Analysis of Voting Patterns In The Senate

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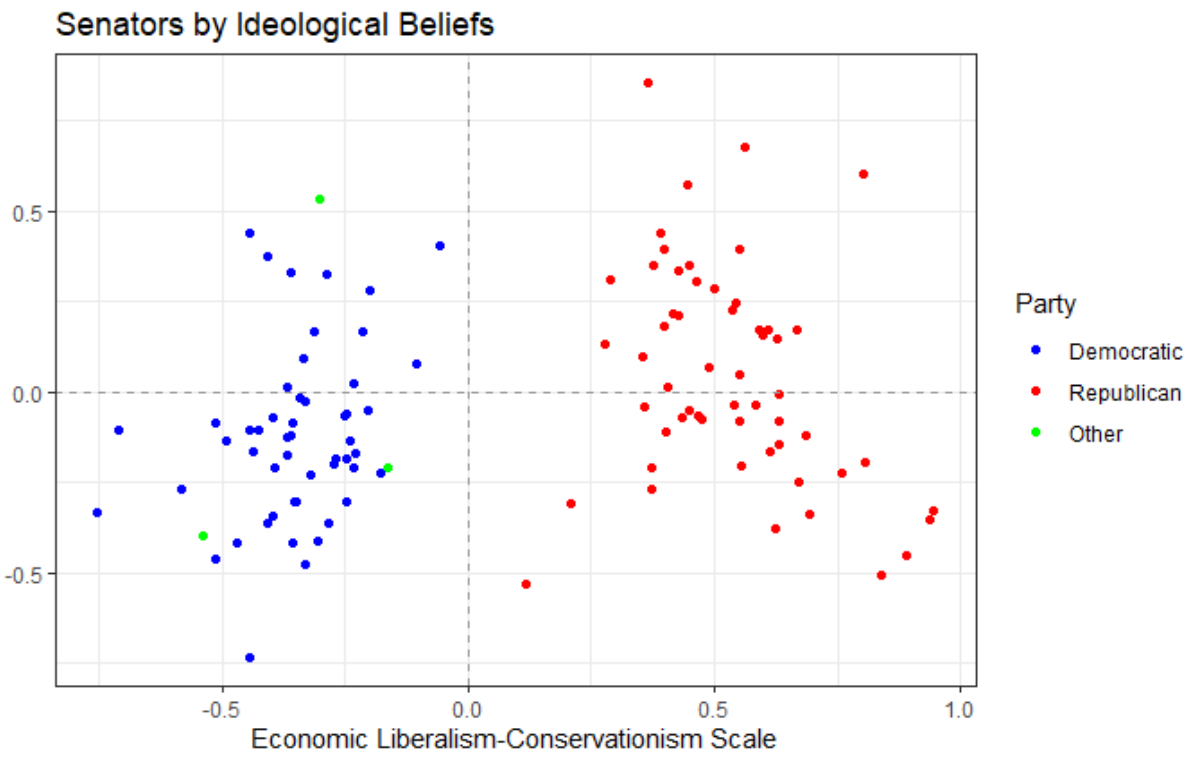
Introduction

Elected officials have the difficult task of being the representatives of the people and our beliefs. For centuries the United States has operated as a two party government with smaller independent parties showing up periodically. The goal of this project is to determine first what the differences between the two major parties are, then how their voting patterns connect to their ideological beliefs.

Data

The data used in this project comes from the Voteview website which is an open source database that records several key metrics about every member of congress. Specifically, the Member's Ideology and Member's Votes datasets will be examined for sessions 117 and 118 (2021-current). The only data used from these files is member icpsr, which is an anonymized code for each member, cast code, a numeric value from zero to nine that indicates how that member voted, rollnumber, showing which vote number is being recorded, and party code which is a numeric code that dictates what party the member belongs to. The data is filtered to only the Senate for both sessions that were analyzed. This includes a total of 100 Senators from session 118 and 104 from 117. Both sessions had a slight Republican majority with session 118 being 49% Republican and session 117 being 51% Republican (Note: Independents are counted in these numbers so the 100 members are distributed between Democrats, Republicans, and Independents which is why 49% is still a majority). The plot below shows the difference in ideological beliefs between the two parties. Points on the right side of the plot are those that have more conservative beliefs, those on the left are people with more liberal beliefs. The goal is to determine if these beliefs have an effect on the way senators vote, and what that effect looks like.



