Appendix A: Validating Catalist's Ideology Estimate

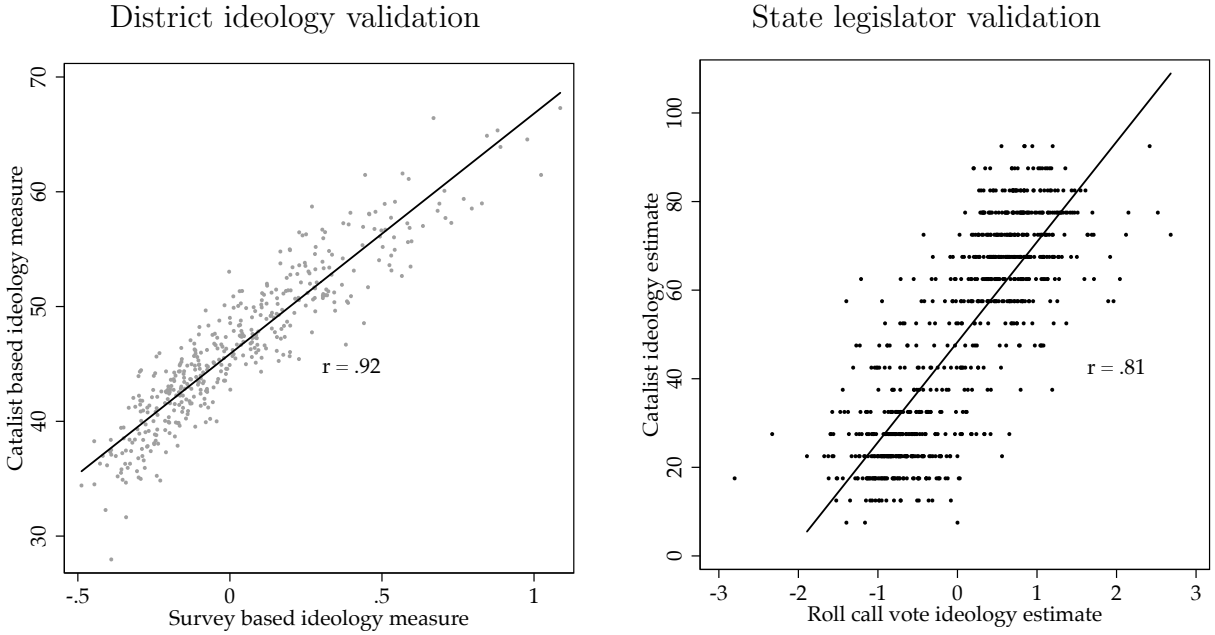
The analysis in this paper relies heavily on Catalist's estimate of each individual's ideology. While Catalist has conducted several of its own validation exercises, which have resulted in convincing results, we undertake two validation analyses independently to further verify the accuracy of these estimates.

For our first validation analysis, we take advantage of congressional district ideological estimates created by Tausanovitch and Warshaw (2013). These ideological estimates are based on responses to survey questions by hundreds of thousands of Americans over an 11-year period. For this comparison, we calculate the mean ideology for each congressional district from the Catalist database. Thus, we are able to compare the Tausanovitch and Warshaw (2013) district ideology measures to district ideology calculations based on the Catalist ideology model.

While the first validation is useful, the main drawback is that it happens at an aggregated level of measurement – the congressional district rather than the individual level. Thus, for our second validation analysis, we attempt to discern how well the Catalist score estimates ideology at the individual level. To do this, we take advantage of the ability to match lists of individuals to the Catalist database using the individuals' home addresses. In many states, it is relatively easy to find the addresses of state legislators. Ultimately, we were able to successfully match 792 state legislators (from across 34 states) into the Catalist database in order to extract Catalist's ideological estimates for those individuals. The data we use to validate the Catalist ideology estimates for this group come from Shor and McCarty (2011), who scale state legislative roll call votes to create measures of ideology for state legislators. Thus, for each of the 792 state legislators, we have a measure of Catalist's estimate of the individual's ideology based on their model, and a measure of the ideological disposition of the legislator's roll call voting in the legislature.

Figure A.1 presents the comparisons from both of these validation exercises. The left-hand panel presents the relationship between the Catalist and survey based ideology measures across the 435 congressional districts. Note that the observations cluster quite closely to the regression line and the two measures are correlated at .92. The right-hand plot shows the comparison for state legislators. While there is somewhat more dispersion among these individuals, there is still a strong relationship between a legislator's roll call voting behavior and Catalist's prediction about their ideology. Indeed, the measures are correlated at .81.

Figure A.1: Validating the Catalist Ideology Model



Overall, the results from these validation tests indicate that the Catalist ideology measure does appear to be strongly related to individuals' true ideological predispositions. This is particularly valuable since the Catalist measure is available for such a large number of American adults, allowing for the granular analyses presented in this paper.

