purchases
- **Maximum savings:** $0.006 \times 0.16 + 0.004 \times 0.20 = 0.00176$
- ... as **fraction** of the 1.3 percent decrease: $0.00176 / 0.013 \leq 0.15$

◀ Return

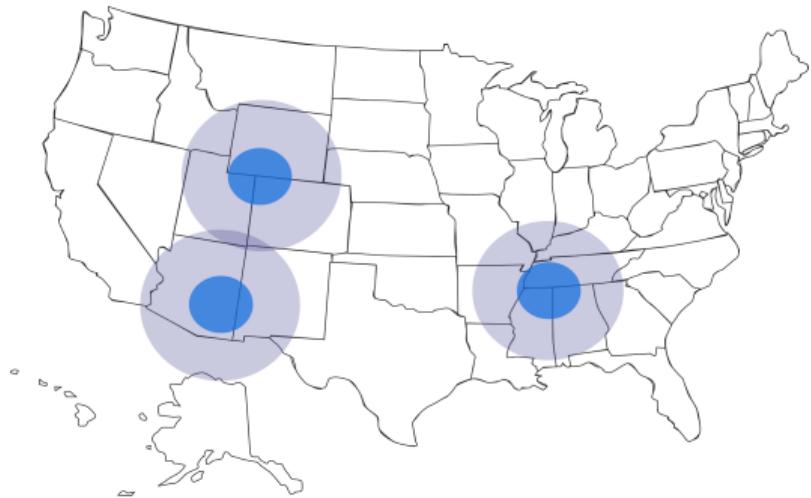
Machine learning: Distribution of the RMSE from predicting entry



— Actual timing ■ Permutation distribution

◀ Return

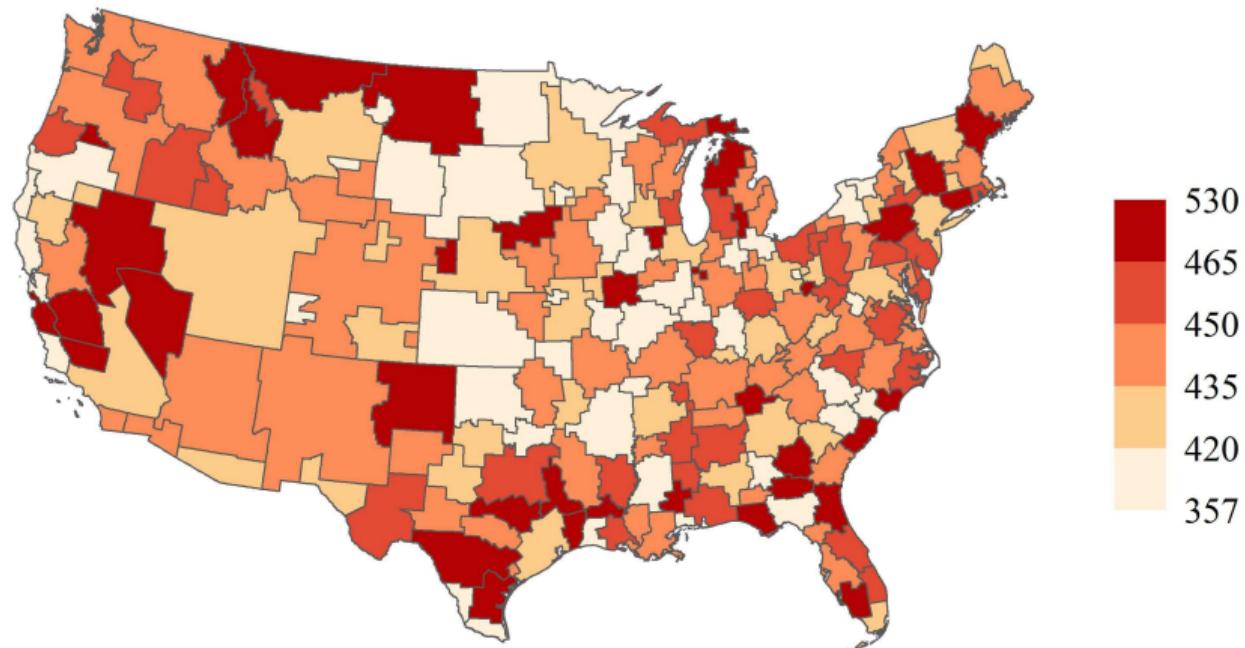
Example: Spatial leave-3-out cross validation



- Draw three random coordinates from the contiguous US
- **Test data:** zip codes within 500 km of these points
- **Training data:** Everything more than 800 km away from these points
- **Buffer zone:** Mitigates “data leakage” from spatial autocorrelation

