Bias in Cable News: Real Effects and Polarization

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Research Questions

- What are the **persuasive effects** of slanted cable news (Fox News and MSNBC) on partisan voting?
- How important are **tastes for like-minded** cable news?
- Can these two forces interact to generate polarization?

The Approach

- Estimate model of
  - allocating time to watching news channels,
  - Influence of exposure on ideology, and
  - voting in Presidential elections 2000, 2004, and 2008.

- **Use channel positions in cable lineup as instrumental variables to estimate "persuasive" effect.**
  - **Cable channel positions do not predict viewership by satellite subscribers in the same zip code.**

Some context. Why care?

MSNBC

FOX News

- Fox News averaging 2-3 million viewers per night. Cumulative reach estimated over 50 million individuals.
- MSNBC and CNN are between 500,000 and 1 million viewers per night.
- Even a small amount of persuasion can have effects with these levels of reach.

Some context. Why care?

- Does the media sector need special regulation?
  - Example of a policy: Comcast/NBC-U merger. Placement of Bloomberg on Comcast systems.
- Implications for endogenous product positioning.
- Increased polarization in US politics.
- Caveats:
  - Multiple media for news, changing technology.
  - First amendment issues.
  - Existing evidence (Gentzkow and Shapiro 2010,2011) suggests echo chambers and manipulation by partisan owners are not important.

Summary of Results

- Large effects of both Fox News and MSNBC on partisan voting.
  - 10+ point increase in Pr(vote R) for an extra hour a week of Fox News. -10 points for MSNBC in 2008.
- Moderate taste for like-minded news.
- Cable news can polarize individuals over an election cycle. (not clear that this is unhealthy)

Contribution and Prior Literature

- Introduce **new research design (channel positions)** to estimate effects.
- Find quantitatively large effects.
  - Dellavigna and Kaplan (2007) based on roll-out.
    - Measurement issues. (Appendix A)
    - Deal with satellite
- We find significant Fox News effect and 2008 MSNBC effect.

- Gentzkow and Shapiro (2010)
  - Embed persuasive effect into similar demand model. Add estimation of "influence" parameter.
    - Possibility of feedback loop.
    - Useful for correcting for selection into satellite.
    - Useful for quantifying and dealing with heterogeneity.
  - Find channels are differentiating in slant more over time.

Quick Outline

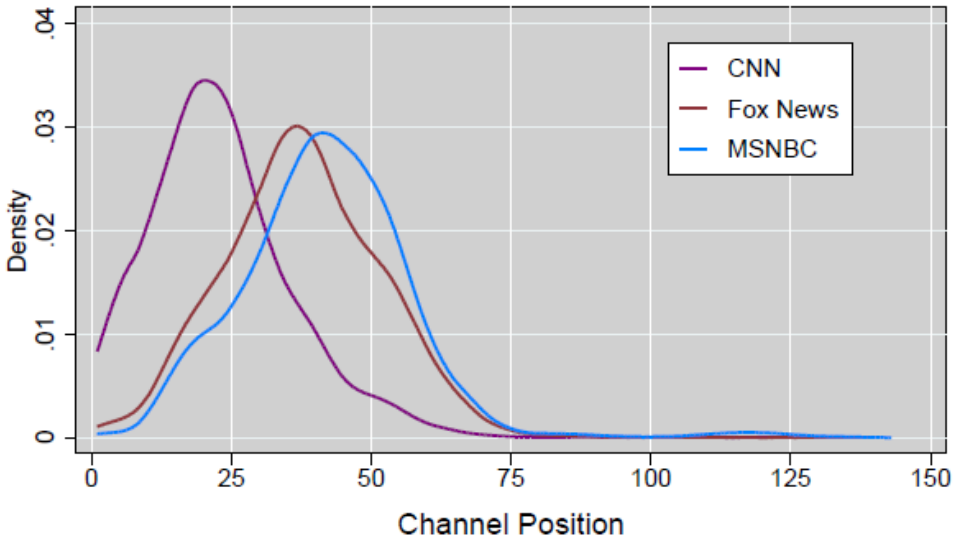
1. Data including ideology estimates
2. 2SLS estimates for voting Republican against hours of Fox News and MSNBC

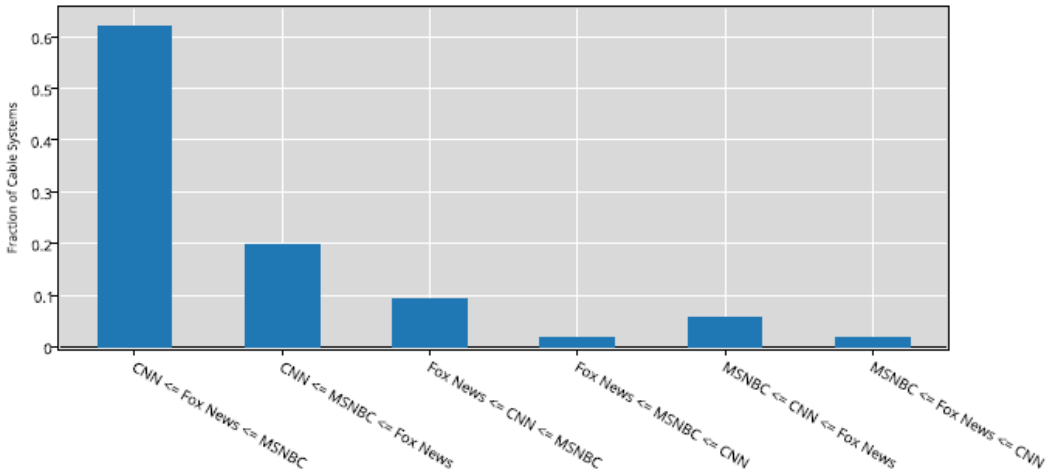
3. Model
4. Parameter estimates and empirical identification
5. Polarization dynamics

