2020 Iowa Congressional Districts

Redistricting requirements

In Iowa, districts must:

1. be contiguous
2. have equal populations
3. be constructed only from counties
4. be geographically compact, as defined by two compactness measures:
   1. length-width compactness, which measures the total absolute difference between the length and width of a district, across all districts
   2. perimeter compactness, which measures the total perimeter of all districts

Algorithmic Constraints

We enforce a maximum population deviation of 0.01%, given strict historical deviation standards. We also merge VTDs into counties and run the simulation at the county level. For compactness, we increase the `compactness` parameter to 1.1, which does not create too much inefficiency.

Data Sources

Data for Iowa comes from the ALARM Project's [2020 Redistricting Data Files](#).

Pre-processing Notes

No manual pre-processing decisions were necessary.

Simulation Notes

We sample 5,000 districting plans for Iowa across two independent runs of the SMC algorithm. As noted above, we set `compactness=1.1`.

Contents

- `IA_cd_2020_stats.csv` contains summary statistics on the sampled redistricting plans
- `IA_cd_2020_plans.rds` is a compressed `redist_plans` object, which contains the matrix of precinct/block assignments and may be used for further analysis.
- `IA_cd_2020_map.rds` is a compressed `redist_map` object, which contains the precinct/block shapefile and demographic data.

Both the `redist_plans` and `redist_map` object are intended to be used with the [redist package](#).

Codebook for summary statistics

- `draw`: unique identifier for each sample. Non-numeric draw names are real-world plans, e.g., `cd_2010` for an enacted 2010 plan.

- `district`: a district identifier. District numbers roughly match those in the enacted plan, but the correspondence is not perfect.
- `chain`: a number identifying the run of the redistricting algorithm used to produce this draw. Used for diagnostic purposes.
- `pop_overlap`: a number indicating the fraction of people in this plan who reside in the same-numbered district in the enacted plan.
- `total_pop`: the total population of each district.
- `total_vap`: the total voting-aged population of each district.
- `pop_*`, `vap_*`: total (voting-aged) population within racial and ethnic groups for each district. Variable codes documented here.
- `plan_dev`: the maximum population deviation among districts in the plan. Computed as `max(abs(distr_pop - target_pop)/target_pop)`.
- `comp_edge`: compactness, as measured by the fraction of internal edges kept. Higher values indicate more compactness.
- `comp_polsby`: compactness, as measured by the Polsby-Popper score. Higher values indicate more compactness.
- `county_splits`: the number of counties which belong to more than one district.
- `muni_splits`: the number of Census Designated Places which belong to more than one district.
- `*_##_dem_*`, `*_##_rep_*`: vote counts for statewide Democratic and Republican candidates in a certain election. More information here.
- `adv_##`, `arv_##`: average vote counts for statewide Democratic and Republican candidates in a certain year. More information here.
- `ndv`, `nrv`: averages of the `adv_##` and `arv_##` variables across all available elections.
- `ndshare`: normal Democratic share, computed as `ndv / (ndv + nrv)`
- `e_dvs`: average Democratic vote share, computed as the average of the Democratic vote share when first scored under each statewide election.
- `pr_dem`: probability seat is represented by a Democrat; calculated as the fraction of statewide elections under which the district had a majority Democratic share.
- `e_dem`: expected number of Democratic seats for the plan; equivalent to summing the `pr_dem` values across districts
- `pbias`: partisan bias at 50% vote share, averaged across all available elections. Positive values indicate Republican bias.
- `egap`: the efficiency gap, averaged across all available elections. Positive values indicate Republican bias.