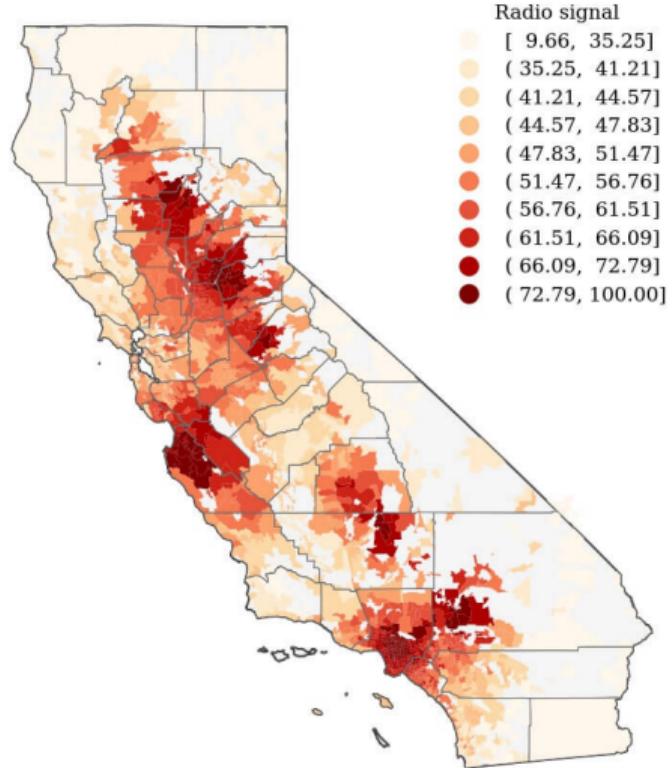
◀ Return

Average monthly household expenditures (by DMA in 2017)

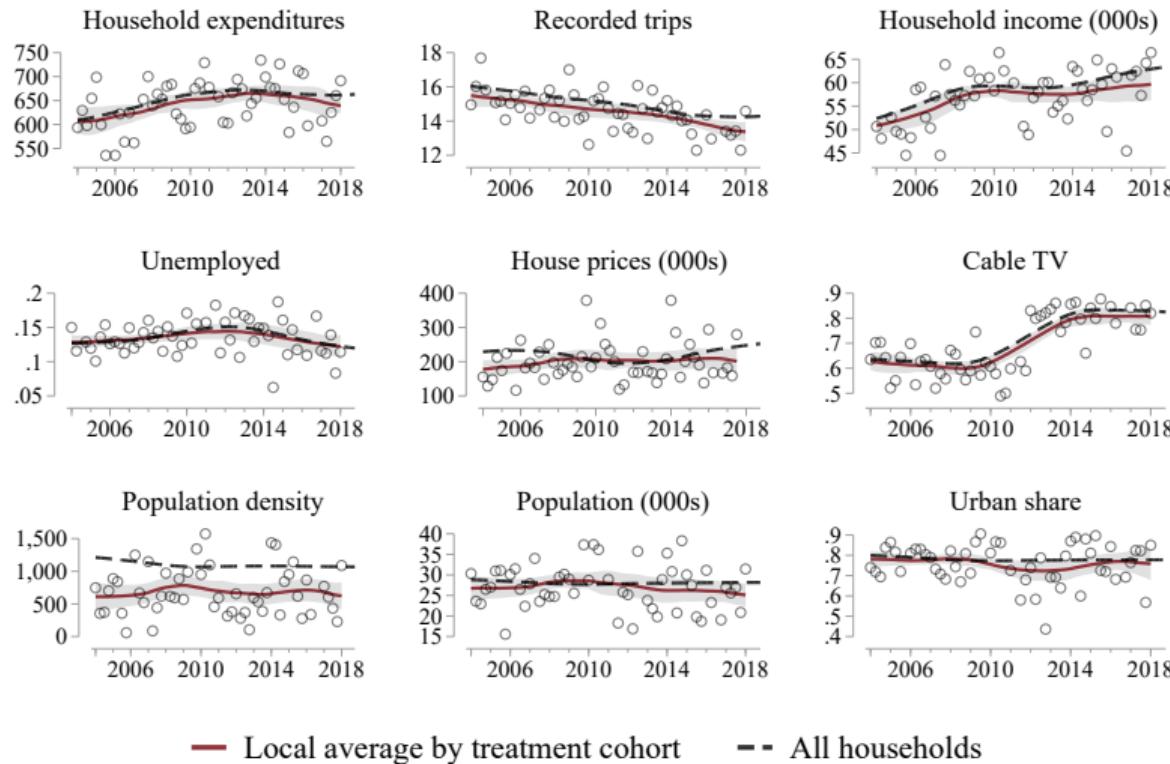


◀ Return

Radio coverage at the zip code level: Example



Covariates of households that gain access to the radio show



◀ Return

Additional quotes

"It is human nature to want it and want it now; it is also a sign of immaturity. Being willing to delay pleasure for a greater result is a sign of maturity. However, our culture teaches us to live for the now. 'I want it' we scream, and we can get it if we are willing to go into debt. Debt is a means to obtain the 'I want its' before we can afford them."

