Influence in the United States Senate
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Research Objectives
- Cast legislative influence in a relational framework.
- Introduce a new measure of legislative influence.
- Infer latent influence networks.
- Assess the power of the new measure in predicting legislative outcomes in the Senate.

Influence
Influence relations are a missing component in explaining legislative outcomes:

- 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 Nerve (Gomes 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 cosponsorships as arising from an influence cascade. The model assumes that temporal distance in cascades follows a power-law or exponential distribution.

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

\[ D_j = \sum_i \frac{w_{ij}}{\sqrt{d_i}} - \sum_j \frac{w_{ji}}{\sqrt{d_j}} \]

\[ (1) \]

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

Density of aggregate bill author dominance for 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 selected 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.

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

Probability of Edge

0.0 0.4 0.8

Number of Edges

1000 1500 2000

Expected to 107th Senate

Average model log likelihood

Influence Network – 107th Senate

Kennedy

Daschle

Kerry

Collins

Grassley

Hutchinson

Clinton

Conservative

Liberal

Seniority

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