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Network Regression on Cosponsorship and Religion in United States Congress

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Abstract
Given the recent surge in identity politics, we explore the effects religion has on the legislative agenda. In mapping all 70,000 pieces of legislation from the 112th (2011-2013) and the 117th (2021-2023) Congress, we infer a series of political relationships among legislators, which we then use to test; (1) If religion influences cosponsorship in the congressional network? (2) If that influence has changed in the last 10 years? We find evidence that in recent years, religious identity affects legislature's cosponsorship behavior. This analysis suggests a positive trend in religion-based polarization in the United States Congress.

Keywords
Cosponsorship, Networks, Religion, Polarization

Introduction

Extensive literature supports the importance of cosponsorship as the core activity in building the legislative agenda. As Schiller (1995) outlines, sponsorship is one of the few legislative activities which legislators have almost total control. Legislatures can decide to introduce and support legislation that appeases their constituents, progresses

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their political career, and initiates institutional change on a variety of policies. While legislators can be thought of as individual sponsoring and cosponsoring bills, when combined the collaborative process of agenda setting reflects shared interests and communal values. The agenda setting stage is believed to be critical in the legislative process due to its ability to control or manage what issues gain government attention.

As cosponsorship is the most used tie in the legislative network, there is a growing body of literature that explores a variety of identity based characteristics on cosponsorship networks. This research has focused primarily on political identities (i.e. partisanship and political ideology) [should i cite who?] and visible identity characteristics (i.e. age, race, gender, and ethnicity). Both have provided extensive support of Huckfeldt's (1984) claim that one's community and one's individual characteristics influence their political actions.

However, existing scholarship falls short on researching the effects of religious affiliation on the congressional cosponsorship network. Given its intrinsic function as a core component of an individual's identity and its known effect on political ideology (Mctague & Pearson-Merowitz 2013), there is a theoretical framework that religion influences legislators actions. This paper provides empirical evidence on how the congressional cosponsorship network is affected by legislators' religious identity.

In this paper, we examine the United States 112th Congress (2011-2013) and the 117th Congress (2021-2023). Data on sponsorship and cosponsorship (roughly 30,000 bills each session) is used in conjunction with network analysis to model the influence of religion in each respective session. We then cross compare the resulting networks to understand how the effect of religious affiliation on congressional ties has changed over the past ten years. With this, we also contribute to the existing body of literature on recent trends in polarization, specifically the growing political division created by religion.

Literature Review

Co-Sponsorship used to Model Congressional Networks

Across disciplines, there is extensive literature supporting the effects of social networks, characterized by friendship, support, acquaintanceship, and communication on individual decisions. Rice (1927) began the earliest attempts of modeling the social network of United States Congressional Representatives by analyzing roll-call votes. Roll-calls are simply the act of voting yes or no on a measure presented before the Congress. Studies have found that this action is more reflective of the individual's ideology or preference in the moment, rather than having any significant pressure from a network (Fowler 2006). Scholarship since have used a variety of connectors to tie legislatures; participant interviews, questionnaires, social media interactions, campaign finance, presence at common events, and most significantly to this study; cosponsorship.

Cosponsorship has become the most common strategy for indirectly inferring legislators' relations and has been used to examine both state and federal bodies throughout the world (Neal 2020). The bill sponsorship system in the United States is designed with one "primary sponsor" which is the legislator who introduces the bill. Despite the fact that some bills are coauthored, there is only one formal primary sponsor, the rest of the legislators who sign their support to the bill are cosponsors. Schiller (1995) argues that bill sponsorship is one of the few activities over which legislatures have almost total control. This is the means by which legislators can introduce and support legislation that appeases their constituents, progresses their political career, and enact change on a variety of policies.

While "legislators can be thought of as individually sponsoring and cosponsoring measures, agenda setting as an institutional exercise is an activity that reflects shared interests and certainly involves interaction among legislators." Bratton & Rouse (2011, pg424) Literature further defends the idea that legislative power of cosponsorship through

its ability to set the agenda. Agenda setting is the process by which policymakers effectively control or manage the issues that receive political attention. While most bills do not pass and less than 4% receive cosponsors, the sponsorship process determines what issues are on the table and therefore subject to institutional change.

