14.770: Media Lecture 20-21b

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Outline

- Media's impact on policy.
  - Affecting politicians' effort
  - And in turn affecting outcomes
- Media and protest.

Effort

Besley and Burgess (2002)

- Setup is a voting model with politician moral hazard and reputations
- Citizens are of two types:
  - Vulnerable (fraction $\gamma < \frac{1}{2}$) care about effort.
  - Non-vulnerable care about politician ideology.
- Politicians can put in effort $e \in [0, E]$ to help vulnerable. Effort unobservable and costs politician E.
- Politicians are of three types with positive probability:
  - Altruistic (always performs E)
  - Selfish (always performs 0)
  - Opportunistic. Opportunistic values re-election only with value Ω.

Timing

- Period 1:
  - Politician chooses effort
  - Media reports on politician effort.
  - Let $q(e, m)$ be the fraction of vulnerable citizens who receive a signal that the politician exerted positive effort.
  - Key conditions are that $q_{em}(e, m) > 0$ (media and effort are complements) and $q_{ee}(e, m) < 0$
- Period 2:
  - Vote to re-elect politician or re-draw politician from initial distribution.
  - Politician chooses effort
  - Game ends

Voting

- Voting:
  - Vulnerable vote optimally to maximize politician effort in period 2.
    - Vulnerable voters vote for re-election if they observe effort in first period, and not otherwise.
    - Why? Types make this voting optimal, since observing effort increases posterior probability of a politician being altruistic. The model therefore combines effort and competence.
    - What if there were only opportunistic types?
  - Non-vulnerable vote for ideological reasons.
    - Ideological vote share for incumbent is $v = b + \varepsilon$
    - ε is distributed as $[-b + a, b - a]$. So v is distributed uniformly on $[a, 2b - a]$. b is expected support for incumbent and a measures accuracy.
  - So incumbent wins re-election if

$$\gamma q(e, m) + (1 - \gamma) v > \frac{1}{2}$$

Solution

- Probability of re-election is

$$P = \begin{cases} 1 & \text{if} \quad \gamma q\left(e,m\right) + \left(1-\gamma\right) a > \frac{1}{2} \\ \frac{(2b-a)+\frac{\gamma}{1-\gamma} q(e,m) - \frac{1}{2(1-\gamma)}}{2(b-a)} & \text{if} \quad \text{otherwise} \\ 0 & \text{if} \quad \gamma q\left(e,m\right) + \left(1-\gamma\right)\left(2b-a\right) < \frac{1}{2} \end{cases}$$

- FOC for optimal effort, at interior, is

$$\frac{\gamma}{2\left(b-a\right)\left(1-\gamma\right)} \Omega q_e = 1$$

- Effort increases if:
  - Media m increases
  - Incumbent advantage b decreases
  - Election becomes less noisy (i.e. a increases)
  - Share of population that cares about effort γ increases

An example....

Image is in the public domain.

"President Bush's job approval rating took a hit in the wake of Hurricane Katrina, dropping to a historic low of 41%, a new Zogby America poll reveals. The public rates the performance of all levels of government in the aftermath of Hurricane Katrina negatively, with 36% giving the President passing marks on his handling of the crisis" *-BBC, 9/8/05*

Some model notes

- How is this model different from a conventional moral hazard model?
  - Types (why?) Voters can't write contracts (except in prospective voting models). So need to motivate voters' decisions.
  - Two types of noise (why?) What would change if $\gamma = 1$?
    - $q = \frac{1}{2}$ in equilibrium – just enough effort to win. Media effect less clear.)
  - Repeated game version?
- Media
  - Is media a complement to effort or a substitute?

Empirics from the US

Snyder and Stromberg (2008)

- Setting: US congressional districts
- Empirical strategy:
  - Examine overlap between newspaper markets and congressional districts
  - Idea: those districts where overlap is less clear get less media coverage, and so congressmen put in less effort
- Driving empirical idea:

$$q_{md} = \alpha ReaderShare_{md}$$

  where q_{md} is quantity of articles about congressman d in media source m, and *ReaderShare* is the share of m's readers in district d
- Define

