

# Appendix to “Congressional Careers, Committee Assignments, and Seniority Randomization in the U.S. House of Representatives”

Michael Kellermann and Kenneth A. Shepsle

April 9, 2009

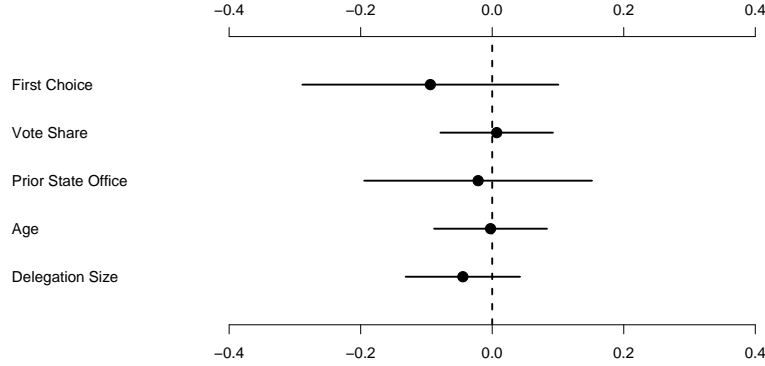
## Randomization checks

The randomization process used by the House Democratic Caucus to assign seniority ranks ensures that, in expectation, the ranks assigned within randomization groups are uncorrelated with pre-existing legislator characteristics. Although we have no reason to believe that the randomization method used to assign ranks was compromised in some way, it is still useful to see if there is evidence that pre-assignment characteristics of the legislators are correlated with the rescaled seniority ranks. To do this, we regressed the rescaled ranks on five variables that might be thought to affect seniority status:

- state influence (as measured by the number of congressional districts in the representative’s state),
- age at which the representative took office (from Swift et al. (2004)),
- whether or not the representative had been elected previously to a state-level office (from Swift et al. (2004) and *Biographical Directory of U.S. Congress*),
- the share of the vote won by the representative when elected (from Swift et al. (2004)),
- whether or not the member requested the committee as his or her first choice (from Frisch and Kelly (2007), 80th through 103rd Congresses).

As shown in Figure 1, the point estimate for each of the covariates is close to zero. To make the estimates more comparable, each non-binary

**Figure 1:** Randomization checks for rescaled seniority ranks



Point estimates and 95% confidence intervals from regression of rescaled ranks on pre-treatment characteristics. N = 1348.

---

predictor is divided by its standard deviation. Each of the 95% confidence intervals contains zero. Averaging over all of the randomization groups, the randomization process appears to have balanced these covariates across rescaled ranks.

### Restriction to freshmen on legislative committees

The results reported in the main paper are based on cases in which Democratic freshmen were assigned to major and minor legislative committees in the House of Representatives. This excludes assignments to three standing committees – Appropriations, Ways and Means, and Rules – as well as randomization groups composed of non-freshmen. As shown in Table 1, the vast majority of cases in which randomization takes place involve freshmen on the legislative committees.

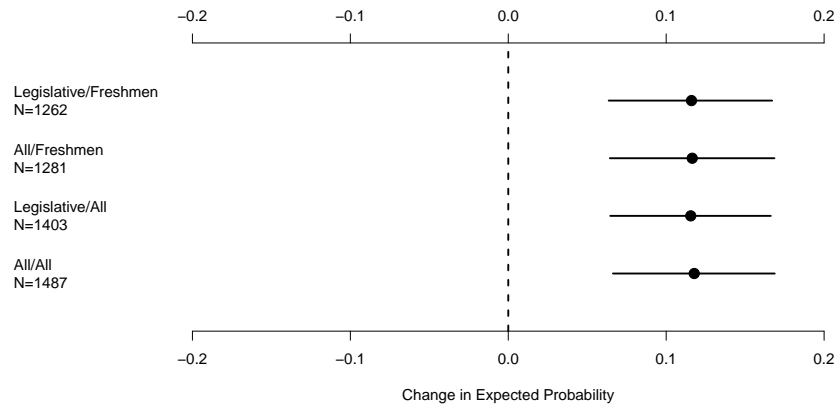
We focus on freshman assignments to the legislative committees, which contribute the bulk of the data and constitute a more homogenous set of observations. Our results are not contingent on restricting the analysis to this subset of randomized assignments. For example, Figure 2 shows estimates of the effect of moving from the least-senior to the most-senior member of a five-member randomization group on the probability of becoming a sub-committee chair. The magnitude of this effect and the precision with which

Chamber status	Exclusive	Major	Minor	Total
Freshmen	19	700	648	1367
Non-freshmen	70	64	88	222
Total	89	764	736	1589

**Table 1:** Distribution of cases by chamber seniority and committee type, 80th - 108th Congresses

it is estimated does not change meaningfully as we exclude non-freshmen assignments or assignments to exclusive committees. The results are driven by freshmen assigned to legislative committees, so we hesitate to extend our inferences to assignments to exclusive committees or to non-freshmen because of the limited amount of data available on these groups.

