From: applications.administrator@capitol.local
To: Senate Redistricting
Subject: INETMAIL: Redistricting Public Input
Date: Thursday, September 30, 2021 10:45:06 AM
Attachments: Stmt-on-S2129-2130.pdf

Date: 2021-09-30
First Name: Andrea
Last Name: Barreiro
Title: N/A
Organization: Math For Unbiased Maps TX (MUM_TX)
Address: [redacted]
City: Dallas
State: TX
Zipcode: [redacted]
Phone: [redacted]

Affirm public info: I agree

Regarding: Senate

Message:
I am making these comments on behalf of Math For Unbiased Maps TX (MUM_TX), an interdisciplinary, nonpartisan coalition of Texas mathematicians, political scientists and philosophers working to ensure a fair and transparent redistricting process. Our research concerns the development and application of ensemble sampling techniques, and in particular their application to the current TX redistricting cycle. In brief, we use Markov Chain Monte Carlo techniques to generate a large number of random, legally valid maps which can then be used as an unbiased baseline to understand what a typical map should look like. Conversely, when a proposed map is an outlier from the ensemble, this may be an indication of gerrymandering.

We applied our methods to the maps that have been made available by the Texas Legislative Council. For all the maps (17 total as of 9/29/21), we generated a table of two important statistics that are commonly used by political scientists to assess partisan gerrymandering: the mean-median score and partisan bias score. You can find the table at our webpage: www.smu.edu/Dedman/Research/Institutes-and-Centers/DCII/Scholarship/Research-Cluster-on-Political-Decision-Making/TXGerryWatch.

We also performed more detailed analysis for the maps S2101, S2129, S2130. We previously submitted comments on our analysis of S2101. Today we will compare and contrast S2129 and S2130. We have attached a statement which contains figures, to which we refer during our comments.

We begin with S2130, which is substantially similar to S2101 proposed on 9/18/21. We compared the proposed map to an ensemble of 500,000 randomly-drawn maps. In this figure, districts are ordered by the number of votes a Democratic candidate for Texas Senate would have received in the 2020 election, had voters used “straight ticket” voting. On average, maps within our ensemble (blue dots) exhibit smoothly increasing vote shares as one moves from Republican-leaning to Democratic-leaning districts. This smooth increase is the hallmark of an unbiased map. But in the proposed map (red dots), the increase is highly disjointed, a clear sign of gerrymandering.

We note several specific features of the proposed plan. First, Democratic voters are disproportionately removed from districts such as 10, 2, 9, 8, and 12 that would be competitive in an unbiased map (a process known as “cracking”), and placed into uncompetitive districts such as 22, 16, 15, 14 and 23 (a process known as “packing”). Second, the list of outcomes between Districts 30 and 12 is very nearly flat, which is a hallmark of maps created with the assistance of computer algorithms designed to automate the gerrymandering process. Finally, the predicted vote share between Districts 12 and 27 changes abruptly by about 10 points -- this represents a “wall” designed to protect legislators from changing voter opinions over time.

We also compute two common numbers that political scientists use to "score" maps. The first such number is called the "mean-median" score: the difference in statewide vote percentage each party would need to win the majority of the chamber. For the proposed map, the Republican Party would need to win only 43.9% of the vote to win 16 seats, while the Democratic Party would need to earn 56.1%; the difference of these numbers gives a "mean-median" score of 12.2 (note: to get these numbers from the figure, scale up by a factor of 100). The second such score is called the "partisan bias" score: the difference in the number of seats each party wins if each were to earn 50% of the vote. For the proposed map, the Republican Party would win 19 seats with 50% of the vote, while the Democratic Party would win only 12 seats; the difference of these numbers gives a "partisan bias" score of –7.

Of course, no plan is going to be perfectly aligned with the ensemble, so just how gerrymandered is this plan? A little? A lot? An extreme amount? This question can be answered using statistics, by comparing each score above to the distribution of those scores within the 500,000-map ensemble. This is done in the figure below, and the results are disappointing. As shown in the following figure, both the "mean-median" and "partisan bias" scores are very far from their typical values within an unbiased ensemble. In fact, the mean-median score for the proposed map is more extreme than 99.995% of ensemble values; that is fewer than 1 in 20,000 maps exhibit a similar score. The partisan bias score for the proposed map was the *most extreme score* we observed in our 500,000 ensemble; only 1 in 3,000 maps shared this score. Finally, not a single map in our 500,000-map ensemble exhibited this level of bias on *both* metrics!