Using cosponsorship data as a tie to connect legislatures in the Congressional network was largely pioneered by Fowler (2006) when he discovered that analysis normally focuses on which bills legislatures will support rather - than which legislatures will support which legislatures. He then used social network analysis to examine cosponsorship from 1973 to 2004 in the US Congress. Crafting a measure of connectedness, he found that well-connected legislators are more successful at passing amendments and gaining support in roll-call votes, a frequent indicator of political influence. Gross (2007) uses a multilevel approach to examine potential social factors on the varying odds of cosponsorship between legislators in the network. He finds that ideological similarity, being from the same state, and sharing committee assignments increase the likelihood that a legislature will support a colleague's bill (further supported by Zhang et al., 2008; Bernhard and Sulkin, 2009; Cho and Fowler, 2010).

Co-Sponsorship used to Model Congressional Networks as it Relates to Identity

There is also a growing body of evidence that core characteristics of a legislature's identity has an effect on the congressional network. "This tendency, often described as "birds of a feather flock together," is prevalent across social networks in a variety of contexts, from friendship groups to schools and businesses", creating a strong likelihood of its prevalence in congress (Craig et al 2016 pg 2). This connection to the congressional network began with Huckfeldt (1984), who originally theorized that one's community and individual characteristics influence the way they interact in the political sphere. This

laid the foundation to an investigation into the effects of race, gender, and ethnic identity on cosponsorship in the congressional network.

The existing literature on the effects of homophily (similar characteristics such as race, gender, and ethnicity) are somewhat split by majority and minority status. Bratton & Rouse (2011) examine numerous social determinants within the cosponsorship network of state legislatures. Their conclusions on the effects of gender and race on legislators' general propensity to cosponsor varied by state. They found strong correlations between homophily and cosponsorship in Texas and California but moderate effects in the other states of interest. However, when they factored minority status into the equation they found a strong correlation in every state legislature. This means that women, Latinos, and African-Americans were relatively more likely to endorse the proposals of others who shared their respective minority status. While they can only hypothesize, Bratton & Rouse suggest that Social Identity Theory explains these results.

Barnes (2016) examines the structure of the legislature to see if women are excluded from the "men's club". In doing so, provides extensive background on what encourages women to collaborate in the political sphere. Her analysis concludes that women cosponsor more legislation than men and a larger proportion of their sponsors are women. This provides evidence that women are relatively more likely to cosponsor measures introduced by other women. Wojcik & Mullenax (2017), using survey based evidence from Brazil's Chamber of Deputies, argue that female representatives engage in higher rates of intragender networking. This means that women have more profuse and diverse legislative networks than male representatives. Combined these findings support the idea that networks are affected by gender identity.

Rocca & Sanchez (2008) challenge those conclusions with regards to race and ethnicity. They find that on average Black and Latino legislators sponsor and cosponsor significantly fewer bills in Congress than do Whites and non-Latinos, respectively. They

attribute this conclusion to the systematic disadvantages in resources and the resulting desire to support one's own group. Craig et al (2016) study the U.S. House cosponsorship network from 1981 through 2004, to highlight the reality faced by minority groups. They find that Black and Latino members of congress are at a comparative disadvantage of race-based assortative mixing in the cosponsorship process. This literature supports the idea that race and ethnic identity affect the congressional cosponsorship network.

The findings for cosponsorship based on homophily are further explained through the psychological principles of the Social Identity Theory. Tajfel (1979) concluded that the process of categorizing oneself as a group member creates a positively valued social identity. Once allegiances have been set, individuals will allocate more resources to the in-group to maximize the benefits they have over the out-group. Psychologists in the years since have discovered this to be especially true as it relates to minority groups - women, Latino, and African-American legislators. Due to the systematic disadvantages the individuals in these groups face they are more likely to support those within their respective social group.

Existing Literature on Religion but NOT *CoSponsorship / Religion Networks*

The literature on congressional cosponsorship networks is vast and studies regarding the effects of gender, race, and ethnicity are becoming increasingly more abundant. However, there is very little (if not any) research on the ways in which religion influences the congressional cosponsorship network. This is quite surprising.

Religion is a core component of a legislature's identity, for some as intrinsic as their sex or race, and for others entirely intertwined with their ideology. Given this nature, we should expect a legislator's religious affiliation to have a significant effect on their political decision. Research has shown it does. Mctague & Pearson-Merowitz (2013)

highlight the ways in which religion affiliation can predict party affiliation (with Jews representing the most liberal, Catholic and Protestants representing the moderate, and evangelical Christians representing the furthest right). They also explain that the recent growth in partisan polarization over cultural and ideological issues only increases the tendency to follow one's religion to a political party. Religion is therefore an intrinsic identity that divides individuals into an in-group and an out-group. This provides evidence that religion has the potential to function exactly like sex, race, and ethnicity. With that we have created three hypotheses to fill the gap in literature on religion within the congressional cosponsorship network.