**Figure 2:** Effects of seniority on probability of serving as subcommittee chair for members assigned in the 80th-105th Congresses, including exclusive and/or non-freshmen assignments



Point estimates and 95% confidence intervals for change in the expected probability of becoming a subcommittee chair due to change from the least-senior to the most-senior member of a five-person randomization group. Estimates based on logistic regression results and generated by simulation from the sampling distribution of the model parameters.

## Modeling seniority effects with covariates

Randomization implies that valid estimates of the effect of differences in seniority can be obtained without controlling for characteristics of the legislators assigned in randomization groups. Including pre-treatment covariates can, however, improve the precision of estimates by accounting for variation in outcomes unrelated to the randomized treatment.

In the case of committee seniority, there are two types of covariates that one might include when modeling the effect of seniority on career trajectories. The first set consists of characteristics of individual legislators at the time of their assignment. These include the legislator’s age at the time of assignment, the margin of victory in the previous election, prior experience in state office, the size of the state, and whether the legislator requested a particular committee. As shown in the first section of this appendix, there is no evidence of a systematic relationship between these variables and the rescaled seniority ranks, suggesting that the randomization was effective in balancing pre-treatment characteristics. It is clear, however, that at least some of these characteristics are related to outcomes such as the decision to transfer off of a committee, and so their inclusion could serve to increase precision.

A second set of covariates relate to the political context in which the randomization groups are situated. One example of such a contextual covariate is queue length – the number of returning members on a committee ranking above the randomization group. Others include the congress in which randomization takes place and the committee to which members are assigned. These covariates are constant for all members within a given randomization group. We include a variable for queue length as well as committee and congress fixed effects to account for these contextual factors.

In contrast to these covariates, which are measurable at the time randomization takes place, we do not control for characteristics or events measured after ranks are assigned. To the extent that these post-treatment characteristics are correlated with the assigned ranks, including them introduces bias into estimates of the effect of the initial randomization to the extent that they are correlated with the assigned ranks.

Including covariates does not affect the substantive or statistical significance of our estimates of the effects of seniority on various career outcomes. Table 2 presents the parameter estimates and standard errors for logistic regressions with and without covariates. The results from the models without covariates were used to generate the estimated first differences reported in Figure 1 of the article. The parameter estimates from logistic regres-

sions with and without covariates cannot be compared directly, but Table 2 shows that including covariates does not produce large changes in either the coefficients or standard errors on rescaled seniority ranks.

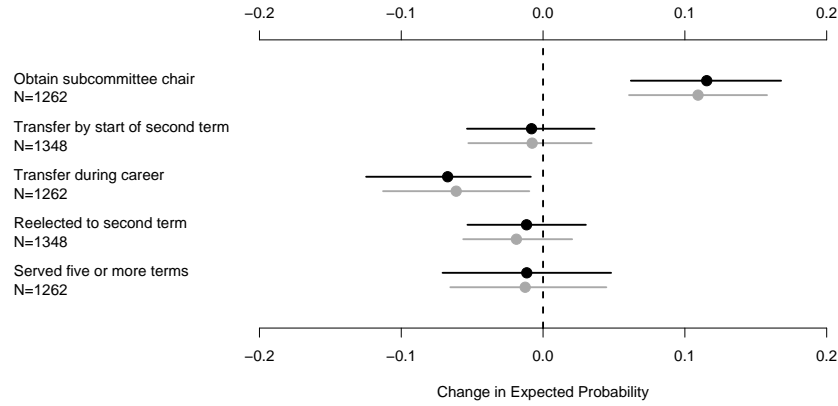
To compare the results obtained with and without covariates directly, we calculate the estimated effect of moving from the bottom to the top of a five-member randomization group for each observation in the dataset, assuming that all other legislator characteristics remained constant. We then take the mean of these expected differences across observations to obtain an average effect that is comparable to the unconditional effect estimates reported in Figure 1 of the article. These estimated effects, along with the estimates obtained without covariates, are presented in Figure 3. Point estimates generated from the two sets of models are quite similar, while the confidence intervals for the models including covariates are slightly smaller. In other words, including covariates does not greatly increase the precision of our estimates, nor does it change our inferences about the effects of seniority on career outcomes.

We also use the models estimated with covariates to provide some context for the magnitude of the seniority effect. In particular, we calculate the conditional difference in the probability of transfer between members assigned to their first-choice committee and members assigned to committees that were not their first choice, after we control for the other covariates in the model. This estimated difference, which should be interpreted as a conditional association rather than a causal effect, is approximately 0.076. This is comparable to the magnitude of the estimated causal effect of a four-unit difference in seniority, which is 0.067.

