Influence in the United States Senate

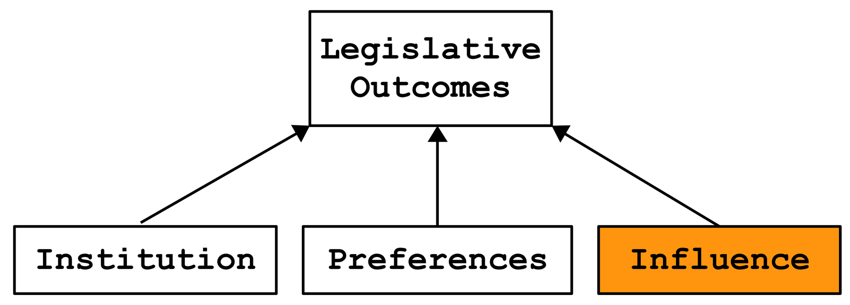
Matthew J. Denny
University of Massachusetts, Amherst | mdenny@polsci.umass.edu

Research Objectives

- Cast legislative influence in a relational framework.
- Introduce a new measure of legislative influence.
- Infer latent influence networks.
- Asses the power of the new measure in predicting legislative outcomes in the Senate.

Influence

Influence relations are a missing component in explaining legislative outcomes:

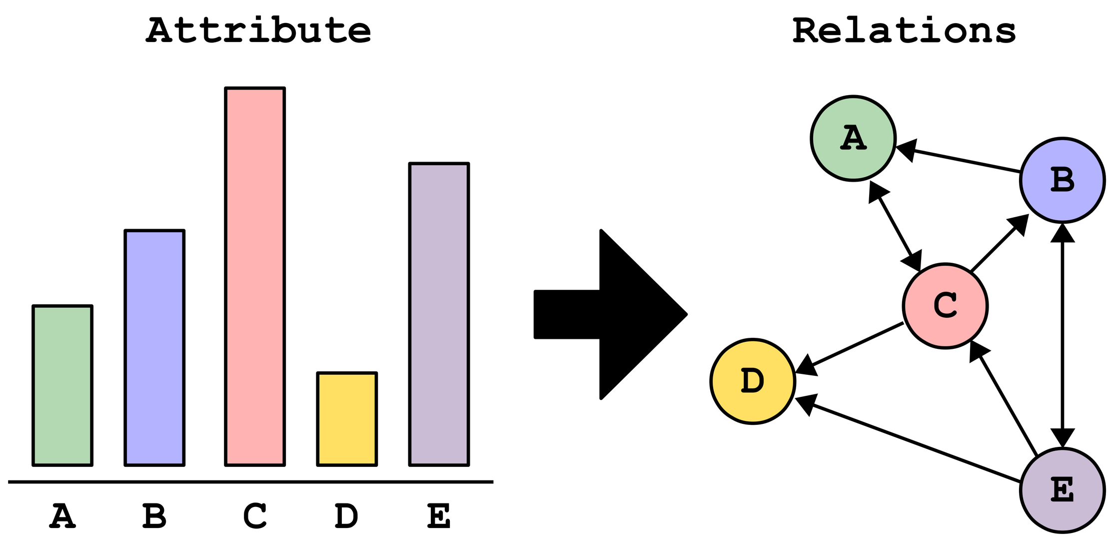


Existing Measures of Influence:

- **Floor amendments**: successfully passed by an MC (Sinclair, 1989; Smith, 1989; Weingast, 1992).
- **Reputation**: survey of legislative staffers (Hall, 1992).
- **Connectedness** (Fowler, 2006).
- **Weak ties (Cosponsorship)** (Kirkland, 2011).