$$Congruence_{cd} = \sum_{m=1}^{M} MarketShare_{mc} ReaderShare_{md}$$

  where c is a county.
- Idea: voter information increasing in congruence

Example

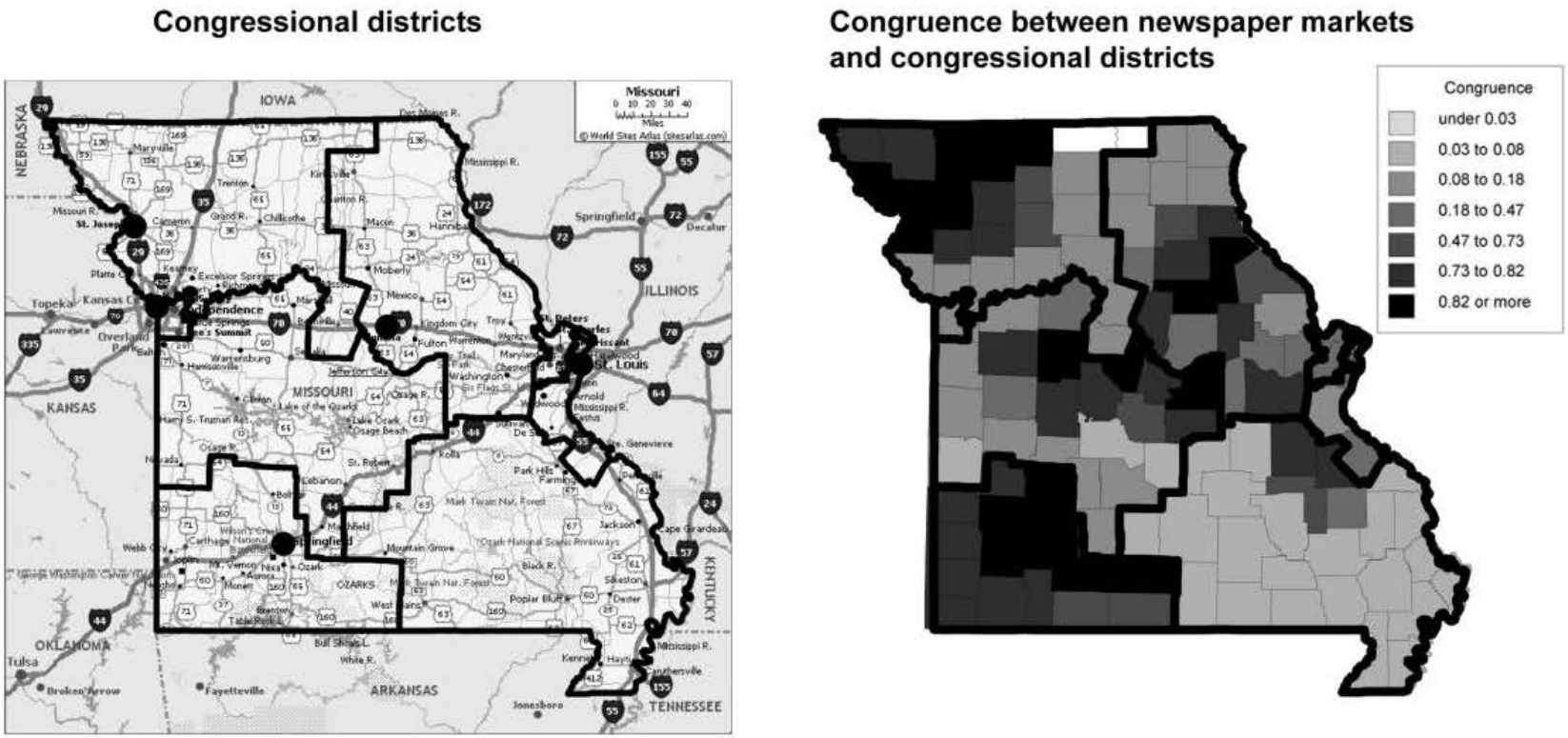


FIG. 2.—Congruence in Missouri

Graphical results

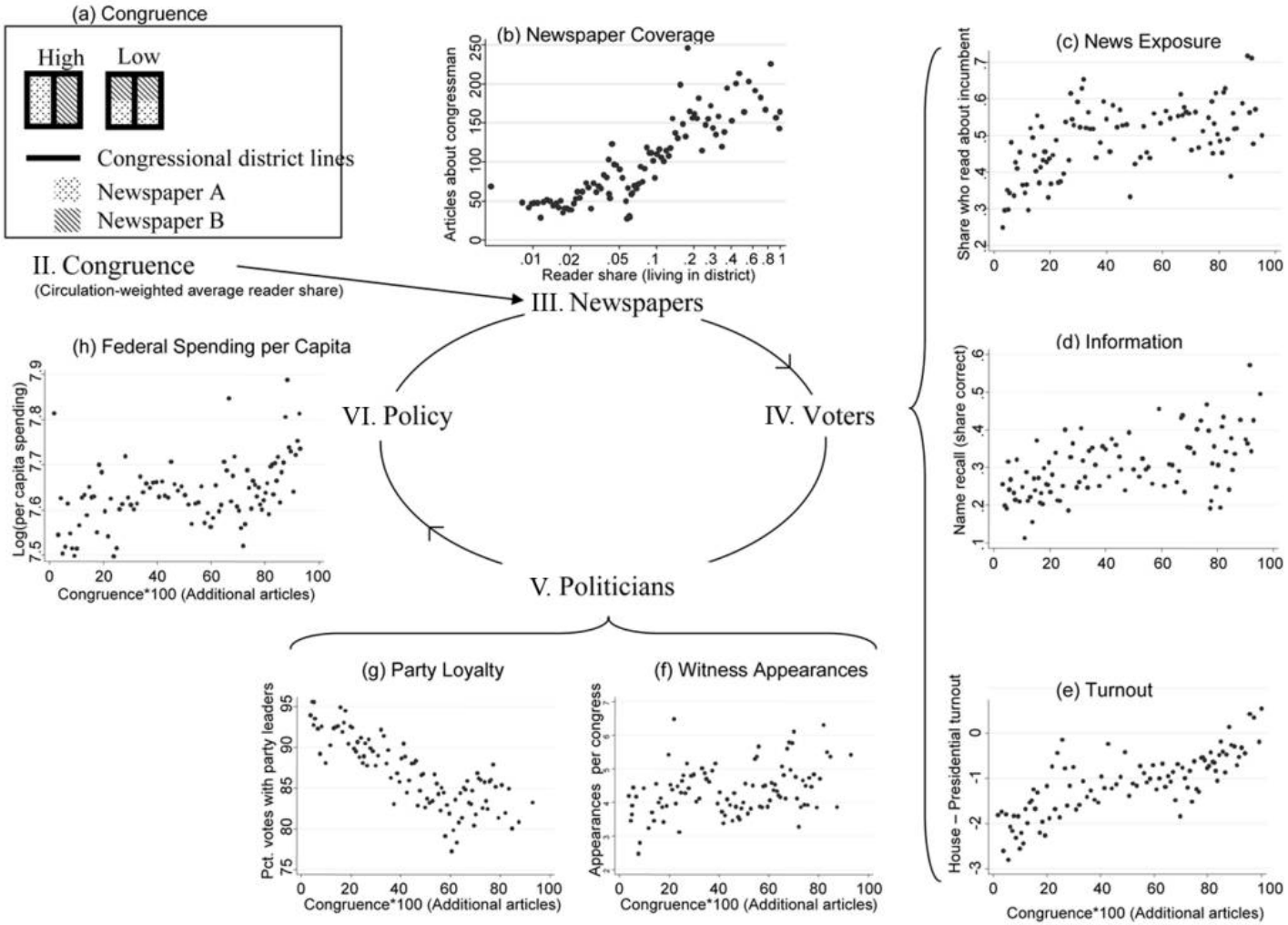


FIG. 1.—Structure of empirical investigation

Empirics

Coverage

- Identifying assumption: congruence is not related to interest in politics.Validity? Endogenous demand?
- Step 1: Does *ReaderShare* increase political coverage
  - q_{mdt} is number of articles in m in district d in year t. $q_{mt} = \sum_d q_{mdt}$.
  - Data from 161 newspapers.
  - Regress

$$\frac{q_{mdt}}{q_{mt}} = ReaderShare_{mdt} + X + \varepsilon$$

    where X are controls like party leaders, seniority, freshmen, majority party, scandals, etc
  - Validity? Placebo using general political knowledge

TABLE 2
NEWSPAPER COVERAGE OF U.S. HOUSE MEMBERS, 1991–2000
Dependent Variable: Articles about Congressman

	(1)	(2)	(3)	(4)
ReaderShare	177.25	164.14		
	(17.95)***	(17.06)***		
Congruence			171.10	170.64
			(19.42)***	(6.18)***
Party leader		154.62	191.93	122.70
		(50.53)***	(72.45)***	(10.65)***
Scandal		70.21	82.15	45.17
		(18.24)***	(27.37)***	(10.76)***
Higher_office (ran or appointed)		90.25	98.21	82.61
		(11.22)***	(13.02)***	(8.25)***
Out_of_state		−34.75	−10.45	−19.99
		(9.38)***	(12.26)	(4.19)***
Close_race		36.02	53.63	33.00
		(16.87)**	(20.56)**	(11.01)***
Freshman		5.32	8.07	9.66
		(3.63)	(5.08)	(4.09)**
Retired		18.38	29.43	19.94
		(7.42)**	(9.26)***	(5.88)***
% urban		−18.40	.19	−34.36
		(12.39)	(13.37)	(5.40)***
Median income		24.67	14.57	−24.79
		(37.71)	(45.38)	(17.78)
Observations	4,206	4,206	2,308	3,421
R^2	.18	.27	.26	.28

* Significant at 10 percent.
** Significant at 5 percent.

- Step 2: Does *Congruence* increase voter information
  - Regress

$$info_{ict} = \gamma Congruence_{ct} + x_{ict} + \alpha_t + \alpha_r + \varepsilon$$

    where *info* are measures about how much an individual knows about their congressman, x are individual controls (party, education, income, age, gender, race) representative controls (tenure, majority, etc) and election controls, α_t are state & year FE and α_r are congressman * 3 term FE
  - Where is identification coming from? thoughts?
  - They also run a specification with county fixed effects, which is identified off of changes in district every ten years.

TABLE 4
VOTER KNOWLEDGE OF HOUSE REPRESENTATIVE

	Baseline		Within-Race	Redistricting
	(1)	(2)	(3)	(4)
Controls	No	Yes	Yes	Yes
Fixed effects	Year	State × year	District × year	State × year, county
	Dependent Variable: ReadAboutIncumbent			
Congruence	.29	.42	.40	.30
	(.08)***	(.09)***	(.12)***	(.09)***
Observations	8,985	8,985	8,985	8,985
R^2	.12	.22	.24	.18
	Dependent Variable: NameRecall			
Congruence	.28	.35	.42	.27
	(.07)***	(.07)***	(.07)***	(.06)***
Observations	14,139	14,139	14,139	14,139
R^2	.16	.27	.30	.24
	Dependent Variable: NameRecognition			
Congruence	.04	.08	.10	.07
	(.05)	(.05)	(.06)*	(.06)
Observations	9,624	9,624	9,624	9,624
R^2	.27	.39	.42	.31
	Dependent Variable: FeelingThermometerProvided			
Congruence	.21	.20	.19	.29
	(.05)***	(.06)***	(.07)***	(.09)***
Observations	12,459	12,459	12,459	12,459
R^2	.18	.25	.28	.19
	Dependent Variable: IdeologicalRatingProvided			
Congruence	.22	.25	.30	.20
	(.09)***	(.09)***	(.10)***	(.09)**
Observations	7,441	7,441	7,441	7,441
R^2	.18	.25	.27	.19
	Dependent Variable: LikesOrDislikesProvided			
Congruence	.28	.26	.21	.30
	(.08)***	(.09)***	(.09)**	(.07)***
Observations	10,775	10,775	10,775	10,775
R^2	.17	.29	.32	.24

* Significant at 10 percent.
** Significant at 5 percent.
*** Significant at 1 percent.

NOTE.—Results are from OLS regressions. Robust standard errors, clustered by county, are in parentheses.

- Step 3: Does *Congruence* increase politician effort
  - Aggregate *Congruence* to district level

$$Congruence_d = \sum_{m=1}^{M} MarketShare_{md} ReaderShare_{md}$$

  - Regress

$$effort_d = Congruence_d + X_d + \varepsilon$$

    where X is district population controls and (sometimes) district FE.
  - Note that here district FE are not as persuasive, since district boundaries change

TABLE 13
DEPENDENT VARIABLE: NUMBER OF WITNESS APPEARANCES BEFORE CONGRESSIONAL HEARINGS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Congruence	.41 (.17)**	.42 (.16)***	.41 (.15)***	.43 (.21)**	.41 (.18)**	.44 (.23)*	.38 (.22)*
District controls	X	X	X	X	X	X	X
Race and representative controls			X	X	X	X	X
Fixed effects	State, year	State, year	State, year	District, year	Rep., year	State, year	State, year
Estimation procedure	Poisson	NB	NB	NB	NB	Poisson	NB
Appearance before committee	All	All	All	All	All	Appr., W&M	Appr., W&M
Observations	4,890	4,890	4,890	4,890	4,890	4,890	4,890

TABLE 14
COMMITTEE ASSIGNMENTS

	Dependent Variable					
	Distributive Committee Assignment			Policy Committee Assignment		
	(1)	(2)	(3)	(4)	(5)	(6)
Congruence	.41	.15	.05	−.18	−.07	−.21
	(.07)***	(.09)	(.08)	(.06)***	(.08)	(.07)***
Controls	No	Yes	Yes	No	Yes	Yes
Fixed effects	State × year	State × year	Year, district	State × year	State × year	Year, district
Observations	4,508	4,508	4,508	4,771	4,771	4,771
R^2	.18	.37	.56	.12	.24	.54

NOTE.—Results are from OLS regressions. The unit of observation is House representative by congressional session. Standard errors clustered by House representative are in parentheses.
* Significant at 10 percent.
** Significant at 5 percent.
*** Significant at 1 percent.

TABLE 15
DEPENDENT VARIABLE: PERCENTAGE OF ROLL CALL VOTES WITH PARTY LEADERSHIP

	(1)	(2)	(3)	(4)	(5)
Congruence	−5.38	−4.75	−4.65	−6.75	−3.27
	(2.06)***	(2.03)**	(2.21)**	(2.63)**	(1.40)**
District controls	X	X	X	X	X
Race and representative controls		X	X	X	X
Fixed effects	State, year	State, year	State × year	District, state × year	Rep., state × year
Observations	4,534	4,534	4,534	4,534	4,534
R^2	.19	.32	.38	.68	.91

NOTE.—Results are from OLS regressions. The unit of observation is House representative by congressional session. Standard errors, clustered by congressional district, are in parentheses.

* Significant at 10 percent.

** Significant at 5 percent.

*** Significant at 1 percent.

TABLE 16
DEPENDENT VARIABLE: NOMINATE SCORES FIRST DIMENSION

	(1)	(2)	(3)	(4)	(5)
(Democrats win) × Congruence	.18	.16	.18	.16	.15
	(.05)***	(.05)***	(.06)***	(.05)***	(.06)***
Democrats win	−.75	−.75	−.81	−.75	−.80
	(.03)***	(.03)***	(.08)***	(.03)***	(.09)***
Congruence	−.04	−.09	−.09	−.06	−.04
	(.04)	(.04)**	(.05)*	(.04)	(.04)
Controls	No	Main	Main, urban interacted	No	Main, urban interacted
Fixed effects	No	No	No	Year, district	Year, district
Observations	3,959	3,959	3,959	3,959	3,959
R^2	.87	.90	.90	.96	.96

- Step 4: Does *Congruence* increase political outcomes for the district
  - Aggregate *Congruence* to county level
  - Regress congressional spending on *Congruence* with same county level controls and county FE as before controls and county FE as before

TABLE 17
DISTRIBUTION OF FEDERAL FUNDS ACROSS COUNTIES, 1984–2004
Dependent Variable: Log Spending per Capita

	BASELINE		WITHIN-RACE		WITHIN NEIGHBOR COUNTIES		REDISTRICTING	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Congruence	.092	.137	.064	.094	.106	.096	.051	.035
	(.030)***	(.027)***	(.030)**	(.030)***	(.039)***	(.038)**	(.021)**	(.020)*
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Fixed effects	State × year	State × year	District × year	District × year	Year, neighbor	Year, neighbor	State × year, county	State × year, county
Observations	33,085	33,085	28,787	28,787	16,698	16,698	33,085	33,085
R^2	.259	.393	.441	.516	.638	.677	.8	.890

NOTE.—Results are from OLS regressions. The unit of observation is county by congressional session. Standard errors, clustered by county, are in parentheses.
* Significant at 10 percent.
** Significant at 5 percent.
*** Significant at 1 percent.