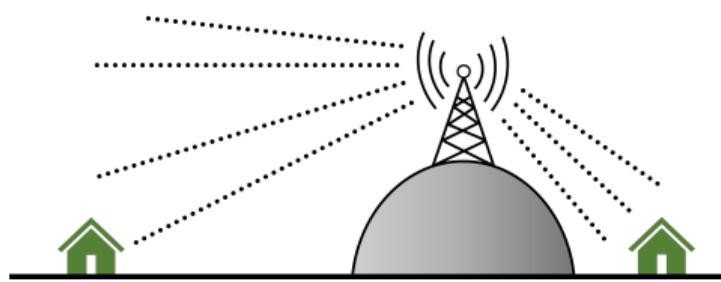
"70% of Americans live paycheck to paycheck. Seven out of ten people you walk past going down the sidewalk are broke. You can model your life after them, and you will be one of them. Or you can mode your life after the weird people. Because wealth is unusual. It's not normal. So you have to engage in unusual behaviors and habits to create unusual results."

"We buy things we don't need with money we don't have to impress people we don't like."

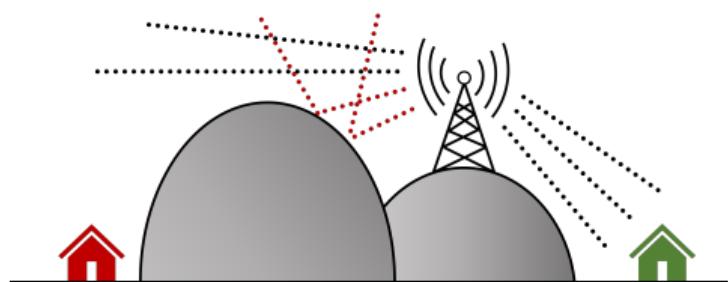
 Return

Radio coverage and signal propagation

Line of sight



No line of sight

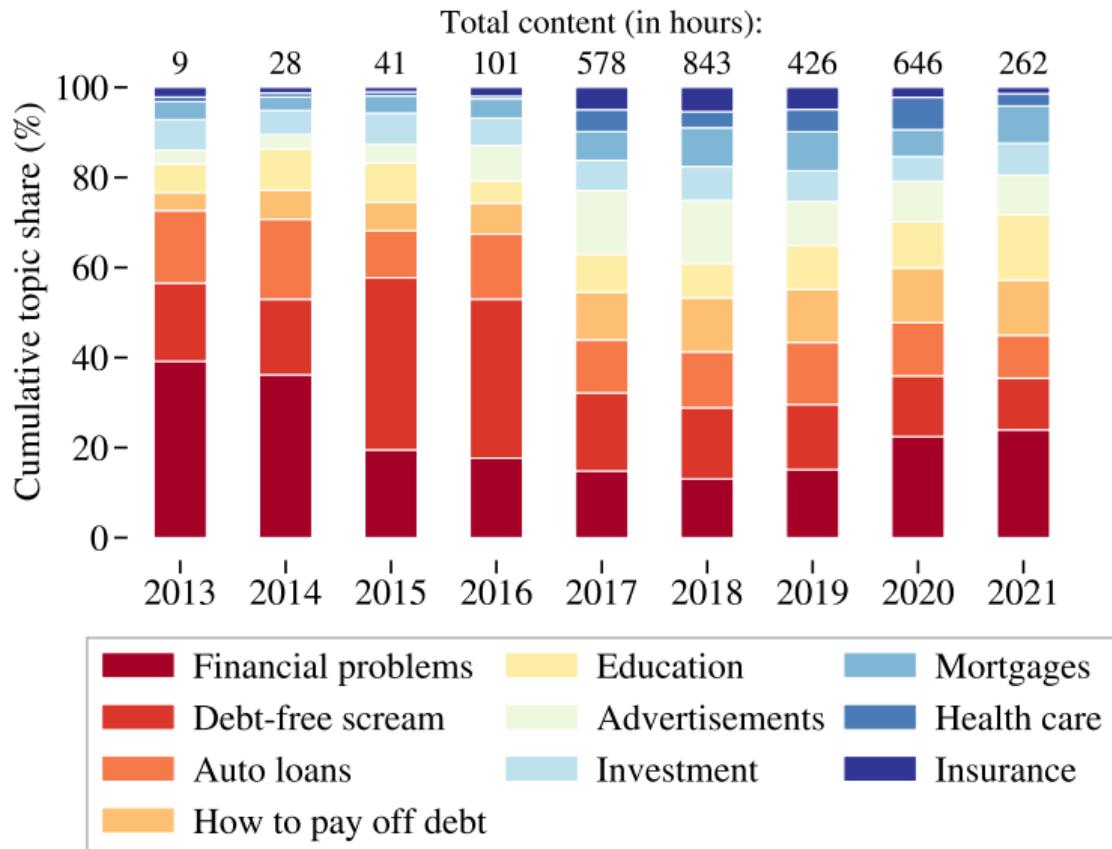


- s continuous signal strength accounting for the **effect of topography**
- **Binary indicator** in the empirical analysis:

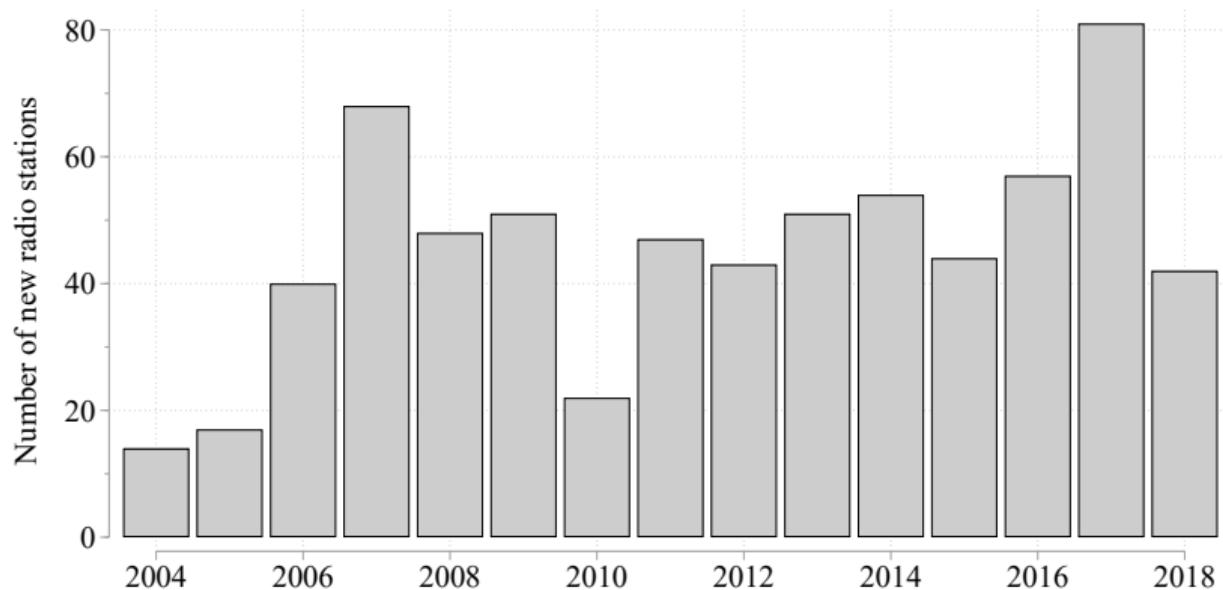
$$\text{Radio show availability} = \begin{cases} 1, & \text{if } s \geq 50 \text{ dB}\mu\text{V/m} \\ 0, & \text{if } s < 50 \text{ dB}\mu\text{V/m} \end{cases}$$

◀ Return

Distribution of topics in YouTube videos over time



National expansion



◀ Return

Effects driven by households with initially high expenditures

| | Dependent variable: log (Expenditures) | | | | | |
|-------------------|--|-------------------|---------------------|---------------------|-----------------------|-------------------|
| | Expenditures | | Income | | Expenditures / income | |
| | (1) High | (2) Low | (3) High | (4) Low | (5) High | (6) Low |
| Radio show | -0.019*** (0.005) | -0.002 (0.005) | -0.012** (0.005) | -0.012** (0.005) | -0.016*** (0.005) | -0.007 (0.005) |
| N | 1,812,463 | 1,595,237 | 1,887,781 | 1,519,910 | 1,667,035 | 1,740,651 |
| R ² | 0.463 | 0.455 | 0.524 | 0.523 | 0.527 | 0.484 |
| Mean of dep. var. | 6.447 | 5.890 | 6.233 | 6.129 | 6.357 | 6.023 |
| Full controls | Yes | Yes | Yes | Yes | Yes | Yes |
| State x Time FEs | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Each column provides estimates from a subset of households obtained by a median split. Columns 1–2: inflation-adjusted and equivalized expenditures in the first year a household is in the panel. Columns 3–4: inflation-adjusted and equivalized household income in the first year. Columns 5–6: household expenditures normalized by income in the first year.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Treatment effects on attitudes