There are dashed lines that intersect at the origin to show the point where someone's beliefs could be classified as more liberal or more conservative. Everything higher and to the right indicate strong conservative views, and those points lower and to the left indicate strong liberal views. This plot shows that there is a clear ideological difference between Democrats and Republicans. While some of the points somewhat stray away from the major clusters, all of the Republicans stay on the conservative side and all Democrats and third party members stay on the liberal side.

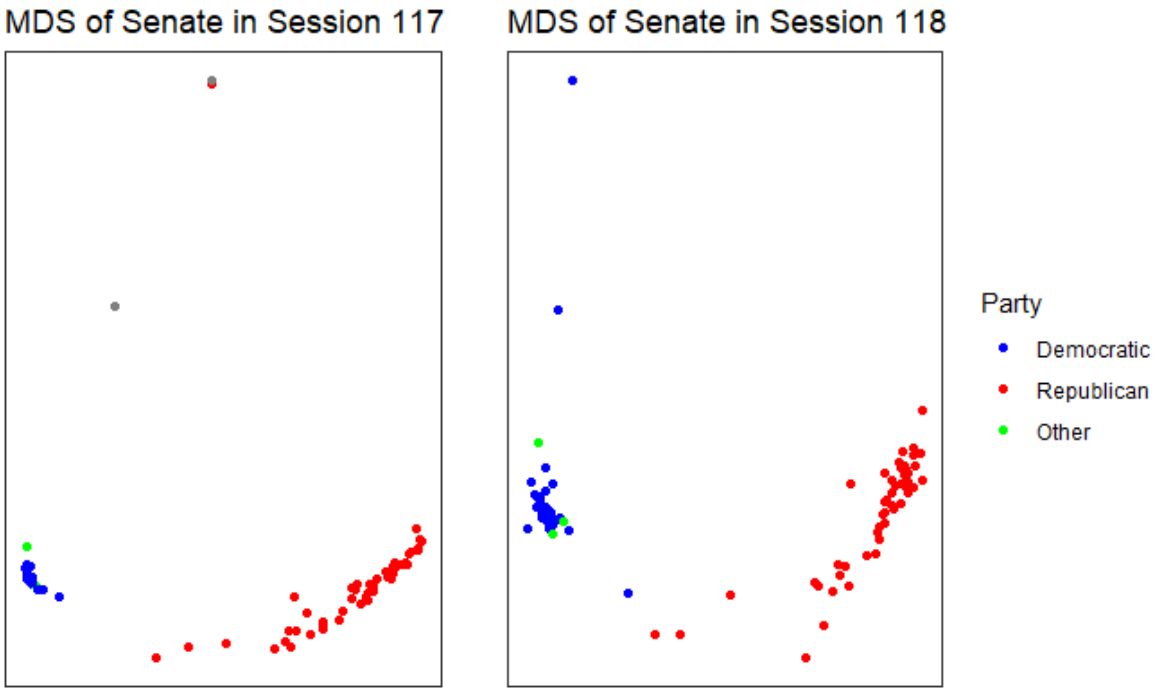
Data Cleaning

The Member's votes and Member's Ideology datasets had to be joined via the icpsr code. From there, to determine how members voted compared to their counterparts, there had to be a distance metric created. Since the cast code variable was on a scale from zero to nine, this had to be transformed into ones and twos. Any vote that was yay is counted as a one, and any vote that was nay is counted as a two. These values are merely factors and only represent that the difference between them is one. In addition to this, any votes that were simply present, not present, or abstain were transformed to NA's. This was done to keep the values between everything at a maximum of one.