Another identification idea

Campante and Do (2014): "Isolated Capital Cities, Accountability, and Corruption: Evidence from US States,"

- Campante and Do have another identification idea: isolated capital cities
- Idea is that newspaper market serves major economic hubs.
  - In some states, e.g. Massachusetts, this is the same as the political hub (Boston)
  - In some states, e.g. New York, this is not the same as the political hub (New York City vs. Albany)
- Examine whether there is more corruption in states with isolated capitals
- Views?
- Instrument using deviation of population from centroid of state
  - Idea is that capitals were intended to be in geographic center of state, which may or may not be the same of population center

Results

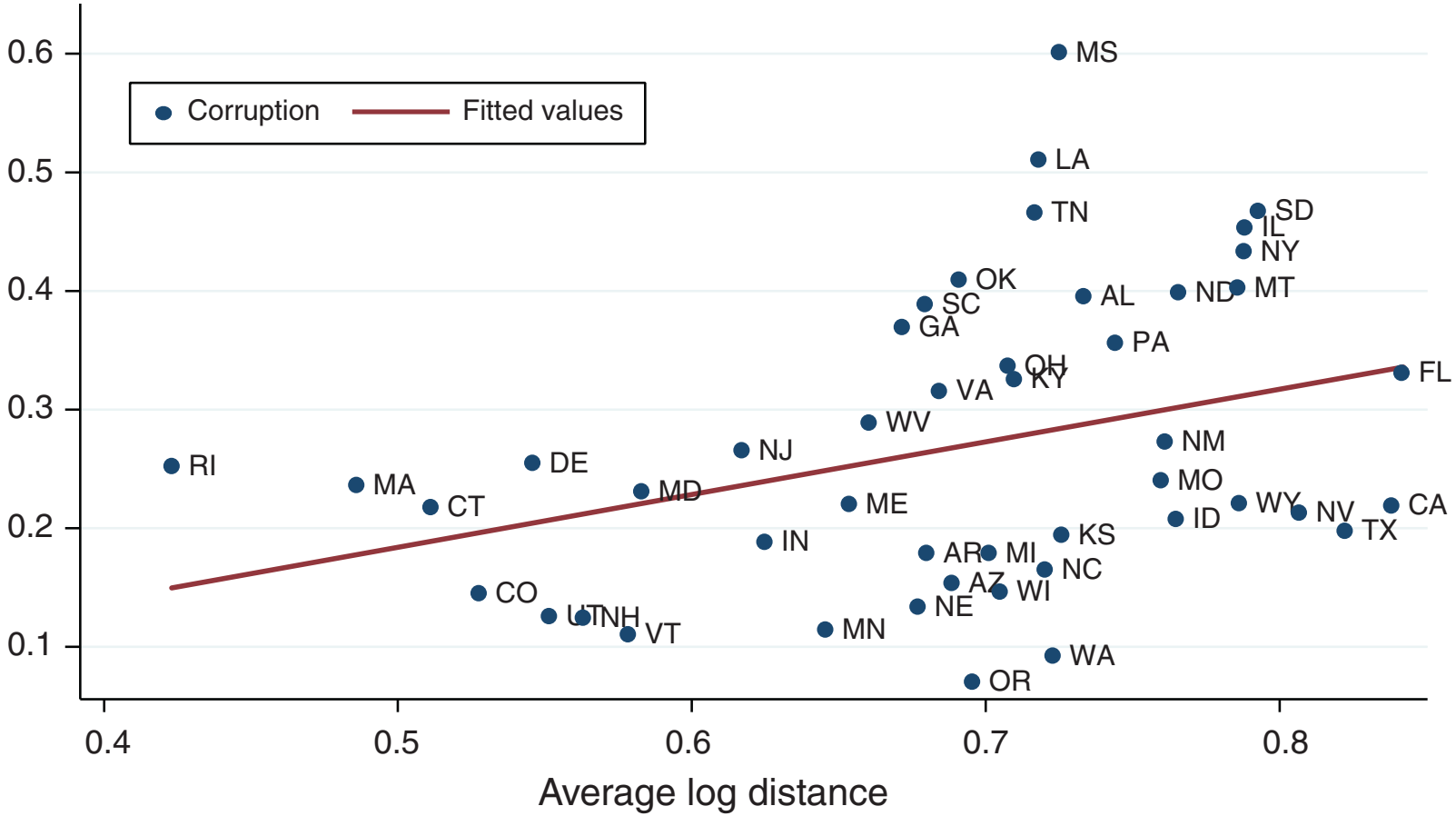


FIGURE 1

Note: Corruption = Federal convictions of public officials for corruption-related crime (average 1976–2002); independent variable: $AvgLogDistance_{not}$ (average 1920–1970).

TABLE 2—CORRUPTION AND ISOLATION OF THE CAPITAL CITY: AVG LOG DISTANCE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$AvgLogDistance_{not}$	1.0477***	1.1666***	1.0307***	0.7932***				
	[0.215]	[0.247]	[0.322]	[0.276]				
$AvgLogDistance_{adj}$					0.8245***	0.8383***	0.8023***	0.5734**
					[0.168]	[0.190]	[0.200]	[0.223]
Basic control variables		X	X	X		X	X	X
Control I			X	X			X	X
Control II				X				X
Observations	48	48	48	48	48	48	48	48
R^2	0.257	0.465	0.532	0.609	0.232	0.406	0.525	0.598

Notes: Robust standard errors in brackets. OLS regressions. Dependent variable: Corruption = Federal convictions for corruption-related crime relative to population, average 1976–2002. Independent variables as of 1970 (*AvgLogDistance average* 1920–1970). All $AvgLogDistance_{not}$ specifications include log *Area* and log *Maximum Distance*. Basic control variables: log *income*, log *population*, *percent college*. Control I: *Share of government employment*, *percent urban*, *census region* dummies. Control II: *racial dissimilarity*, *regulation index*, Share of value added in mining.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

TABLE 5—CORRUPTION AND ISOLATION OF THE CAPITAL CITY: ADDRESSING CAUSALITY

	1st stage (1)	1st stage (2)	2SLS (3)	2SLS (4)	2SLS (5)	2SLS (6)	2SLS (7)	2SLS (8)
Panel A. Population: Centroid								
$AvgLogDistance_{not}$	0.8708***		1.8280***	1.7360***	1.5857***			
	[0.250]		[0.583]	[0.546]	[0.567]			
$AvgLogDistance_{adj}$		1.0851***				1.4880***	1.3880***	1.2725***
		[0.287]				[0.489]	[0.441]	[0.458]
Basic Control	X	X	X	X	X	X	X	X
Control I	X	X		X	X		X	X
Control II	X	X			X			X
Observations	48	48	48	48	48	48	48	48
R^2	0.851	0.677	0.387	0.463	0.538	0.398	0.481	0.551
F-statistic	12.15	14.27	—	—	—	—	—	—
AR *p*-value	—	—	0.002	0.002	0.003	0.002	0.002	0.003
Panel B. Land suitability: Centroid								
$AvgLogDistance_{not}$	1.2427**		1.1403	1.7231**	1.4375**			
	[0.456]		[0.976]	[0.858]	[0.681]			
$AvgLogDistance_{adj}$		1.4166**				0.8999	1.4495**	1.2610**
		[0.530]				[0.776]	[0.734]	[0.618]
Basic control	X	X	X	X	X	X	X	X
Control I	X	X		X	X		X	X
Control II	X	X			X			X
Observations	48	48	48	48	48	48	48	48
R^2 (centered)	0.828	0.607	0.465	0.465	0.562	0.456	0.469	0.553
F-statistic	7.42	7.15	—	—	—	—	—	—
AR *p*-value	—	—	0.333	0.033	0.014	0.333	0.033	0.015

Newspaper Coverage

TABLE 6—NEWSPAPER COVERAGE OF STATE POLITICS AND THE CONCENTRATION OF CIRCULATION AROUND THE CAPITAL

Number of search hits	State elections (1)	State budget (2)	State government (3)	Governor's name (4)
ReaderConcentr	884.057***	983.524***	1,164.911**	1,377.846***
	[304.295]	[254.500]	[555.114]	[239.350]
Observations	431	436	436	436
R^2	0.783	0.770	0.789	0.716

Notes: Robust standard errors in brackets, clustered by state. OLS regressions. Dependent variable: Number of search hits for each term in NewsLibrary.com (January 1, 2008 to December 31, 2009). Control variables: log of daily circulation, Number of search hits for "Monday," state fixed effects.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Knowledge

TABLE 8—DISTANCE TO THE CAPITAL AND INDIVIDUAL ENGAGEMENT WITH STATE POLITICS

	Knowledge (1)	*Knowledge* (2)	*Interest* (3)	*Interest* (4)	*Gen. interest* (5)	*Gen. interest* (6)
log *distance to capital*	−0.0623***	−0.0836***	−0.0326	−0.0649**	−0.0001	−0.0120
	[0.0205]	[0.0252]	[0.0227]	[0.0288]	[0.0218]	[0.0275]
State fixed effects	X	X	X	X	X	X
County controls	X	X	X	X	X	X
Individual controls		X		X		X
Observations	780	780	652	648	780	776
Mean of dependent variable	0.662	0.662	0.403	0.403	0.590	0.590
Pseudo R^2	0.033	0.172	0.021	0.160	0.014	0.207

Notes: Robust standard errors in brackets, clustered by county. Probit regressions, marginal effects reported. Dependent variables: *Knowledge* = dummy for knowing name of at least one candidate in gubernatorial elections; *Interest* = dummy for caring "a great deal," "quite a bit," or "some" about newspaper articles regarding gubernatorial elections (conditional on reading newspapers); *General interest* = dummy for reporting interest in government and public affairs "most of the time" or "some of the time." County controls: *population, percent urban, population density, percent non-White, median age, median income, and median schooling* (from 1990 Census); Individual controls: dummies for *age, occupation, sex, income, and political party identification, and number of children and general level of information* (from ANES). All columns include state fixed effects.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Public goods

