ONLINE APPENDIX: (HOW) CAN WE ESTIMATE THE IDEOLOGY OF CITIZENS AND POLITICAL ELITES ON THE SAME SCALE?

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This appendix provides supplementary information for "(How) Can We Estimate the Ideology of Citizens and Political Elites on the Same Scale?" Sections 1 and 2 list full question wordings for the Senate Representation Survey and 2008 Cooperative Congressional Election Study (CCES), respectively, for all questions used in the paper. Section 3 provides information about the estimation procedure for the group-based ideal point model discussed in the paper. Section 4 provides information about the behavior of the Gibbs sampler, including why posterior medians, rather than means, are used as estimates of the cutpoint parameters. Section 5 describes the results of Monte Carlo simulations of sMSD values for the two surveys under the assumptions of the full joint scaling model. Section 6 compares the policy-based ideal point estimates from the paper to ideology estimates from Bayesian Aldrich-McKelvey scaling. Section 7 replicates the results of tests of spatial voting in the 2004 and 2008 presidential election using each of the group-based ideal point estimates from the two datasets analyzed in the paper. Section 8 presents results from a heteroskedastic ideal point model.

1. Senate Representation Question Wording

Generally speaking, do you usually think of yourself as a Republican, a Democrat, or an Independent? [follow up on strong Republican/Democrat or independent leaning Republican/Democrat/no lean]

How did you vote in the 2004 election

I voted for George Bush

I voted for John Kerry

I voted for someone else (please specify):_____

I was not able to vote

As you know, your Representatives and Senators in Washington vote on issues that affect our country. On the following pages, we will ask you about some actual proposals before the U.S. Senate. We will give you a brief description of each proposal. Please tell us whether you would support each proposal and how you think your Senators would vote when these issues come up. If you aren't sure how one or both of your Senators would vote, please try to guess how they would vote when faced with this proposal based upon what you know about them.

[For each Senate proposal question, respondents were asked "How would you vote on this measure?", with response options: "I support this measure and would vote 'yes.", "I oppose this measure and would vote 'no.", and "Don't know". They were also asked "Please tell us how you think your Senators will vote on this measure", with response options "Probably for", "Maybe for", "Maybe against", "Probably against" and "Not sure" for each of their senators.]

S 397: Protection of Lawful Commerce in Arms Act

- Prevents people from suing gun manufacturers and dealers for the misuse of their products, including when crimes are committed with guns they make or sell.
- The bill would still allow lawsuits for product defects and malfunctions.
- Requires safety locks for all guns sold or transferred.
- Increases penalties for possession or use of "armor piercing" ammunition when committing a crime.
- S 1307: Central American Free Trade Agreement
- Promotes free trade between the U.S. and Central American countries.
- Reduces tariffs, duties and other fees and taxes on imports and exports between the U.S. and Central American countries for things such as textiles and agricultural goods.

S AMDT 826 to HR 6: Greenhouse Gas Reduction and Credit Trading System

- Would require that industries reduce their production of greenhouse gasses to year 2000 levels within five years.
- Would establish a credit trading system that would allow companies who are unable to reduce emissions to this level to buy credits from other companies who reduce their pollution to farther below the limit.
- S AMDT 44 to S 256: Minimum Wage Increase
 - Would raise the minimum wage to \$5.85 immediately, then to \$6.55 after one year, and to \$7.25 in two years.
 - The minimum wage before this bill was proposed was \$5.15.

HR 1997: Unborn Victims of Violence Act

- Makes it an additional crime to harm or kill a fetus while committing a violent crime against a pregnant woman.
- Does not require that the attacker knew the woman was pregnant.
- Does not apply to abortions.

S AMDT 3183 to S 2400: Hate Crimes Amendment

- Would classify crimes motivated by a victim's race, color, religion, sexual orientation, disability or national origin as "hate crimes" to be prosecuted in federal (not state) courts.
- Authorizes \$5 million per year over the next two years for the Justice Department to assist state and local authorities in investigating and prosecuting hate crimes.