H1: (general) Legislators will be more likely to cosponsor measures sponsored by colleagues with the same religious affiliation.

H2: (minority group) Those belonging to religious minority groups will be relatively more likely to cosponsor measures introduced by another members of the same religious minority (ie Jewish legislators will be more likely to cosponsor bills introduced by other Jewish legislators)

H3 (increased polarization) There will be a stronger effect of religion (measured by legislators being more likely to cosponsor measures sponsored by colleagues with the same religious affiliations) in the 117th Congress compared to the 112th Congress.

Research Design

There is a lack of research on how religion affects the relationships between legislators, as discussed above, and this paper looks to address this gap. To understand the relationships between members of congress we use cosponsorship as a measure of positive relationships. Cosponsoring another member's bill is a sign of shared morals, values, and opinions in a directional manner as cosponsoring a person's bill is a sign of support, which does not inherently mean that bills writer supports the cosponsor. So

our paper is using cosponsorship as a measure of similarity and positive relationships between members of Congress.

Recently there has been evidence that polarization has increased as culture wars and identity politics become more prevalent; however, very few of these papers look at religion. So to understand how religion has changed over time we are looking at the 112th and 117th congress'. These congresses were chosen because the 112th ran from January 3, 2011 to January 3, 2013, which was after the financial crisis but before the election of Donald Trump. Thus it seemed to be a suitable 'control' case for how religion affects cosponsorship. Then the 117th congress was chosen as it is the most recent congress to finish a full session running from January 3, 2021 to January 3, 2023. So at the time of this writing it is the most recent complete congress we can access cosponsorship data on. These sessions are also direct mirrors of each other with the 112th having a Democratic President and Senate with a Republican House and the 117th having a Republican President and Senate and a Democratic House. So both of these congresses have similar groups of control in the separate branches.

We are using two sets of models to assess the effect of religion. The first set of models is to assess (x) hypothesis. This model is a network regression model as such:

$$consponsorship = B_1(relgion) + B_2(party) + B_3(ideology)$$

and we expect religion to be statistically significant for the 117th congress but not the 112th congress. We do not expect party or ideology to be statistically significant, as they are simply controlling for other factors that may affect cosponsorship.

The second set of models is to assess (x) hypothesis. For this we are again running a network regression model, but this time with similarities in religion being variables

separate from the whole religion variable:

$$cosponsorship = B_1(catholic) + B_2(jewish) + B_3(other)$$

$$+B_4(protestant) + B_5(unknown)$$

and we expect Jewish and Other to be statistically significant as these are the minority groups in congress. But we do expect both of these categories to be statistically significant in both the 112th and 117th congress. We will also run this model with the controls of party and ideology to see if they change the results:

$$cosponsorship = B_1(catholic) + B_2(jewish) + B_3(other) + B_4(protestant)$$

$$+B_5(unknown) + B_6(party) + B_7(ideology)$$

Data and Networks

We pulled data from three main sources to build two networks with different edge level covariables of congresspeople: the Pew Research Center, Congressional Website on Cosponsorship, and Voteview (which are discussed in depth in the data collection section). The first network is of the 112th Congress with every congressional member in that session being a node. The second network is the exact same setup except with the 117th Congress. In both of these networks the ties are of cosponsorship with a tie being a member cosponsoring another members legislation and these ties are binary, directed, and exclude self-ties.

Within each of these two networks there are three edge level covariables: religion, ideology, and party. Religion and party are both binary undirected ties that exclude self-ties with ideology being the same except being a weighted tie.

Dependent Variable

The dependent variable in our model is `cosponsorship`, which is measured as a binary and directed tie between two congresspeople. Ties are binary with any example of cosponsorship between two members given a 1 and the lack of the behavior given a 0. This paper considers legislation to be any of the following proposals in both the House and the Senate: Bill, Joint Resolution, Concurrent Resolution, and a Simple Resolution. There is precedent for using all four of these types of proposals as legislation(citation); however, we also use all of them as this gives us the largest and most expansive amount of data to work with.

In the 112th congress there are 531 members with a total of 31706 total cosponsorship ties between members, with most members cosponsoring multiple pieces of legislation (93.4 percent). There are only three members cosponsoring no legislation. The member who cosponsored the most legislation in the 112th was Stephen Fincher who cosponsored 200 bills.

