# The Spatial Model of Voting: Theory and Empirics

CSLS Empirical Methods Workshop

November 16, 2012

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Misconceptions

Kevin M. Quinn UC Berkeley

### **Overview**

# very basic introduction to theoretical ideas behind spatial models of voting

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

### **Overview**

- very basic introduction to theoretical ideas behind spatial models of voting
- very basic introduction to attempts to estimate parameters of spatial models

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper

Editorial Boards

### **Overview**

- very basic introduction to theoretical ideas behind spatial models of voting
- very basic introduction to attempts to estimate parameters of spatial models
- exposure to some results from some work in this area (no claim of representativeness)

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

policy space

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

- policy space
- actors

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

- policy space
- actors
- preferences

The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

- policy space
- actors
- preferences
- behavioral assumptions (sincere vs. strategic behavior)

The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

- policy space
- actors
- preferences
- · behavioral assumptions (sincere vs. strategic behavior)
- institutions (rules of the game)

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

The key ingredients:

- policy space
- actors
- preferences
- · behavioral assumptions (sincere vs. strategic behavior)
- institutions (rules of the game)
- information (important but we will ignore this today)

The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

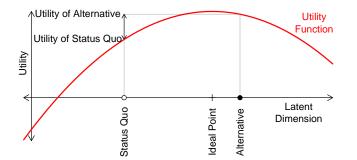
Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme

Court Example: Newspaper

Editorial Boards



#### The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

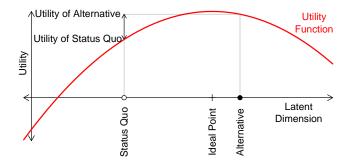
The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards



Additional examples on board.

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

#### Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

# **Candidate Competition**

### In class example

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

# Assume an odd number of voters and a uni-dimensional policy space.

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

Assume an odd number of voters and a uni-dimensional policy space.

Voters have single-peaked preferences.

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme

Court

Example: Newspaper Editorial Boards

Assume an odd number of voters and a uni-dimensional policy space.

Voters have single-peaked preferences.

The policy position corresponding to the median voter's ideal point is a stable outcome in that it defeats all alternatives in a binary majority rule vote.

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Assume an odd number of voters and a uni-dimensional policy space.

Voters have single-peaked preferences.

The policy position corresponding to the median voter's ideal point is a stable outcome in that it defeats all alternatives in a binary majority rule vote.

NB: The uni-dimensional policy space is very important for this result.

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

### **Statutory Interpretation**

The following is based on Ferejohn and Weingast. 1992. "A Positive Theory of Statutory Interpretation." *International Review of Law and Economics*.

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background

Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

# **Statutory Interpretation**

Three interpretative stances a court might take:

- Naive textualist. A naive textualist (NT) interprets the legislation as close as possible to that as desired by the enacting legislature. We call this "naive" because such a court does not take into account the political consequences of its decisions, i.e., whether its interpretations are politically viable.
- (2) Politically sophisticated honest agent. A politically sophisticated honest agent of the enacting legislature (SA) decides a case so as to gain a policy outcome as close as possible to that desired by the enacting legislature. Sophisticated agents take into account current political circumstances and hence whether their interpretations are politically viable.
- (3) Unconstrained policy advocate. An unconstrained policy advocate (UPA) is a court with well-defined preferences over policy that attempts to impose its own preferences. We assume that an unconstrained court is politically sophisticated (as opposed to naive) and takes into account whether its interpretations are politically viable.<sup>11</sup>

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper

Editorial Boards

### **Empirics**

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem

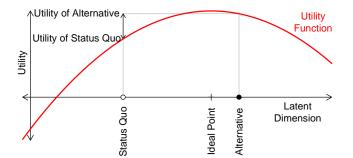
Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The Spatial Theory of Voting



#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Let *i* index votes and *j* index voters

