

The Spatial Model of Voting: Theory and Empirics

CSLS Empirical Methods Workshop

November 16, 2012

Theory

Background

Example: Candidate
Competition

The Median Voter Theorem

Example: Statutory
Interpretation

Empirics

The Spatial Model as an
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Example: The US Congress

Example: The US Supreme
Court

Example: Newspaper
Editorial Boards

Misconceptions

Kevin M. Quinn
UC Berkeley

- **very** basic introduction to theoretical ideas behind spatial models of voting

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Misconceptions

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

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Misconceptions

- **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)

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The key ingredients:

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The key ingredients:

- policy space

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The key ingredients:

- policy space
- actors

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The key ingredients:

- policy space
- actors
- preferences

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Misconceptions

The key ingredients:

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

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The key ingredients:

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

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Misconceptions

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)

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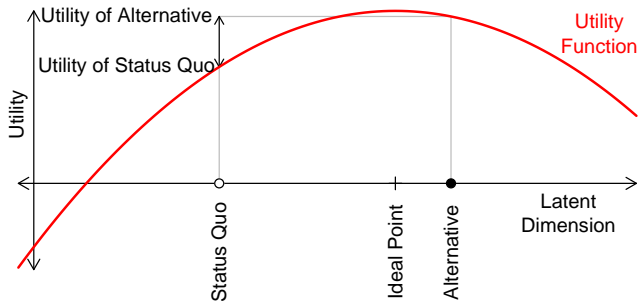
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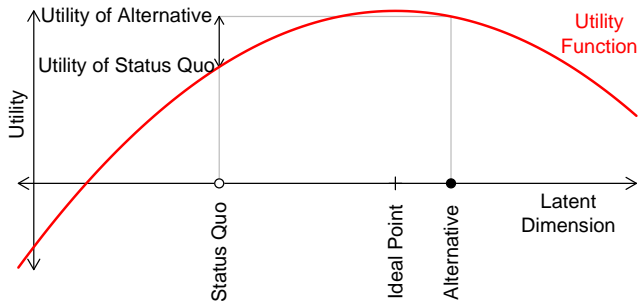
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Additional examples on board.

Candidate Competition

In class example

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The Median Voter Theorem

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

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The Median Voter Theorem

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

Voters have single-peaked preferences.

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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.

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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.

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

Three interpretative stances a court might take:

- (1) *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.¹¹

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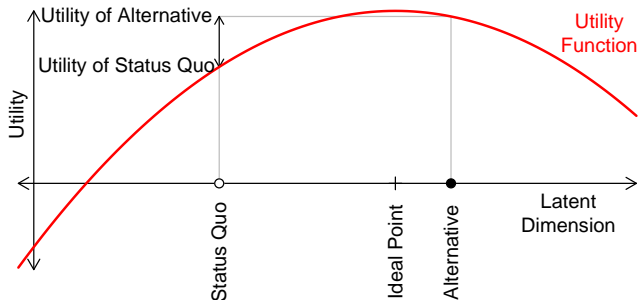
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The Spatial Model as an Empirical Model

Let i index votes and j index voters

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The Spatial Model as an Empirical Model

Let i index votes and j index voters

$x_i^{(o)}$: status quo point

$x_i^{(a)}$: alternative point

θ_j : j 's most preferred policy

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

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

Utility difference:

$$\begin{aligned} y_{ij}^* &= u_{ij}^{(o)} - u_{ij}^{(a)} \\ &= [x_i^{(a)} x_i^{(a)} - x_i^{(o)} x_i^{(o)}] + 2[x_i^{(o)} - x_i^{(a)}]\theta_j + [\delta_{ij}^{(o)} - \delta_{ij}^{(a)}] \\ &= \alpha_i + \beta_i \theta_j + \epsilon_{ij} \end{aligned}$$

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

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

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

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

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The Spatial Model of Voting: Theory and Empirics

The likelihood function is proportional to:

$$p(\mathbf{y}|\alpha, \beta, \theta) = \prod_{i=1}^n \prod_{j=1}^m \Phi(\alpha_i + \beta_i \theta_j)^{y_{ij}} [1 - \Phi(\alpha_i + \beta_i \theta_j)]^{1-y_{ij}}$$

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Identification issues

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Identification issues

Coding of y

The Spatial Model as an Empirical Model

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 $\alpha_j + \beta_i \theta^* = 0$.