In the 117th congress there are 535 members with a total of 35826 total cosponsorship ties between members, with a slightly higher majority of members cosponsoring multiple pieces of legislation than in the 112th (96.6 percent). There are still two members who do not cosponsor any legislation. In the 117th the member who cosponsored the most legislation was Jennifer Wexton with 215 bills. Together across these two congresses there is a large swath of legislation allowing us to get a full picture of cosponsorship in these two sessions.

Independent Variables

There are three independent variables used in our model: `religion`, `ideology`, and `party`. While `religion` is the one we are focusing our attention on, as there is a large gap in the literature surrounding it, we decided to include `ideology` and `party` as

other independent variables as we believe that religion, ideology, and party of members are intertwined in the relationships that are formed.

Religion

The first, and most important of our Independent Variables is `religion`, which is measured using CQ Roll Call questionnaire which asks members of the House and Senate identity based questions such as their religion. With this, each member reported their religious affiliation; however, there are a wide range of different religions across Congress so we reduced these categories into smaller ones in order to better analyze the effects.

In the 112th congress members reported 38 different religious affiliations amongst them with only a slight decrease to 24 in the 117th. But many of these categories of religion either only include a handful (or oftentimes only 1) of members or fall under broader religious categories. To deal with this we used the Pew Research Centers methodology to determine what religions could be categorized under larger ones, and ended with five main religious groups: Catholic, Protestant, Jewish, Other, and Unknown.

For the 112th congress we reduced 4 of the original religions categories reported to Catholic: Anglican, Anglican Catholic, Roman Catholic, and Unitarian. All four of these religions are either Catholic in and of themselves, follow the same beliefs as Catholicism, or are an offshoot of Catholicism. We then continued this process for the other four categories. We reduced 25 religious categories to Protestant, 1 religious category to Jewish, 6 religious categories to Other, and 2 categories to Unknown. The most interesting category is Other with there being Quakers, Nazarenes, Greek Orthodox, Mormon, Buddhist, and Muslim.

For the 117th congress there were 24 broad religious affiliations with 2 groups categorized as Catholic, 13 religious categories reduced to Protestant, 1 to Jewish, six

to Other and 2 to Unknown. The Other category is made up of Unaffiliated, Buddhist, Hindu, Mormon, Muslim, and Nondenominational. Across both sessions of congress when two members belong to the same of these five groups they are given a 1 and they are given a 0 if they belong to different groups. For breakdowns of members into religious groups see Figure 5.

Ideology

The second independent variable in our model is `ideology`, and to measure ideological similarities between members we used DW-NOMINATE scores. NOMINATE is an acronym for Nominal Three-Step Estimation and is often used to quantify political ideologies of people, parties, and political institutions. We will be using the first dimension, which is measured on a scale from -1 to 1 on a liberal-conservative scale, as this dimension quantifies a general political leaning without looking too intricately at specific policies. On this scale a -1 describes an extreme liberal and a 1 describes an extreme conservative.

In our model we calculated the absolute value of the difference between DW-NOMINATE scores between members with members who were very similar in ideology would have a close to zero score and members with extreme ideological differences would be close to 2. For the 112th congress the most liberal member was Barbara Lee with a score of -0.679 and the most conservative member was Paul Broun with a score of 0.913. This is a smaller range than the 117th congress, with an average score of 0.078, which shows a conservative lean. The average difference between members was 0.496.

For the 117th congress the members ranged in score from -0.811 on the liberal end with Sylvia R. Garcia to 0.936 on the conservative end Tommy Tuberville. The average of scores in the 117th congress is 0.061, which shows a slight conservative lean in this session. The average difference between members was 0.519, which is relatively

large and an increase from the 112th congress. This may point towards an increase in polarization discussed in other papers.

Party

The final independent variable in our model is `party` which refers to the political party of the members. This is measured as either Republican, Democrat, or Independent; however there were only two independents for both sessions respectively so we recategorized each of them according to what their beliefs most closely aligned with.

In the 112th congress there were two members who identified themselves as Independents which were Joseph I. Lieberman and Bernard Sanders. Both of these members have sincere left leanings, as confirmed by their DW-NOMINATE scores of -0.205 and -0.538 respectively. Because of these leftist inclinations we recategorized both of them as Democrats to allow for a more complete analysis.

In the 117th congress there were again two people who identified themselves as Independents: Angus King and Bernard Sanders. As we have already discussed Sanders was recategorized as a Democrat in the 112th congress and the same process was conducted to recategorize him as a Democrat again. We did the same process with Angus King, and after confirming his DW-NOMINATE score of -0.161 we recategorized him as a Democrat.