S AMDT 1085 to HR 2419: Remove Funding for "Bunker Buster" Warhead

- The "bunker buster" is a small nuclear warhead designed to destroy fortified underground positions by breaking through rock or concrete to a certain depth before exploding.
- This amendment would stop the use of federal funds for the development of the proposed "bunker buster" nuclear warhead.
- The money would instead be used to pay down the national debt.

S AMDT 367 to HR 1268: Remove Funding for Guantamo Bay Detention Center

- Eliminates \$36 million in funding which was planned to build a new permanent prison facility at Guantanamo Bay, Cuba to house detainees from the war on terrorism.
- S AMDT 1626 to S 397: Child Safety Locks Amendment
- Requires gun manufacturers and sellers to include child safety locks on all firearms sold or transferred.

S 256: Bankruptcy Abuse Prevention and Consumer Protection Act

- In Chapter 7 bankruptcy, a debtor sells off most of his or her property and pays as much of his debts as he can and the rest of his debts are erased. In Chapter 13 bankruptcy, debtors work out a payment plan to pay off all or most of their debts.
- This bill would force debtors into Chapter 13 bankruptcy in which they must pay off their debts (rather than have them erased) if they are able to do so while still earning above their state's median income.
- Places child support and alimony payments into the category of non-dischargeable debts, which must still be repaid under all forms of bankruptcy.
- Allows some special treatment for active-duty military members, veterans and those with serious medical conditions
- Requires debtors to pay for and attend credit counseling before filing for bankruptcy
- Requires that monthly credit card statements include warnings and explanations about interest rates and fees.

• Caps home equity protection at \$125,000 if debtor purchased the home within 40 months of filing for bankruptcy.

S 5: Class Action Fairness Act

- Class action lawsuits are brought in the name of a group of people who all claim to have been affected similarly by a product, procedure or other act. These lawsuits try to get companies who allegedly caused this harm to pay the group that was affected.
- This bill requires that all class action settlement proposals include estimates of lawyers' fees if payment for the court's ruling are in the form of coupons
- Requires that all members of the affected class be notified about settlement proposals.
- Sends to federal (not state) court all civil action in which the case involves more than \$5 million, concerns a plaintiff of one state and a defendant of another, or involves a foreign state or its citizens.
- Grants judges expanded powers to determine if class action settlements are fair, reasonable and adequate

S AMDT 2807 to S CON RES 95: Reverse Tax Cuts on High Incomes

- Rolls back tax cuts for those whose income is above \$1 million per year.
- Uses the funds raised for increases in homeland security spending and for paying down the national debt.

S AMDT 168 to S CON RES 18: Prohibit Drilling in ANWR

• Would keep the Arctic National Wildlife Refuge in Alaska closed to oil drilling.

S AMDT 1615 to S 397: Broaden Definition of Armor Piercing Ammunition

- Would classify any handgun ammunition that is capable of penetrating body armor as "armor piercing."
- Would ban all such "armor piercing" handgun ammunition as well as rifle ammunition that is marketed or designed specially for armor piercing.

S AMDT 2799 to S CON RES 95: Cigarette Tax Increase

- Increases taxes on cigarettes to \$1 (the tax was previously 39 cents).
- Uses the funds raised by these taxes (estimated at \$30.5 billion) to pay for increased spending on health programs such as medical research, disease control, wellness, tobacco addiction counseling and preventative health efforts including substance abuse and mental health services.

S AMDT 3107 to S 1637: Overtime Pay Regulations

- The Department of Labor has proposed regulations that would eliminate overtime pay for anyone making over \$100,000 per year or anyone making between \$23,660 and \$100,000 per year who works as an administrator or in a professional "white collar" job.
- This amendment would get rid of these regulations

S AMDT 3379 to S 2400: Raise Tax Rate on Highest Income Bracket

- Raises the tax rate on all income above \$326,450 per year from 35% to 36%.
- Uses the funds raised to pay for the security and stabilization of Iraq.

