



[Gerrymandering analyzer from Prof. Sam Wang, Princeton University](#)

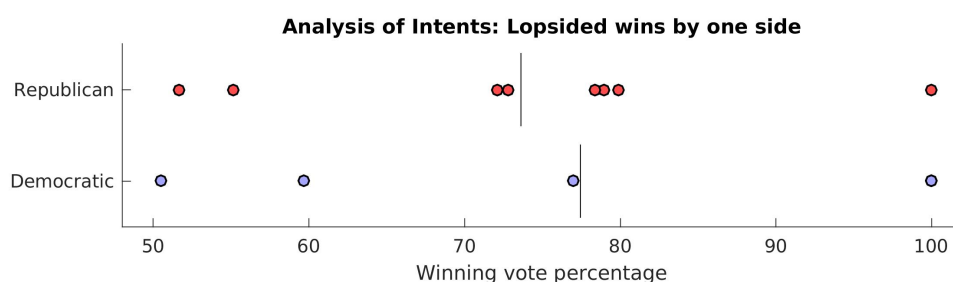
Reference: 68 Stan. L. Rev. XX, 2016.

The GA state delegation of 2002 had 13 seats, 5 Democratic/other and 8 Republican. The average Democratic share of the two-party total vote was 46.0% (raw), 44.6% with imputation of uncontested races.

## Analysis of Intent

If a political party wishes to create for itself an advantage, it will pack its opponents to win overwhelmingly in a small number of districts, while distributing its own votes more thinly. To test for a lopsided advantage, one can compare each party's winning margins and see if they are systematically different. This is done using the [two-sample t-test](#). In this test, the party with the *smaller* set of winning margins has the advantage.

**First Test of Intent: Probing for lopsided win margins (the two-sample t-test):** The difference between the two parties' win margins does not meet established standards for statistical significance. The probability that this difference or larger could have arisen by partisan-unbiased mechanisms is 0.89.

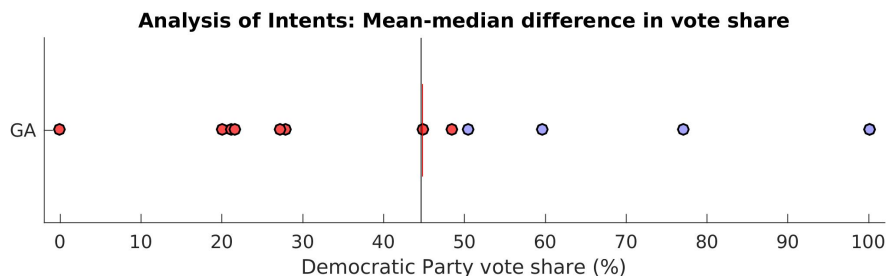


**Second Test of Intent: Probing for consistent advantages for one party (mean-median difference and/or chi-square test):** The choice of test depends on whether the parties are closely matched (mean-median difference) or one party is dominant (chi-square test of variance).

When the parties are closely matched in overall strength, a partisan advantage will be evident in the form of a difference between the mean (a.k.a. average) vote share and the median vote share, calculated across all districts. Partisan gerrymandering arises not from single districts, but from patterns of outcomes. Thus a single lopsided district may not be an offense - indeed, single-district gerrymandering is permitted by Supreme Court precedent. Rather, it is combinations of outcomes

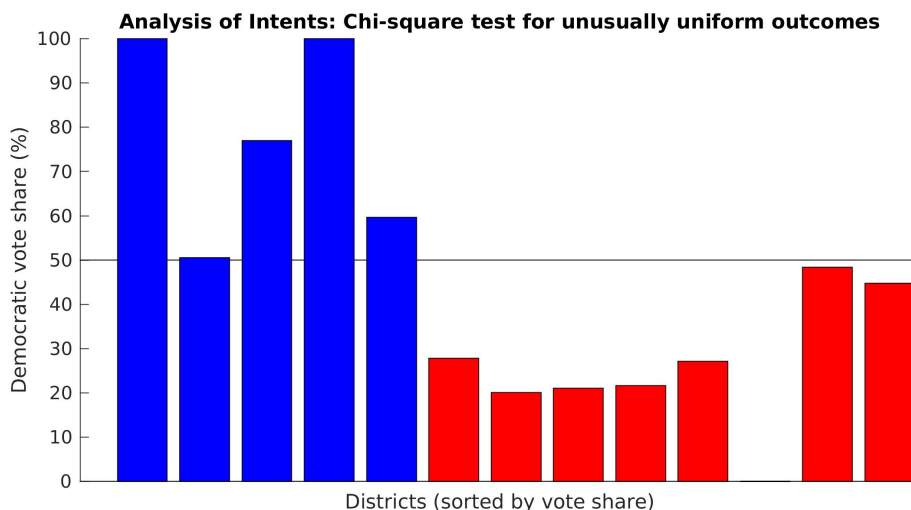
that confer undue advantage to one party or the other.