If two members are a part of the same party they receive a 1 and if they are not they receive a 0. So if both members are Democrats then they will receive a 1 and if both members are Republicans they will also receive a 1; however if there is any difference such as one Republican and one Democrat then they will receive a 0.

Data Collection

To aggregate data on cosponsorship we used the `incidentally` package which automatically goes through congress's website to get data on legislators' bill sponsorship

and cosponsorship activities. To aggregate data on the religion of members we used two documents collected by the Pew Research Center for both the 117th and the 112th congress. These documents from the Pew Research Center also had information on the party affiliation of members, which allowed us to aggregate the data easier. Then for the other independent variable of DW-NOMINATE we used the website voteview to collect each member's scores.

The only issues with our data collection were that there were a few members of congress who were present in other datasets but not in the initial pull of religions. Since we based our network off of the religion datasets, we were required to remove around 3-5 senators from the cosponsorship and DW-NOMINATE datasets.

Methods

After running our two sets of models we were pleased with many of the results. For the first set of models, which looked to predict if religion affected cosponsorship in members of Congress we found that it did affect them during the 117th session but not for the 112th. Table 1 shows our findings for the 117th, which are that we have statistically significant evidence (alpha = .05, p-value = 0) that religion is affecting cosponsorship of the 117th congress after accounting for party and ideology. However, we do not find the same evidence that there is an effect of religion and cosponsorship in the 112th congress. See table 2 and 1 for results of the 112th and 117th congress respectively.

For the second set of models, which looked to assess specific religions to see if they affected cosponsorship, we found that for the 112th congress none of the religious groups were statistically significant (see table 3). This means that in the 112th congress we do not have evidence that minority religious groups in congress were more likely to cosponsor legislation with other legislators in their same group. We also did not find evidence that non-minority religions, Catholic and Protestant, were more likely to cosponsor legislation

with fellow Catholic or Protestant members. We also ran this model with the inclusion of the control variables of party and ideology, but the results did not change, and thus are only including the model without them to lower our R-squared.

However, when we moved to the 117th congress we found that all of the religious groups were statistically significant (see table 4). This means that for this congress we have evidence at the .05 alpha level that people are more likely to cosponsor legislation with other members within their religious group, no matter if they are a minority or majority religion. We again also ran this model with the inclusion of the control variables of party and ideology, but the results did not change.

Conclusion

As individual identity is becoming increasingly more politicized and therefore polarized, it is important to understand its effects on the legislative agenda. In this paper, we have focused on the United States 112th Congress (2011-2013) and the 117th Congress (2021-2023) to understand how the effect of religious affiliation on congressional ties has changed over the past ten years. This analysis provides empirical evidence on how the congressional cosponsorship network is affected by legislators' religious identity.

Given the split result by congressional terms, two major conclusions can be drawn from this research. First, the network analysis of the 117th Congress provides evidence that religious affiliation has an effect on the cosponsorship network. This effect is notably significant regardless of minority and majority status. Practically, this means legislators will be more likely to cosponsor measures sponsored by colleagues with the same religious affiliation. These findings imply the effects of religion are comparable to other key identity characteristics as discovered in existing reports [site most relevant sources].

Secondly, the inconclusive results for the 112th Congress provide evidence that religion did not have a statistically significant effect on the cosponsorship network in

2011 to 2013. While this challenges the general hypothesis that religion would impact the ways in which legislatures collaborate, it does mean religion's effect on the congressional network is a relatively new phenomenon. This, in turn, provides evidence for increased political polarization based on religion.

While this study is not the first to limit the scope of congressional terms [see Bratton & Rouse and others], it is important to note when establishing trends. Future research should focus on the 10 years between our findings to find the exact shift of religion's influence on congressional cosponsorship.

Even despite this limitation, there are substantial practical implications for this paper. Firstly, it bridges the gap between existing literature on general cosponsorship and the effects of identity on congressional behavior. Our paper builds on both to say that religion influences the ways in which legislatures collaborate and therefore collectively build the legislative agenda. This provides a new avenue of research for future scholars. More notably, this paper points to the future of Congressional politics, eliciting more questions about the mechanisms that lead to polarization. How is the greater public impacted when legislatures are influenced by religion when deciding what issues receive government attention?