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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

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

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Misconceptions

Interpretation

α_i : related to baseline propensity to see a $y = 1$ on vote i

β_i : sign determines whether $y = 1$ is a “left” or “right” vote,
absolute value related to strength of association between latent
 θ and observed votes on i

θ_j : latent ideal point for voter j

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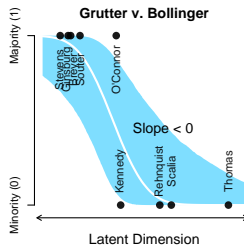
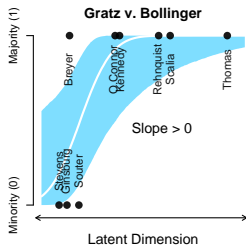
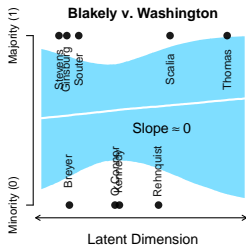
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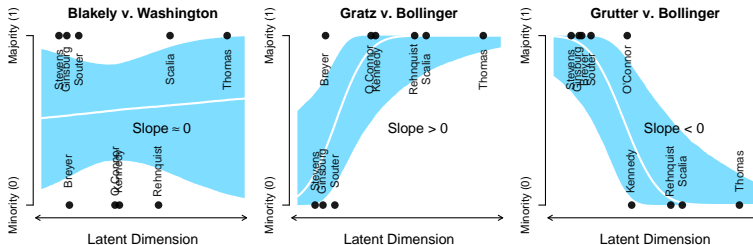
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Relationship to IRT models for standardized tests

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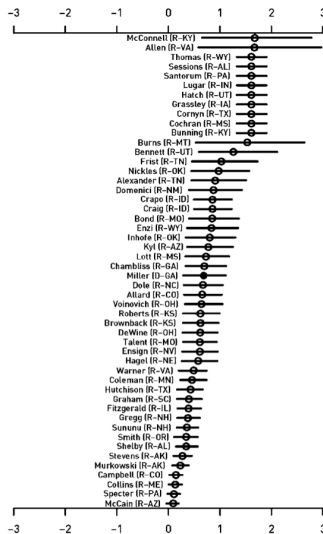
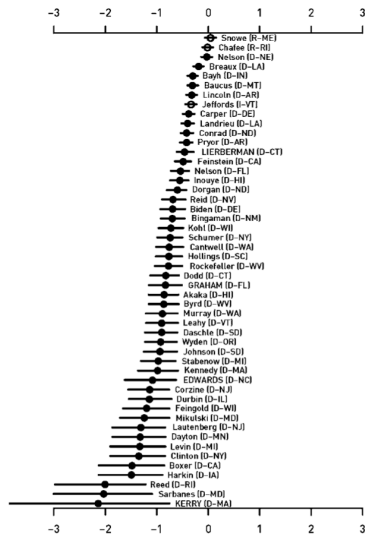
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How might this work?

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



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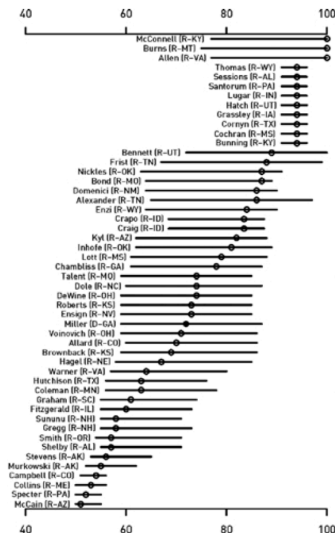
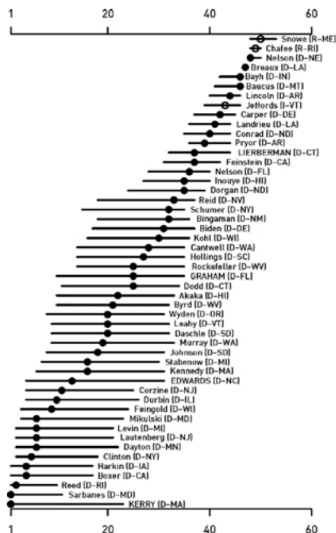
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Figure 2
Rank Ordering and 95% Confidence Intervals using 62 National Journal Key Votes