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory

#### Interpretation Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Let *i* index votes and *j* index voters

 $x_i^{(o)}$ : status quo point  $x_i^{(a)}$ : alternative point  $\theta_j$ : *j*'s most preferred policy The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Let *i* index votes and *j* index voters

 $x_i^{(o)}$ : status quo point  $x_i^{(a)}$ : alternative point  $\theta_j$ : *j*'s most preferred policy

Random utility of  $x_i^{(o)}$  for j:  $u_{ij}^{(o)} = -|\theta_j - x_i^{(o)}|^2 + \delta_{ij}^{(o)}$ 

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Let *i* index votes and *j* index voters

 $x_i^{(o)}$ : status quo point  $x_i^{(a)}$ : alternative point  $\theta_j$ : *j*'s most preferred policy

Random utility of  $x_i^{(o)}$  for *j*:  $u_{ij}^{(o)} = -|\theta_j - x_i^{(o)}|^2 + \delta_{ij}^{(o)}$ 

Random utility of  $x_i^{(a)}$  for j:  $u_{ij}^{(a)} = -|\theta_j - x_i^{(a)}|^2 + \delta_{ij}^{(a)}$ 

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Let *i* index votes and *j* index voters

 $x_i^{(o)}$ : status quo point  $x_i^{(a)}$ : alternative point  $\theta_j$ : *j*'s most preferred policy

Random utility of  $x_i^{(o)}$  for *j*:  $u_{ij}^{(o)} = -|\theta_j - x_i^{(o)}|^2 + \delta_{ij}^{(o)}$ Random utility of  $x_i^{(a)}$  for *j*:  $u_{ij}^{(a)} = -|\theta_j - x_i^{(a)}|^2 + \delta_{ij}^{(a)}$ Utility difference:

$$y_{ij}^{*} = u_{ij}^{(o)} - u_{ij}^{(a)}$$
  
=  $[x_{i}^{(a)}x_{i}^{(a)} - x_{i}^{(o)}x_{i}^{(o)}] + 2[x_{i}^{(o)} - x_{i}^{(a)}]\theta_{j} + [\delta_{ij}^{(o)} - \delta_{ij}^{(a)}]$   
=  $\alpha_{i} + \beta_{i}\theta_{j} + \epsilon_{ij}$   
with  $\epsilon_{ij} \sim \mathcal{N}(0, 1)$ 

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Let *i* index votes and *j* index voters

 $x_i^{(o)}$ : status quo point  $x_i^{(a)}$ : alternative point  $\theta_j$ : *j*'s most preferred policy

Random utility of  $x_i^{(o)}$  for *j*:  $u_{ij}^{(o)} = -|\theta_j - x_i^{(o)}|^2 + \delta_{ij}^{(o)}$ Random utility of  $x_i^{(a)}$  for *j*:  $u_{ij}^{(a)} = -|\theta_j - x_i^{(a)}|^2 + \delta_{ij}^{(a)}$ Utility difference:

$$y_{ij}^{*} = u_{ij}^{(o)} - u_{ij}^{(a)}$$
  
=  $[x_{i}^{(a)}x_{i}^{(a)} - x_{i}^{(o)}x_{i}^{(o)}] + 2[x_{i}^{(o)} - x_{i}^{(a)}]\theta_{j} + [\delta_{ij}^{(o)} - \delta_{ij}^{(a)}]$   
=  $\alpha_{i} + \beta_{i}\theta_{j} + \epsilon_{ij}$ 

with  $\epsilon_{ij} \sim \mathcal{N}(0, 1)$ 

If  $y_{ij} = 1$  is a vote for the status quo:

 $\Pr(y_{ij} = 1 | \alpha_i, \beta_i, \theta_j) = \Pr(y_{ij}^* > 0 | \alpha_i, \beta_i, \theta_j) = \Phi(\alpha_i + \beta_i \theta_j)$ 