TABLE 12—PUBLIC GOODS AND ISOLATION OF THE CAPITAL CITY

	OLS *PG exp.* (1)	*OLS* *Oth. exp.* (2)	*OLS* *PG prov.* (3)	*2SLS* *PG exp.* (4)	*2SLS* *Oth. exp.* (5)	*2SLS* *PG prov.* (6)
$AvgLogDistance_{not}$	−0.478***	0.319***	−2.690*	−0.552**	0.330**	−0.405
	[0.137]	[0.102]	[1.533]	[0.217]	[0.149]	[2.517]
Observations	48	48	48	48	48	48
AR p-value	—	—	—	0.021	0.041	0.874
R^2	0.451	0.593	0.877	0.448	0.593	0.871

Notes: Robust standard errors in brackets. Dependent variables: *PG exp.* (public good expenditures) = share of state expenditures on education, public welfare, health, and hospitals in 2008; *Oth. exp.* (other expenditures) = share of state expenditures on government administration, interest on debt, and "other" in 2008; *PG prov.* (public good provision) = first principal component of "Smart State" Index (2005), percent of population with health insurance (2008–2009), and log of hospital beds per capita (2009). Independent variables: $AvgLogDistance_{not}$ average 1920–2000. Control variables: log *area* and log *maximum distance*, log *income*, log *population*, *percent college*, *share of government employment*, *racial dissimilarity*, *percent urban*, *regional* dummies (all specifications). IV: *centroid* $AvgLogDistance_{not}$ of population. AR p-value: p-value from Anderson-Rubin (minimum distance) test.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Media Crowd-out and Policy

Eisensee and Stromberg (2007)

- Setting: US response to foreign disasters
- Empirical idea:
  - Disasters that strike when the news is focused on other things get less media coverage, and therefore less political response
- Two versions of this:
  - The Olympics
  - "Daily news pressure" which is the average amount of time news spends on the top 3 stories (average of the 40 days after disaster)
  - Include yea, month, country, and disaster type FE and controls for intensity of disaster

Results

TABLE IV
EFFECT OF THE PRESSURE FOR NEWS TIME ON DISASTER *NEWS* AND *RELIEF*

	Dependent variable: *News*				Dependent variable: *Relief*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News Pressure	−0.0162	−0.0163	−0.0177	−0.0142	−0.0117	−0.0119	−0.0094	−0.0078
	(0.0041)***	(0.0041)***	(0.0057)***	(0.0037)***	(0.0045)***	(0.0045)***	(0.0058)	(0.0040)**
Olympics	−0.1078	−0.1079	−0.0871	−0.111	−0.1231	−0.1232	−0.1071	−0.1098
	(0.0470)**	(0.0470)**	(−0.0628)	(0.0413)***	(0.0521)**	(0.0521)**	(0.0763)	(0.0479)**
World Series	−0.1133				−0.1324			
	(−0.1065)				(0.1031)			
log Killed			0.0605				0.0582	
			(0.0040)***				(0.0044)***	
log Affected			0.0123			0.0376		
			(0.0024)***				(0.0024)***	
Imputed log Killed				0.0491				0.0442
				(0.0034)***				(0.0037)***
Imputed log Affected				0.0151				0.0394
				(0.0020)***				(0.0020)***
Observations	5,212	5,212	2,926	5,212	5,212	5,212	2,926	5,212
R-squared	0.1799	0.1797	0.3624	0.2875	0.1991	0.1989	0.4115	0.3726

Linear probability OLS regressions. All regressions include year, month, country, and disaster type fixed effects. Regressions with imputed values (4 and 8) also include fixed effects for the interaction of missing values and disaster type. Robust standard errors in parentheses: * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

What about political advertising

Llareguy, Marshall, and Snyder (2014)

- We've focused on the "news" coverage of politics
- But what about explicitly politcal advertising
- Surprisingly there is much less here
- Llareguy, Marshall, and Snyder (2014) examine this in the context of Mexico
  - Exploit a reform where radio and TV ad shares are allocated based on previous election results
  - Look at spillovers due to the fact that media markets are not coincident with electoral boundaries
- Seems like a good topic for more work, particularly in the US

Media as a coordination device

- Newer area of research has emphasized the role of media as a coordination device
  - Suppose you hate the government and want to protest.
  - There is safety in numbers. Government can easily quash 10 person protest; much harder to surpress 1 million people
  - Then successful protests involve coordination - everyone may want to protest, but will only do so if they believe everyone else will also protest with them
- Media are important as a coordination device
  - Traditional media: broadcasting plans for rallies etc.
    - Aside: this is why step 1 of a coup is to seize the TV stations
  - Social media: interactivity allowing people to agree among themselves

Theory of protests

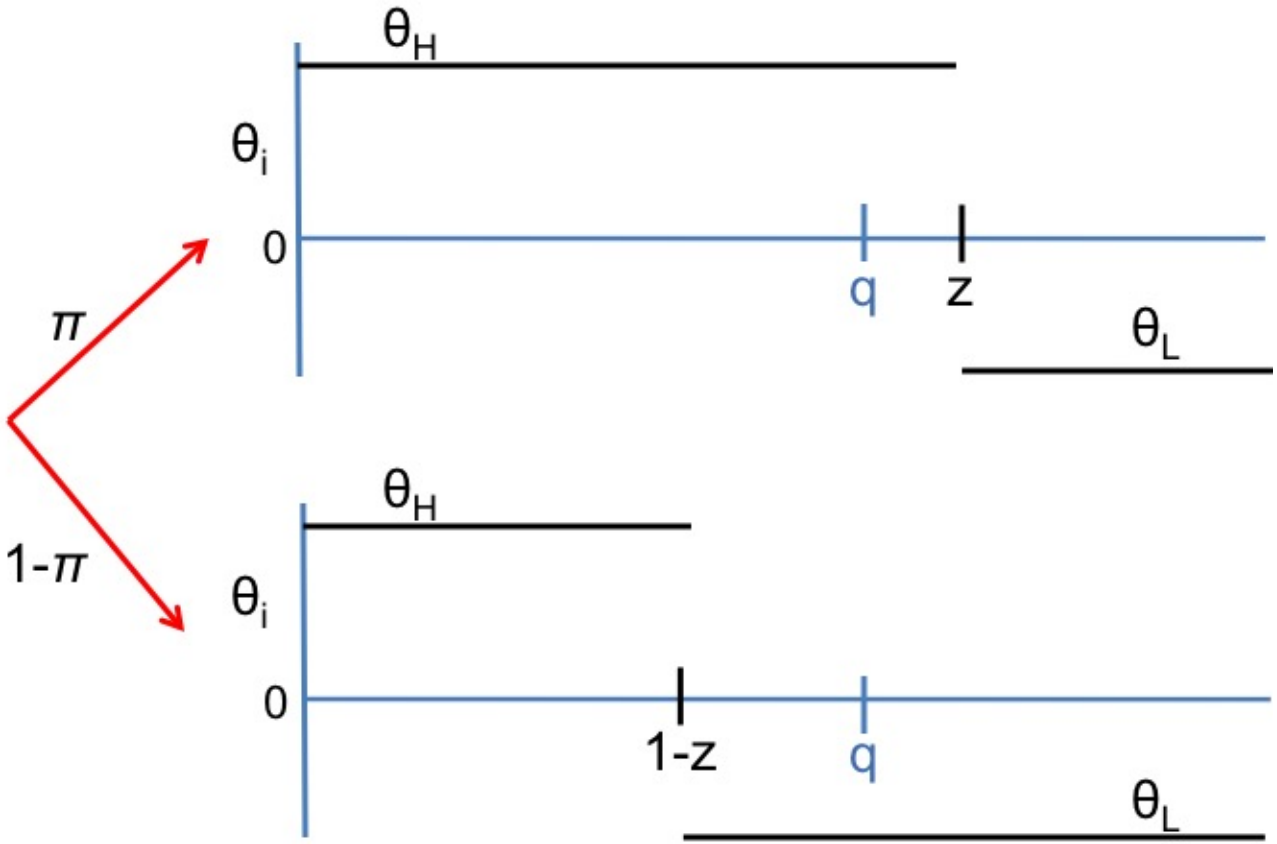
Barbera and Jackson 2017: A Model of Protests, Revolution, and Information

- Barbera and Jackson write down a formal version of coordination game I sketched earlier to study the impact of better information on successful protests
- Setup:
  - Players of mass 1 indexed by i. Each person has type θ_H or θ_L.
  - Collective action (protest, revolution, whatever) is successful iff at least fraction $q \in [0, 1]$ participates.
  - Coordination comes from payoffs: Each individual receives payoffs $\frac{\theta}{=}$ if they participate and protest succeeds and payoff $-C$ if they participate and protest fails.
  - Note: each individual is small relative to success of protest . So these are the individual utility gains/losses from participation in the protest.

Information

- Two states of the world: With probability π, in "High" state with fraction $z > q \geq \frac{1}{2}$ are H types; with probability $1 - \pi$, in "Low" state with fraction $1 - z < q$ are H types.
- Note: coordination games usually involve multiple equiliria. In this case, equilibrium where nobody participates is always an equilibrium. They focus on the other equilibrium, i.e., equilibrium with most protest, which sometimes exists.
- Information questions come from the inference question: I know my type, and maybe I get some other signals. What's my inference about this?