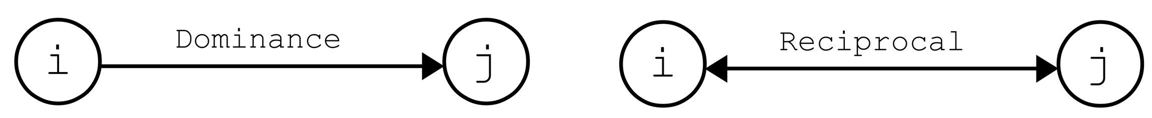
A Relational Framework

Move beyond an individual-centered conceptualization to a set of relationships:

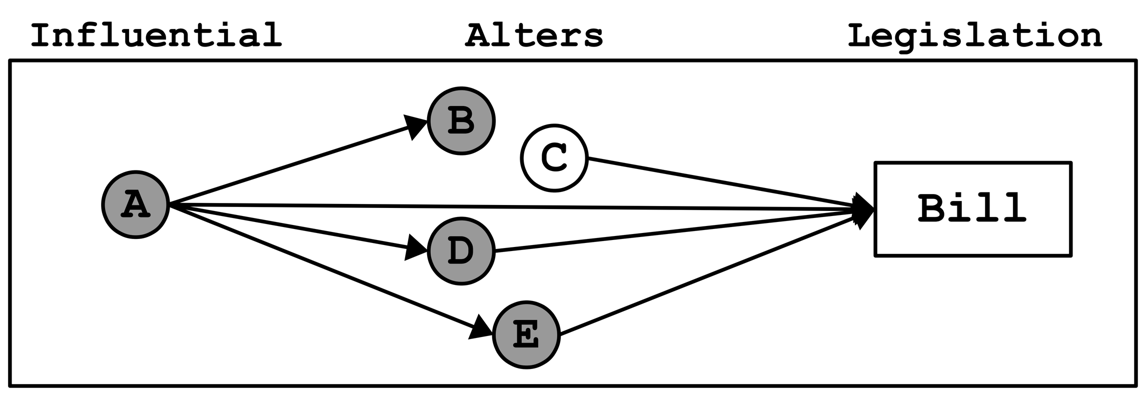


Characteristics of Influence:

- **Domain specific:** legislators hold more sway in some areas.
- **Directed:** Influence relations may be reciprocal or one-sided.



- **Failure Prone:** may not outweigh preferences.

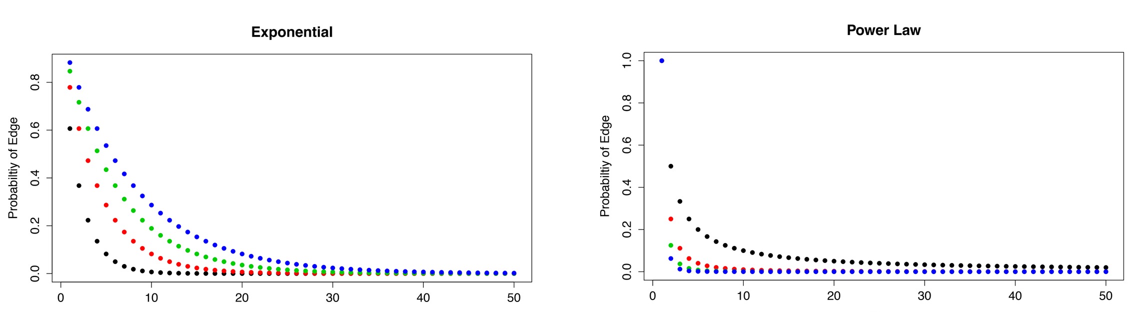


Measuring Influence Relationships

This study leverages temporal patterns in bill cosponsorship activity to infer a latent influence network using NetInf (Gomez Rodriguez et al., 2010).

- Cosponsorship of a bill results from cascade of interpersonal influence.
- Look for consistent temporal patterns in bill cosponsorship activity.
- Infer a latent influence network that maximizes the probability of observed cascades.