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

The likelihood function is proportional to:

$$\boldsymbol{\rho}(\mathbf{y}|\boldsymbol{\alpha},\boldsymbol{\beta},\boldsymbol{\theta}) = \prod_{i=1}^{n} \prod_{j=1}^{m} \Phi(\alpha_{i} + \beta_{i}\theta_{j})^{y_{ij}} \left[1 - \Phi(\alpha_{i} + \beta_{i}\theta_{j})\right]^{1-y_{ij}}$$

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

The likelihood function is proportional to:

$$p(\mathbf{y}|\alpha,\beta,\theta) = \prod_{i=1}^{n} \prod_{j=1}^{m} \Phi(\alpha_{i} + \beta_{i}\theta_{j})^{y_{ij}} \left[1 - \Phi(\alpha_{i} + \beta_{i}\theta_{j})\right]^{1-y_{ij}}$$

Identification issues

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

The likelihood function is proportional to:

$$p(\mathbf{y}|\alpha,\beta,\theta) = \prod_{i=1}^{n} \prod_{j=1}^{m} \Phi(\alpha_{i} + \beta_{i}\theta_{j})^{y_{ij}} \left[1 - \Phi(\alpha_{i} + \beta_{i}\theta_{j})\right]^{1-y_{ij}}$$

Identification issues

Coding of y

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Cutpoints / Cutlines:

The point of indifference between the status quo and alternative is the point where the probability of choosing either one is 0.5 or equivalently where  $\alpha_i + \beta_i \theta^* = 0$ .

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Cutpoints / Cutlines:

The point of indifference between the status quo and alternative is the point where the probability of choosing either one is 0.5 or equivalently where  $\alpha_i + \beta_i \theta^* = 0$ .

Elementary algebra reveals that the cutpoint for vote *i* is

$$\theta^* = -\alpha_i / \beta_i$$

The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Interpretation

 $\alpha_i$ : related to baseline propensity to see a y = 1 on vote *i* 

 $\beta_i$ : sign determines whether y = 1 is a "left" or "right" vote, absolute value related to strength of association between latent  $\theta$  and observed votes on *i* 

 $\theta_j$ : latent ideal point for voter j

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Interpretation

 $\alpha_i$ : related to baseline propensity to see a y = 1 on vote *i* 

 $\beta_i$ : sign determines whether y = 1 is a "left" or "right" vote, absolute value related to strength of association between latent  $\theta$  and observed votes on *i* 

 $\theta_j$ : latent ideal point for voter j

#### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

#### The Spatial Model of Voting: Theory and Empirics



Example: Candidate Competition

The Median Voter Theorem

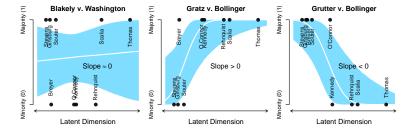
Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards



# The Spatial Model as an Empirical Model

### The Spatial Model of Voting: Theory and Empirics



Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

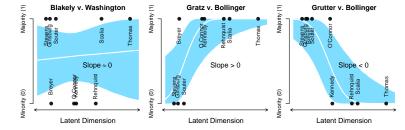
### Empirics

The Spatial Model as an Empirical Model Example: The US Congress

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Misconceptions



Relationship to IRT models for standardized tests

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

Misconceptions

# How might this work?

### Figure 1 Point Estimates and 95% Confidence Intervals using 62 National Journal Key Votes

														Background
-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3	Example: Candidate
L														Competition
			🕂 Chaf						Mc	Connell (R-KY Allen (R-VA	i ———	*	_	The Median Voter Theorem
			+ Nels	on (D-NE)						Thorn	as (R-WY) -	<u> </u>		
			<ul> <li>Breaux</li> <li>Bayh (D-</li> </ul>	ID-LAJ						Sessio	ons (R-AL) =	*		Example: Statutory
			Baucus I								igar (R-IN) =			Interpretation
			+ Lincoln (							Ha	tch (R-UT) -	<u> </u>		
			<ul> <li>Jeffords</li> <li>Carper ID</li> </ul>	II-VII I-DEI							sley (R–IA) 🗕 nyn (R–TX) 🗕			Empirics
			<ul> <li>Landrieu</li> </ul>	(D-LA)							an (R-MS) =			The Spatial Model as an
			<ul> <li>Conrad (D</li> <li>Pryor (D-)</li> </ul>	I-ND) MR1						Bunn Burns (R-MT)	ing (R-KY) -	*	_	Empirical Model
			- LIERBER							ennett (R-UT)		<u> </u>		p
			- Feinstein							Frist (R-TN)		_		Example: The US Congress
			<ul> <li>Nelson (D-</li> </ul>							kles (R-OK)		_		Example: The US Supreme
			<ul> <li>Inouye (D-I</li> <li>Dorgan (D-I</li> </ul>	11) ND1					Alexa	nder (R-TN) 🔸 nici (R-NM) 🗕	_ č	-		Court
			Reid [D-NV]							Crapo (R-ID)	<u> </u>			
		-	<ul> <li>Biden (D–DE</li> </ul>	1					-	Craig (R-ID)	<b></b>			Example: Newspaper
		_	<ul> <li>Bingaman (</li> <li>Kohl (D–WI)</li> </ul>	U-NMJ						ond (R-MO) =	<u>_</u>			Editorial Boards
			Schumer (D-	-NYI						ofe (R-OK) -	Ť			Misconceptions
			<ul> <li>Cantwell (D-</li> </ul>	-WAJ						Kyl (R-AZ) -	_ <b>ě</b>			Misconceptions
		-	Hollings (D-: Rockefeller	SC]						.ott [R-MS] -	<u> </u>			
			Dodd (D-CT)	(U-WV)						ler (D-GA)	-			
		<b>_</b>	GRAHAM (D-	FL)						ole (R-NC) -	- <b>ě</b>			
			Akaka (D-HI)							ard [R-C0] -	<u> </u>			
		-	Byrd (D–WV) Murray (D–W/							ich (R-0H) 🗕 rts (R-KS) 🗕	*			
			Leahy (D-VT)							ck (R-KS) -	ě.			
		_ <b>ě</b> _	Daschle (D-SI	)					DeWi	ne (R-OH) 🗕	-ē			
			Wyden (D-OR) Johnson (D-S							nt (R-MO) — gn (R-NV) —	<u> </u>			
			Stabenow (D-S							jel (R-NE)	<u> </u>			
		<b>_</b>	Kennedy (D-N	4A)					Warn	r (R-VA)	ě –			
	-		EDWARDS [D-	NC)					Colema	n (R-MN) -	-			
			urbin (D-IL)							n (R-TX) – C n (R-SC) – C				
		- Fi	singold (D-WI)						Fitzgera	ld (R-IL) -	<b>_</b>			
	_	- м	ikulski (D-MD	)					Greg	g (R-NH) 🗕	-			
			utenberg (D-N vton (D-MN)	U)						(R-NH) -0				
			vin (D-MI)						Shelb	y (R-OR)	-			
		Cli	nton (D-NY)						Stevens	(R-AK) -O-				
		Box	er [D-CA]							(R-AK) -				
	_	Reed (D-	kin (D-IA)						Calling	R-CO] +				
		- Sarba	nes (D-MD)						Specter (	R-PAJ 🔶				
	•	— к	ERRY (D-MA)						McCain [	R-AZI 🔶				
	- <u>-</u>	· ·												
-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3	.17

### The Spatial Model of Voting: Theory and Empirics

Theory

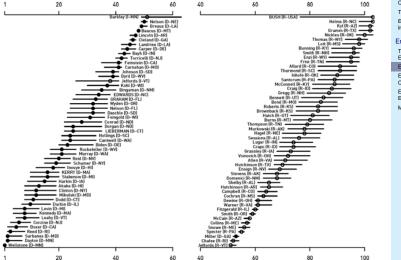
### Figure 2 Rank Ordering and 95% Confidence Intervals using 62 National Journal Key Votes