We now consider S2129. In this proposed map, vote shares (red dots) exhibit smoothly increasing vote shares as one moves from Republican-leaning to Democratic-leaning districts. This smooth increase is the hallmark of an unbiased map. We do see some signs of "cracking" at District 10 and some "packing" at Districts 3 and 22; however, in comparison to S2130, many more of the red dots reside within the blue violins, indicating that the vote shares are typical; they are not outliers.

The mean-median score and partisan-bias scores for S2129 are also much more representative of a "typical" map. For this proposed map, the Republican Party would need to win 50.8% of the vote to win 16 seats, while the Democratic Party would need to earn 49.2%; the difference of these numbers gives a "mean-median" score of –1.6. For this proposed map, the Republican Party would win 15 seats with 50% of the vote, while the Democratic Party would win 16 seats; the difference of these numbers gives a "partisan bias" score of 1.
Overall, this suggests that S2129 is slightly favorable to the Democratic Party. But how favorable? The histograms in the next figure indicate that these values are squarely in the range of a typical map; in fact, they are very close to the ensemble median. Here we measured the ensemble median to be –2.3 for the mean-median score and 1 seat for the partisan bias.

In summary, S2130 shows clear signs of gerrymandering, and does not accurately reflect the statistics of a typical map. In contrast, S2129 shows small signs of possible gerrymandering, but largely does accurately reflect the statistics of a typical map. The gerrymandering we observed in S2130 significantly reduces the competitiveness of a large fraction of our legislative races, thus depriving millions of Texans of the right to have a meaningful voice in who represents them.

[redacted]

MUM_TX Statement on S2129, S2130

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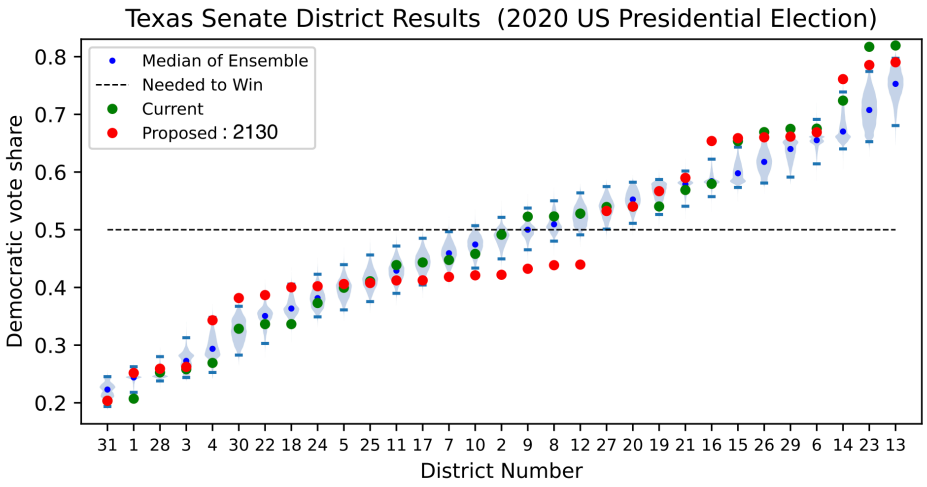