HR 4250: Jumpstart Our Business Strength Act

- Will reduce the corporate tax rate on domestic manufacturers and small corporations from 35% to 32% and provide about \$145 billion in tax reductions to U.S. corporations over the next 10 years.
- Allows individual taxpayers who pay no state income tax to deduct their state sales tax on their federal tax returns.
- Would repeal certain tax regulations on foreign imports. The World Trade Organization had ruled these taxes in violation of their regulations, so repealing them will stop the WTO from penalizing U.S. exports.
- Allows private collection agencies to track down citizens who have not fully paid their taxes.
- Eliminates certain tax shelters and tax avoidance practices for businesses. This is expected to bring in about \$63 billion in new tax revenue over the next 10 years.
- Ends federal price supports for tobacco farmers and allots \$10 billion to tobacco farmers as compensation.
- Allows the Food and Drug Administration to regulate tobacco products

S 2061: Healthy Mothers and Healthy Babies Access to Care Act

- Places a limit of \$250,00 on noneconomic (pain and suffering) damages in lawsuits against obstetricians, gynecologists and nurse midwives for medical malpractice.
- Allows people to sue these types of doctors for malpractice only within three years of the date of the appearance of injury or one year after the claimant discovers the injury.
- Allows punitive damages (meant to punish the accused) only in cases where doctors intentionally or knowingly harmed patients.
- When punitive damages are allowed, they are limited to two times the economic damages or \$250,000 whichever is greater.
- Limits the liability of manufacturers, distributors and providers of gynecological products that have been approved by the Food and Drug Administration.
- Allows payments of certain medical malpractice verdicts to be paid in installments over time (rather than all at once).

S AMDT 2937 to HR 4: Child Care Funding for Welfare Recipients

- Provides an additional \$6 billion to states over the next 5 years for child care for welfare recipients.
- This is paid for by renewing customs fees that would have expired

S AMDT 3158 to S 2400: Military Base Closing Delays

- This measure would delay for two years the planned closing of several military bases in the U.S.
- Would also limit some of the planned closing of overseas military bases

S AMDT 3584 to HR 4567: Stopping Privatization of Federal Jobs

• Would stop the government from contracting out 1,100 jobs in the Homeland Security Department's Citizenship and Immigration Services bureau to private companies and would keep these jobs within the federal government.

HR 1308: Working Families Tax Relief Act

- Would extend the \$1000 per child tax credit through 2009.
- Would reduce taxes by extending the upper limit adjustment for the 10% tax bracket through 2010. This means that married couples would pay a 10% tax rate on their first \$14,000 of yearly income. Without this extension, only the first \$12,000 would be taxed at 10% and the rest at a higher rate.
- Would extend tax breaks for married couples (the elimination of the so-called "marriage penalty") through 2008.
- Would extend the existing income tax exemption from the alternative minimum tax for couples with incomes below \$58,000.
- Extends the Research and Development tax credit, which allows businesses to deduct 20% of qualified research expenses, through 2010.

S AMDT 1026 to HR 2161: Prohibiting Roads in Tongass National Forest

• Would prohibit federal funds from being used to plan or build new roads for the purpose of logging in the Tongass National Forest in Alaska.

S AMDT 902 to HR 6: Fuel Economy Standards

- Would require that passenger cars made before 2008 average 25 miles per gallon.
- This requirement would be gradually increased to 40 miles per gallon by the year 2016.
- Nonpassenger (or commercial) vehicles would have to average 16 miles per gallon before 2008, and this standard would gradually increase to 27.5 miles per gallon.

S AMDT 278 to S 600: Family Planning Aid Policy

- Under current U.S. policy, government money cannot be given to family planning organizations in other countries if these organizations perform or promote abortions, even if the U.S. money is not specifically used for this purpose.
- This vote would reverse this policy and allow U.S. funds to go to family planning organizations in other countries whether or not they promote or perform abortions

S J RES 20: Disapproval of Mercury Emissions Rule

• This vote would replace the current credit-trading system for mercury emissions from power plants with a policy of strict limits on the amount of mercury that power plants can release into the atmosphere

S AMDT 1977 to HR 2863: Banning Torture by U.S. Military Interrogators

- Would prohibit "cruel, inhuman or degrading treatment or punishment" against anyone in the custody of the U.S. military.
- Limits interrogation techniques to those authorized in the U.S. Army Field Manual on Intelligence Interrogation.