							Background
 Corrin - Ourbi Feingot - Mikutski Levin (D-M)	Constant Constan	SERNAN (D-CT) (D-CA) FU U D)	in Character Character Roberts Roberts Roberts Haget Winner (F Hone Karaner Haget Graham (R- Graham (R- Granam	Bennett (R-UT)           Final (R-TN)           Cides (R-OC)           Band (R-NH)           asander (R-NH)           asander (R-NH)           Band (R-NH)	(T) Thomas (R-WY) Sessions (R-AL) Santorum (R-PA) Lugar (R-IN) Hatch (R-UT) Grassley (R-IA) Cornyn (R-TX) Cochran (R-MS) Bunning (R-KY)	****	Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation The Spatial Model as an Empirical Model Example: The US Supreme Court Example: Newspaper Editorial Boards Misconceptions
Durbi     Feingolo     Mikulski	se (D-NJ) in (D-IL) id (D-WI) (D-WI) (D-MD) j (D-NJ) j (D-NJ) -MN)		Coleman (R- Graham (R-S Fitzgerald (R- Sununu (R-N		80	100	.18
							.10

### The Spatial Model of Voting: Theory and Empirics

Theory

Figure 4 Rank Ordering and 95% Confidence Intervals including President Bust using all non-unanimous roll calls from the 107th Senate. National Journal Key Votes



The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition

The Median Voter Theorem

Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

# Previous figures from Clinton, Jackman, and Rivers. 2004. "The Most Liberal Senator?". *PS: Political Science and Politics*. 805-811.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory

### Interpretation Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

### FIGURE 2. Uncertainty Over Identity and Location of Pivots, 106th U.S. Senate

Identity of Veto Pivot (prob of o	ccupying 33rd rank)	Location of Veto Pivot and Adjacent Senator
0.00 0.02 0.04 0.0	6 0.08 0.10 0.12	-1.2 -1.1 -1.0 -0.9 -0.8 -0.7 -(
KERREY -		
BRYAN -		KERREY
		LANDRIEU
KOHL -		
EDWARDS -		CONBAD
LANDRIEU		BINGAMAN
		GRAHAM
		FEINGOLD
DORGAN		Veto Pivot
		BAUCUS
CONRAD		BIDEN
ROBB		CLELAND
HOLLINGS		BAYH
MOYNIHAN		FEINSTEIN
FEINSTEIN		JOHNSON
BINGAMAN		HOLLINGS
FEINGOLD	_	ROBB
CLELAND		MOYNIHAN
BAYH I		DORGAN
GRAHAM		INOUYE
JOHNSON MOZNHOL		KOHL
BIDEN		EDWARDS
BAUCUS		BRYAN
0.00 0.02 0.04 0.04	6 0.08 0.10 0.12	-1.2 -1.1 -1.0 -0.9 -0.8 -0.7 -(
Identity of Median (prob of occ	upying 50th rank)	Location of Median and Adjacent Senators
0.0 0.2 0.4	0.6 0.8 1.0	0.10 0.15 0.20 0.25 0.30
SNOWE		Median
		COLLINS
<b></b>		SNOWE
0.0 0.2 0.4	0.6 0.8 1.0	0.10 0.15 0.20 0.25 0.30

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation Empirica The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

# Previous figure from Clinton, Jackman, and Rivers. 2004. "The Statistical Analysis of Roll Call Data". *APSR*. 98: 355-370.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory

### Interpretation Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem

Example: Statutory

Interpretation

### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

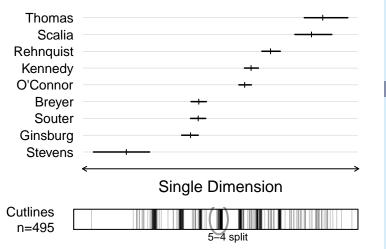
Example: The US Supreme Court

Example: Newspaper Editorial Boards

Misconceptions

# How might this work?

# **Unidimensional Summary**



### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

Latent Dimension

### McReynol Butler -Sutherland Rehnqui Van Devanter Sanford Taft McKenna 66425 Reed Rγ Holmes Brandeis Goldbe Murp War Black Douglas 1920 1940 1960 1980 2000