Setup



Information

- Suppose no other signal. I am an H type. By Bayes rule, probability of "High" state is

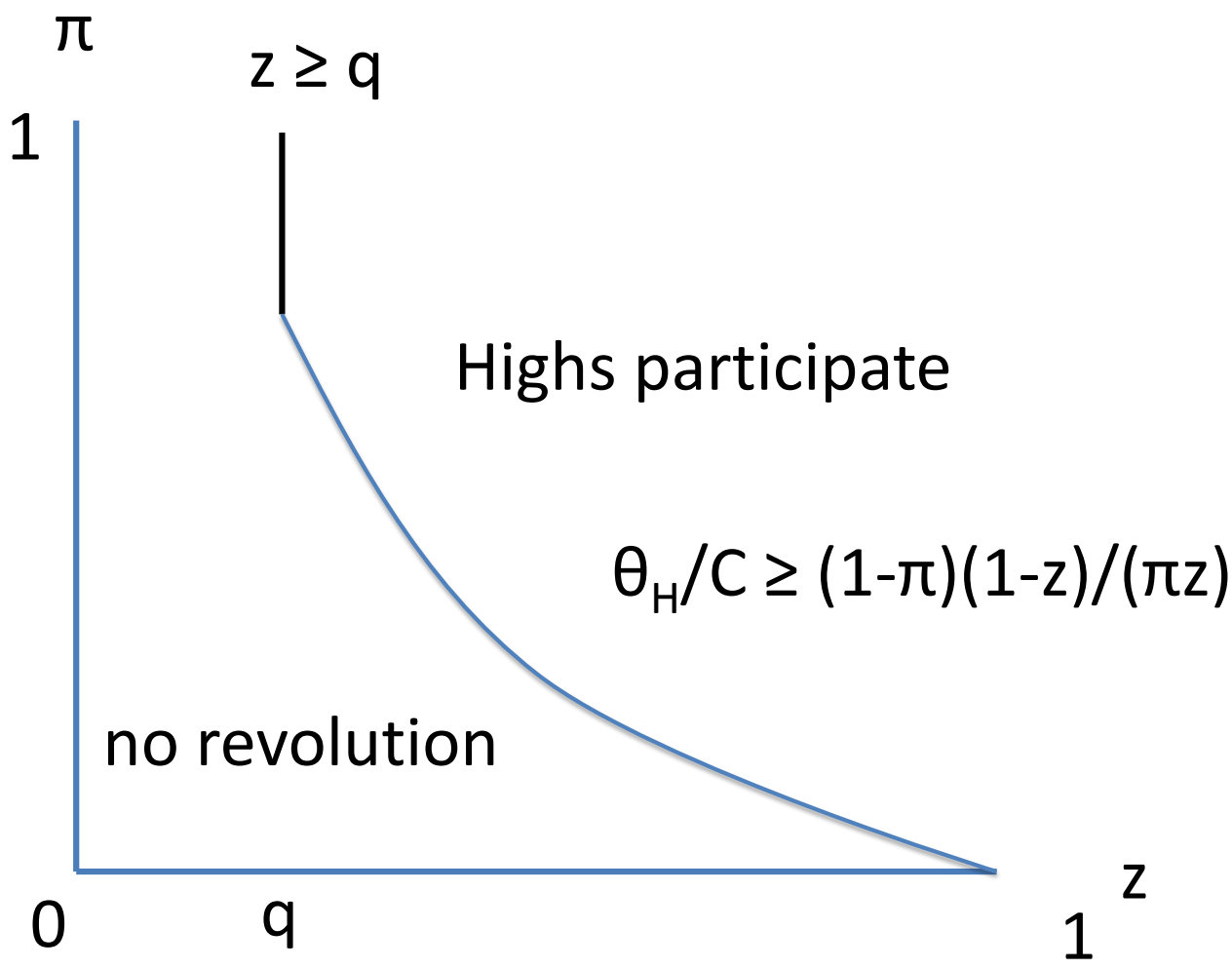
$$\frac{\pi z}{\pi z + (1-\pi)(1-z)}$$

- Should I revolt if I'm a high type? I will do so if

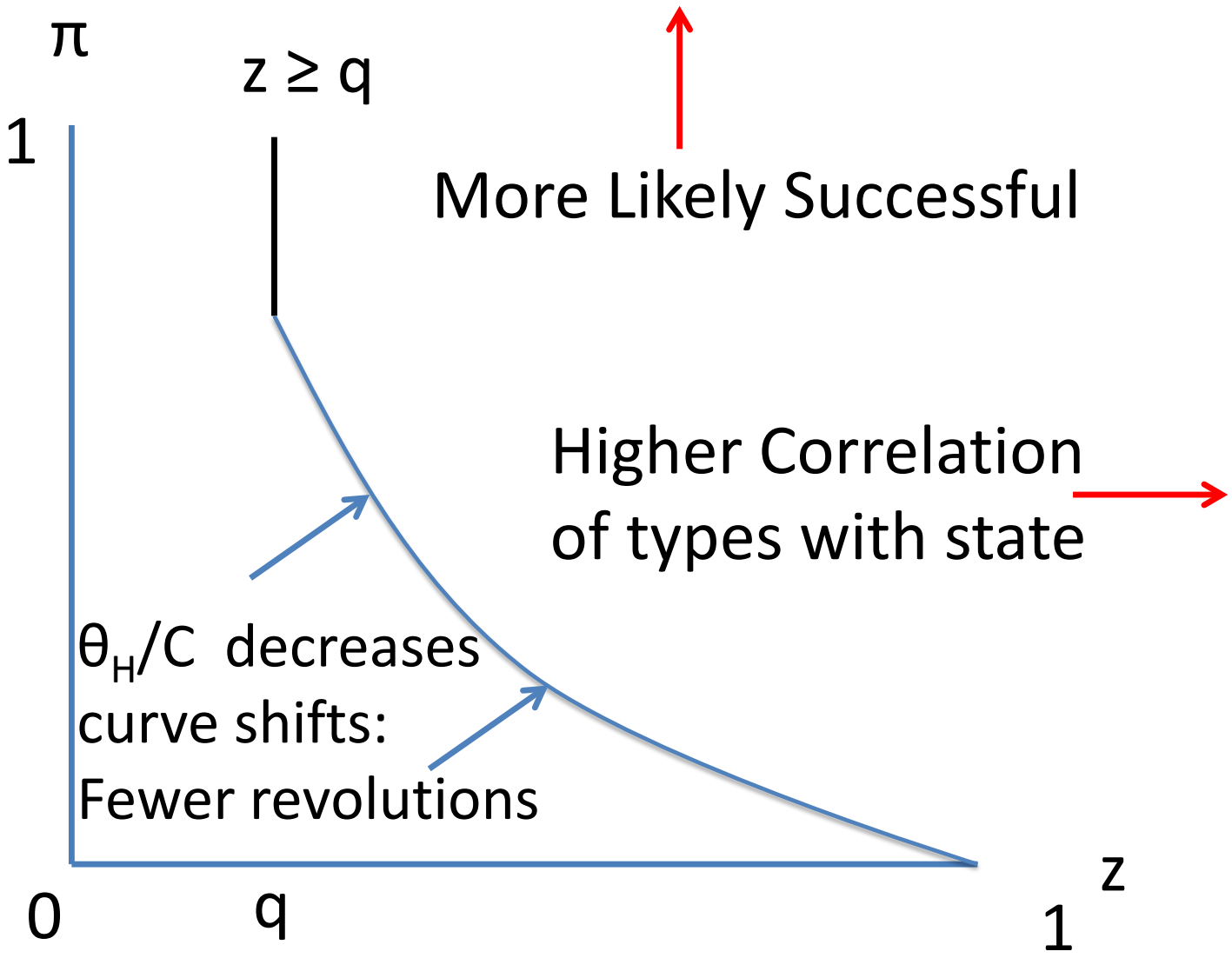
$$\begin{aligned}
\theta_H Pr(HighState) &\geq C(1 - Pr(HighState)) \\
\frac{\theta_H}{C} &\geq \frac{(1 - Pr(HighState))}{Pr(HighState)} \\
\frac{\theta_H}{C} &\geq \frac{(1-\pi)(1-z)}{\pi z}
\end{aligned}$$

- Note that this implies that probability of revolt is increasing in both π and z, through Bayes rule

Participation



Participation



Communication

- Suppose each agent can see 1 other randomly chosen agent's type. What happens?
- Changes updating through Bayes rule about probability of High state.
- If an H agent sees another H agent, then probability of High state (through Bayes rule) is

$$\frac{\pi z^2}{\pi z^2 + (1-\pi)(1-z)^2}$$

- If an H agents sees a low agent, then probability of High state is

$$\frac{\pi z(1-z)}{\pi z(1-z) + (1-\pi)z(1-z) = \pi}$$

Communication

- So now two cases to consider:
  - High type will show up if they see a low type if

$$\pi\theta_H \geq (1-\pi)C$$

    Note this is more demanding condition than before, since you are less optimistic about high state than if you'd never seen a signal.
  - High type will show up if they only see a low type if both previous condition (with new Bayes rule)

$$\theta_H Pr(HighState) \geq C(1 - Pr(HighState))$$

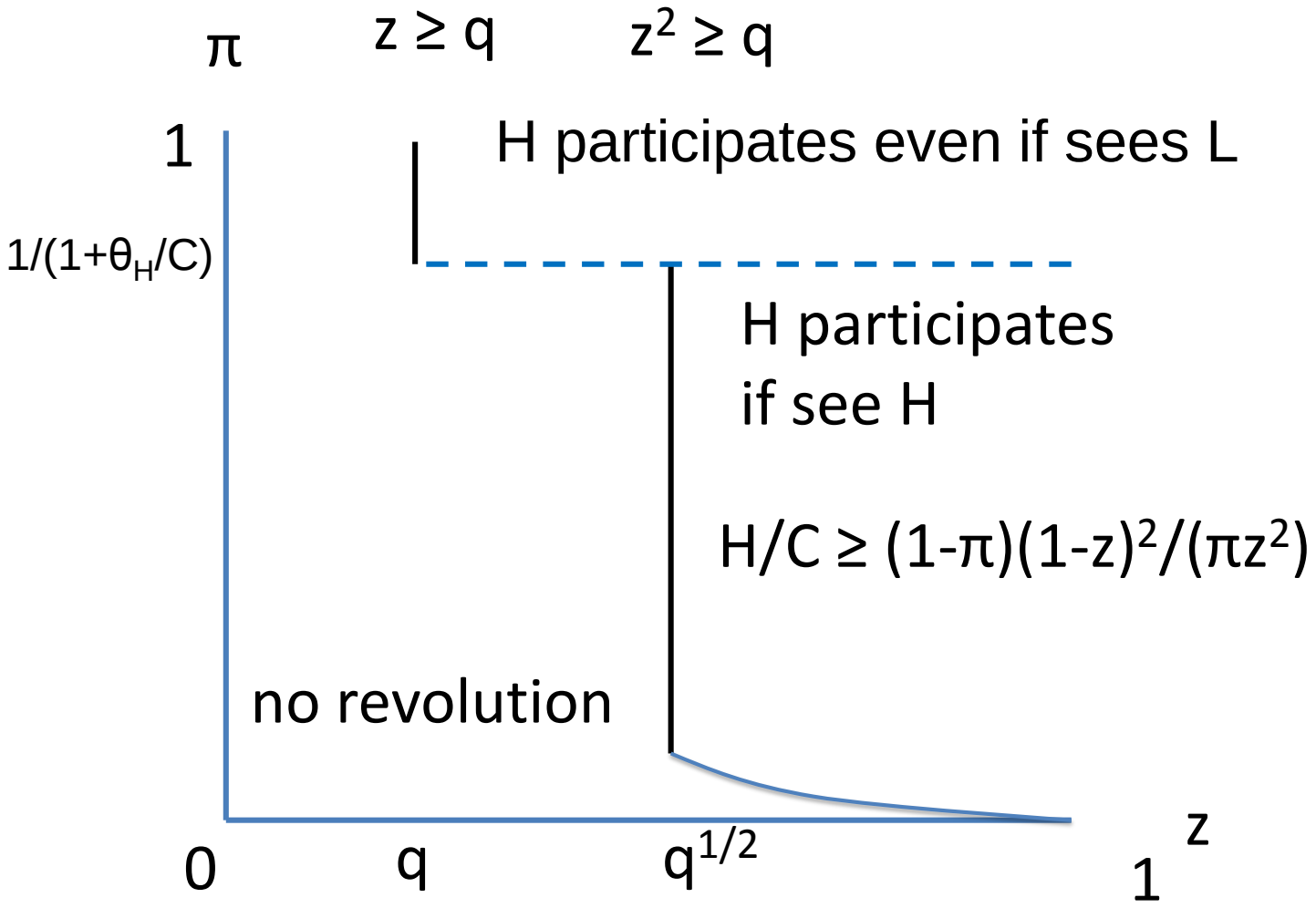
$$\theta_H \frac{\pi z^2}{\pi z^2 + (1-\pi)(1-z)^2} \geq (1 - \frac{\pi z^2}{\pi z^2 + (1-\pi)(1-z)^2})$$