Under this model, we treat each sequence of bill cosponosrships as arising from an influence cascade. The model assumes that temporal distance in cascades follows a power-law or exponential distribution:



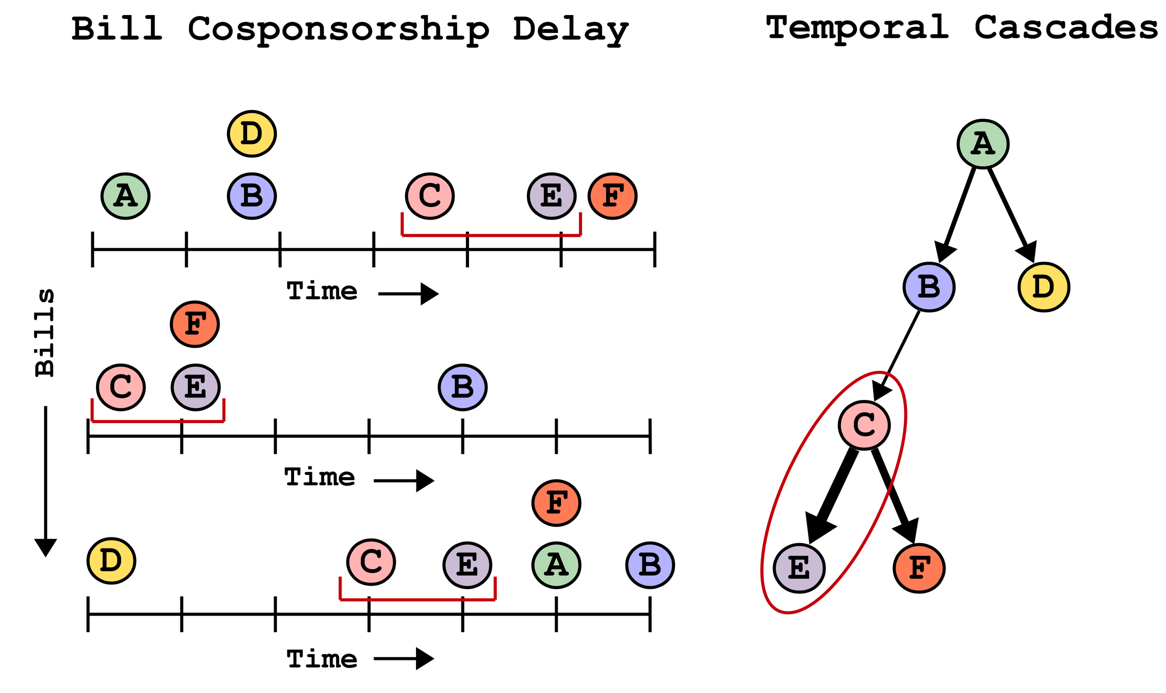
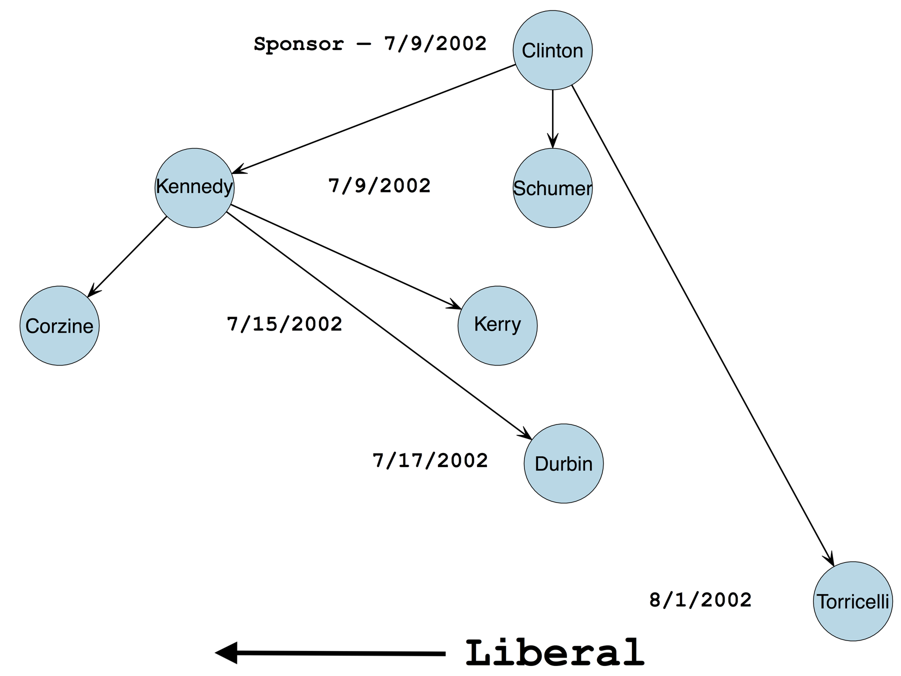