2. 2008 CCES QUESTION WORDING

[Prompt for CC316a to CC316i] Congress considered many important bills over the past two years. For each of the following tell us whether you support or oppose the legislation in principle. [Note: for these questions, response options are: Support, Oppose; Not Sure]

CC316a Roll Call Votes - Withdraw Troops Withdraw Troops from Iraq within 180 days

CC316b Roll Call Votes - Increase Minimum Wage Increase Minimum Wage from \$5.15 to \$7.25

CC316c Roll Call Votes - Stem Cell Research Allow federal funding of embryonic stem cell research

CC316d Roll Call Votes - Eavesdrop Overseas Without Court Order Allow U. S. spy agencies to eavesdrop

on overseas terrorist suspects without first getting a court order

CC316e Roll Call Votes - Health Insurance Program for Children Fund a \$20 billion program to provide health insurance for children in families earning less that \$43,000

CC316f Roll Call Votes - Amendment to Ban Gay Marriage Constitutional Amendment banning Gay Marriage

CC316g Roll Call Votes - Federal Assistance for Housing Crisis Federal assistance for homeowners facing foreclosure and large lending institutions at risk of failing CC316h Roll Call Votes - Extend NAFTA Extend the North American Free trade Agreement (NAFTA) to include Peru and Columbia

CC316i Roll Call Votes - Bank Bailout U. S. Government's \$700 Billion Bank Bailout Plan

[Prompt for CC317a to CC317m] One way that people talk about politics in the United States is in terms of left, right, and center, or liberal, conservative, and moderate. We would like to know how you view the parties and candidates using these terms. The scales below represent the ideological spectrum from very liberal (0) to very conservative (100). The most centrist American is exactly at the middle (50).

CC317a Place on Ideological Scale – Yourself Where would you place yourself? If you are not sure, or don't know, please check "Not Sure".

CC317b Place on Ideological Scale - Democratic Party Where would you place the Democratic party? If you are not sure, or don't know, please check "Not Sure".

CC317c Place on Ideological Scale - Republican Party Where would you place the Republican party? If you are not sure, or don't know, please check "Not Sure".

CC317d Place on Ideological Scale - President George Bush

CC317h Place on Ideological Scale - Barack Obama

CC317g Place on Ideological Scale - John McCain

CC317e Place on Ideological Scale - Senator 1 Where would you place [name of Sen 1]? If you are not sure, or don't know, please check "Not Sure".

CC317f Place on Ideological Scale - Senator 2 Where would you place [name of Sen 2]? If you are not sure, or don't know, please check "Not Sure".

CC317i Place on Ideological Scale - Senate Candidate 1 Where would you place [name of Senate Candidate 1]? If you are not sure, or don't know, please check "Not Sure".

CC317j Place on Ideological Scale - Senate Candidate 2 Where would you place [name of Senate Candidate 2]? If you are not sure, or don't know, please check "Not Sure".

CC326b Voted for (Choice) For which candidate for President of the United States did you vote? [Response options are: John McCain (Republican), Barack Obama (Democratic), Ron Paul, Ralph Nader,

Bob Barr (Libertarian), Cynthia McKinney (Green), Other, I didn't vote in this election, I'm not sure] CC307 Pre Election 3 point party ID Generally speaking, do you think of yourself as a ...? [Response options are: Democrat, Republican, Independent, Other, Not sure]

CC307a Pre Election 7 point Party ID Note: Coded from branching questions asked depending on response in CC307

[Response options are: Strong Democrat, Not very strong Democrat, Lean Democrat, Independent, Lean Republican, Not very strong Republican, Strong Republican, Not sure]

3. Description of Group-Based Scaling Gibbs Sampler

This section describes a modified version of the Gibbs sampler for the quadratic-normal ideal point model from Clinton et al. [2004] (CJR). The modification restricts the sampler to estimate the item parameters $(\alpha, \beta \text{ and, by transformation } \gamma)$ to be structured based only on the preferences of a pre-specified group of actors. The sampler is identical to the CJR sampler except for the sampling step for the item parameters. This appendix shares notation with CJR. For more information about the standard version of the model and sampler, see the CJR paper.