Data

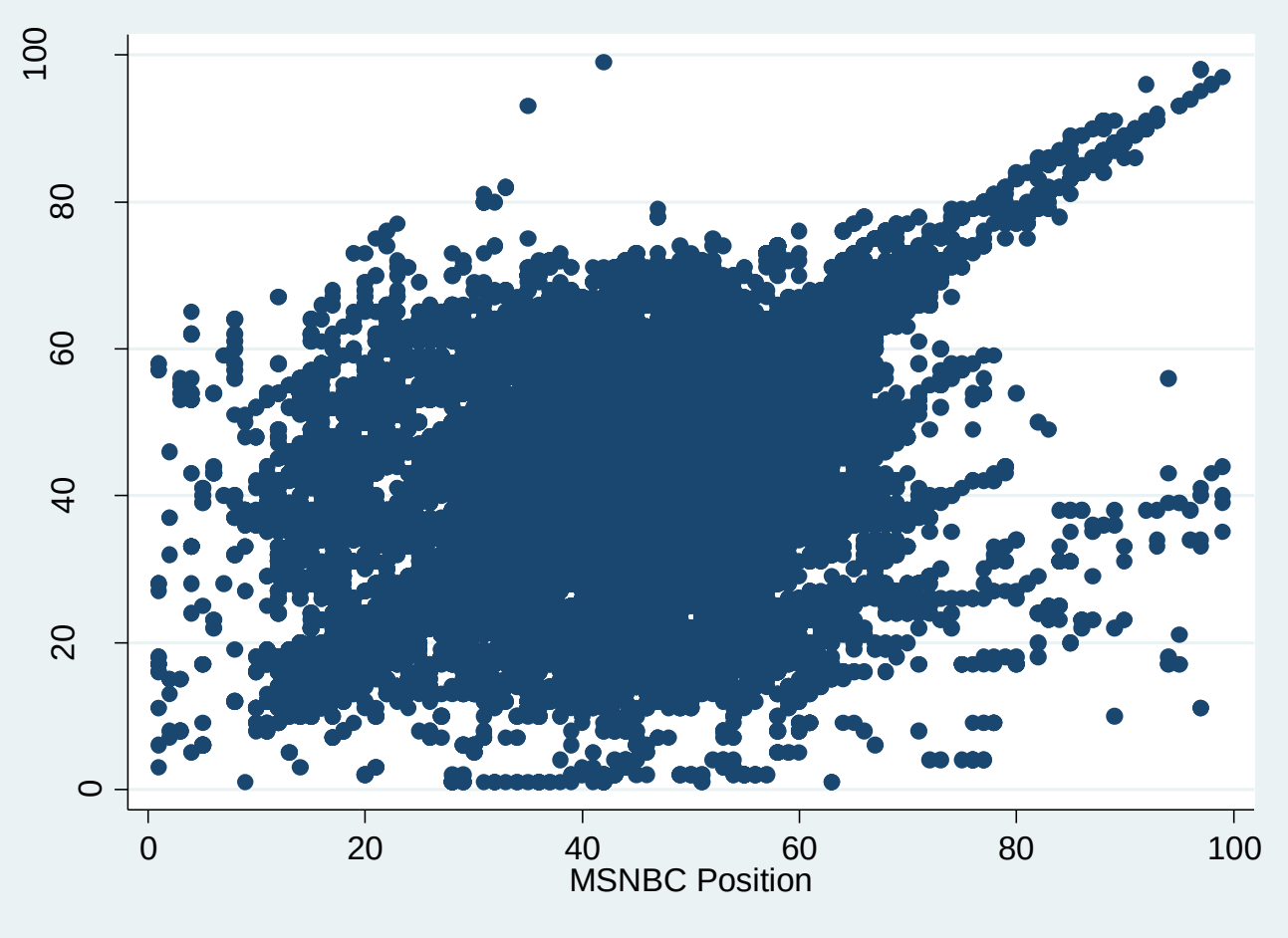
- Channel Lineups (Nielsen FOCUS)
  - Position by channel by zip code by year.
- Viewership: Individual level viewership data (Simmons and Mediamark)
  - Zip code.
  - Hours of channels watched per week.
  - Demographics.
  - Cable or satellite subscription.
- Voting: NAES and CCES surveys.
  - Zip code.
  - Demographics.
  - Intent to vote in Presidential elections 2000, 2004, 2008 (repeated cross sections).
  - Most watched cable news channel.
- Broadcast transcripts of CNN, Fox News, MSNBC
- The Congressional Record