$$\frac{\theta_H}{C} \geq \frac{(1-\pi)(1-z)^2}{\pi z^2}$$

    and there are enough other H types who see other H for revolution to work, i.e.

$$z^2 \geq q$$

Equilibrium



Effect of information

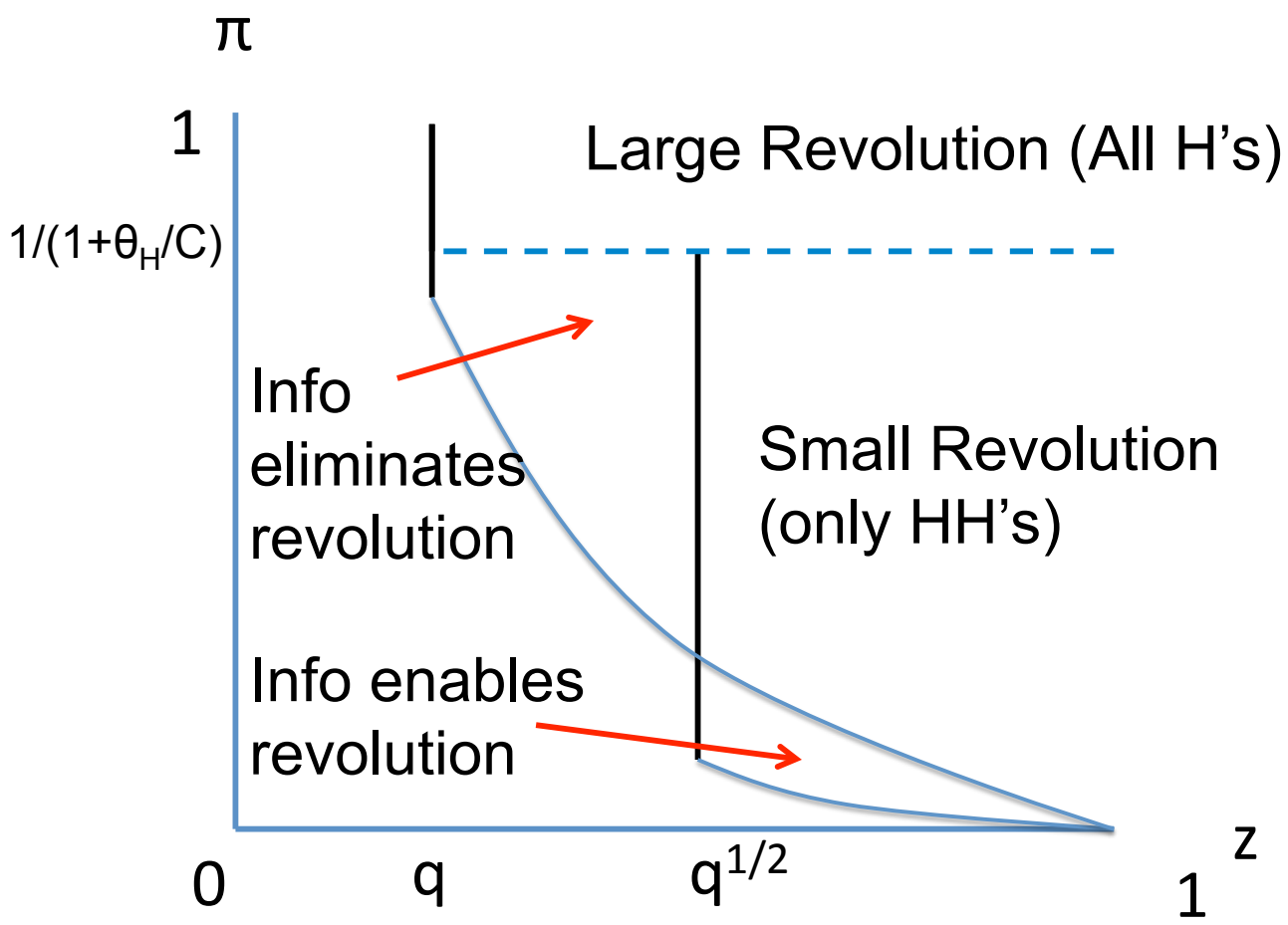


Figure 6: Sometimes information aids the revolution and other times it blocks it

types are ex ante worse off and the L types are better off. This happens if $z^2 < q < z$ while (2) holds.

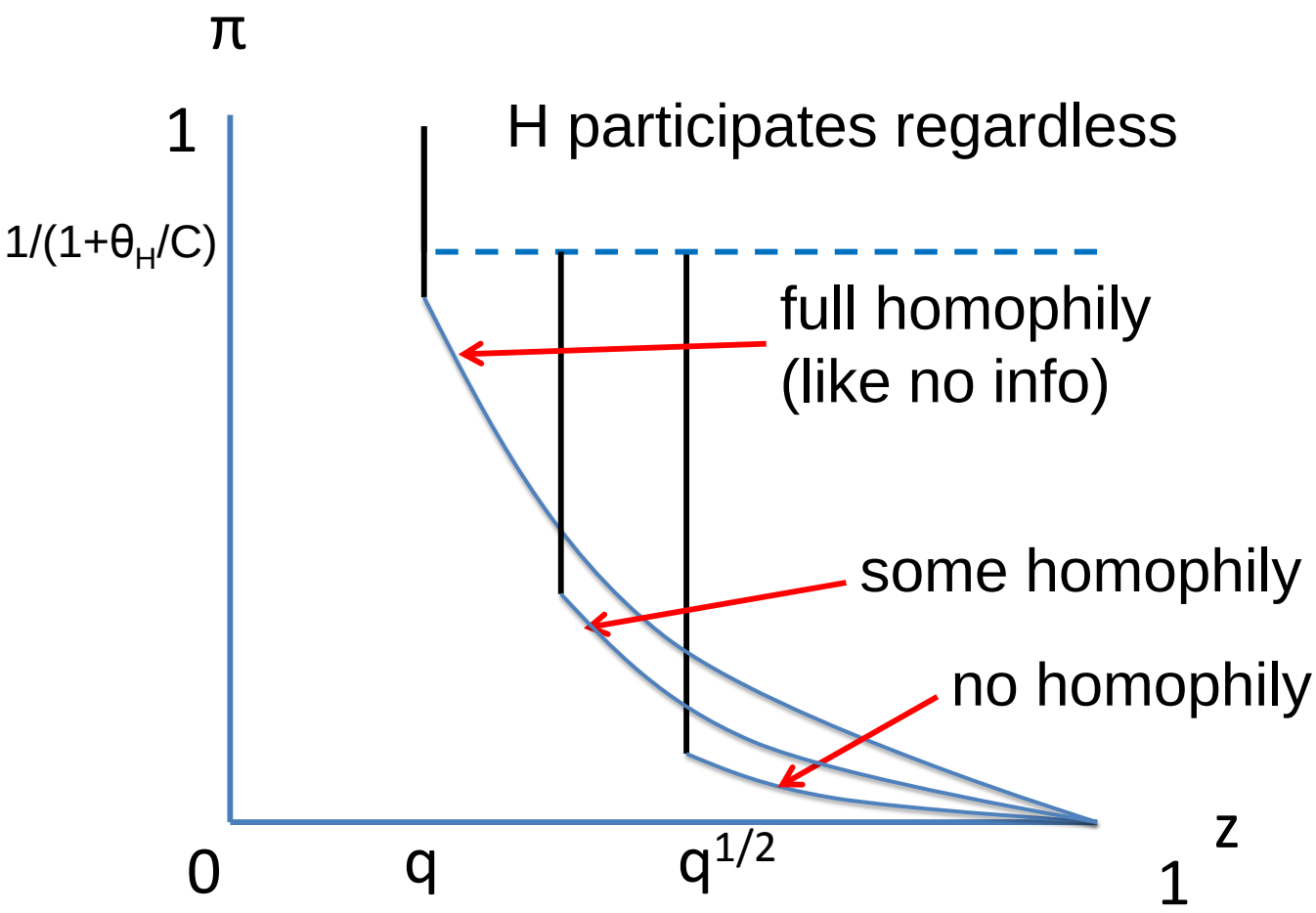
Effect of information

- Key point: information doesn't necessarily always facilitate revolution
- Why?
- There is now a region where H types would have shown up before, but now, will only show up if they see another H type. So you get a "smaller" revolution than before (only the HH participate. Only an equilibrium if $z^2 > q$.
- On the other hand, when π is low, there's a region where the information value of the signal helps a lot relative to what you would had from Bayes rule with no signals

Social media

- To extent to social media, now suppose that there is some correlation in matching.
- That is, suppose a fraction $h \in [0, 1]$ of matches that would have been cross-type are always same type. So $h = 0$ is random and $h = 1$ is perfect homophily.
- This changes the Bayes rule since you now have to account for h in your updating.
- Equilibrium is now somewhere in between the two models.