### Supreme Court Voting Over Time

Term

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory

### Interpretation Empirics

The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

Misconceptions

.25

### AGREEMENTS AMONG SUPREME COURT JUSTICES IN CONTROVERSIAL CASES, 1939 AND 1940 TERMS (In Percentages)

Justice	McRey- nolds	Rob- erts	Hughes	Stone	Reed	Frank- furter	Murphy	Black	Doug- las
McReynolds	-	64	64	41	35	31	38	24 <sup>·</sup>	24
Roberts	64		75	51	45	45	39	37	36
Hughes	64	75		78	63	64	53	49	49
Stone	41	51	78		81	84	75	69	68
Reed	35	45	63	81		86	80	79	79
Frankfurter	31	45	64	84	86		91	85	84
Murphy	38	39	53	75	80	91		89	89
Black	24	37	49	69	79	85	89		100
Douglas	24	36	49	68	79	84	89	100	

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

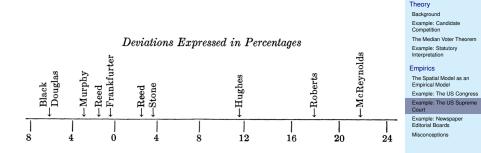
The Spatial Model as an Empirical Model

Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The Spatial Model of Voting: Theory and Empirics



This figure and previous from: Pritchett. 1941. "Divisions of Opinion Among Justices of the U.S. Supreme Court, 1939-1941." *APSR*. 35: 890-898.

# How might we measure the political positions of newspaper editorial boards?

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model

Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Political Positions of Newspapers

- 495 Supreme Court cases from 1994-2004 terms
- 25 major newspapers
- 1500 editorial-case positions
- We personally read and checked the coding for each of the 1500 editorial positions
  - 1: clearly in favor of majority position
  - 0: clearly against majority position
  - ?: unclear but covered
- This simple coding allows a simple item response theory model to be used to compare the newspapers and justices to each other.

More detail in:

Ho and Quinn. 2008. "Measuring Explicit Political Positions of Media." *Quarterly Journal of Political Science*. 3: 353-377.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem

Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The Spatial Model of Votina: Theory and Empirics

#### Newspaper Code Circulation (1000s) Observation Period Editorials Washington Times WT Atlanta Journal ÂĴ Investor's Business Daily ίÑV Atlanta Constitution ÄĊ Rocky Mountain News RMN Empirics Miami Herald MH SDUT MST CPD DFP San Diego Union Tribune Minneapolis Star Tribune Cleveland Plain Dealer Detroit Free Press Atlanta Journal Constitution Philidelphia Inquirer Arizona Republic Boston Globe Chicago Sun-Times Dallas Morning News San Francisco Chronice AJC PI AR BG CST DMN SFC HC Court Houston Chronicle New York Post NYP Chicago Tribune CT Washington Post Los Angeles Times ŴP LAT New York Times NYT Wall Street Journal WS.I USA USA Today 500 1000 1500 2000 1994 1996 2000 2002 2004 20 40 60 80 100 120

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation The Spatial Model as an

Empirical Model Example: The US Congress Example: The US Supreme

Example: Newspaper Editorial Boards

## The New Hork Times

The court reached one of its lowest moments of the term when it ruled in favor of the Boy Scouts' right to exclude gay members. The four dissenters – Justices Stevens, Ginsburg, Breyer and Souter – did not challenge the principle that an organization cannot be forced to adopt an unwanted message. But the dissenters correctly noted that the Boy Scouts had failed to show that admitting gays was fundamentally incompatible with the organization's core mission, the test the court has traditionally applied to groups trying to escape an anti-discrimination law.