Positioning

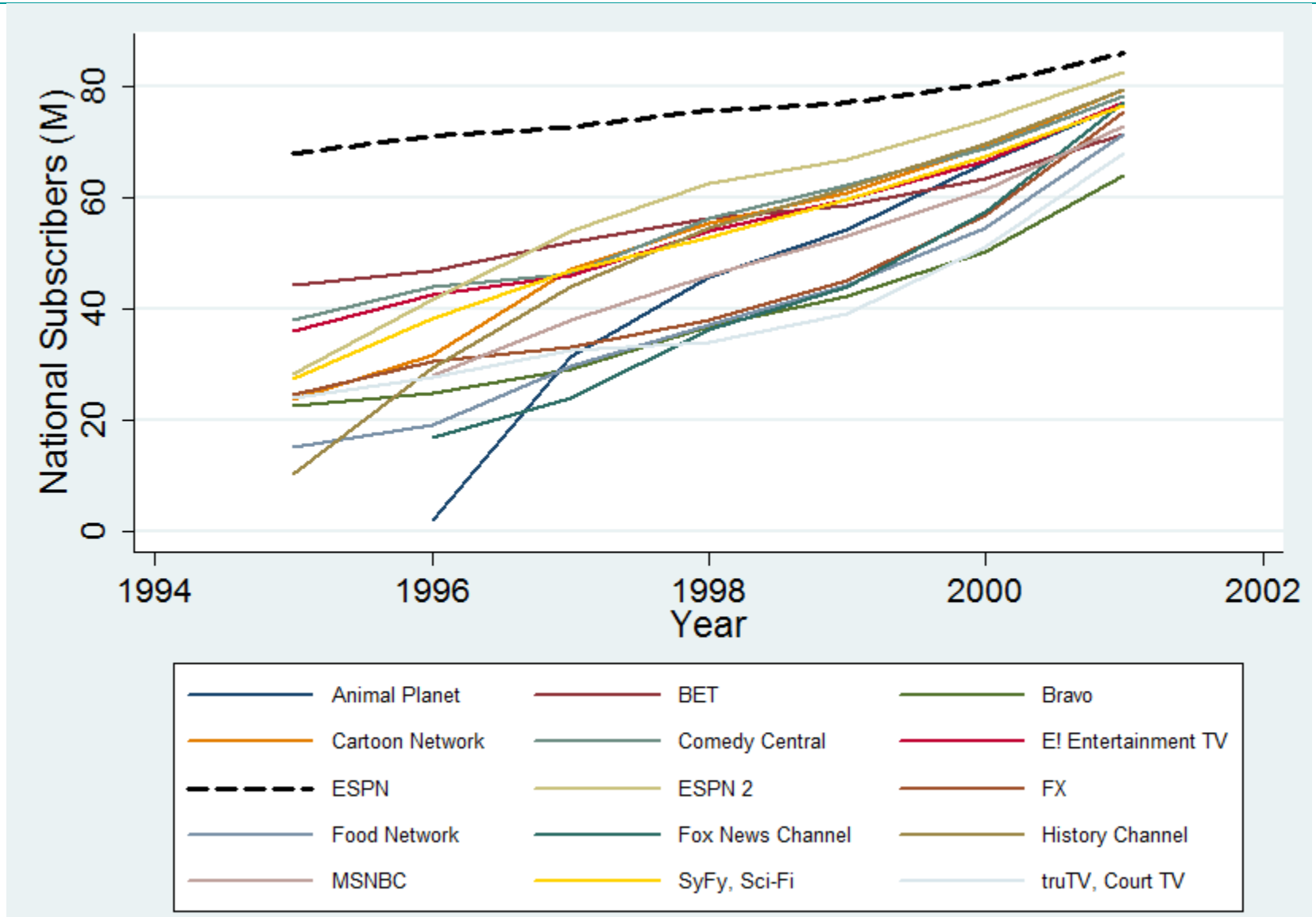




Positioning

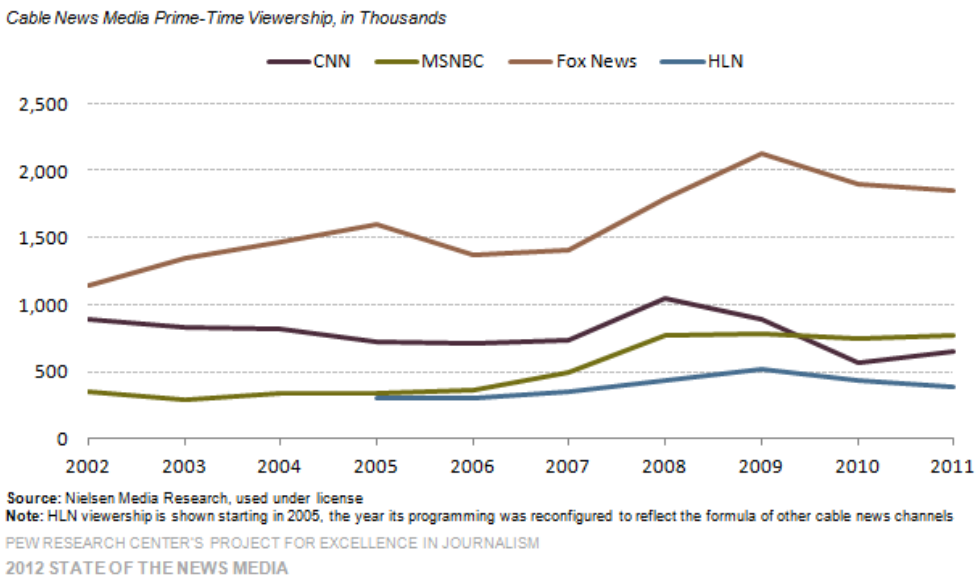


Cable TV: 1994-2001



Viewership

Mean Hours per Week			
	CNN	Fox News	MSNBC
2000	1.02	0.52	0.40
2001	1.41	0.80	0.52
2002	1.40	1.02	0.46
2003	1.19	1.07	0.54
2004	1.22	1.26	0.55
2005	1.25	1.28	0.60
2006	1.14	1.18	0.54
2007	1.16	1.22	0.56
2008	1.20	1.52	0.67
Total	1.22	1.07	0.53



Individual level survey (N =~ 136,000)

Median hours watched is 0 for all channels.

Most viewers watch only one cable news channel, if positive. (Our data represent weekly recall.)

Transcripts and Channel Ideology

- We want to assign a scalar ideology to each channel-year.
- Follow previous literature (eg Gentzkow and Shapiro (2010)) in using language that channels employ, and comparing to language employed by agents with a measured ideology- Congress-people.
- Each Congressperson has an estimated Nominate score between -1 and 1.