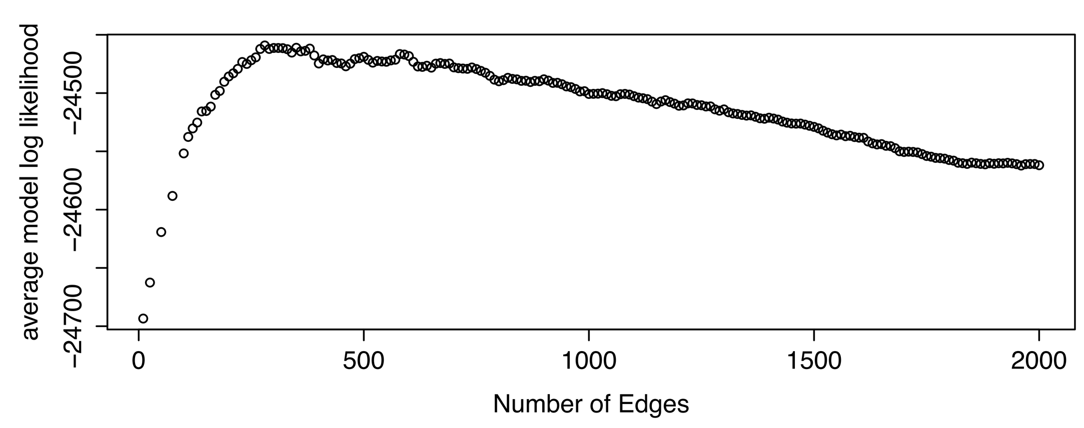
Figure: Most likely Influence cascade for S.2715, a bill to extend emergency unemployment benefits for victims of the 9/11 terrorist attacks.