| | Main study | | Robustness: Passive control | | One-week follow-up | |
|-----------|--------------------------|---------------------------------|-----------------------------|---------------------------------|--------------------------|---------------------------------|
| | (1) Debt attitudes | (2) Consumption attitudes | (3) Debt attitudes | (4) Consumption attitudes | (5) Debt attitudes | (6) Consumption attitudes |
| Treatment | -0.530*** (0.065) | -0.237*** (0.061) | -0.603*** (0.061) | -0.230*** (0.060) | -0.303*** (0.094) | -0.208** (0.090) |
| N | 962 | 962 | 1,030 | 1,030 | 522 | 522 |
| z-scored | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

Note: The debt attitude index and the consumption attitude index are oriented such that larger values correspond to more positive attitudes towards the object. "Treatment" is a binary indicator taking value one for respondents who listened to a five minute recording from the Dave Ramsey Show. Control variables include numerical age and age squared, log income, female indicator, an indicator for having completed a Bachelor's degree or higher, and region indicators.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

◀ Return

Instructions: Attitudes towards debt

How much do you agree or disagree with the statements below?

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| There is no excuse for borrowing money | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| You should always save up first before buying something | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| You can live a good life without borrowing money | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| All in all, borrowing money is not worth the cost | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

◀ Return

Instructions: Materialistic attitudes

How much do you agree or disagree with the statements below?

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| I admire people who own expensive homes, cars, and clothes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The things I own say a lot about how well I'm doing in life | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

◀ Return

Decrease in monthly grocery expenditures

| | Dependent variable: log (Expenditures) | | | | | |
|----------------------------|--|------------------------|------------------------|------------------------|------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Radio show | -0.0131*** (0.0027) | -0.0128*** (0.0026) | -0.0161*** (0.0027) | -0.0121*** (0.0034) | -0.0133*** (0.0034) | -0.0140*** (0.0042) |
| N | 3,744,066 | 3,744,066 | 3,407,700 | 3,407,700 | 3,355,677 | 3,354,689 |
| R ² | 0.518 | 0.521 | 0.522 | 0.524 | 0.525 | 0.529 |
| Mean of dep. var. | 6.185 | 6.185 | 6.186 | 6.186 | 6.185 | 6.185 |
| Household & Time FEs | Yes | Yes | Yes | Yes | Yes | Yes |
| Household controls | | Yes | Yes | Yes | Yes | Yes |
| Local economic conditions | | | Yes | Yes | Yes | Yes |
| State x Time FEs | | | | Yes | Yes | Yes |
| County controls x Time FEs | | | | | Yes | Yes |
| DMA x Time FEs | | | | | | Yes |

Note: Household controls: log household income, household size, and age, married and labor market status indicators. Local economic conditions: house prices, unemployment rate. County controls (in 2000): racial composition, share of Christians, log per-capita income, log population.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