Transcripts and Channel Ideology

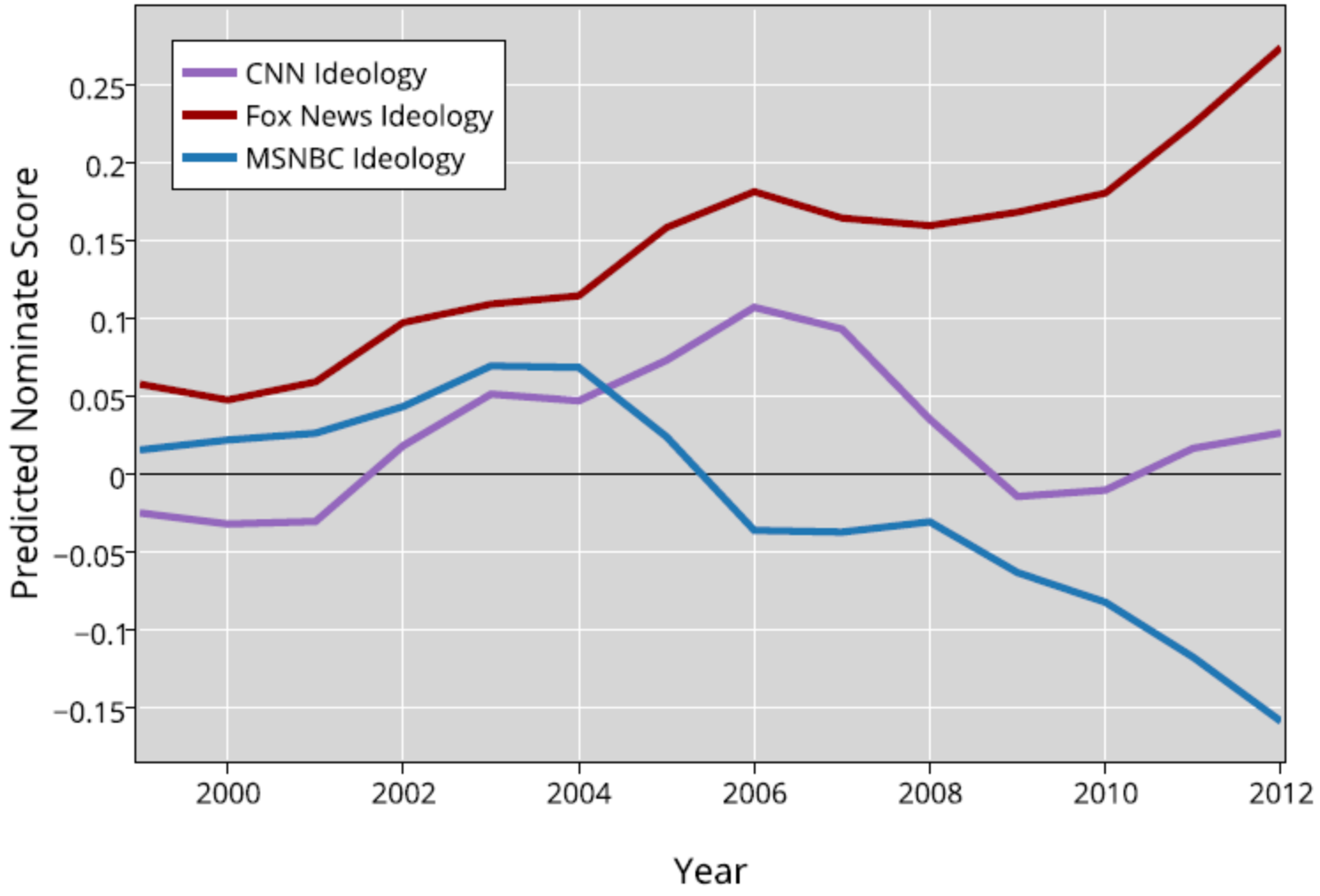
- Count frequency of two-word phrase usage by Congress person separately by year.

- Would like to regress ideology on phrase usage, but many more phrases than Congress people.

- Variable selection via Elastic Net regression of Nominate score on phrase usage, separately by year.

- Plug in phrase usage by cable news channels.
- Remove mean for each year.
- Moving average smoothing +/- one year.

Transcripts and Channel Ideology



2.5% Most Indicative Phrases by Year

2000		2002		2004	
'"benefit wealthiest"'	-3.55	'"clean forest"'	3.53	'"administr refus"'	-3.78
'"break wealthi"'	-3.08	'"democrat friend"'	2.71	'"administr republican"'	-3.15
'"break wealthiest"'	-4.53	'"environment standard"	-3.40	'"compani hmo"'	-3.90
'"busi come"'	3.14	'"forc labor"'	-3.83	'"cost energi"'	3.16
'"caught nap"'	3.60	'"laid worker"'	-4.89	'"fall far"'	-6.86
'"child tax"'	4.84	'"lock box"'	-2.72	'"far short"'	-3.33
'"continu everi"'	-4.68	'"polit correct"'	4.98	'"hold line"'	3.48
'"cut wealthi"'	-3.22	'"reagan said"'	4.25	'"job administr"'	-4.20
'"cut wealthiest"'	-4.20	'"renounc citizenship"'	-4.26	'"liabil cost"'	3.06
'"feder bureaucraci"'	5.87	'"sexual orient"'	-3.17	'"major want"'	-3.88
'"largest tax"'	3.28	'"social justic"'	-2.68	'"marriag will"'	3.33
'"live poverti"'	-3.89	'"trillion surplu"'	-2.89	'"protect tradit"'	2.89
'"pm todai"'	5.22	'"us later"'	-2.86	'"revenu feder"'	3.37
'"tax hike"'	4.10	'"wealthiest american"'	-2.59	'"trillion surplu"'	-3.03
'"wealthiest american"'	-3.24			'"univers health"'	-4.17

