Social Network Analysis of Cosponsorship in the 115th Congress

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Background & Domain Info

115TH CONGRESS

2017-2018

More polarized, perceived as very partisan

Becoming increasingly diverse (gender, race, age)

Divisions along ideological, geographical, lines

SOCIAL NETWORK ANALYSIS (SNA)

Domain of statistics oriented towards analysis of connections between nodes (i.e. people)

Key ideas: algorithmic grouping of nodes, visual analysis of connections, quantifying likelihood of connection, imputing future connections, etc.

Investigation Goals

- Investigate algorithmically-observable groupings within 115th senate body
- Analyze factors significant in forming of cosponsorship ties
- Gain visual perspective on high-volume cosponsorship connections

Data & Methods

N = 105 senators
Age
Gender
Race
Party

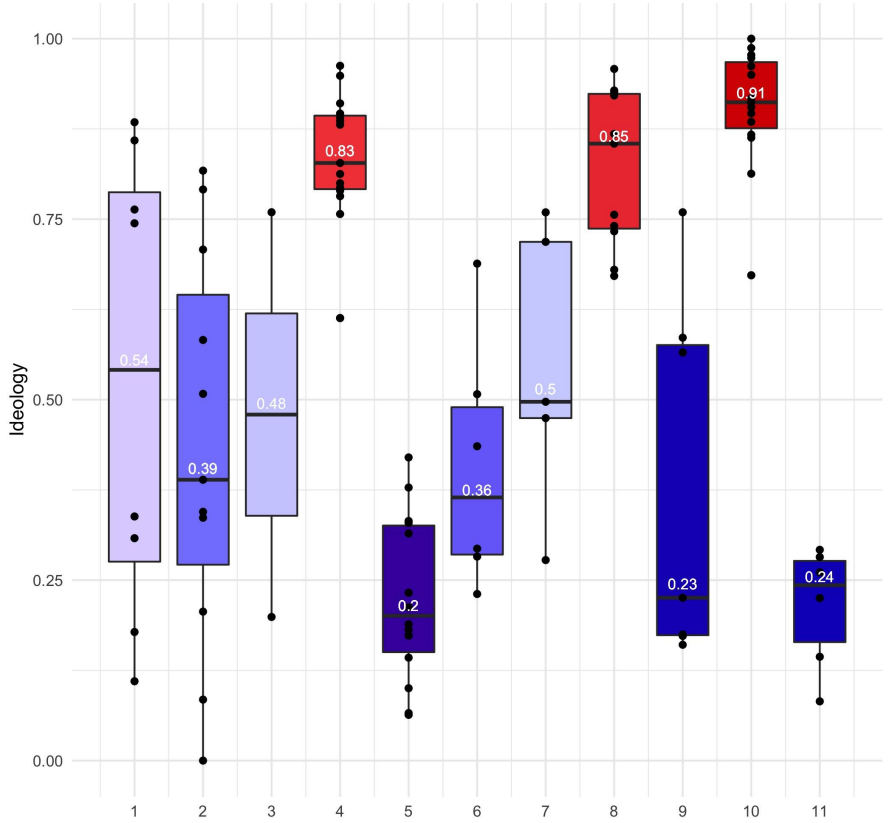
>5000 cosponsorships during 115th Congress

Stochastic Block Modeling – Exponential Random Graph Models – Visual Analysis

Stochastic Block Model

SNA algorithm to find suspected groupings

"Ideology score"



Hue indicates median group ideology score

Eleven groups, seven decisively liberal-leaning

ERGM

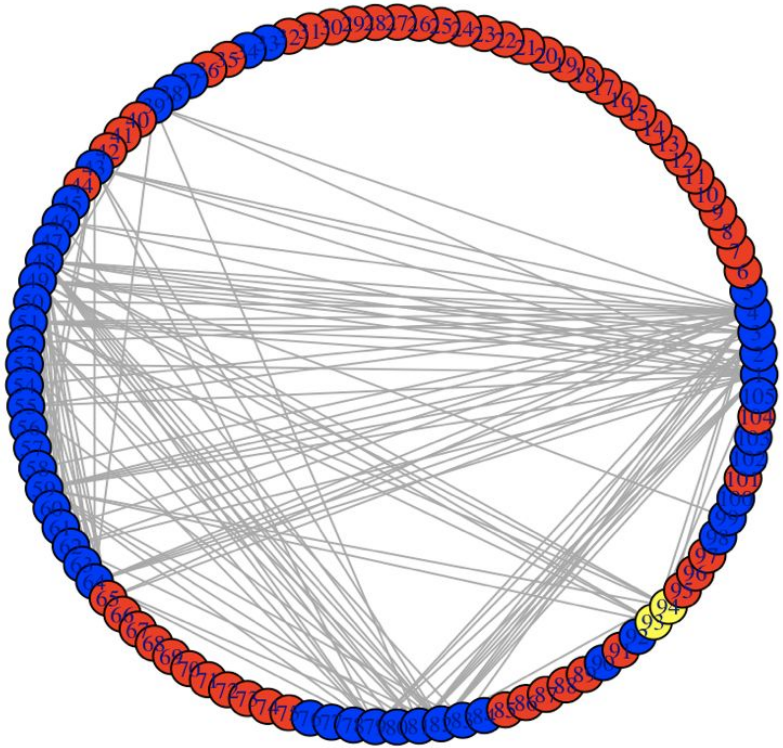
Age	**Nodecov*, Absdiff***
Race	**Nodefactor, Nodematch**
Gender	**Nodefactor*, Nodematch**

- Older senators have **lower log-odds** of cosponsoring *in general,* **higher log-odds** of cosponsoring > average # of bills.
- As age difference between senators grows, the log-odds of cosponsorship **decreases.**
- Race not a significant predictor of cosponsorship
- **Asian senators have lower log-odds** of cosponsoring > average # of bills, **hispanic senators have higher log-odds.**
- Male senators have **higher log-odds** of cosponsoring with other senators.

Visualization

Edge represents >150 bills cosponsored (greater than average volume)

Nodes colored by party



Organized algorithmically

Shaped for interpretability

Analysis & Conclusions

Party Collaboration

Not rated significant in ERGM

In highly-weighted network, some interesting trends

SBM shows bipartisan groups lean liberal

Demographics

Male senators shown with higher log-odds of cosponsorship in ERGM

Race not rated significant, but interesting trends emerge

General Ideas

ERGMs, SBMs, and SNA visualizations rely on algorithmic understanding of relationships.

Digging deeper will make these trends more clear.

Implications & Looking Forward

House of Representatives Data

Future classes of Congress Members

Link prediction in Congressional networks

Accounting for committee work, geography, etc.

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