

Online Appendix to *The Ideological Mapping of American Legislatures*

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1 Updates

This online appendix is up-to-date as of the publication of the paper in the *American Political Science Review*. Updates to the appendix and links to the data can be found at <http://bshor.wordpress.com>.

2 Estimation Error

There are two general approaches assessing estimation error in ideal points. Within the NOMINATE framework, Lewis and Poole (cite) use bootstrapping techniques to recover standard errors. The Bayesian IRT framework provides measures based on variation across simulations. Typically, however, large roll call voting matrices provide relatively precise estimation of ideal points. This makes accounting for estimation uncertainty, at least in the U.S. context, somewhat less important than in less data-rich environments.

Our two-step estimation technique, however, necessitates more care in addressing estimation error. Due to computational costs, we did not estimate common space ideal points for all fifty state legislatures and Congress simultaneously. Had we done so, we could have used the standard IRT approach of taking the variance of simulated ideal points as a measure of estimation uncertainty.

Because of our two-stage approach, the calculation of standard errors is a bit more complicated. This section documents our procedure for generating bootstrapped error estimates for our scores at both individual and aggregate levels.

2.1 The Procedure

We take advantage of the simulations that underlie the Bayesian IRT model to compute estimation error of legislative ideal points in the roll call voting space. For each legislator in each state, we collect 1,000 simulations of the individual-level roll call ideal point. The mean of the distribution is our estimate of the legislator's ideology. The standard deviation, is our estimate of the uncertainty in *roll call space*. But this is only one source of estimation error; we must also account for the estimation of the projection into the NPAT space common space.

In our regular mapping procedure, for each state, we regress NPAT responders' roll call ideal points onto the survey-based scores. This generates fifty sets of state-specific mapping coefficients that translate roll call-based ideal points into NPAT common space. Because the parameter es-

estimates from these regressions are themselves subject to error, we must account for this as well. Using the distribution of roll call and survey ideal point simulations, we simulate 1,000 slopes and intercepts for each state.

Then for each legislator, we loop over each simulated roll call ideal point, generating a predicted NPAT common space score using a randomly drawn set of mapping coefficients from the mapping simulations. Thus, each legislator gets 1,000 separate simulated NPAT common space scores. The standard deviation of those simulated scores is our bootstrapped individual-level error estimate.

In general, the estimates of uncertainty do not appear too large. This is because of the large number of roll call votes per legislator and the several dozen NPAT responders that serve as bridges in our state mappings. The uncertainty estimates do vary somewhat across states and individuals, but predictably in relation to the amount of available data. The median standard deviation across legislators in each state is plotted below.

The individual-level NPAT ideal point simulations can also be used to produce aggregate uncertainty measures such as the mean or median position by chamber or party. One simply needs to draw a simulated ideal point for each legislator and compute the measure of interest across a number of iterations. The figure below plots the average standard error of the chamber median for upper and lower chambers.

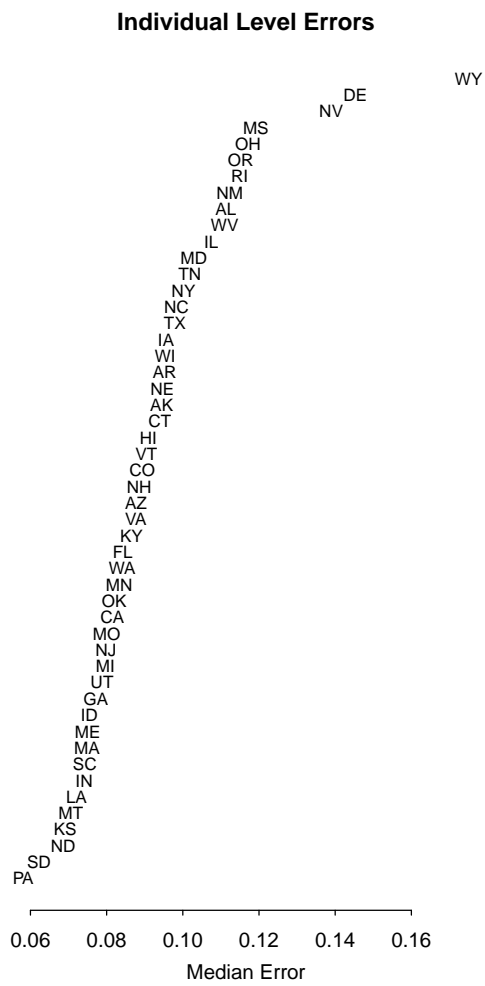


Figure 1: *Plot of medians of individual ideal point errors by state (pooled over time).*

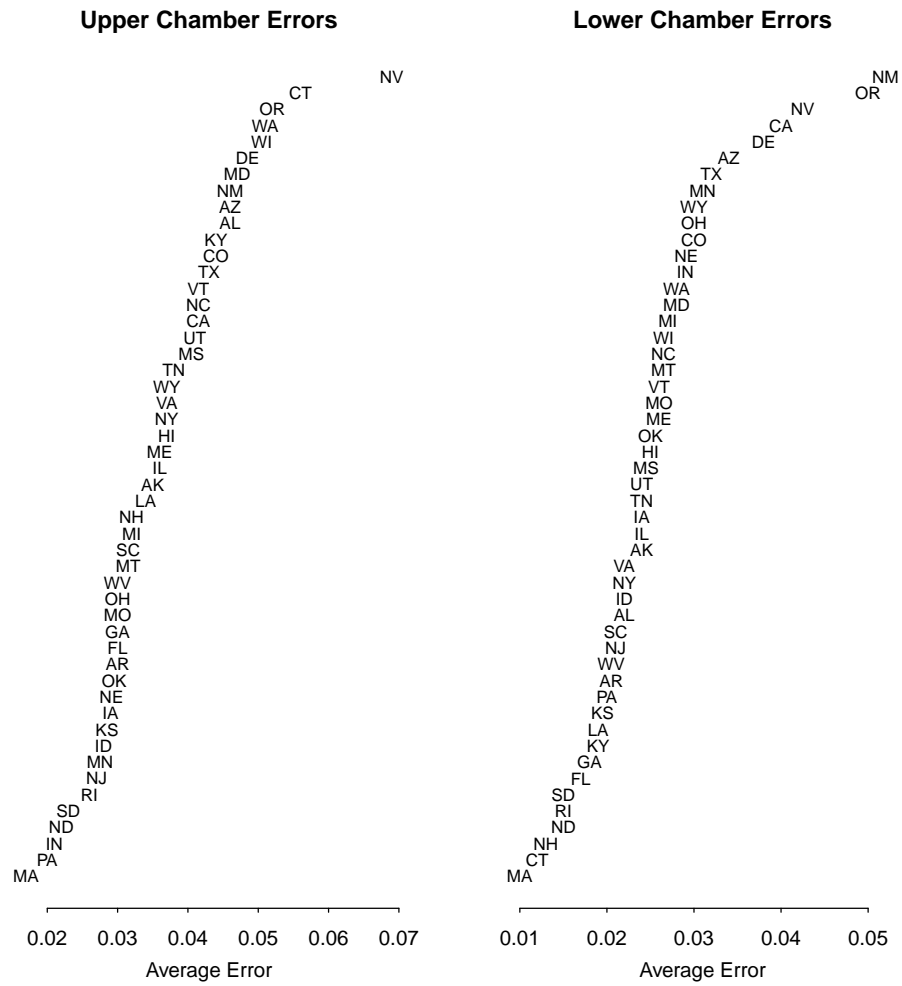


Figure 2: Plot of average standard errors for chamber medians for both chambers over time.