**Table 2:** Career outcomes of randomized freshmen Democrats

	Subcommittee		Transfer:		Transfer:		Served	
	Chair		1st Term		Career		>1 Term	
								Served >5 Terms
Intercept	-1.036 (0.065)	-2.691 (1.214)	-1.465 (0.070)	-1.600 (0.866)	-0.393 (0.058)	-0.101 (0.728)	1.725 (0.076)	-0.446 (1.077)
<b>Rescaled Rank</b>	<b>-0.150 (0.035)</b>	<b>-0.159 (0.036)</b>	<b>0.013 (0.038)</b>	<b>0.013 (0.042)</b>	<b>0.070 (0.031)</b>	<b>0.077 (0.033)</b>	<b>0.023 (0.042)</b>	<b>0.045 (0.045)</b>
First Choice		0.213 (0.186)		-0.506 (0.242)		-0.383 (0.182)		-0.152 (0.235)
Age		-0.010 (0.009)		-0.017 (0.010)		-0.028 (0.008)		-0.051 (0.011)
Delegation Size		0.004 (0.005)		0.014 (0.006)		0.013 (0.005)		0.021 (0.007)
Vote Share		0.011 (0.005)		0.008 (0.006)		0.015 (0.005)		0.058 (0.010)
Prior State Office		-0.210 (0.142)		0.168 (0.161)		0.275 (0.131)		0.032 (0.182)
Queue Length		-0.050 (0.026)		0.005 (0.027)		0.010 (0.024)		0.000 (0.032)
Congress Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Committee Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
-2loglik	1442	1319	1302	1128	1697	1515	1146	873
N	1262	1262	1348	1348	1262	1262	1348	1348
Note: Estimates from logistic regressions with the indicated predictors. Standard errors in parentheses.								

**Figure 3:** Estimated effects of seniority on career outcomes, with and without covariates



Point estimates and 95% confidence intervals for change in the expected probability of the indicated event due to change from the least-senior to the most-senior member of a five-person randomization group. Estimates based on logistic regression results (shown in Table 2) with (grey) and without (black) covariates. These estimates are generated by simulation from the sampling distribution of the model parameters.



### Censoring in career bill production

Estimating the effect of differences in seniority on the number of sponsored bills passed by the House presents a challenge because some members in the dataset remained active in the House after the 106th Congress, which is the last congress for which Adler and Wilkerson (2007) have made data available. To state the problem more precisely, let  $y_i^*$  be the number of bills that representative  $i$  will pass in his or her career, and  $y_i'$  be the number of bills passed through the 106th Congress. The observed data is therefore

$$\begin{aligned} y_i &= \begin{cases} y_i' \leq y_i^* & \text{if } i \text{ continued beyond the 106th Congress} \\ y_i^* & \text{otherwise} \end{cases} \\ d_i &= 1 \text{ if } i \text{ continued beyond the 106th Congress, 0 otherwise} \end{aligned}$$

Following Caudill and Mixon (1995), who model fertility outcome data for women in which some women may have children in the future, we use a censored negative binomial regression model with the following form:

$$\begin{aligned} \text{Log}L(\mu_i, \theta) &= \sum_{i=1}^n \left[ (1 - d_i) \log(f_i(y_i)) + d_i \log\left(\sum_{j=y_i}^{\infty} f_i(j)\right) \right] \\ \mu_i &= \exp(X_i\beta) \end{aligned}$$

where  $f_i$  is the negative binomial density with mean  $\mu_i$  and variance  $\mu_i + \frac{\mu_i^2}{\theta}$ . It is important to note that whether or not an observation is censored does not depend directly on the underlying value of  $y_i^*$ . Moreover, given the results in the paper regarding the effect of differences in seniority on the probability of remaining in the House, censoring does not depend on the randomized seniority ranks. The parameter estimates and standard errors for these regressions are shown in Table 3. Simulations from the sampling distributions of the parameters were used to generate the effect estimates and confidence intervals shown in Figure 3 of the article.

**Table 3:** Bill production of randomized freshmen Democrats

	All	Committee	Non-Committee
Intercept	2.408 (0.044)	1.433 (0.073)	2.076 (0.046)
<b>Rescaled rank</b>	<b>-0.019</b> <b>(0.025)</b>	<b>-0.083</b> <b>(0.040)</b>	<b>0.019</b> <b>(0.026)</b>
Theta	0.583	0.256	0.549
-2LogLik	6546	3932	5885
N	1252	1252	1252

Note: Estimates from censored negative binomial regressions with the indicated predictors. Standard errors in parentheses.

## References

- Adler, E. Scott and John Wilkerson. 2007. “Congressional Bills Project: 1947–2000.” Computer file, downloaded from <http://congressionalbills.org/>.
- Caudill, Stephen B. and Franklin G. Mixon, Jr. 1995. “Modeling Household Fertility Decisions: Estimation and Testing of Censored Regression Models for Count Data.” *Empirical Economics* 20(2):183–196.
- Frisch, Scott A. and Sean Q Kelly. 2007. “House Committee Request Data, 80th-103rd Congress.” Computer file, downloaded from <http://purple.niagara.edu/sqkelly2/Data%20Page.htm>.
- Swift, Elaine K., Robert G. Brookshire, David T. Canon, Evelyn C. Fink, John R. Hibbing, Brian D. Humes, Michael J. Malbin and Kenneth C. Malbin. 2004. “Database of [United States] Congressional Historical Statistics, 1789-1989.” Inter-University Consortium for Political and Social Research (distributor).