Starting with a set of initial values for the ideal points x and item parameters α and β , we can write the steps of the Gibbs sampler for the group-restricted ideal point model as:

- (1) sample y^* from $p(y^*|x, \alpha, \beta, y)$
- (2) sample γ, β from $p(\alpha, \beta | x_{(g)}, y^*_{(g)})$
- (3) sample x from $p(x|\alpha, \beta, y^*)$

where y^* denotes the latent utility differences between the two alternatives for each voter on each vote which are sampled at each iteration as a data augmentation step and the (g) subscript for x and y in the second sampling step denotes the values only for the group chosen to structure the ideological dimension. Note that we estimate the model in the specification from equation 1 in the paper and then transform $\gamma = \alpha/\beta$ at each iteration of the sampler to obtain the specification in equation 2.

The first step simply involves sampling from a normal with mean $x_i\beta_j$ and variance one, truncated at zero either above or below based on each observed value of y_{ij} . The second step is a set of regressions for each item j conditional on the values of x and y^* , only using the parameters from members of the group selected for structuring the ideology scale. The final step of the sampler involves transforming to obtain a set of regressions in which the ideal points x become regression coefficients for each actor i conditional on the item parameters and latent utility differences.

The sampler is implemented through a modification of the pscl function in the ideal library in R Jackman [2009]. [NOTE: I hope to add this function to the pscl library if this article is accepted for publication.]

4. GIBBS SAMPLER PERFORMANCE

The sampler appears to converge rapidly (within several thousand iterations or, in most cases, much sooner) for the models and datasets used in the paper. The main issue involves the transformation of the item parameters to obtain cutpoint estimates (γ_j 's) for each parameter by dividing the difficulty parameter α_j by the discrimination parameter β_j . Although this makes the parameters more easily interpretable, it induces undesirable behavior for posterior samples for the cutpoint parameters. This occurs for iterations of the sampler in which discrimination parameters take values near zero, causing the cutpoint parameters to become extremely large in magnitude.

In order to obtain more stable estimates of the cutpoint parameters that are not dramatically affected by the small number of extreme draws, I use the median (rather than mean) of posterior draws for the cutpoints as my estimates. Figure A1 shows an example of this, plotting posterior medians and means for each item in the Senate Representation Survey for both Respondent-based and Senator-based ideal point estimations. Discrimination parameter estimates are nearly identical when using means or medians. Cutpoint estimates, however, differ sharply in some cases. The figure also shows examples of traceplots for the most



FIGURE A1. Cutpoint Parameter Posterior Means are Highly Volatile for Items with Discrimination Parameter Estimates Near Zero. Left (center) column plots means vs. medians of Gibbs sampler draws for discrimination (cutpoint) parameters for each item under groupbased scalings of Senate Representation Survey. Right column shows traceplots for the most divergent cutpoint parameters under each scaling.

discrepant cutpoints under each scaling. It is apparent that a relatively small number of iterations in which the discrimination parameters (traceplot not shown) are sampled near zero produce very high or very low values for the cutpoint parameters, having a strong affect on the resulting posterior mean estimates. This occurs only for the few items on which there is nontrivial posterior mass near zero.

5. smsd Monte Carlo Simulations

This section describes a set of Monte Carol simulations for the Senate Representation Survey and 2008 CCES data in which all ideal points (x_i) and item parameters $(\beta_j \text{ and } \alpha_j)$ are fixed at their posterior means from the full joint scaling of legislators and respondents, then for each simulation, a vote matrix is simulated by sampling from the distribution of votes given the parameter values and legislator- and respondent-based scalings are run separately for the simulated vote matrix. This process is repeated 100 times and the sMSD between the two group-based scalings is noted.¹

¹Each simulation for the Senate Representation Survey was run for 12,500 iterations with the first 2,500 iterations dropped as a burn-in period and the rest stored for inference. Because of the very large number of respondents in the 2008 CCES, each simulation was run for only 5,000 iterations with the first 1,000 iterations dropped as a burn-in period and the rest stored for



FIGURE A2. sMSD Monte Carlo Simulations, Senate Representation Survey Data Histograms show distribution of sMSD values from 100 sets of respondent- and Senate-based ideal point scalings, each on a roll call matrix drawn from the predictive distribution setting ideal points and item parameters equal to their posterior means from the full joint scaling. Vertical lines show the observed sMSD values from the group-based scalings of the observed data.