Appendix B: District Level Results for Unequal Representation

In this section of the Appendix we shift the level of analysis from examining how much representation individuals receive to how much representation different income groups receive when aggregated at the district-level. We conduct this analysis with the Catalist data since there are insufficient observations in the CCES data to conduct this type of analysis district-by-district. We begin by taking the mean Catalist ideology score for four different income groups in each congressional district – the bottom 31st percentile, the 32nd through the 63rd percentile, the 64th through the 95th percentile, and the 96th through the 100th percentile. In other words, this provides us with a measure of ideology for the low-, middle-, high-, and very high-income groups in each district. For one set of models, we use the national income percentiles to create these groups and for the other set of models we use percentiles constructed at the district level. We take both of these approaches since it is possible that legislators may be more responsive based on an individual's overall wealth (relative to the national population) or that legislators would be more responsive based on an individual's wealth relative to the other constituents in that legislator's district.

As with the analysis presented in the body of the paper, both the mean ideology measures and the legislator nominate scores are placed on 0 to 100 scales. Thus, a positive coefficient would indicate that as the mean ideology of a particular group becomes more liberal (or conservative) the legislator's roll call voting also becomes more liberal (or conservative). However, before presenting the results it is important to note that once aggregated to the district level, the mean ideologies of the different income groups are highly correlated. For the groups created based on national income percentiles, the correlations range from .85 (for the correlation between the bottom group and the top group) to .97 (for the correlation between the middle two groups). For the groups created based on district income percentiles,

the correlations range from .86 (for the correlation between the bottom group and the top group) to .97 (for the correlation between the middle two groups). Furthermore, for both sets of measures, the mean ideologies of any three income groups predict the mean ideology for the fourth group with R-squared values in excess of .9. Given that we are limited to (at most) 433 observations in these models, the high degree of multi-collinearity is undoubtedly affects the precision of the coefficient estimates.

Table A.1 shows the OLS coefficients and standard errors from six separate models. The first three models uses the national income percentiles to construct the groups and then estimates those for all members of Congress and then separately for Republican and Democratic legislators. The second set of models uses the district income percentiles to estimate models for the same three groups. In the first set of models, we find results that are largely consistent with what we show in the main body of the paper. In particular, legislators appear to be fairly responsive to the lowest income group ($\beta = 1.196$) in the pooled model, but there are significant differences once we break out the results by party. Specifically, Republicans are far less responsive to this lower income group than are Democrats. Legislators' nominate scores are also strongly associated with the ideologies of the 64th-95th income percentile group in the pooled model ($\beta = 1.428$), but there are again notable differences by party, with Republicans being far more responsive to this group than Democrats. Finally, there is a positive (but much smaller) association between the ideologies of those in the top 5% of the national income distribution and their legislators, though this association is weaker when the models are unpacked by party (and negative in the case of the model isolating Democratic members of Congress).

Interestingly, when we shift to the models using the district-level income percentiles, we see somewhat different patterns. In these models, there is actually a negative association between legislators' nominate scores and the ideologies of the bottom income group. Instead, it is the second income group ($\beta = 3.828$) which appears to receive the most representation

Table A.1: Regression Models Testing Associations Between Mean Ideology of Income Groups and Member Nominate Scores

	National Income Percentiles			District Income Percentiles		
	All districts	Rep. districts	Dem. districts	All districts	Rep. districts	Dem. districts
0-31st percentile	1.196	0.153	0.632	-0.690	-0.352	0.026
	(0.613)	(0.347)	(0.330)	(0.556)	(0.360)	(0.306)
32nd-63rd percentile	-0.175	-1.422	-0.131	3.828	-0.184	0.981
	(0.829)	(0.508)	(0.403)	(0.751)	(0.546)	(0.369)
64th-95th percentile	1.428	1.819	0.424	-0.501	1.007	-0.093
	(0.682)	(0.477)	(0.299)	(0.713)	(0.535)	(0.333)
96th-100th percentile	0.383	0.123	-0.031	0.287	0.172	0.015
	(0.312)	(0.232)	(0.129)	(0.351)	(0.293)	(0.151)
Intercept	-76.388	7.171	35.031	-77.784	8.708	33.935
	(10.856)	(6.391)	(7.073)	(10.024)	(6.745)	(6.865)
R^2	0.559	0.229	0.380	0.633	0.212	0.434
N	433	241	192	433	241	192

Note: Entries are ordinary least squares coefficients with standard errors in parentheses. N = 433 members of the House of Representatives. Two legislators are excluded due to insufficient votes to compute a Nominate score.

when we shift to district income percentiles. When we separate these models by party, we find that Republican legislators appear to be more responsive to the third income group while Democrats are most responsive to the second group. Additionally, and consistent with the first set of models, the coefficient for the very top income group is positive, but small (and it is close to zero in the model isolating Democratic legislators).

While again emphasizing that the estimates from these models are to be interpreted with caution given the high multicollinearity, the patterns reported here are generally in line with those we report in the paper. Consistent with the results we show in Figure 4, lower income groups do appear to receive fairly high levels of responsiveness. Additionally, the degree to which lower income groups receive responsiveness is related to whether they live in districts represented by Democratic or Republican members of Congress. Democratic legislators generally appear to be more responsive to the lower two income groups while Republican legislators are more responsive to the larger two income groups.

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