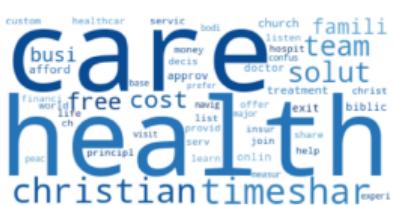
◀ Return

Text analysis: Word clouds

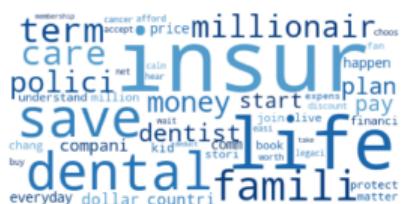
Topic: Auto loans



Topic: Health care



Topic: Insurance



Topic: Investment



Topic: Financial problems



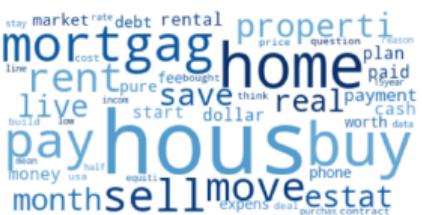
Topic: Debt-free scream



Topic: Advertisements



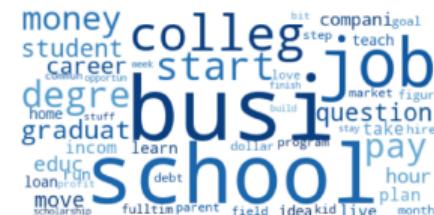
Topic: Mortgages



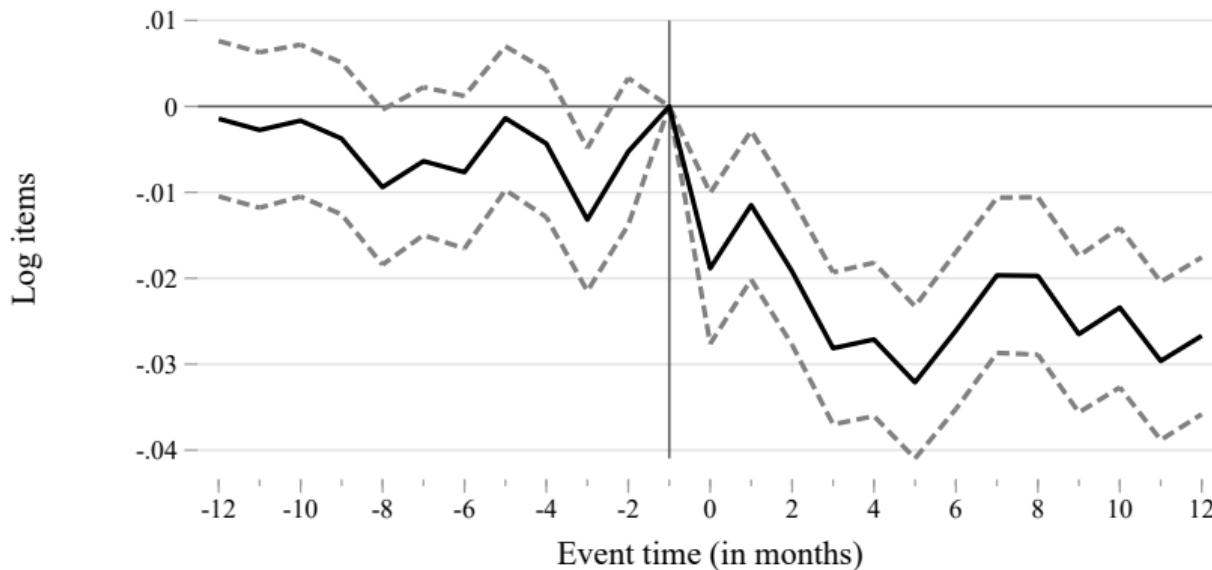
Topic: How to pay off debt



Topic: Education



Savings channel: Households purchase fewer products



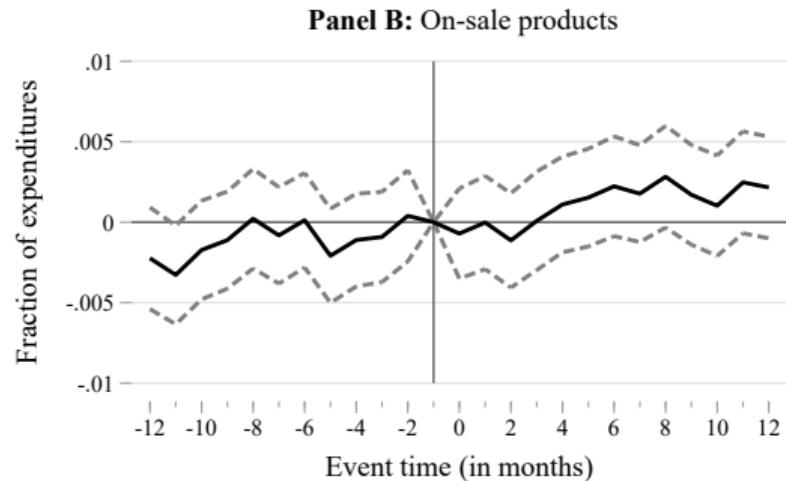
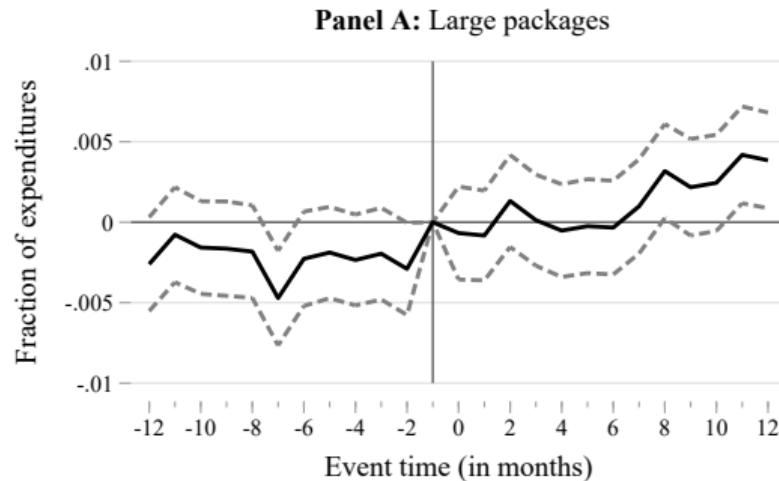
Coefficients from a regression of the log of the total number of purchased items per month on a set of event time indicators and the full set of controls. 95% confidence intervals are shown.