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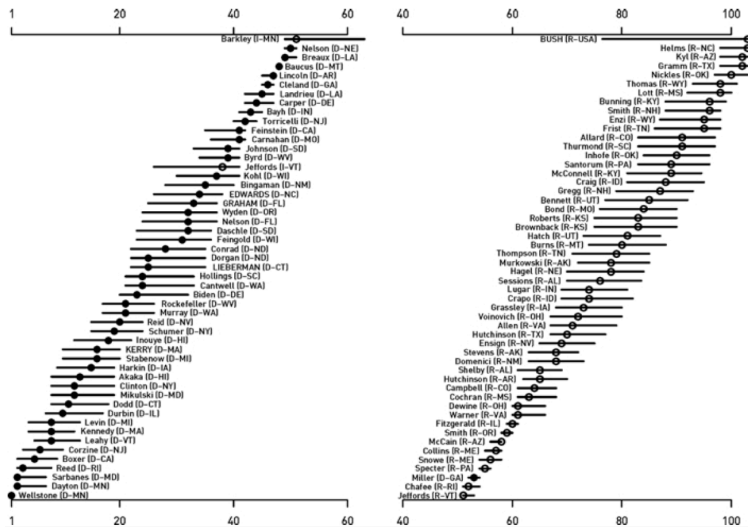
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Example: Newspaper Editorial Boards

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



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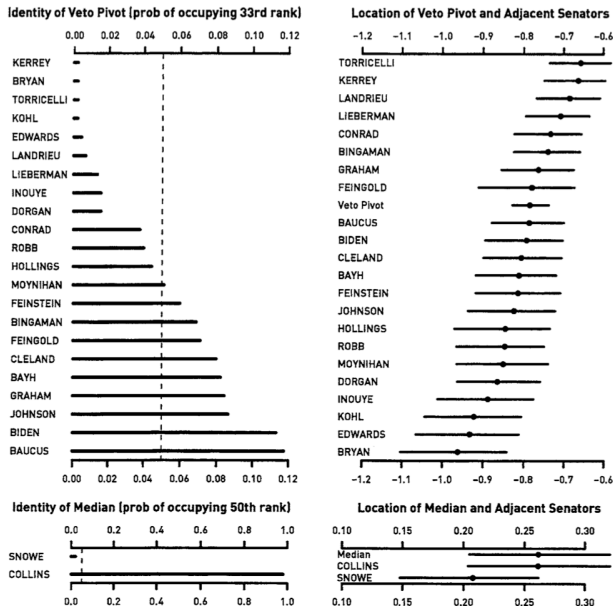
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Previous figures from Clinton, Jackman, and Rivers. 2004.
“The Most Liberal Senator?”. *PS: Political Science and Politics*.
805-811.

The US Congress

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



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

How might this work?

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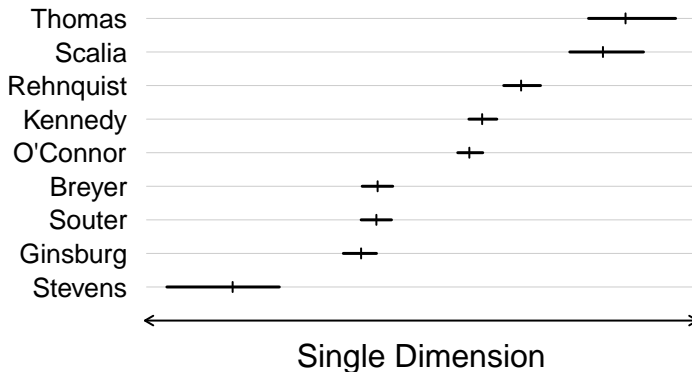
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Unidimensional Summary