2006		2008		2010	
'"billion cut"'	-2.67	'"11 countri"'	3.84	'"bigger govern"'	2.90
'"billion week"'	-4.08	'"bush took"'	-3.53	'"constitut sai"'	3.42
'"cut wealthiest"'	-3.51	'"call abort"'	2.92	'"creat govern"'	2.99
'"flag burn"'	-2.65	'"democrat bill"'	3.21	'"democrat control"'	3.20
'"iraq polici"'	-2.85	'"entitl reform"'	3.37	'"employ mandat"'	3.20
'"keep tax"'	4.39	'"new nuclear"'	3.45	'"govern bureaucrat"'	3.26
'"largest cut"'	-3.43	'"new refineri"'	3.17	'"govern mandat"'	3.12
'"ms 13"'	3.40	'"plan bring"'	3.30	'"grow govern"'	3.02
'"presidenti power"'	-3.19	'"properti without"'	4.76	'"louisiana mr"'	3.01
'"protect tradit"'	3.04	'"soon on"'	4.44	'"mandat tax"'	3.36
'"republican friend"'	-2.79	'"sue opec"'	4.73	'"new mandat"'	4.24
'"war cost"'	-2.72	'"tax burden"'	2.89	'"obamacar pass"'	3.02
'"wiretap american"'	-2.81	'"thing common"'	2.97	'"print monei"'	3.02
'"year bush"'	-4.04	'"without due"'	2.80	'"sixth economi"'	4.12
'"yet republican"'	-4.26	'"yet todai"'	4.91	'"spend borrow"'	2.90
				'"spend control"'	3.07

2SLS – IV Analysis – First Stage

- First Stage:
  - Six regressions: RHS are year effects, demographics, and channel positions.
  - Linear probability model for watching CNN, FNC, or MSNBC.
  - Hours watched of CNN, FNC, MSNBC.

$$
\begin{aligned}
h_{it}^{c} &= \delta_{ct} + a_{it} + \eta_c x_{it} + \theta_{c,CNN} p_{it}^{CNN} + \theta_{c,FNC} p_{it}^{FNC} + \theta_{c,MSNBC} p_{it}^{MSNBC} + e_{ict} \\
\chi_{it}^{c} &= \tilde{\delta}_{ct} + \tilde{a}_{it} + \tilde{\eta}_c x_{it} + \tilde{\theta}_{c,CNN} p_{it}^{CNN} + \tilde{\theta}_{c,FNC} p_{it}^{FNC} + \tilde{\theta}_{c,MSNBC} p_{it}^{MSNBC} + \tilde{e}_{ict}
\end{aligned}
$$

- Show results from single equation first stage for clarity.

2SLS – IV Analysis – Second Stage

- Second Stage:
  - Linear probability intent to vote R on year effects, demographics, and predicted hours watched by channel.

$$y_{it} = \gamma_t + \alpha x_{it} + \beta_c h_{it}^c + \beta_f h_{it}^f + \beta_m h_{it}^m + \epsilon_{it}$$

- First stage run on viewership data set.
- Second stage and OLS run on NAES/CCES individual voting survey data.

First Stage: Viewing and Positions

	VARIABLES	(1) Fox News Hours	(2) CNN Hours	(3) MSNBC Hours
Cable	FNC Cable Position	-0.122***	-0.0316	0.0500***
		(0.0214)	(0.0210)	(0.0132)
	CNN Cable Position	-0.0126	-0.112***	-0.0139
		(0.0137)	(0.0135)	(0.00849)
	MSNBC Cable Position	0.129***	0.0718***	-0.0973***
		(0.0232)	(0.0228)	(0.0143)
Satellite	FNC Cable Position	-0.00617	0.0328	0.00273
		(0.0457)	(0.0449)	(0.0282)
	CNN Cable Position	0.00759	0.0137	-0.00864
		(0.0311)	(0.0306)	(0.0192)
	MSNBC Cable Position	0.0511	0.0135	0.0111
		(0.0500)	(0.0491)	(0.0309)
	Cable Observations	137,312	137,312	137,312
	Satellite Observations	36,735	36,735	36,735
	F-test for Positions on Cable Hours	16.33	23.61	18.14
	Chow Test Stat	5.320	14.14	10.18
	Chow P Value	0.0211	0.000170	0.00142

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The Satellite Placebo

- Placebo would be misleading if satellite subscribers' political ideology were uncorrelated with cable subscribers'.
  - Level shift of ideology should still be picked up in the placebo test.

- Cable and satellite subscribers' observable demographics are strongly positively correlated.
- Demographics correlate with viewing the same amongst cable and satellite subscribers.

- Though we can comfortably rule out that the own-position coefficients are equal between cable and satellite, the satellite estimates are not "precise zeroes."

Cable-Satellite Observable Corr's

Characteristic	N>0	N>10	N>50	N>100	IV
Black	0.581***	0.708***	0.783***	0.912***	0.996***
	(0.0129)	(0.0148)	(0.0279)	(0.0571)	(0.0388)
College	0.398***	0.540***	0.705***	0.716***	0.917***
	(0.0165)	(0.0202)	(0.0412)	(0.0714)	(0.0779)
HH Income	0.498***	0.612***	0.820***	0.886***	0.973***
	(0.0144)	(0.0166)	(0.0309)	(0.0607)	(0.0637)
Age	0.261***	0.358***	0.395***	0.490***	0.791***
	(0.0165)	(0.0212)	(0.0458)	(0.0764)	(0.0998)
Hispanic	0.538***	0.665***	0.778***	0.843***	0.838***
	(0.0138)	(0.0159)	(0.0234)	(0.0345)	(0.0304)
Party ID R	0.105***	0.289***	0.629***	0.888***	1.552***
	(0.0286)	(0.0503)	(0.106)	(0.172)	(0.437)
Party ID D	0.118***	0.228***	0.630***	1.174***	2.947*
	(0.0282)	(0.0506)	(0.117)	(0.211)	(1.690)

Second Stage: Voting on Hours

	All	2000	2004	2008
FNC Hours	0.137***	0.100***	0.122***	0.141***
	(0.0108)	(0.0304)	(0.0204)	(0.0154)
CNN Hours	0.0221	0.0148	-0.0105	0.0337
	(0.0197)	(0.0253)	(0.0258)	(0.0205)
MSNBC Hours	-0.101***	0.0296	-0.0144	-0.113***
	(0.0221)	(0.0416)	(0.0470)	(0.0226)

- One SD of Fox News channel position changes viewership by about 4 minutes, implying 0.007 points change on voting.