Table

Poisson regression

[Return to overview slide](#)

Intensive margin: Only economically **small** changes in buying strategies



- **Large packages:** Expenditure share of 20% largest items
- **On-sale products:** Expenditure share of products purchased on-sale
- **Bounds:** Effects explain **at most 15%** of the decrease in expenditures

Table

Details

[Return to overview slide](#)

Machine learning exercise: Can we predict the timing of the expansion?

1. Train a **random forest regression** to predict the **timing of market entry**
 - Minimize the RMSE using a test-train split
 - Spatial leave- p -out cross-validation (Le Rest et al., 2014)

More

Machine learning exercise: Can we predict the timing of the expansion?

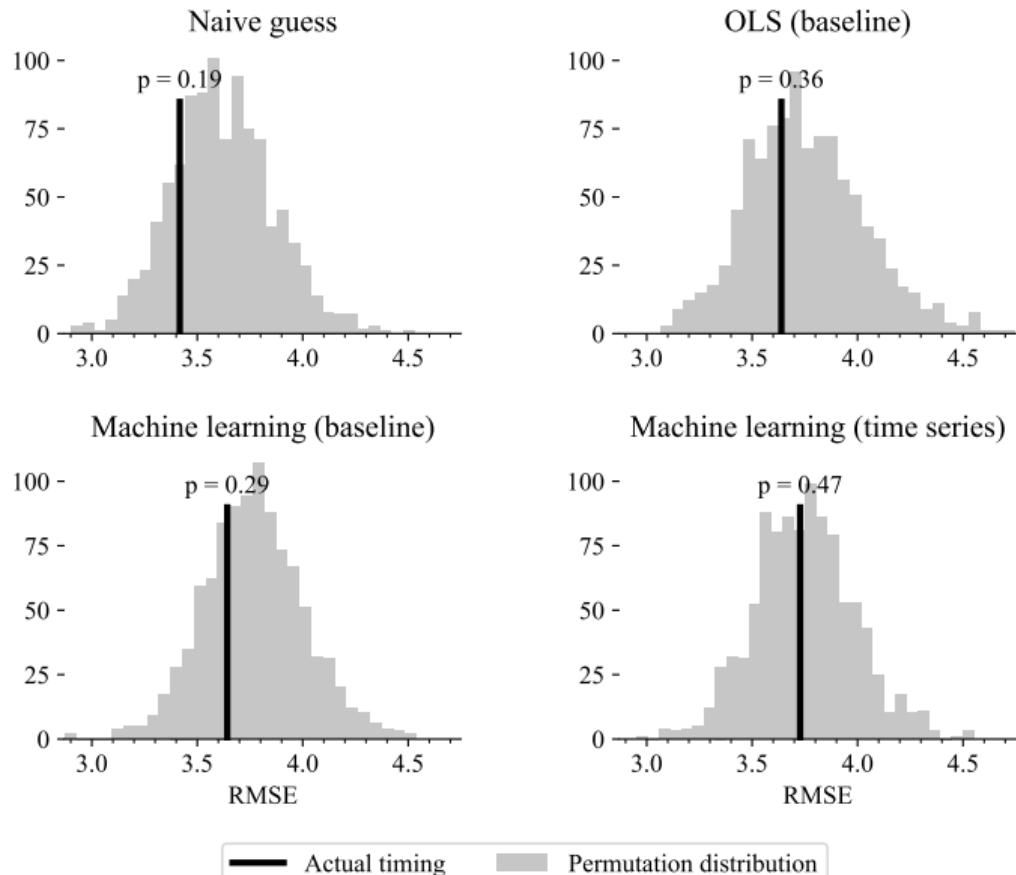
1. Train a **random forest regression** to predict the **timing of market entry**
 - Minimize the RMSE using a test-train split
 - Spatial leave- p -out cross-validation (Le Rest et al., 2014) [More](#)
2. Derive the distribution of the RMSE for a random benchmark