Effect of homophily



What about in practice?

Enikolopov et al 2016: Social Media and Protest Participation: Evidence from Russia

- Does this matter? Lots of interest in role of social networks in faciltiating protests, esp. vis-a-vis Arab spring
- Enikolopov et al look at this in context of Russia, looking at VK (Russian social network)
- Empirical idea: VK was launched by Pavel Durov in 2006, and started by inviting his classmates to participate. Network is largest in these cities.
- They show that there are more protests in 2011 in cities with more classmates of Durov.
- They control for average number of students from various cities studying at same university in other cohorts.

First stage

Table 1. Determinants of VK penetration in 2011 (first stage regression).

	Log (number of VK users), Aug 2011						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log (SPbSU students), same 5-year cohort as VK founder	0.4847***	0.1581***	0.1416***	0.1322***	0.1393***	0.1371***	0.1360***
	[0.1443]	[0.0425]	[0.0466]	[0.0489]	[0.0482]	[0.0463]	[0.0488]
Log (SPbSU students), one cohort younger than VK founder	0.5741***	-0.0292	-0.0259	-0.0452	-0.0433	-0.0464	-0.0457
	[0.1064]	[0.0552]	[0.0463]	[0.0461]	[0.0468]	[0.0472]	[0.0474]
Log (SPbSU students), one cohort older than VK founder	0.3101	0.0250	0.0058	0.0161	0.0175	0.0137	0.0142
	[0.1866]	[0.0523]	[0.0472]	[0.0468]	[0.0467]	[0.0445]	[0.0454]
Regional center		0.2952***	0.3932***	0.3015*	0.2563*	0.3008*	0.3026*
		[0.0899]	[0.1268]	[0.1583]	[0.1526]	[0.1539]	[0.1523]
Distance to Saint Petersburg, km			0.0002	0.0001	0.0001	0.0002	0.0000
			[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Distance to Moscow, km			-0.0002	-0.0002	-0.0002	-0.0003	-0.0001
			[0.0001]	[0.0001]	[0.0001]	[0.0002]	[0.0001]
Rayon center (county seat)			0.0045	-0.0142	-0.0134	-0.0056	-0.0155
			[0.0916]	[0.0873]	[0.0869]	[0.0906]	[0.0843]
Log (average wage), city-level, 2011			0.1688	0.2108	0.1977	0.1756	0.1386
			[0.1573]	[0.1637]	[0.1686]	[0.1691]	[0.1571]
Presence of a university in a city, 2011				-0.0224	-0.0087	-0.0348	-0.0056
				[0.1496]	[0.1468]	[0.1478]	[0.1441]
Internet penetration, region-level, 2011				-0.1190	-0.1572	-0.0677	-0.0875
				[0.2304]	[0.2144]	[0.2272]	[0.2254]
Log (number of Odnoklassniki users), 2014				0.1475*	0.1391*	0.1322	0.1706**
				[0.0798]	[0.0806]	[0.0801]	[0.0793]
Ethnic fractionalization, 2010				0.4041*	0.4872**	0.5660***	0.4599**
				[0.2149]	[0.2073]	[0.2016]	[0.2197]
Observations	625	625	625	625	625	625	625
R-squared	0.4031	0.8263	0.8486	0.8517	0.8546	0.8550	0.8540
Population controls		Yes***	Yes***	Yes***	Yes**	Yes***	Yes***
Age cohort controls			Yes**	Yes**	Yes***	Yes**	Yes**
Education controls			Yes***	Yes***	Yes***	Yes***	Yes***
Electoral controls, 1995					Yes		
Electoral controls, 1999						Yes*	
Electoral controls, 2003							Yes
p-value for equlity of coefficients for three cohorts	0.555	0.045**	0.059*	0.057*	0.048**	0.051*	0.047**
p-value for equlity of coefficients of Durov's and younger cohort	0.679	0.019**	0.021**	0.017**	0.015**	0.016**	0.014**
p-value for equlity of coefficients of Durov's and older cohort	0.458	0.054*	0.049**	0.088*	0.072*	0.069*	0.072*

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are adjusted by clusters within regions. Unit of observation is a city. Logarithm of any variable is calculated with 1 added inside. When "Yes" is added to indiciate inclusion of a group of controls, a significance level is reported immediately after for this group of controls. Flexible controls for population (5th polynomial) are included in all specifications. Age cohort controls include the number of people aged 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50 and older years, in each city according to 2010 Russian Census. Education controls include the share of population with higher education overall according to 2002 Russian Census and separately in each of the age cohorts according to 2010 Russian Census, to account for both the levels and the change in education. Electoral controls include vote for Yabloko party, Communist Party (KPRF), LDPR party, the ruling party (Our Home is Russia in 1995, Unity in 1999, United Russia in 2003), vote against all, and electoral turnout for a corresponding year.

Reduced form

Table 2. Student cohorts and protest participation in 2011. Reduced form estimation.

	Log (number of protesters), Dec 2011				Incidence of protests, dummy, Dec 2011			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (SPbSU students), same 5-year cohort as VK founder	0.253**	0.259**	0.263**	0.274**	0.062***	0.062***	0.064***	0.065***
	[0.114]	[0.114]	[0.115]	[0.116]	[0.020]	[0.020]	[0.020]	[0.021]
Log (SPbSU students), one cohort younger than VK founder	0.152	0.150	0.137	0.160	0.012	0.011	0.009	0.012
	[0.105]	[0.105]	[0.105]	[0.106]	[0.020]	[0.020]	[0.020]	[0.020]
Log (SPbSU students), one cohort older than VK founder	-0.075	-0.072	-0.082	-0.068	-0.017	-0.016	-0.018	-0.015
	[0.113]	[0.113]	[0.112]	[0.113]	[0.020]	[0.020]	[0.020]	[0.020]
Regional center	0.287	0.288	0.318	0.292	-0.015	-0.013	-0.009	-0.014
	[0.488]	[0.480]	[0.480]	[0.487]	[0.099]	[0.097]	[0.096]	[0.098]
Distance to Saint Petersburg, km	-0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Distance to Moscow, km	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Rayon center (county seat)	0.003	0.005	-0.029	-0.051	-0.001	0.001	-0.007	-0.011
	[0.044]	[0.046]	[0.048]	[0.054]	[0.009]	[0.009]	[0.010]	[0.011]
Log (average wage), city-level, 2011	0.100	0.147	0.001	-0.068	0.021	0.039	0.007	-0.014
	[0.176]	[0.190]	[0.193]	[0.184]	[0.034]	[0.037]	[0.036]	[0.034]
Presence of a university in a city, 2011	0.870**	0.876**	0.860**	0.898**	0.196**	0.195**	0.195**	0.200**
	[0.423]	[0.423]	[0.422]	[0.426]	[0.098]	[0.098]	[0.097]	[0.097]
Internet penetration, region-level, 2011	0.138	0.181	0.175	0.149	-0.013	0.005	-0.003	-0.007
	[0.243]	[0.240]	[0.280]	[0.257]	[0.045]	[0.045]	[0.054]	[0.048]
Log (number of Odnoklassniki users), 2014	0.104	0.081	0.157	0.133	0.032*	0.024	0.041*	0.034*
	[0.109]	[0.120]	[0.123]	[0.119]	[0.017]	[0.019]	[0.021]	[0.019]
Ethnic fractionalization, 2010	-0.580*	-0.516	-0.468	-0.506	-0.089	-0.081	-0.071	-0.067
	[0.321]	[0.335]	[0.337]	[0.343]	[0.059]	[0.061]	[0.062]	[0.062]
Observations	625	625	625	625	625	625	625	625
R-squared	0.823	0.826	0.828	0.826	0.776	0.780	0.781	0.781
Population controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Age cohort controls	Yes*	Yes**	Yes**	Yes**	Yes**	Yes***	Yes***	Yes***
Education controls	Yes*	Yes**	Yes**	Yes**	Yes*	Yes*	Yes*	Yes*
Electoral controls, 1995		Yes**				Yes**		
Electoral controls, 1999			Yes**				Yes*	
Electoral controls, 2003				Yes*				Yes***
p-value for equlity of coefficients for three cohorts	0.271	0.271	0.250	0.247	0.078*	0.071*	0.058*	0.069*
p-value for equlity of coefficients of Durov's and younger cohort	0.528	0.489	0.430	0.487	0.089*	0.073*	0.067*	0.079*
p-value for equlity of coefficients of Durov's and older cohort	0.115	0.111	0.099*	0.102	0.031**	0.032**	0.025**	0.028**

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are adjusted by clusters within regions. Unit of observation is a city. Logarithm of any variable is calculated with 1 added inside. When "Yes" is added to indiciate inclusion of a group of controls, a significance level is reported immediately after for this group of controls. Flexible controls for population (5th polynomial) are included in all specifications. Age cohort controls include the number of people aged 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50 and older years, in each city according to 2010 Russian Census. Education controls include the share of population with higher education overall according to 2002 Russian Census and separately in each of the age cohorts according to 2010 Russian Census, to account for both the levels and the change in education. Electoral controls include vote for Yabloko party, Communist Party (KPRF), LDPR party, the ruling party (Our Home is Russia in 1995, Unity in 1999, United Russia in 2003), vote against all, and electoral turnout for a corresponding year.

Table 3. VK penetration and protest participation in 2011.