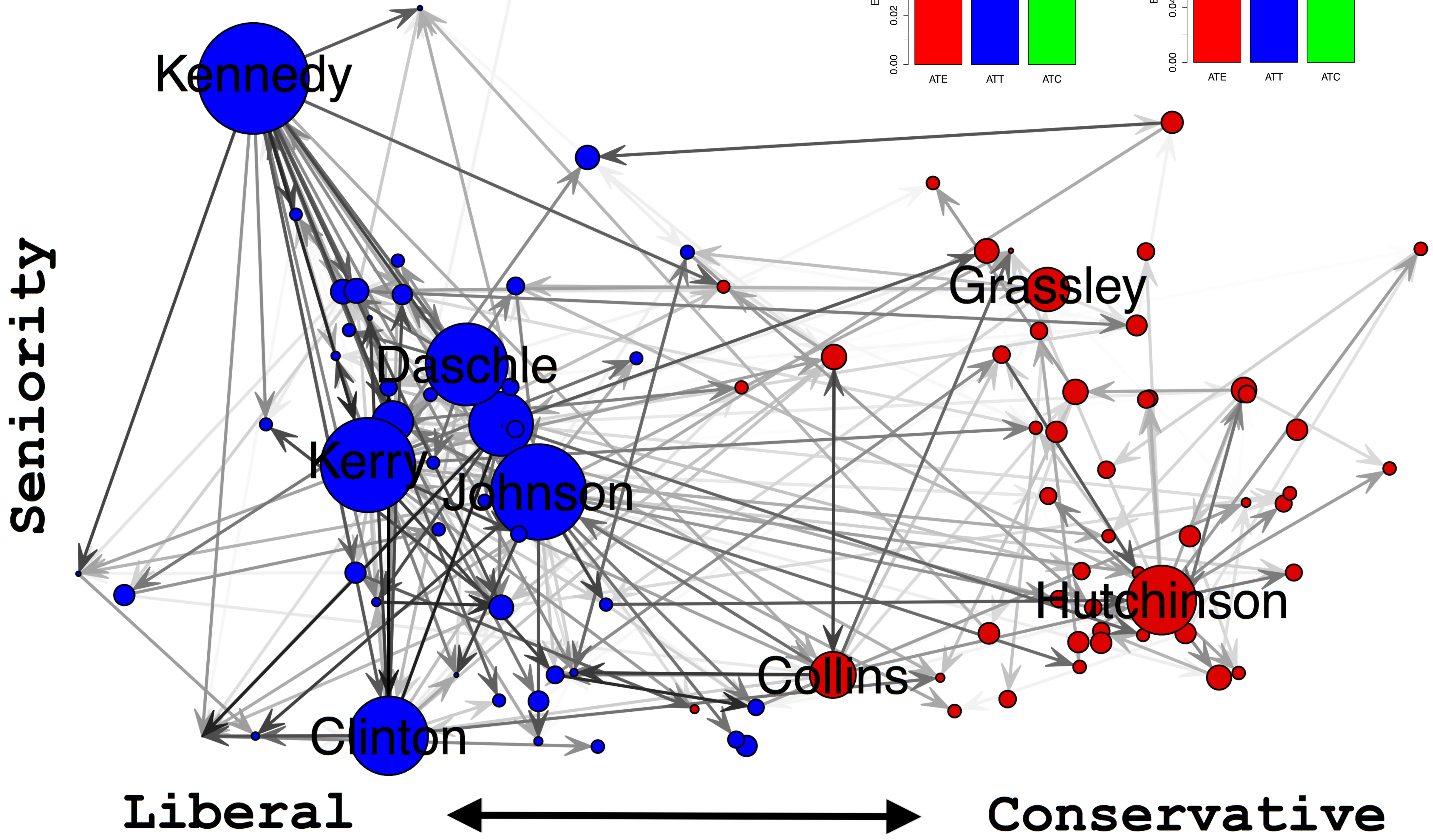
Model Selection

- Use inferred networks to predict cosponsorship timing.
- Use cross-validation with 10 splits for each congress.
- Use discrete event history model estimated with rare events logit (King and Zeng, 2001).
- Produces roughly 500x speedup vs. fully specified model.

Figure: Average held-out likelihood for 107th Senate: maximum at 298 edges.