[Return: Correlates of entry](#)

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2. Derive the distribution of the RMSE for a random benchmark

[Return: Correlates of entry](#)



Logistics of the experiment

- Representative US online panel: $N = 1,500$
 - Survey company: Lucid
 - Stratified by age, gender, education
 - Attention check
- Data collection: August 2021
- Pre-registration: AEA RCT Registry (#AEARCTR-0008050)
- Ethics: German Association for Experimental Economic Research (#T7wapLjB)

[Return: Design](#)

ACS

Details

Data: Radio coverage (1992–2019)

1. Collect novel data on all **670** affiliated radio stations

- Date of entry (from Ramsey)
- Engineering data (from the FCC)
 - Location of radio antennas
 - Antenna height, power, frequency

Entries by year

Example

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Example

2. Estimate the **spatial coverage** of each station

- Longley-Rice/Irregular-Terrain Model (Olken, 2009)
- Accounts for the effect of topography

Line of sight

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Line of sight

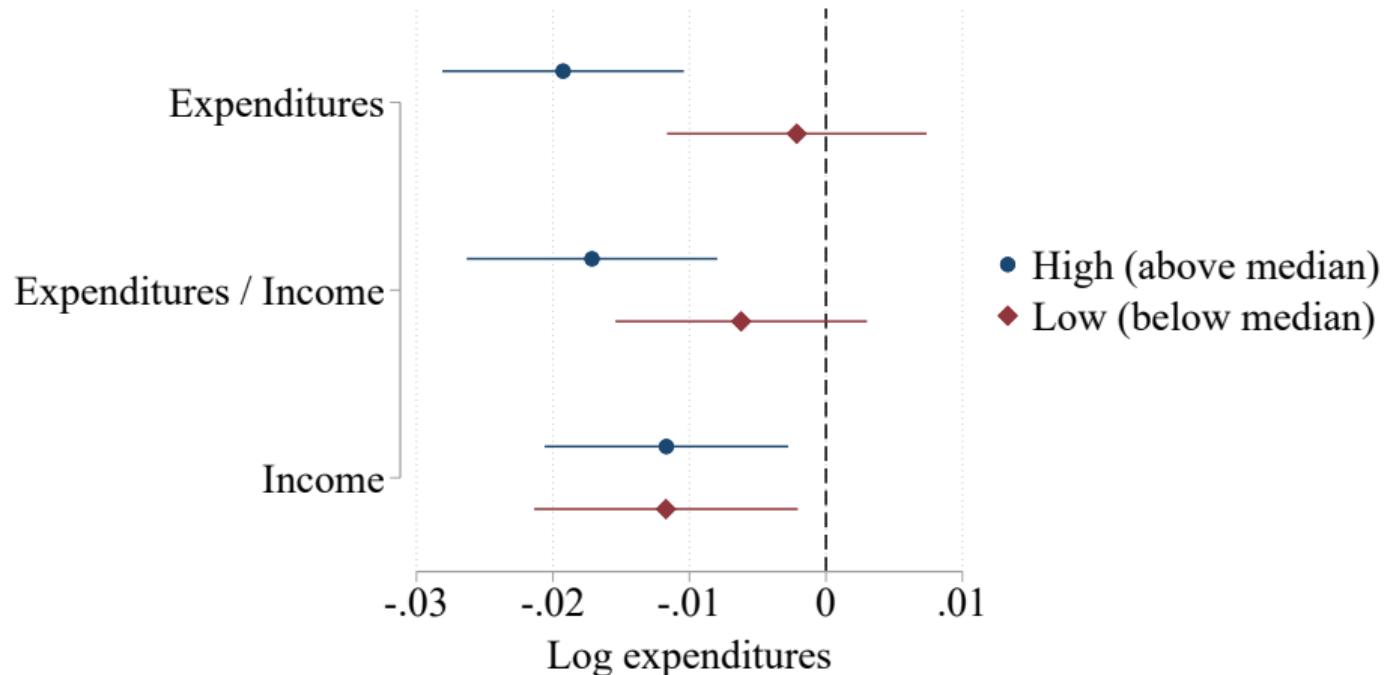
Example

→ Panel data on radio coverage (by **zip code** and **month**)

- Continuous radio signal strength
- **Binary measure:** Radio show_{zt} = 1 if $s_{zt} \geq 50 \text{ dB}\mu\text{V/m}$

◀ Return: Expansion

Heterogeneity: Baseline expenditures and income



Coefficients from separate OLS regressions with the full set of controls. Median split based on the household-level average in the first year (before market entry). 95% confidence intervals are shown.

Table

◀ Return: Results overview