Cutlines
n=495



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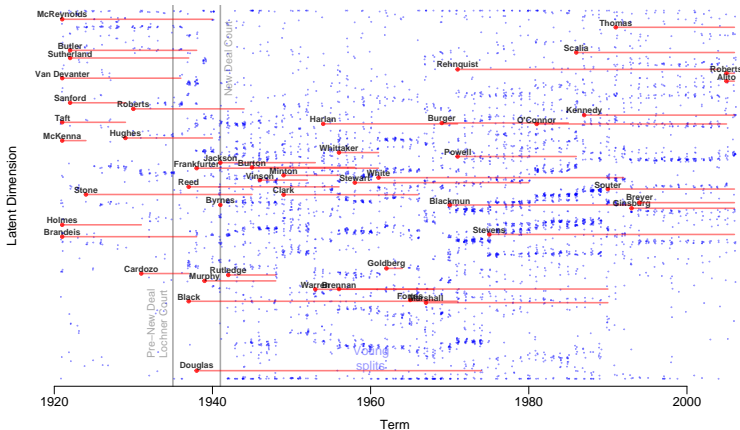
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Supreme Court Voting Over Time



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The US Supreme Court

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

<i>Justice</i>	<i>McReynolds</i>	<i>Roberts</i>	<i>Hughes</i>	<i>Stone</i>	<i>Reed</i>	<i>Frankfurter</i>	<i>Murphy</i>	<i>Black</i>	<i>Douglas</i>
<i>McReynolds</i>	—	64	64	41	35	31	38	24	24
<i>Roberts</i>	64	—	75	51	45	45	39	37	36
<i>Hughes</i>	64	75	—	78	63	64	53	49	49
<i>Stone</i>	41	51	78	—	81	84	75	69	68
<i>Reed</i>	35	45	63	81	—	86	80	79	79
<i>Frankfurter</i>	31	45	64	84	86	—	91	85	84
<i>Murphy</i>	38	39	53	75	80	91	—	89	89
<i>Black</i>	24	37	49	69	79	85	89	—	100
<i>Douglas</i>	24	36	49	68	79	84	89	100	—

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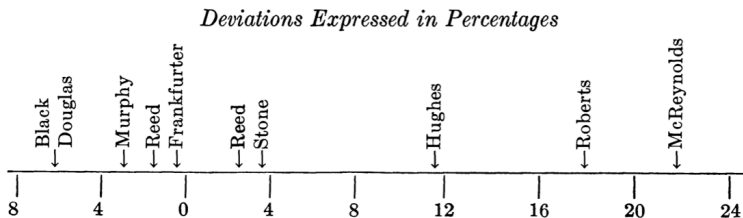
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This figure and previous from: Pritchett. 1941. "Divisions of Opinion Among Justices of the U.S. Supreme Court, 1939-1941." *APSR*. 35: 890-898.

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

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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.

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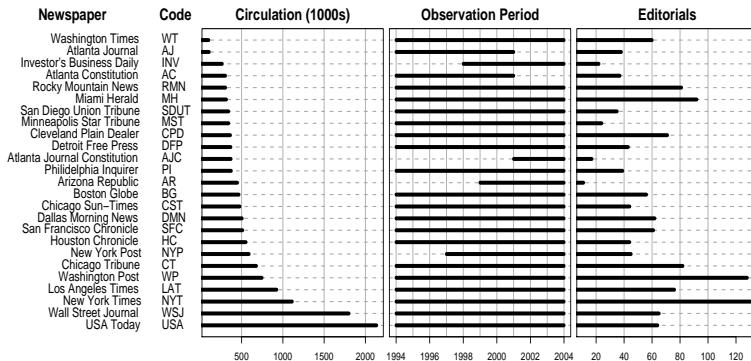
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The New York Times

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.

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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 yesterday 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.

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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.

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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.

