

Modeling Polarization Dynamics in U.S. Senate Bill Cosponsorship Networks

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Political polarization is rising globally, driving both individuals and their elected representatives to the extreme ends of the political spectrum. We assess polarization in the U.S. Senate by analyzing bill cosponsorship patterns from 1988 to 2023 across 12 policy issues. Senators signal their support for a bill proposed by other senators when they cosponsor it. Countervailing factors determine their willingness to cross party lines to embrace bipartisan lawmaking: allegiance to one's party, i.e. being a team player, inhibits cosponsoring with senators from a different party; on the other hand, seeking legislative productivity incentivizes collaboration to amass sufficient votes to pass bills. We model the bill cosponsorship network as evolving bipartite graphs of senators connected to bills which is projected to a unipartite network of senators who cosponsor bills together. The resulting edges could be either homophilous/partisan (within the same party) or heterophilous/bipartisan (across parties). We hypothesize that heterophily is declining because the penalty for cooperating with out-group parties has risen in a polarized society, which in turn causes partisan gaps to widen, especially on contentious policy issues. Our model accounts for the rate and level of partisan polarization by measuring the number of same party and cross-party edges with respect to congressional sessions and policy issues. In the figure below, we identify different partisanship trends for Democrat and Republican senators on issues such as abortion, climate change, and housing before and after the rise of the Tea Party Caucus which was formed in 2010. This network model formulates an abstract representation of a legislative body as temporal graphs—which undergo node replacement at each election cycle—and continuously reassess the level of bipartisanship activity as a proxy for quantifying polarization.

Bipartisan Cosponsorship Republicans vs Democrats

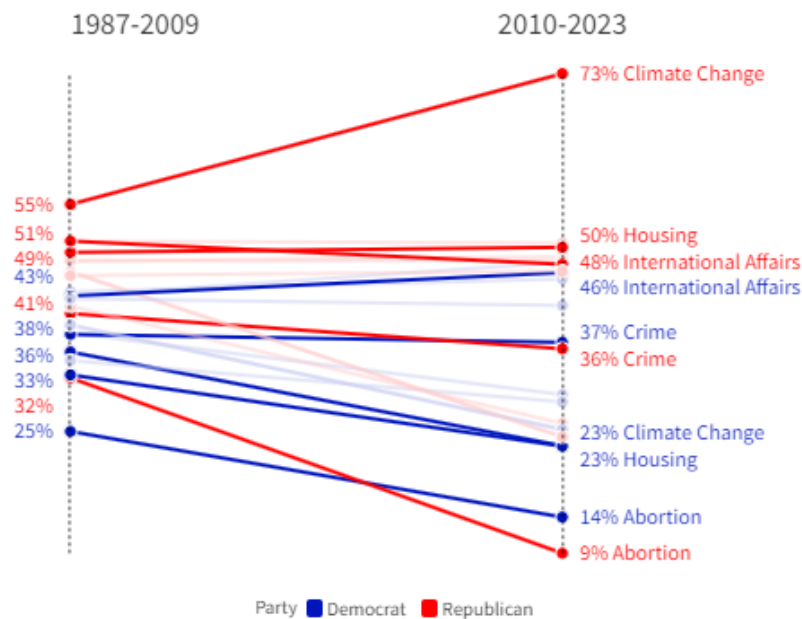


Figure 1: Change in percent of cross-party edges by policy issues and party