Model

- Three part demand analysis: cable/satellite subscription, time allocation, and voting.
  - Distribution of consumer-viewer-voters who differ on demographics (x), zip code/channel positions, ideology (r), and tastes for channels.
  - Ideology and tastes for channels are partly endogenous and inter-dependent.

- Timing within election cycle:
  1. Subscribe to cable, satellite, or neither
  2. Allocate time amongst news channels
  3. Ideology evolves
  4. Vote

Model (Voting)

- Every individual equally likely to be sampled.
- Each election has a cut-off ideology.
- Intend to vote for Republican candidate if voter's ideology greater than cut-off.
- Estimate initial ideology distribution from BLP with demographic interactions on county level vote shares from previous election.

Model (Viewing and Ideology Evolution)

- Given access to channels, solve time allocation problem:

$$v_{ij} = \sum_{c \in C_{jt}} \gamma_{ict} \log(1 + T_{ijc})$$

$$\gamma_{it} = \chi_{it} \circ \nu_{it}$$

$$\chi_{ict} \sim \text{Bernoulli}(\alpha_{0ct} + \Pi_{0c} d_i + \zeta_0 pos_{ict})$$

$$\nu_{ict} \sim \text{Exp}(\alpha_{ct} + \Pi_c d_i + \zeta pos_{ict} + \eta(r_{ct} - r_{it})^2)$$

Channel ideology

Channel-year FE

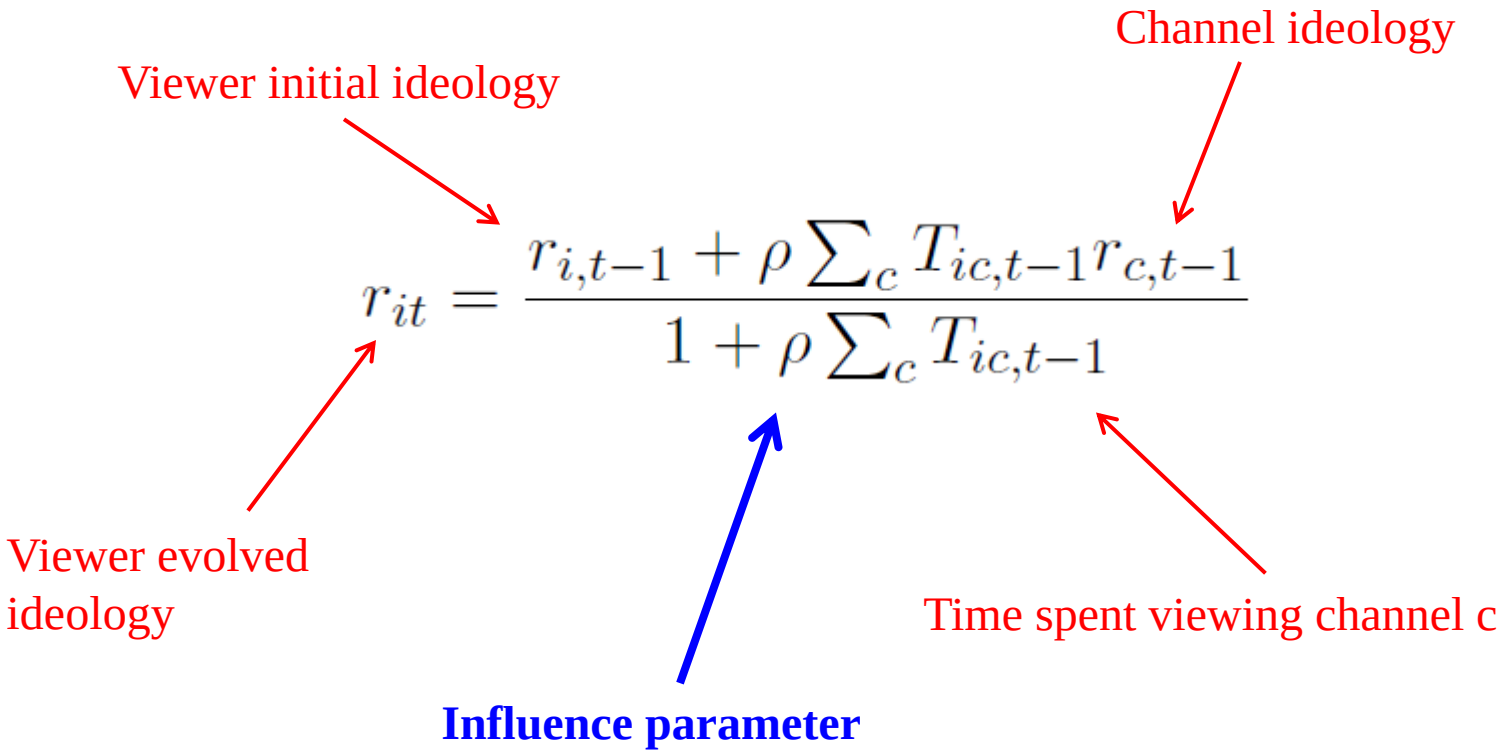
Demographics

Channel position

Viewer initial ideology

Model (Viewing and Ideology Evolution)

- Ideology evolves in accordance to time spent watching on each channel:



Model (Viewing and Ideology Evolution)

- Model of influence that generates this updating…

- Normal prior
- Receive normal signals per hour watched from ideology of channel.
- ρ can be rate of signals of given variance received per hour, or equivalently precision of signals received for given rate per hour.

- **Agent treats signals from the same channel as uncorrelated** as in DeMarzo, Vayanos, and Zweibel (2003)

Model (Cable/Satellite Subscription)

- Subscribe to cable/satellite/nothing

$$u_{ij} = v_{ij}^{*} + \delta_j + \epsilon_{ij}$$

- BLP specification.
- Not estimating price sensitivities.
- Heterogeneity is all in tastes for news channels.