Panel A. Number of protesters

	Log (number of protesters), Dec 2011							
	IV	IV	IV	IV	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (number of VK users), Aug 2011	1.912**	1.863**	1.920**	2.015**	0.228***	0.216***	0.216***	0.227***
	[0.900]	[0.862]	[0.886]	[0.906]	[0.072]	[0.072]	[0.074]	[0.076]
Log (SPbSU students), one cohort younger than VK founder	0.238*	0.231*	0.227*	0.252*	0.224**	0.224**	0.211*	0.236**
	[0.124]	[0.125]	[0.125]	[0.131]	[0.107]	[0.109]	[0.108]	[0.108]
Log (SPbSU students), one cohort older than VK founder	-0.106	-0.105	-0.108	-0.097	0.013	0.019	0.011	0.027
	[0.143]	[0.143]	[0.136]	[0.144]	[0.092]	[0.091]	[0.089]	[0.092]
Population controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Age cohort controls	Yes	Yes	Yes	Yes	Yes*	Yes*	Yes**	Yes**
Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Electoral controls, 1995		Yes				Yes		
Electoral controls, 1999			Yes				Yes	
Electoral controls, 2003				Yes*				Yes**
Observations	625	625	625	625	625	625	625	625
Effective F-statistics (Olea Montiel and Pflueger 2013)	276.8	274	274	274				

Panel B. Probability of protests

	Incidence of protests, dummy, Dec 2011							
	IV	IV	IV	IV	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (number of VK users), Aug 2011	0.466***	0.446***	0.464***	0.481***	0.039***	0.037***	0.037***	0.039***
	[0.180]	[0.169]	[0.174]	[0.181]	[0.013]	[0.013]	[0.013]	[0.014]
Log (SPbSU students), one cohort younger than VK founder	0.033	0.030	0.031	0.034	0.029	0.029	0.027	0.031
	[0.025]	[0.026]	[0.026]	[0.027]	[0.020]	[0.021]	[0.021]	[0.020]
Log (SPbSU students), one cohort older than VK founder	-0.024	-0.023	-0.025	-0.021	0.006	0.007	0.005	0.009
	[0.029]	[0.029]	[0.028]	[0.030]	[0.017]	[0.017]	[0.017]	[0.018]
Population controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Age cohort controls	Yes	Yes	Yes	Yes	Yes**	Yes**	Yes**	Yes**
Education controls	Yes	Yes	Yes*	Yes	Yes	Yes	Yes	Yes
Other controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Electoral controls, 1995		Yes				Yes**		
Electoral controls, 1999			Yes				Yes	
Electoral controls, 2003				Yes				Yes**
Observations	625	625	625	625	625	625	625	625
Effective F-stat (Montiel Olea and Pflueger 2013)	276.8	274	274	274				

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are adjusted by clusters within regions. Unit of observation is a city. Logarithm of any variable is calculated with 1 added inside. When "Yes" is added to indiciate inclusion of a group of controls, a significance level is reported immediately after for this group of controls. Flexible controls for population (5th polynomial) are included in all specifications. Age cohort controls include the number of people aged 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50 and older years, in each city according to 2010 Russian Census. Education controls include the share of population with higher education overall according to 2002 Russian Census and separately in each of the age cohorts according to 2010 Russian Census, to account for both the levels and the change in education. Electoral controls include vote for Yabloko party, Communist Party (KPRF), LDPR party, the ruling party (Our Home is Russia in 1995, Unity in 1999, United Russia in 2003), vote against all, and electoral turnout for a corresponding year. Other controls include dummy for regional and county centers, distances to Moscow and St Peterburg, log (average wage), share of people with higher education in 2002, internet penetration in 2011, log (Odnoklassniki users in 2014).

Table 4. VK Penetration and pre-VK Protests.

Panel A. Participation in earlier protests								
	Log (number of protesters), 1987-1992				Log (pro-democracy protesters), 1987-1992			
Log (number of VK users), Aug 2011	0.534	0.427	0.284	0.493	0.144	-0.011	0.017	0.141
	[1.883]	[1.943]	[1.839]	[1.927]	[1.495]	[1.510]	[1.491]	[1.573]
P-value for equality of coefficients with that in Table 4	0.492	0.488	0.413	0.463	0.295	0.277	0.265	0.288
	Log (participants in labor protests), 1997-2002				Log (participants in social protests), 2005			
Log (number of VK users), Aug 2011	-0.562	-0.537	-1.380	-0.497	-0.313	-0.292	-0.075	-0.042
	[1.877]	[1.716]	[1.831]	[1.962]	[1.632]	[1.497]	[1.569]	[1.600]
P-value for equality of coefficients with that in Table 4	0.216	0.193	0.094*	0.220	0.273	0.256	0.314	0.304
Panel B. Incidence of earlier protests								
	Incidence of protests, 1987-1992				Incidence of pro-democracy protests, 1987-1992			
Log (number of VK users), Aug 2011	0.009	0.007	-0.015	0.024	-0.011	-0.020	-0.023	0.004
	[0.281]	[0.282]	[0.267]	[0.281]	[0.195]	[0.195]	[0.191]	[0.198]
P-value for equality of coefficient with that in Table 5	0.194	0.202	0.155	0.197	0.090*	0.092*	0.078*	0.091*
	Incidence of labor protests, 1997-2002				Incidence of social protests, 2005			
Log (number of VK users), Aug 2011	-0.070	-0.060	-0.172	-0.036	-0.057	-0.055	-0.022	-0.019
	[0.243]	[0.219]	[0.238]	[0.256]	[0.239]	[0.221]	[0.230]	[0.235]
P-value for equality of coefficient with that in Table 5	0.056*	0.047**	0.021**	0.065*	0.105	0.099*	0.123	0.117
Population, Age cohorts, Education, and Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electoral controls, 1995		Yes				Yes		
Electoral controls, 1999			Yes				Yes	
Electoral controls, 2003				Yes				Yes
Observations	625	625	625	625	625	625	625	625

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are adjusted by clusters within regions. Unit of observation is a city. Logarithm of any variable is calculated with 1 added inside. "Yes" indiciates inclusion of a corresponding group of controls. Significance level is NOT reported after each group of controls for the purpose of brevity. Flexible controls for population (5th polynomial) are included in all specifications. Age cohort controls include the number of people aged 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50 and older years, in each city according to 2010 Russian Census. Education controls include the share of population with higher education overall according to 2002 Russian Census and separately in each of the age cohorts according to 2010 Russian Census, to account for both the levels and the change in education. Electoral controls include vote for Yabloko party, Communist Party (KPRF), LDPR party, the ruling party (Our Home is Russia in 1995, Unity in 1999, United Russia in 2003), vote against all, and electoral turnout for a corresponding year. Other controls include dummy for regional and county centers , distances to Moscow and St Peterburg, log (average wage), share of people with higher education in 2002, internet penetration in 2011, log (Odnoklassniki users in 2014). P-values for equality of coefficients are calculated relative to a corresponding coefficient in columns (1)-(4) of Tables 4 and 5, using a 3sls framework.

Table 6. VK penetration and Voting Outcomes.

	Voting share for United Russia, 2007				Voting share for United Russia, 2011			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (number of VK users), Aug 2011	0.035	0.019	0.045	0.003	0.230*	0.179*	0.230*	0.182*
	[0.050]	[0.041]	[0.046]	[0.037]	[0.128]	[0.099]	[0.118]	[0.104]
Log (SPbSU students), one cohort younger than VK founder	-0.007	-0.004	-0.006	-0.007	-0.002	0.002	-0.001	0.000
	[0.009]	[0.008]	[0.008]	[0.007]	[0.017]	[0.014]	[0.016]	[0.013]
Log (SPbSU students), one cohort older than VK founder	0.002	0.001	-0.000	-0.003	0.004	0.006	0.001	-0.002
	[0.008]	[0.007]	[0.008]	[0.006]	[0.017]	[0.013]	[0.015]	[0.013]
Population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort controls	Yes***	Yes***	Yes***	Yes**	Yes	Yes	Yes	Yes
Education controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Other controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Electoral controls, 1995		Yes***				Yes***		
Electoral controls, 1999			Yes***				Yes***	
Electoral controls, 2003				Yes***				Yes***
Observations	625	625	625	625	625	625	625	625
Effective F-statistics (Olea Montiel and Pflueger 2013)	276.8	274	274	274	276.8	274	274	274

	Voting share for Medvedev, 2008				Voting Share for Putin, 2012			
Log (number of VK users), Aug 2011	0.125*	0.115*	0.137**	0.098*	0.127*	0.111*	0.127*	0.096
	[0.071]	[0.062]	[0.067]	[0.054]	[0.073]	[0.065]	[0.067]	[0.058]
Log (SPbSU students), one cohort younger than VK founder	-0.005	-0.003	-0.005	-0.004	0.002	0.003	0.003	0.002
	[0.011]	[0.009]	[0.010]	[0.008]	[0.011]	[0.010]	[0.010]	[0.008]
Log (SPbSU students), one cohort older than VK founder	0.001	-0.000	-0.003	-0.003	0.008	0.007	0.005	0.003
	[0.009]	[0.008]	[0.009]	[0.007]	[0.011]	[0.010]	[0.010]	[0.009]
Population controls	Yes	Yes	Yes*	Yes**	Yes	Yes	Yes*	Yes*
Age cohort controls	Yes**	Yes*	Yes**	Yes	Yes	Yes	Yes	Yes
Education controls	Yes	Yes	Yes	Yes	Yes***	Yes***	Yes***	Yes***
Other controls	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Electoral controls, 1995		Yes***				Yes***		
Electoral controls, 1999			Yes***				Yes***	
Electoral controls, 2003				Yes***				Yes***
Observations	625	625	625	625	625	625	625	625
Effective F-statistics (Olea Montiel and Pflueger 2013)	276.8	274	274	274	276.8	274	274	274

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are adjusted by clusters within regions. Unit of observation is a city. Logarithm of any variable is calculated with 1 added inside. When "Yes" is added to indiciate inclusion of a group of controls, a significance level is reported immediately after for this group of controls. Flexible controls for population (5th polynomial) are included in all specifications. Age cohort controls include the number of people aged 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50 and older years, in each city according to 2010 Russian Census. Education controls include the share of population with higher education overall according to 2002 Russian Census and separately in each of the age cohorts according to 2010 Russian Census, to account for both the levels and the change in education. Electoral controls include vote for Yabloko party, Communist Party (KPRF), LDPR party, the ruling party (Our Home is Russia in 1995, Unity in 1999, United Russia in 2003), vote against all, and electoral turnout for a corresponding year. Other controls include dummy for regional and county centers, distances to Moscow and St Peterburg, log (average wage), share of people with higher education in 2002, internet penetration in 2011, log (Odnoklassniki users in 2014).

Summing up...

- Media can have important roles in policy
  - Through accountability channel
  - And as a coordination device.

14.770 Introduction to Political Economy

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