Influence Network – 107th Senate

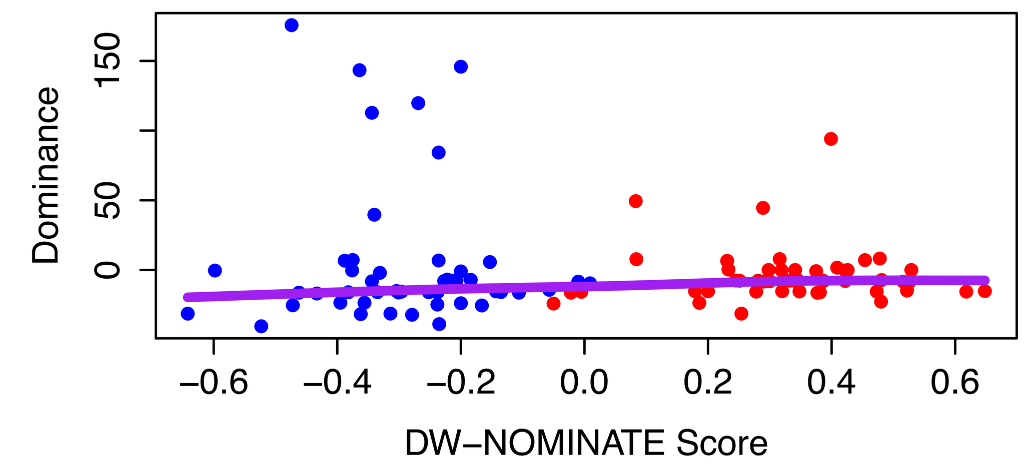


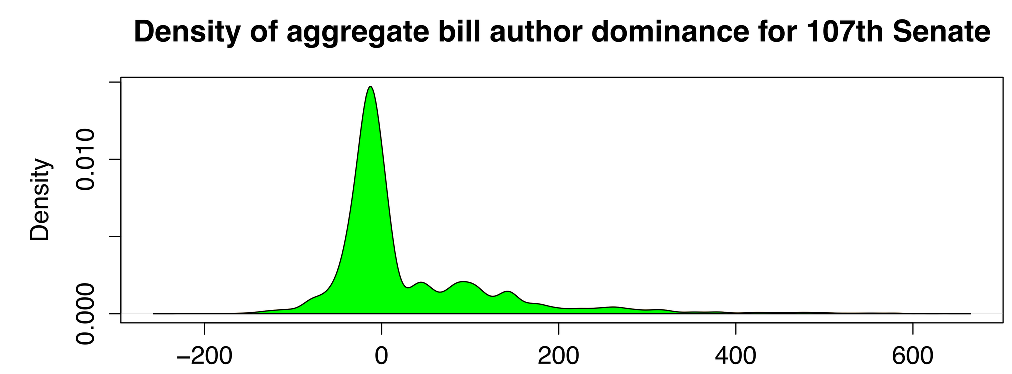
Measure Definition

Let the *dominance* influence of a legislator be their (weighted) outdegree minus their indegree in the inferred influence network:

$$D_i = \sum_{j \neq i} I_{i,j} - I_{j,i} \qquad \text{Where } I \text{ is the Influence Network} \tag{1}$$

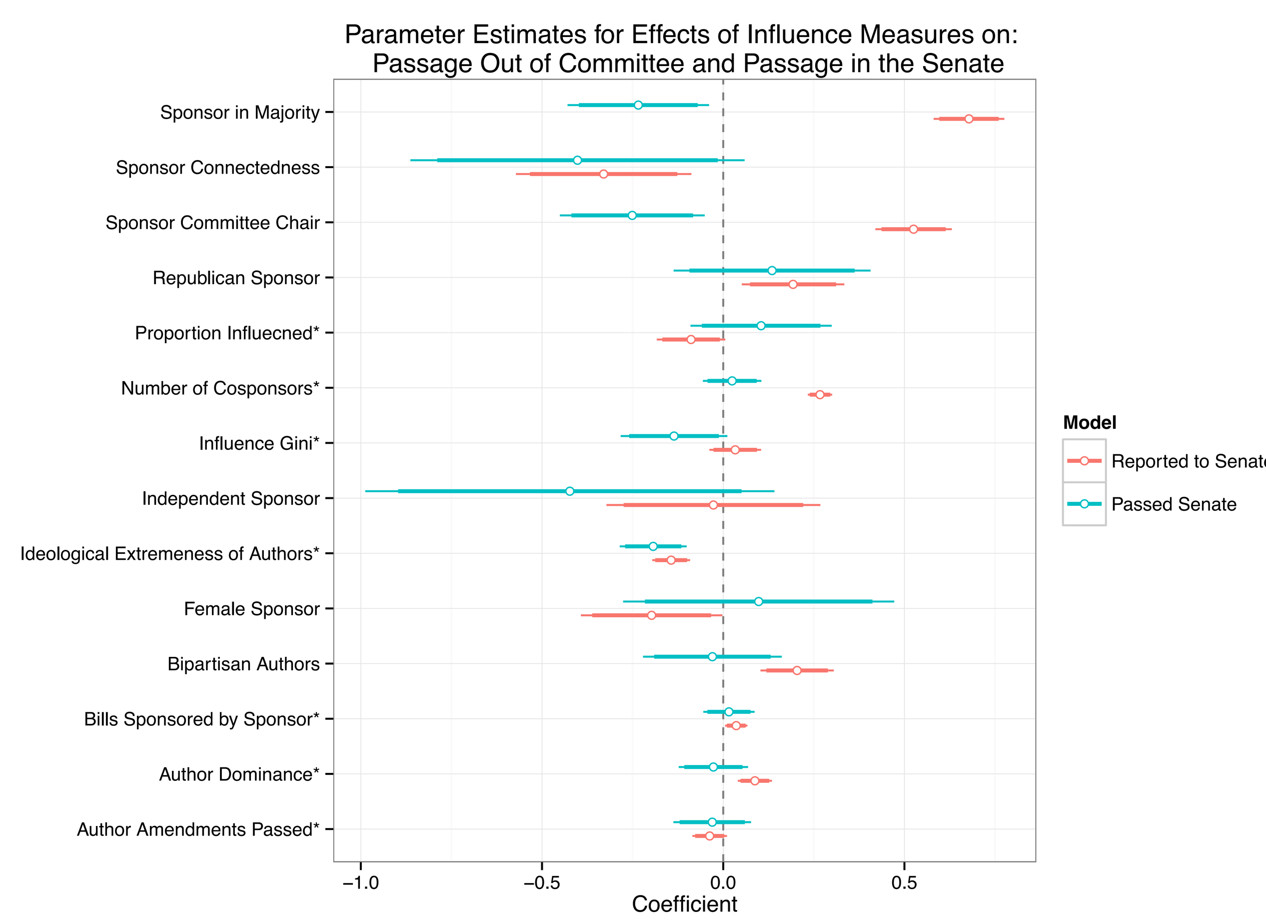
Figure: Dominance influence scores for senators in the 107th Senate.



