Summary evaluation of some congressional redistricting plans

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See an update in my 2019 paper.

The metrics evaluated are:

1. Number of county splits

2. Number of responsive (competitive) districts

3. Number of D seats for 50% two-party D vote

4. D vote required to win half the seats.

5. Compactness

6. VRA – Voting Rights Act - % African Americans in the district with the most

7. Maximum population deviation before splitting precincts

I have not calculated any of the numerous compactness measures. I think the human brain is superior at this just by looking at the maps. I’ve added my subjective grade in the table that shows numbers for the other four metrics.

The penultimate column labelled VRA lists the % of African Americans for the district with the largest %. It is customary in PA to require at least one district with greater than 50% AA. However, for all the plans in the table, the %AA in the VRA district is larger than for any other ethnic group.

Details and map images of these plans are contained in directories as described in ReadMe.

In the Table, plans N2, N3, N4, N6, N8, N9 and N10 were drawn by me. Full descriptions of N3 and N8 and their maps are given in their own directories. The other N plans are in the “Other N Maps” directory. Maps associated with other people are in “Other peoples’s Maps” directory.

Here are very brief comments about the methodology I use for these metrics. % D vote required to win half the seats is called the median minus mean metric in the literature. # D seats and number of responsive districts use probit (<https://en.wikipedia.org/wiki/Probit_model>) weightings rather than artificial sharp cutoffs. I’ve written complete details in a separate document that is in the technical directory. That directory also discusses how to obtain the final maximum population deviation of one.

The county split metric is subject to definition. Numbers for three definitions are presented. The first number before the colon counts the number of splits. For example, if a county has precincts in three districts, that counts as two splits. The minimum number of splits in PA is 17; this is shown in technical\splits.doc. The second number after the first colon counts each county that is split once, regardless of how many times it is split, with the added convention that the three counties that have more people than can be contained in one district (Philadelphia, Allegheny and Montgomery) are not counted as split if they contain one full district. I was using this second metric until it became clear that it has the unacceptable flaw that it rewards plans that split a few counties many times. The third number, after the second colon, gives the number of unsplit counties, this has the same flaw as the second metric. However, it should be noted here that even the first metric is debatable because it counts a split of even one precinct the same as splitting a county in half. Also, note that either split metric becomes smaller if larger population deviations are allowed; the numbers of splits reported in this table are for zero population deviations in order to conform to the law and to provide a uniform basis for comparing different plans. Evaluating splitting is not as straightforward as is often assumed. More details are in technical\splits.doc. Blank \_ entries for the first and third metrics will eventually be added.

Summary Table

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Metrics 🡪 | County  splits | Responsive  Districts | # D Seats  @50% vote | % D Vote  @50% seats | Compact  grade | VRA  %AA | Max pop  deviation |
| Plan |
| Chen1 | 17:12:53 | 6.7 | 6.7 | 53.3 | B+ | 50.6 | 1289 |
| N2 | \_ :16:\_ | 7.3 | 8.1 | 51.1 | B- | 43.8 | 908 |
| N3 | 28:19:47 | 8.3 | 8.6 | 50.3 | C+ | 43.8 | 1927 |
| N4 | \_ :39:\_ | 5.2 | 7.5 | 53.1 | A | 40.2 | 2790 |
| N4b | 54:35:32 | 7.6 | 7.1 | 51.9 | A | 43.7 | 862 |
| Leach5 | \_ :40:\_ | 8.7 | 8.2 | 50.8 | C- | 55.1 | 1? |
| N6 | 18:12:54 | 5.2 | 6.8 | 52.0 | B+ | 42.0 | 1056 |
| Holt7 | \_:9:\_ | 5.7 | 6.9 | 53.0 | B- | 52.8 | 1328 |
| Holt2018 | 17:11:54 | 5.9 | 6.4 | 54.0 | C+ | 54.3 | 25 |
| N8 | 18:9:57 | 7.0 | 7.5 | 51.9 | B | 58.9 | 1169 |
| N9 | \_ :25:\_ | 8.6 | 9.1 | 49.9 | C- | 43.8 | 827 |
| N10 | 17:10:54 | 7.3 | 7.5 | 51.7 | B | 58.8 | 1377 |
| Kimbrough1 | ? | 7.7 | 6.9 | 51.4 | ? | ? | 3347 |
| Murphy1 | \_ :10:\_ | 5.5 | 6.6 | 54.1 | B | 47.5 | 3078 |
| PA-Act131 | \_ :25:\_ | 2.7 | 5.4 | 55.6 | F | 58.9 | 1 |

More plans whose maps are in the directories will be evaluated here soon.

General Comparisons:

1. Most plans have average population deviations 0.14% which is smaller than the average precinct population thereby being ready for the final step of splitting precincts. A few drawn by others have deviations ~ 0.5%. The final step of splitting precincts can also result in splitting more counties.

2. With the exception of plan N4, plans with fewer splits generally look better to me, so I have assigned them a higher compactness grade,

3. All of these plans are biased in favor of Republicans (D seats less than 9 and D votes greater than 50%) with the exception of plan 9 which has a very small bias in favor of Democrats.

4. Plans with fewer splits and higher compactness grade generally have more bias and less responsiveness than those with more splits. However, plan N8 with the fewest splits has less bias and more responsiveness than the other low split plans 1-Chen, 6, 7-Holt and Murphy1.

5. All plans are better than PA Act131 on all measures except that plans N4 and Leach5 have more splits and plan N9 has the same number.

6. Fairness and responsiveness are generally correlated, at least for the plans here. Responsive maps with more competitive districts usually result in fairer plans, i.e., %D seats closer to 9 and %D vote to win 50% of the seats closer to 50%.

Concluding Comments:

So far this document just presents facts for you to think about. It is certain that different individuals will decide that some redistricting criteria are more important than others. Some reformers are unwilling to look at fairness or responsiveness whereas I believe that these are very important criteria. The basic tension comes down to what is most important, process or outcome. While I don’t dismiss process, I think outcome is more important. If I may indulge in an analogy, it’s like dining. Even if the cook does everything by the book, we don’t usually visit the kitchen; it’s how it tastes that counts. That’s why I have gone to considerable effort to be able to estimate outcomes of plans.

As a result of my study I can affirm specifically for PA what scholars have been writing for years. The traditional redistricting criteria generally lead to more bias and less responsiveness. Bias is being argued as a violation of 1st amendment rights by discriminating against voters of like mind. Responsiveness to voters is recognized as essential for the will of the people to be expressed in Congress, and it is also felt that responsiveness would decrease polarization. For these reasons, I feel that just reaffirming the traditional redistricting criteria without adding fairness and responsiveness would be advocating poor public policy.