Estimation

- Key model parameters are:
  - ρ: Influence parameter.
  - η: Taste for like-minded news.
  - ζ: Effect of channel position on viewership.
  - Channel demographic tastes and channel-year fixed effects.

- Given model parameters and data, simulate time-watched, cable/satellite subscriptions, and voting.

- **Choose parameters to match regression coefficients from model to estimated regression coefficients. (indirect inference)**

Model Estimates

Parameter	Estimate	Bootstrapped Standard Error
Slant Preference (η)	0.003	0.0002
Ideological Influence (ρ)	0.062	0.0046
Position Effect - Ratings	-0.001	0.0001
Position Effect - Viewership	-0.031	0.0041
2000 R/D Threshold	-0.045	0.0296
2004 R/D Threshold	0.504	0.0232
2008 R/D Threshold	0.445	0.0300
Channel Ideology Intercept (a)	-0.162	0.0286
Channel Ideology Slope (b)	14.052	0.7871

Table : Key parameter estimates.

Model Estimates

						Channel Position Elasticity		
Age	Income ($000s)	Ethnicity	College Educated	Gender	Ideology	CNN	FOX	MSNBC
60	100	White	Yes	Man	Centrist	-0.037	-0.029	-0.031
60	100	White	Yes	Man	Median Republican	-0.063	-0.032	-0.049
60	100	White	Yes	Man	Median Democrat	-0.046	-0.044	-0.036
30	30	White	Yes	Man	Centrist	-0.037	-0.029	-0.030
30	30	White	Yes	Man	Median Republican	-0.063	-0.033	-0.046
30	30	White	Yes	Man	Median Democrat	-0.046	-0.046	-0.034
30	30	Black	Yes	Woman	Centrist	-0.036	-0.029	-0.031
30	30	Black	Yes	Woman	Median Republican	-0.059	-0.032	-0.049
30	30	Black	Yes	Woman	Median Democrat	-0.044	-0.046	-0.036
30	30	Hispanic	No	Man	Centrist	-0.037	-0.029	-0.029
30	30	Hispanic	No	Man	Median Republican	-0.063	-0.032	-0.045
30	30	Hispanic	No	Man	Median Democrat	-0.046	-0.045	-0.034
60	100	White	Yes	Woman	Centrist	-0.037	-0.028	-0.032
60	100	White	Yes	Woman	Median Republican	-0.064	-0.032	-0.051
60	100	White	Yes	Woman	Median Democrat	-0.046	-0.044	-0.037
60	30	Black	No	Woman	Centrist	-0.036	-0.028	-0.030
60	30	Black	No	Woman	Median Republican	-0.060	-0.031	-0.047
60	30	Black	No	Woman	Median Democrat	-0.044	-0.042	-0.035
30	100	White	Yes	Woman	Centrist	-0.037	-0.028	-0.032
30	100	White	Yes	Woman	Median Republican	-0.064	-0.032	-0.051
30	100	White	Yes	Woman	Median Democrat	-0.046	-0.044	-0.037

Table 8: Elasticities of individual ratings (hours watched) with respect to channel position, for selected demographic and ideological profiles.

Empirical Identification

- Influence parameter determines strength of second stage hours effect in IV for voting regression.

- Taste for like-minded news explains difference between IV and OLS estimates in voting regression.

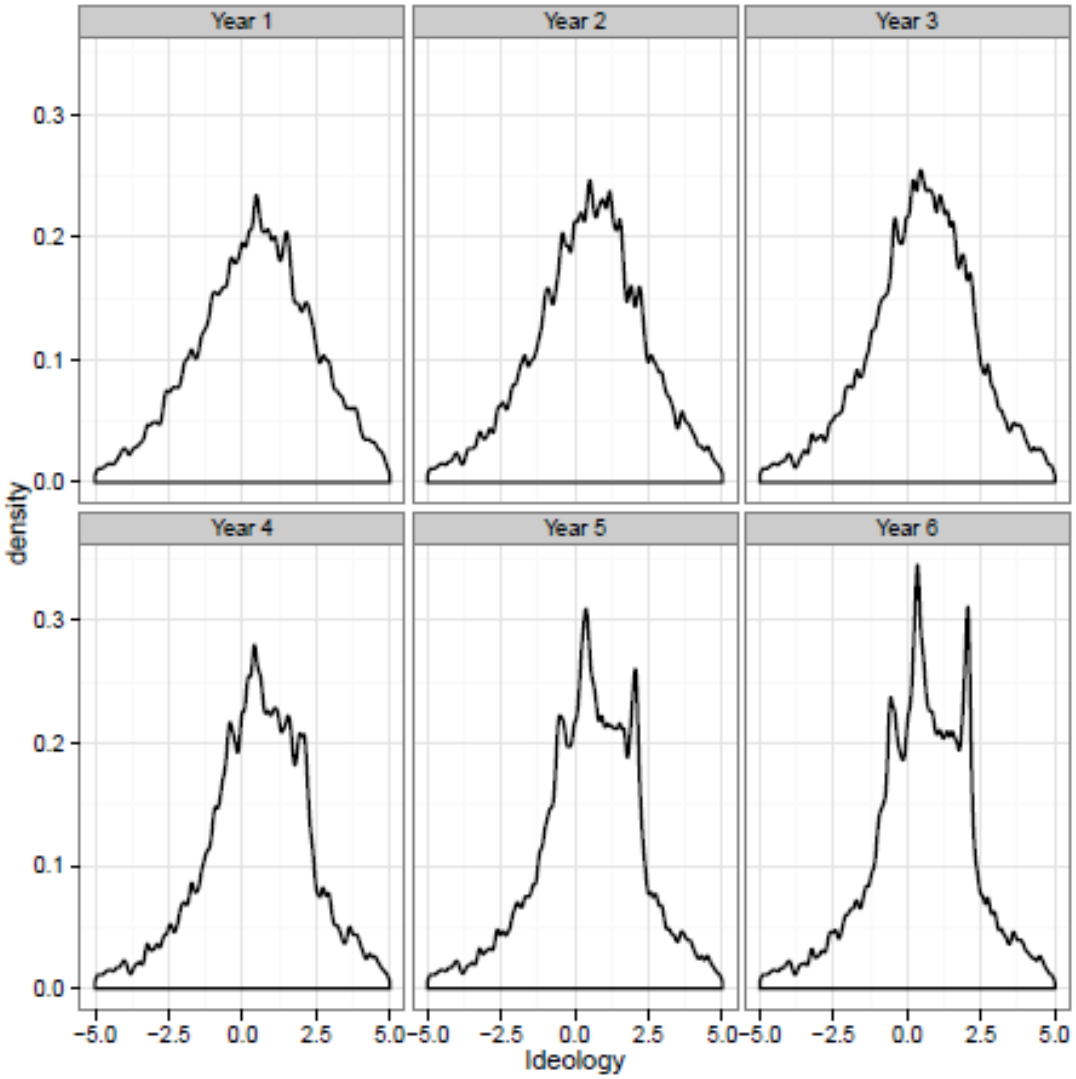
- Demographics and channel-year fixed effects have direct analogs in the first stage regressions.