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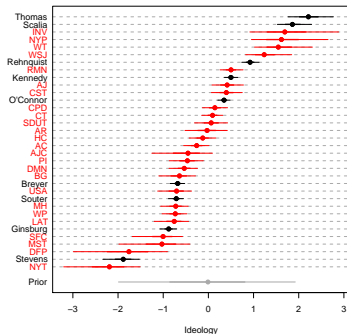
Example: The US Congress

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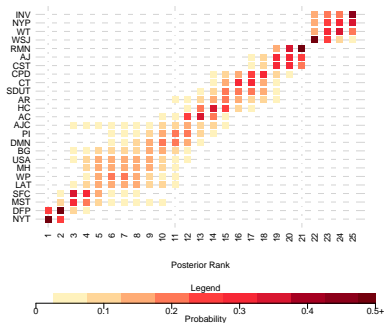
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Ideal Point Estimates



Newspaper Ranks



Newspaper Editorial Boards

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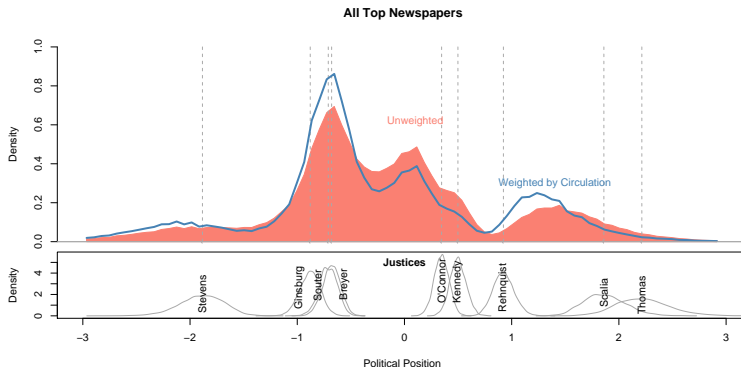
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Some scholars have expressed concern about the use of ideal point models to study judicial behavior.

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*.

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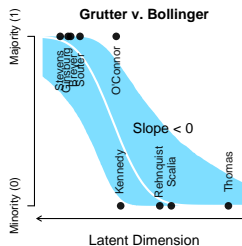
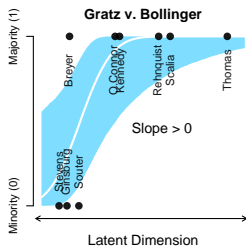
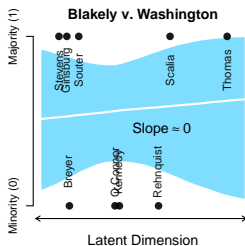
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Every Case Is Counted Equally

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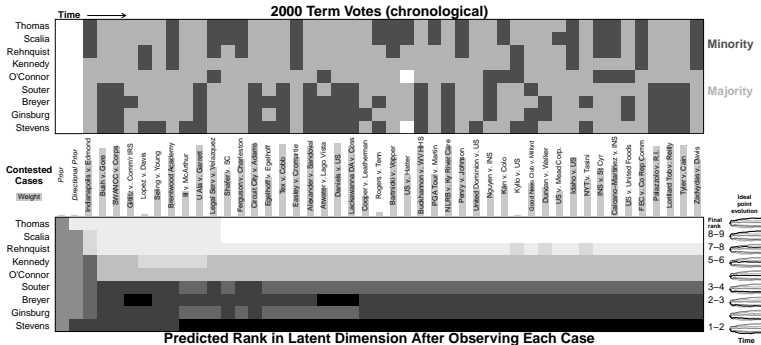
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Unidimensional Models are Useless in a Multidimensional World

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.