James Dale, the excluded Eagle Scout, deserved better. So did the rest of the nation.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

# The Washington Post

THE QUESTION of whether the Boy Scouts can discriminate against gays pits core values of free association against important anti-discrimination principles: legally, a tough call. We thought that the scouts, especially given their unusual quasi-public status, could lawfully be stopped from excluding gays. A sharply divided Supreme Court vesterday disagreed, holding that the scouts' First Amendment rights trump a New Jersey anti-discrimination law that forbids discrimination on the basis of sexual orientation. The opinion is more a comment on the First Amendment's broad scope than a validation of prejudice. The Boy Scouts' discrimination against gays remains as offensive and wrong a position following the court's decision as it was before.

The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The San Diego Union-Tribune.

In another important case in which the justices arrived at the proper decision, the court declared that the Boy Scouts of America have a right to exclude homosexuals as leaders. By a narrow 5-4 margin, the court ruled that private, nonprofit organizations, like the scouts, have a First Amendment right to "free association." As such, they may not be forced to accept members or leaders whose views or comportment are contrary to that for which the private organization stands.

Critics of the court's decision argue that the justices have given groups, like the scouts, a license to discriminate. But had the court come down the other way, then a group like the NAACP could be forced to accept, say, a Ku Klux Klan member; and the B'nai B'rith could be forced to accept a neo-Nazi in its midst.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The Washington Times

Today, lawyers have become the pre-eminent befuddlers of common sense. Among the dangerous nonsense purveyed by these folks is the recent attempt to compel the Boy Scouts of America - a traditionalist youth group whose mission is to help make young men "morally straight" -to accept a homosexual scoutmaster and avowed gay rights activist. All this, on "anti-discrimination" grounds.

Wednesday, the Supreme Court rejected the idea, which had been upheld by the New Jersey Supreme Court, that the Boy Scouts had no fundamental right to exclude would-be members who do not subscribe to or conform with the organization's most basic tenets. In this particular instance, the Boy Scouts withdrew the membership of former Assistant Scoutmaster James Dale, an adult volunteer, after learning of his homosexual lifestyle. This, of course, put the Boy Scouts in the gunsights as one of the last remaining bastions of American culture that has not bowed to the gay agenda - which demands not merely live-and-let live tolerance, but total acceptance - indeed, emphatic endorsement.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory

Interpretation Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

Misconceptions

INV NYF Thomas Scalia WT RMN Rehnguis Â, CST Kenned SDUT AR HC O'Connor CPD AJC AJC DMN BG USA MH WP LAT SFC DFP NYT SDU A A DMN BG Breyer Souter Ginsburg - N 0 + 10 60 - 0 4 8 5 8 8 8 8 8 DFP Stevens Posterior Rank Prior Legend 0.1 0.2 Probability -3 -2 -1 0.3 0.4

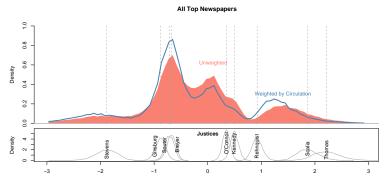
Newspaper Ranks

Ideology

Ideal Point Estimates

#### .35

### The Spatial Model of Voting: Theory and Empirics



Political Position

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

# **Misconceptions**

Some scholars have expressed concern about the use of ideal point models to study judicial behavior.

In some cases, this seems to be a knee jerk reaction against quantification of judicial behavior.

In other cases, more sophisticated concerns are raised about the data coding, modeling assumptions, and properties of the estimates.

Most of the following examples are from Ho and Quinn. 2010. "How Not to Lie with Judicial Votes: Misconceptions, Measurement, and Models." *California Law Review*.