Speed of Polarization

- We simulate a group of voters from 2008 unconditional distribution.
- Because of heterogeneity in taste for channels, some have high draws for MSNBC, some for Fox News..

- How quickly do they spread apart?

Speed of Polarization



Speed of Polarization

- Model estimates imply 4-5 years.
- Esteban-Ray polarization metric increases.
- Increase relies on interaction of tastes for like minded news with influence effect.

Remove Fox News Counterfactual

- Drops mean county Republican vote share in 2000 election by 1.6%

- Roughly 2-4x estimate of Dellavigna and Kaplan taken at face value

Weaknesses, Future Analysis

- Are the results too big?
- Two elements:

1. Are the "reduced form" estimates too large?
   - Instrument pushes around viewership by minutes, not hours.
   - Heterogeneous effects
   - Dellavigna and Kaplan with correct data find null effects.

2. Are the model assumptions driving counterfactual results?
   - Probably, though model follows literature fairly closely.
   - Missing heterogeneity (next slide)

Weaknesses, Future Analysis

- No panel data
- Joint distribution of ρ: Influence parameter and η: Taste for like-minded news
- No external shocks to ideology between elections
- Other news sources + technological change

Conclusion

- Introduce channel positions as instrumental variables.
  - Cable channel positions don't correlate with same zip satellite viewership.
  - Cable and satellite consumers look very similar.

- Measurable effect of Fox News and MSNBC on intention to vote Republican in Presidential elections.

- Estimated model implies possibility of media driven polarization over 5-10 years.

Comparison to Previous Literature

- Influence parameter: "Fox News Effect" from Della Vigna and Kaplan (2007): Introduction of FNC increases Republican vote share by 0.4 to 0.7 percentage points.

- Data set (Factbook) is severely mis-measured.
- Document in Crawford and Yurukoglu (2012) that only 30% of the data are updated year-to-year.

- Many "no FNC" markets actually do have FNC, but are not updated in data.
  In fact, many had in 1998.

Year 2000	Factbook Fox News		
Nielsen Fox News	0	1	Total
0	3,632	58	3,690
1	3,076	1,520	4,596
Total	6,708	1,578	8,286

Table 5: Year 2000: Nielsen Fox News Availability and Factbook non-updated Fox News Availability.

Year 1998	Factbook Fox News		
Nielsen Fox News	0	1	Total
0	4,837	358	5,195
1	1,871	1,220	3,091
Total	6,708	1,578	8,286

Table 6: Year 1998: Nielsen Fox News Availability and Factbook non-updated Fox News Availability.

Comparison to Previous Literature

	Republican two-party vote share change between 2000 and 1996 pres. elections								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Factbook Fox	0.00798***	0.00869***		0.00421***	0.00473***		0.00694***	0.00741***	
	(0.00257)	(0.00270)		(0.00154)	(0.00163)		(0.00150)	(0.00158)	
Nielsen Fox			0.00786***			0.00400***			0.00215
			(0.00171)			(0.00122)			(0.00131)
Observations	9,256	8,286	8,286	9,256	8,286	8,286	9,256	8,286	8,286
R-squared	0.557	0.559	0.561	0.753	0.755	0.579	0.812	0.815	0.814
Data Set	Factbook	Factbook	Nielsen	Factbook	Factbook	Nielsen	Factbook	Factbook	Nielsen
Sample	Full	Matched	Matched	Full	Matched	Matched	Full	Matched	Matched
Specification	OLS	OLS	OLS	District FE	District FE	District FE	County FE	County FE	County FE

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: OLS, District FE, and County FE specifications from DVK and with corrected Fox News availability data.

	Republican two-party vote share change between 1996 and 1992 pres. elections					
	(1)	(2)	(3)	(4)	(5)	(6)
Factbook Fox	0.00539	0.00459		-0.00237	-0.00271	
	(0.00503)	(0.00507)		(0.00313)	(0.00325)	
Nielsen Fox			0.00702**			0.00296
			(0.00337)			(0.00205)
Observations	4,006	3,637	3,637	4,006	3,637	3,637
R-squared	0.327	0.337	0.341	0.620	0.625	0.626
Data Set	Factbook	Factbook	Nielsen	Factbook	Factbook	Nielsen
Sample	Full	Matched	Matched	Full	Matched	Matched
Specification	OLS	OLS	OLS	District FE	District FE	District FE

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: OLS and District FE Placebo specifications from DVK and with corrected Fox News availability data.