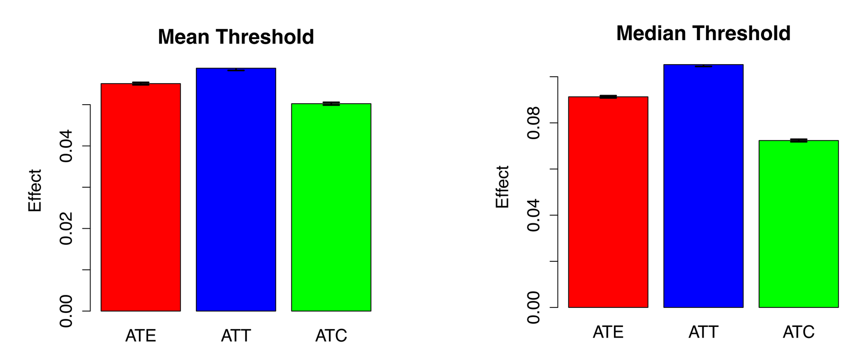


Measure Comparison

Panel models with Senator, session and bill major topic (from Congressional Bills Project) fixed effects were estimated. Passage out of Senate sample subsetted to bills that passed committee.



Estimates of author dominance effect on bill passage out of committee using mean (33.71) and median (-1.588) thresholds. Exact matching on 9 variables with a bias correction for author floor amendments passed was used[1].



Gomez Rodriguez, Manuel, Jure Leskovec, and Andreas Krause. Inferring networks of diffusion and influence. *Proceedings of the 16th ACM SIGKDD international conference on Knowledge discovery and data mining - KDD '10*, page 1019, 2010.

King, Gary and Langche Zeng. Logistic regression in rare events data. *Political Analysis*, 9 (2):137–163, 2001.

Footnotes:
[1] Matching variables included: bill sponsor gender, Connectedness, committee chairmmanship, majority party membership, and number of bills sponsored. The number of bill cosponsors, absolute difference in bill author ideology from chamber mean ideology, whether the bill had bipartisan authors and the session the bill was introduced. Exact matching reduced original sample of 35,685 bills to 30 (mean) and 33 (median) matched pairs respectively.

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INSTITUTE FOR SOCIAL SCIENCE RESEARCH
UNIVERSITY OF MASSACHUSETTS AMHERST