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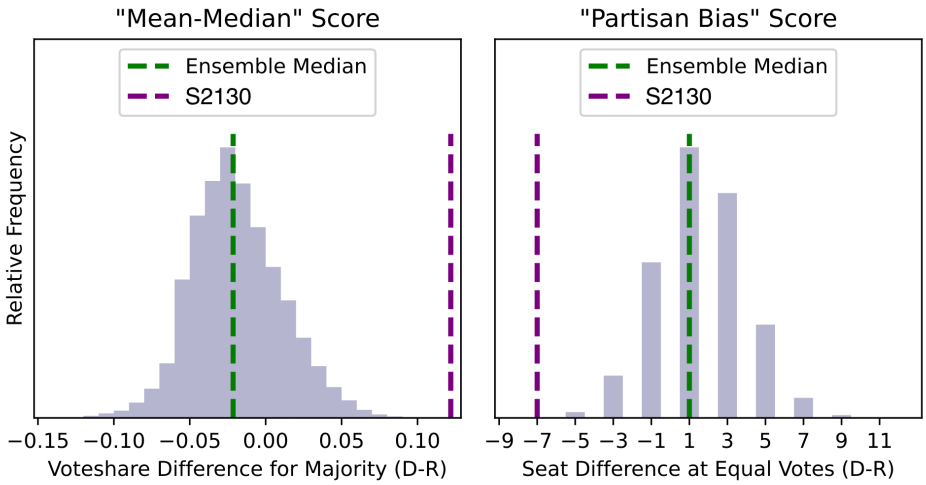

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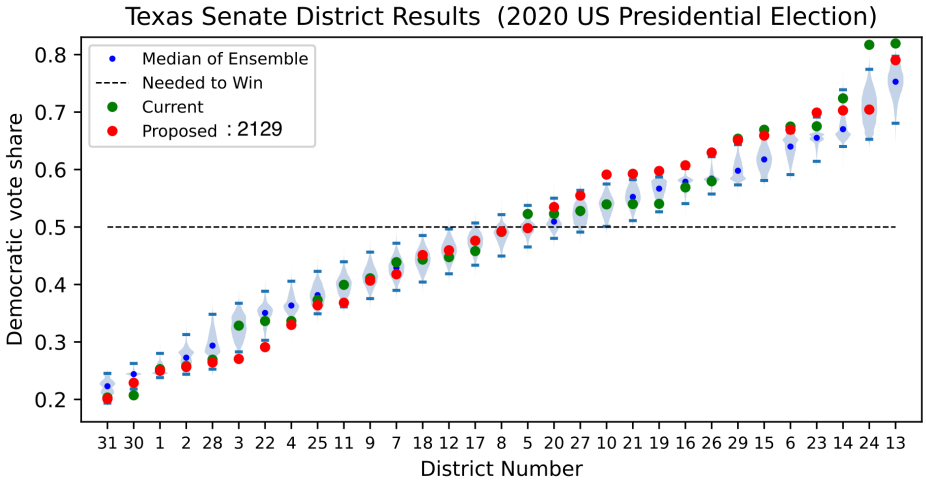

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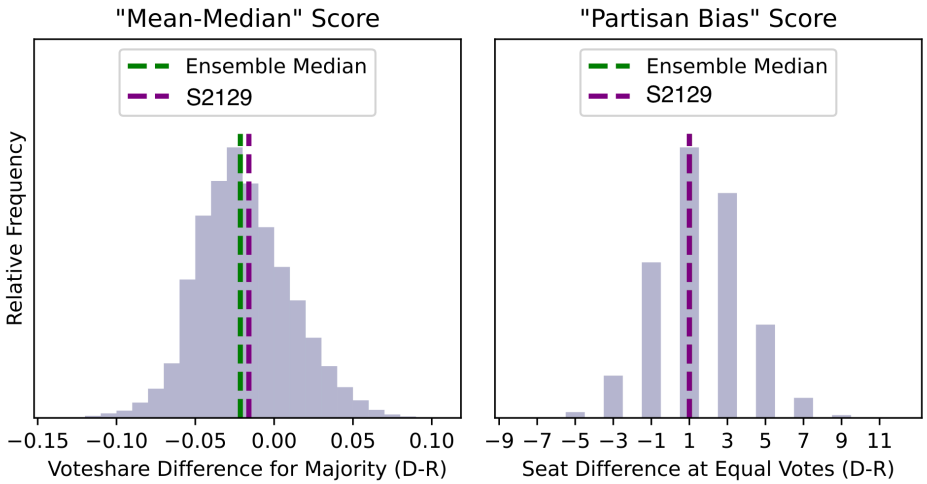

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