Figures A2 and A3 show histograms of the distributions of sMSD values for these simulations for the two datasets. On each histogram, the sMSD between the corresponding group-based scalings of the actual data are denoted by vertical lines. It is clear that the observed sMSD for the Senate Representation Survey is much lower for both senators and respondents, indicating a much larger discrepancy between the estimated ideological dimensions than we would expect to occur if the joint model were true. For the CCES data, however, the observed sMSD values fall much closer to those that would be expected if the joint model were true. While this is not intended as a sharp test of the hypothesis of identical dimension structure between the two groups, it does provide a way of assessing the magnitude of the discrepancy under each of the two group-based scalings.

inference. Based on a small number of longer simulations, this appeared to have a very small impact on the results of the simulations in terms of sMSD values.



FIGURE A3. sMSD Monte Carlo Simulations, 2008 CCES Data Histograms show distribution of sMSD values from 100 sets of respondent-, House- and Senate-based ideal point scalings, each on a roll call matrix drawn from the predictive distribution setting ideal points and item parameters equal to their posterior means from the full joint scaling. Vertical dotted lines show the observed sMSD values from the group-based scalings of the observed data.

6. Comparison to Bayesian Aldrich-McKelvey Scaling

This section presents the results of estimating Bayesian Aldrich-McKelvey (BAM) scores for senators using the 2008 CCES, following Hare et al. [2015]'s method of estimation for senators based on the 2010 CCES. This survey asked respondents to place themselves as well as Bush, Obama, McCain, the Democratic party, the Republican party, their two sitting senators, and the major party candidates for Senate on a 0-100 liberal-conservative scale which I rescale to range from -5 to 5. It should be noted that this scale differs from the more standard 1-7 scale used by Hare et al. [2015] and by Aldrich and McKelvey [1977] and may cause the estimates to be less reliable or to have somewhat different characteristics. Similar to Hare et al., I sample 200 respondents from states having more than 200 respondents to ease the computational burden of



FIGURE A4. 2008 CCES: Comparison of Ideal Point Estimates with Bayesian Aldrich-McKelvey Scores. Estimates for Democratic (Republican) senators are plotted with D(R). Solid curve shows loess regression.

estimating this model on such a large sample of respondents. I compare these perception-based estimates to the policy-based estimates from the paper, including House-based, Senate-based and respondent-based ideal point estimates.

Overall the results, shown in Figure 6, are similar, following the pattern found by Hare et al. [2015] between DW-NOMINATE estimates and BAM scores, albeit with a slightly nosier relationship for these data. There exists a clear positive relationship between these two sets of estimates, but the BAM scores are separated much more sharply by party than the ideal point estimates. This is consistent with the findings of Hare et al. [2015]. There are a few large outliers including Snowe (R-ME) who is given a BAM score similar to those for Democrats, but whose ideal point estimate is near the middle of the spectrum near other moderate Republicans, and Lieberman (I-CT) who was perceived as more conservative than his policy positions would suggest. Other outliers include Hagel (R-UT) and Warner (R-VA) who somewhat confusingly was retiring, while a Democratic candidate with the same last name was running in the election to replace him. The fact that relatively high correlations exist between these estimates is all the more impressive given that the



FIGURE A5. 2008 CCES: Comparison of Ideal Point Estimates with Bayesian Aldrich-McKelvey Scores Using House- Senate- or Respondent-Based Scalings. Estimates for Democratic (Republican) senators are plotted with D(R). Solid curve shows loess regression.

BAM scores are based on an average of fewer than seven valid placements per respondent and the ideal point estimates are based only on eight issue positions.

We can also examine the relationship between BAM scores and the House-based, Senate-based and respondent-based ideal point estimates presented in the paper. As would be expected given the strong similarity of each of these sets of estimates with the full joint scaling for the 2008 CCES, the correlations between the BAM scores and each of the three group-based scalings are fairly similar to the correlations with the full joint ideal point estimates.