Methods and Analysis

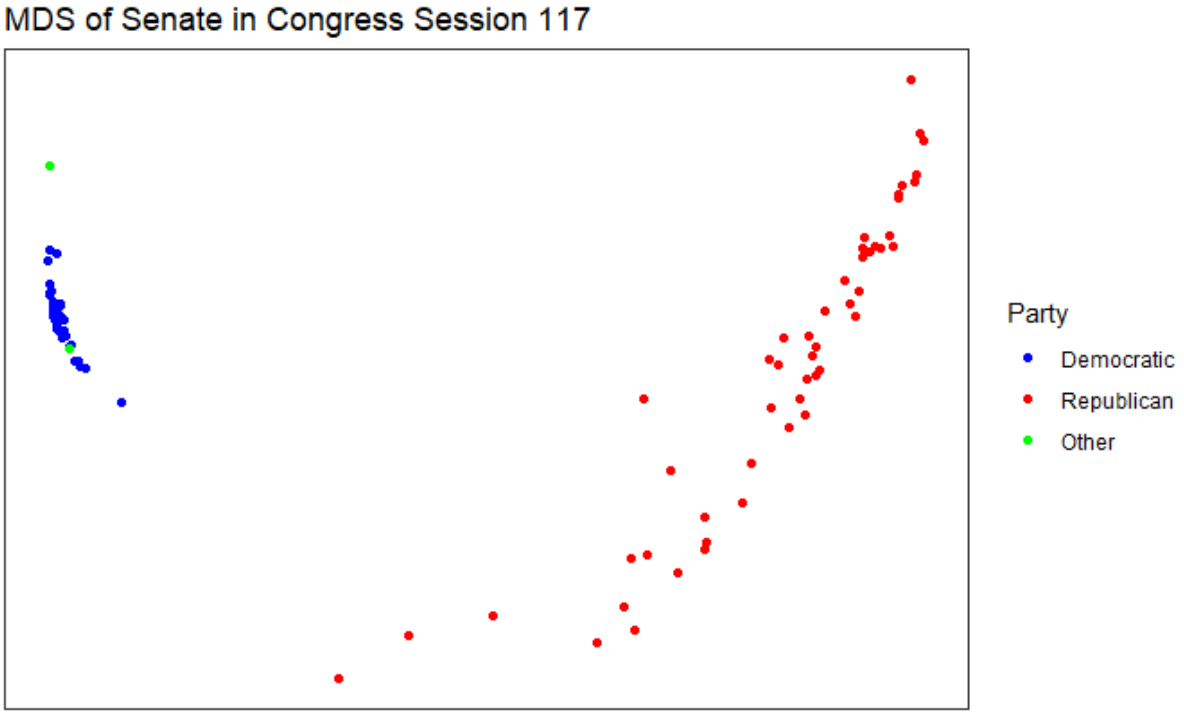
The data was run to compare how each senator voted compared to each other for each given vote. To do this, every combination of two senators was found. Those

combinations were run through two loops to ensure each combination of senators were evaluated for each individual vote. If the two disagreed on a vote, a one was recorded. If the two agreed, a zero was recorded. This creates a distance vector that is comprised of ones and zeros. Once the loops have gone through every single vote for that session, a sum of the vector is taken and placed into a distance matrix. It is important to note that if one senator casts a vote in a vote that the other senator does not vote in, a one is recorded as this is still a difference in votes. This includes votes where one senator chooses to abstain and the other casts a vote. Once the final distance matrix is created, a multidimensional scaling procedure is run to determine the true distance between all of the senators. The results of this procedure give x and y coordinates that can visually represent the distance between each senator's voting patterns when compared to one another.



The way to interpret these plots is to simply look at the groupings of dots. Dots that are close to each other represent two senators that primarily voted the same across all of the recorded votes for that session of congress. They also show that people belonging to a specific party tend to vote the same as others in their party. While this is not groundbreaking news, it is important to note that the cluster of Democrats on both plots is much tighter than the cluster of Republicans. This means that based on the data used, Democrats seem to vote almost identically to each other whereas Republicans tend to have more flexibility in their party's voting systems. There is a small cluster at the bottom of the 118th session plot where it seems some Republicans and one Democrat voted similarly to each other. Additionally,at the top of the 118th session plot,

there are two Democrats that seem to vote very differently than the rest of their party, but even more differently than the Republican senators. In the 117th session there were four senators that either didn't finish their term, or were added to the senate part of the way through the session. Those dots are the ones up at the top of the plot. They all seem to disagree with everyone else which is not an accurate representation of the data. If we remove those four points and recreate the plot, this is what we end up with.



We can now more clearly see that while Democratic senators seem to vote more similarly the Republican senators seem to actually have some internal parity in their votes.

Conclusion

While it is easy to simply say that Democrats and Republicans don't get along and disagree on everything, we can show that this is backed up by their voting patterns. Democrats seem to put up a much more united front and vote very similarly to each other across several years and two sessions of congress. Republicans tend to have more internal disagreement in their party but largely all still fall in the same cluster with each other. However, it is incredibly clear that neither party agrees with the other. In both sessions of congress we see a massive gap between the two clusters with only a couple of dots falling in the center of either plot that could dictate someone agreeing with the opposite party more than their own.