Bibliography

Tables, Figures

```
Coefficients:
                    Estimate Pr(<=b) Pr(>=b) Pr(>=|b|)
Intercept           0.10     1.00    0.00    0.00
Religion Ties       0.00     0.22    0.78    0.51
Party               0.01     0.86    0.14    0.24
DW Nominate Scores 0.02     0.79    0.21    0.44

Residual standard error: 0.3159 on 285686 degrees of freedom
Multiple R-squared: 0.0001194   Adjusted R-squared: 0.0001089
F-statistic: 11.37 on 3 and 285686 degrees of freedom, p-value:
```

Figure 1. Model for measuring religious effects of cosponsorship in the 112th session.

```
Coefficients:
                   Estimate Pr(<=b) Pr(>=b) Pr(>=|b|)
Intercept          0        0.00    1.00    0.00
Religion           1        1.00    0.00    0.00
Party              0        0.58    0.42    0.78
DW Nominate Scores 0        0.87    0.13    0.31

Residual standard error: 2.401e-12 on 281426 degrees of freedom
Multiple R-squared: 1   Adjusted R-squared: 1
F-statistic: 3.876e+27 on 3 and 281426 degrees of freedom, p-value:
```

Figure 2. Model for measuring religious effects of cosponsorship in the 113th session.

```
Coefficients:
           Estimate Pr(<=b) Pr(>=b) Pr(>=|b|)
Intercept   0.11    1.00    0.00    0.00
Catholic    0.00    0.38    0.62    0.79
Jewish     -0.02    0.34    0.66    0.56
Other       0.03    0.84    0.16    0.34
Protestant  0.00    0.24    0.76    0.46
Unknown     0.09    0.78    0.22    0.32

Residual standard error: 0.3159 on 285684 degrees of freedom
F-statistic: 4.633 on 5 and 285684 degrees of freedom, p-value: 0.0003143
Multiple R-squared: 8.107e-05   Adjusted R-squared: 6.357e-05
```

Figure 3. Model for measuring effects of specific ingroup behaviors of 112th session.

```
Coefficients:
           Estimate Pr(<=b) Pr(>=b) Pr(>=|b|)
Intercept  0        1       0       0
Catholic   1        1       0       0
Jewish     1        1       0       0
Other      1        1       0       0
Protestant 1        1       0       0
Unknown    1        1       0       0

Residual standard error: 2.269e-12 on 281424 degrees of freedom
F-statistic: 2.606e+27 on 5 and 281424 degrees of freedom, p-value:
Multiple R-squared: 1   Adjusted R-squared: 1
```

Figure 4. Model for measuring effects of specific ingroup behaviors of 117th session.

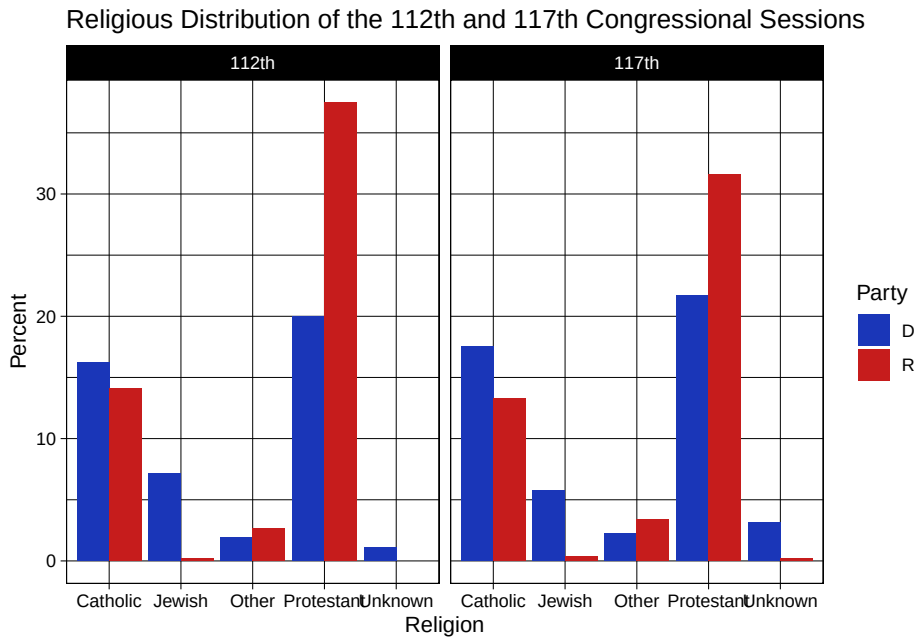
Religious Distribution of the 112th and 117th Congressional Sessions
112th
117th
Percent
0
10
20
30
Catholic
Jewish
Other
Protestant
Unknown
Religion
Party
D
R

Figure 5