7. Heteroskedastic Ideal Point Model Performance

This section presents the results of applying a heteroskedastic ideal point model to the Senate Representation Survey data. The model assumes that the probability of actor i supporting policy j can be written as

(1)
$$P(y_{ij} = 1) = \Phi(\frac{x_i\beta_j - \alpha_j}{\sigma_j})$$



FIGURE A6. Heteroskedastic Ideal Point Model Simulations Varying Number of Respondents.

where σ_j is fixed at 1 for senators, while it is given a uniform prior from 0 to 100 for respondents, with all respondents assumed to have the same σ_j . Ideal points x_i are given independent standard normal priors, and both β_j and α_j are given independent normal priors with mean 0 and variance 25. The model is estimated using JAGS for the full data as well as for 100 randomly sampled subsets of respondents for sizes 2,000, 500 and 111.

Figure A6 plots the posterior means for $\sigma_{resp}/\sigma_{sen} = \sigma_{resp}$ (since σ_{sen} is fixed at 1) against the ratio of the standard deviations of respondent and senator idea ideal point estimates. The results make clear that, far from solving the common dimension problem, this additional modeling feature results in perhaps *more* problematic pathologies whereby both the ideal point estimates and the relative error variances are sensitive to the number of survey respondents included in the data.



FIGURE A7. Testing Spatial Voting in the 2004 Presidential Election: Group Based Scaling of the Senate Representation Survey. Curves show predicted probabilities from probit regressions predicting presidential vote with estimated ideal point from each of the three sets of group-based ideal point estimates. Ideal point estimates are identified such that Kerry and Bush are located at -.25 and .25 respectively, meaning the midpoint between the two candidates is at 0.

8. Testing Spatial Voting Using Group-Based Estimates

This section uses the group-based ideal point estimates presented in the main paper to examine the use of spatial voting in the 2004 and 2008 presidential elections. The analyses loosely follow those from Jessee [2012].

Figure A7 plots the results of three probit regressions predicting presidential vote in the 2004 election with ideal points from a full joint scaling, a respondent-based estimation and a senator-based estimation for the Senate Representation Survey data. The relationships are all quite similar, suggesting that the overall substantive results do not depend strongly on which scaling approach is used. Figure A8 presents the results of the same analysis adding in party identification via dummy variables for Democratic and Republican identification (with independent leaners treated as partisans). Again, these results are similar overall regardless of which ideal point estimates are used.



FIGURE A8. Testing Spatial Voting with Party Identification in the 2004 Presidential Election: Group Based Scaling of the Senate Representation Survey. Curves show predicted probabilities from probit regressions predicting presidential vote with estimated ideal point from each of the three sets of group-based ideal point estimates as well as dummy variables for Democratic and Republican party identification (independent leaners are coded as partisans). Ideal point estimates are identified such that Kerry and Bush are located at -.25 and .25 respectively, meaning the midpoint between the two candidates is at 0.



FIGURE A9. Testing Spatial Voting in the 2008 Presidential Election: Group Based Scaling of the 2008 CCES. Curves show predicted probabilities from probit regressions predicting presidential vote with estimated ideal point from each of the three sets of group-based ideal point estimates. Ideal point estimates are identified such that Obama and McCain are located at -.25 and .25 respectively, meaning the midpoint between the two candidates is at 0.

Figures A9 and A10 repeat the same exercise but for the 2008 presidential election using the 2008 CCES data. Again, the results are broadly similar whether the House-based, Senate-based or respondent-based ideal point estimates are used.



FIGURE A10. Testing Spatial Voting with Party Identification in the 2008 Presidential Election: Group Based Scaling of the 2008 CCES. Curves show predicted probabilities from probit regressions predicting presidential vote with estimated ideal point from each of the three sets of group-based ideal point estimates as well as dummy variables for Democratic and Republican party identification (independent leaners are coded as partisans). Ideal point estimates are identified such that Obama and McCain are located at -.25 and .25 respectively, meaning the midpoint between the two candidates is at 0.

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