### The Spatial Model of Voting: Theory and Empirics

#### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper

Example: Newspaper Editorial Boards

# **Every Case Is Counted Equally**

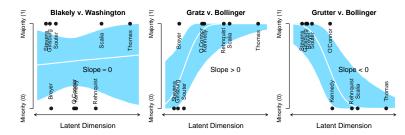
### The Spatial Model of Voting: Theory and Empirics



Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper Editorial Boards



# **Every Case Is Counted Equally**

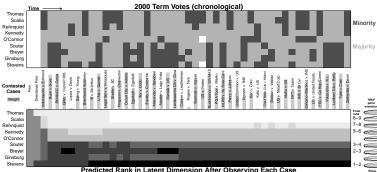
### The Spatial Model of Votina: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper Editorial Boards



Predicted Rank in Latent Dimension After Observing Each Case

# Unidimensional Models are Useless in a Multidimensional World

The idea that something as complicated as Supreme Court decisionmaking can be captured with a uni-dimensional spatial model is very counterintuitive (outrageous???) to many scholars of the court.

### The Spatial Model of Voting: Theory and Empirics

### Theory

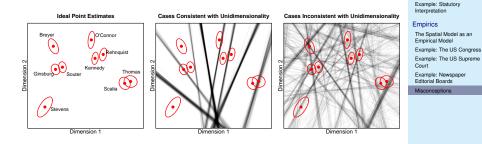
Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper

Editorial Boards Misconceptions

# Unidimensional Models are Useless in a Multidimensional World



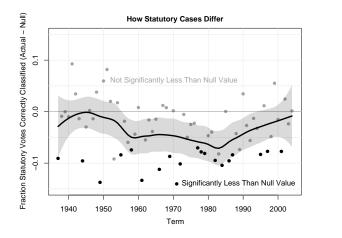
The Spatial Model of

Voting: Theory and

Empirics

Theory Background Example: Candidate Competition The Median Voter Theorem

# Unidimensional Models are Useless in a Multidimensional World



The Spatial Model of Voting: Theory and Empirics

Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

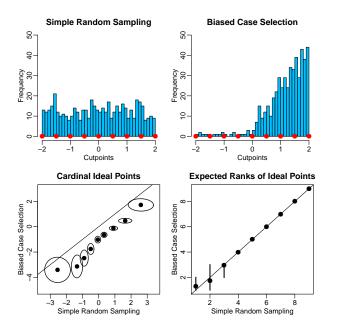
### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper Frithraja Boards

Misconceptions

Comparison of ability to classify votes on cases with Westlaw Key Number *Statutory Construction and Operation (361VI)* relative to null distribution formed from all nonunanimous cases in term.

## **Selection Bias Creates Serious Problems**



The Spatial Model of Voting: Theory and Empirics

#### Theory

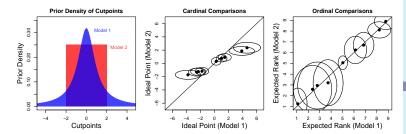
Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court

Example: Newspaper Editorial Boards

# All Estimates from Latent Variable Models Are Sensitive to Arbitrary Modeling Assumptions



The Spatial Model of Voting: Theory and Empirics

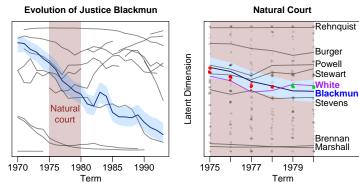
### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

#### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper Editorial Boards

# All Estimates from Latent Variable Models Are Sensitive to Arbitrary Modeling Assumptions



The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress Example: The US Supreme Court Example: Newspaper Frittorial Boards

# All Estimates from Latent Variable Models Are Sensitive to Arbitrary Modeling Assumptions

Term	Justice	Prob. Median
1998	Kennedy	0.574
1999	O'Connor	0.901
2000	O'Connor	0.992
2001	O'Connor	> 0.999
2002	O'Connor	0.998

(from Martin, Quinn, & Epstein, 2005)

These are useful summaries under a very wide range of assumptions.

### The Spatial Model of Voting: Theory and Empirics

### Theory

Background Example: Candidate Competition The Median Voter Theorem

Example: Statutory Interpretation

### Empirics

The Spatial Model as an Empirical Model Example: The US Congress

Example: The US Supreme Court

Example: Newspaper Editorial Boards