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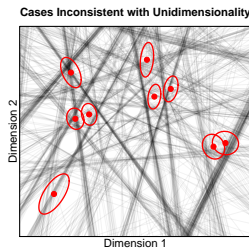
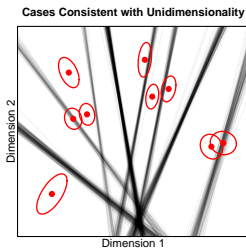
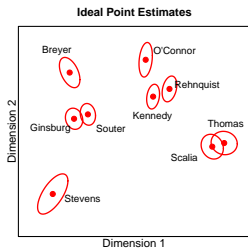
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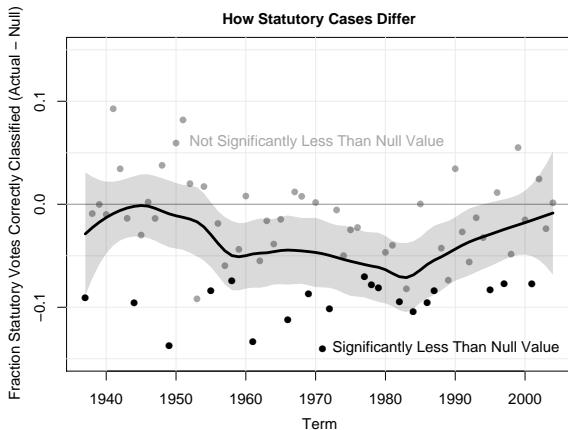
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Unidimensional Models are Useless in a Multidimensional World



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

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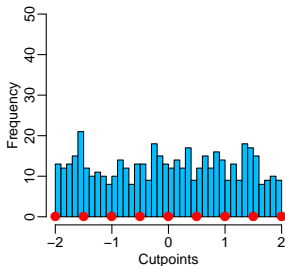
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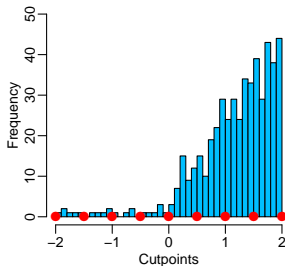
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Selection Bias Creates Serious Problems

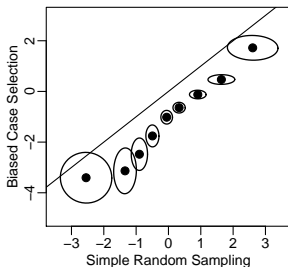
Simple Random Sampling



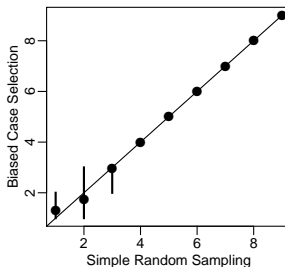
Biased Case Selection



Cardinal Ideal Points



Expected Ranks of Ideal Points



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

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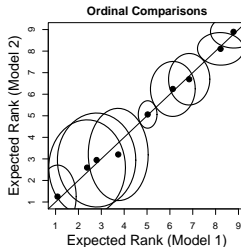
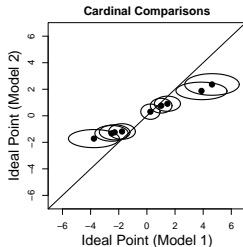
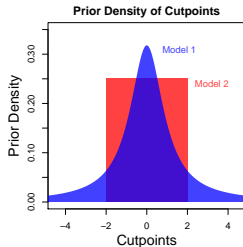
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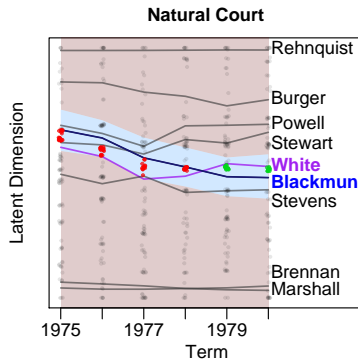
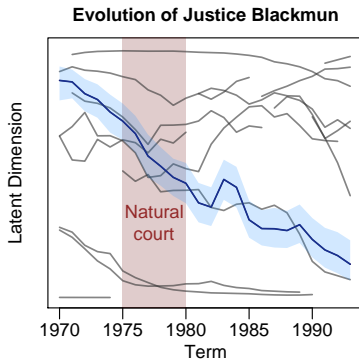
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All Estimates from Latent Variable Models Are Sensitive to Arbitrary Modeling Assumptions

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.

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