The mean-median difference is 0.2% in a direction of advantage to the Democratic Party. The mean-median difference would reach this value in 48.6% of situations by a partisan-unbiased process. This difference is not statistically significant ( $p>0.05$ ).

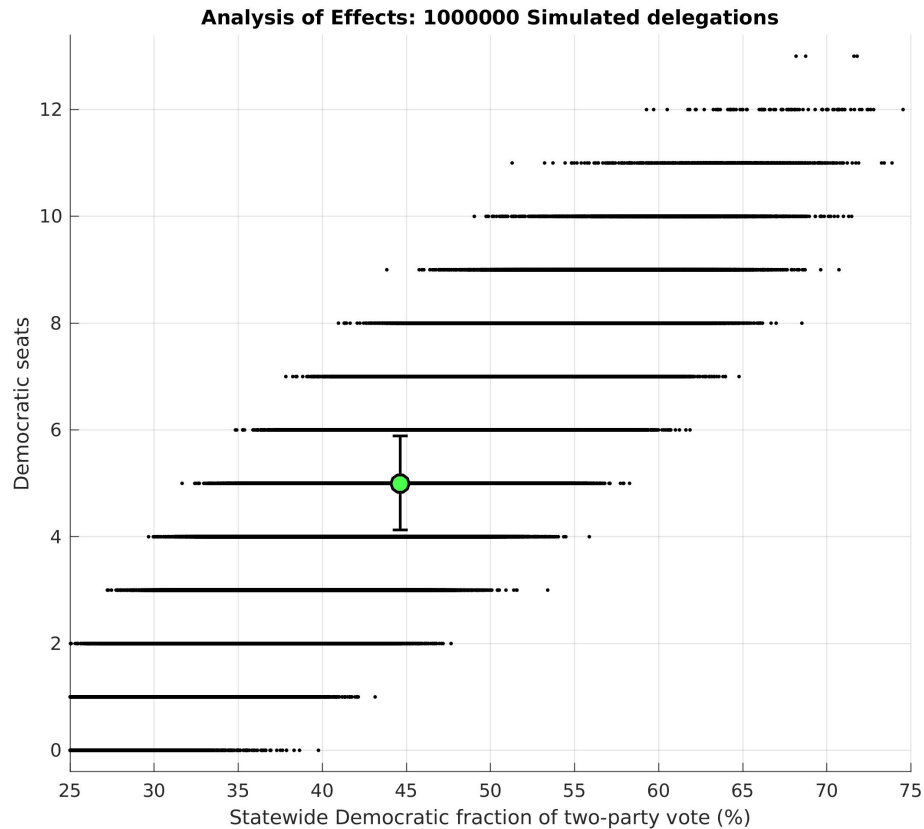


When one party is dominant statewide, it gains an overall advantage by spreading its strength as uniformly as possible across districts. The statistical test to detect an abnormally uniform pattern is the chi-square test, in which the vote share of the majority party-controlled seats are compared with nationwide patterns.

The standard deviation of the Republican majority's winning vote share is 11.6%. At a national level, the standard deviation is NaN%. This difference is not statistically significant ( $p>0.05$ ).



**Test of effects: How many extra seats did either party gain relative to party-neutral sampling? (fantasy delegations):** It is possible to estimate how the state's delegation would be composed if votes were distributed according to natural variations in districting. This is done by drawing districts at random from a large national sample, and then examining combinations whose vote totals are similar to the actual outcome. In the following simulations, the "fantasy delegations" give a sense of what would happen on average, based on national standards for districting. The sampled districts include urbanized areas, and therefore the simulations include the Republican advantage arising from population clustering.



In this election, the average Democratic vote share across all districts was 44.6%, and Democrats won 5 seats. 12160 fantasy delegations with the same vote share had an average of 5.0 Democratic seats (green symbol), with a standard deviation of 0.9 seats (see error bar). The actual outcome (red symbol) was therefore advantageous to Republicans. However, this advantage was not statistically significant.

The above calculations are based on Samuel S.-H. Wang, "Three Tests for Practical Evaluation of Partisan Gerrymandering," 68 Stan. L. Rev. XX (2016). For further information, contact [sswang@princeton.edu](mailto:sswang@princeton.edu).