

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

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

The KY state delegation of 2014 had 6 seats, 1 Democratic/other and 5 Republican.
The average Democratic share of the two-party total vote was 36.0% (raw).

Analysis of Intent

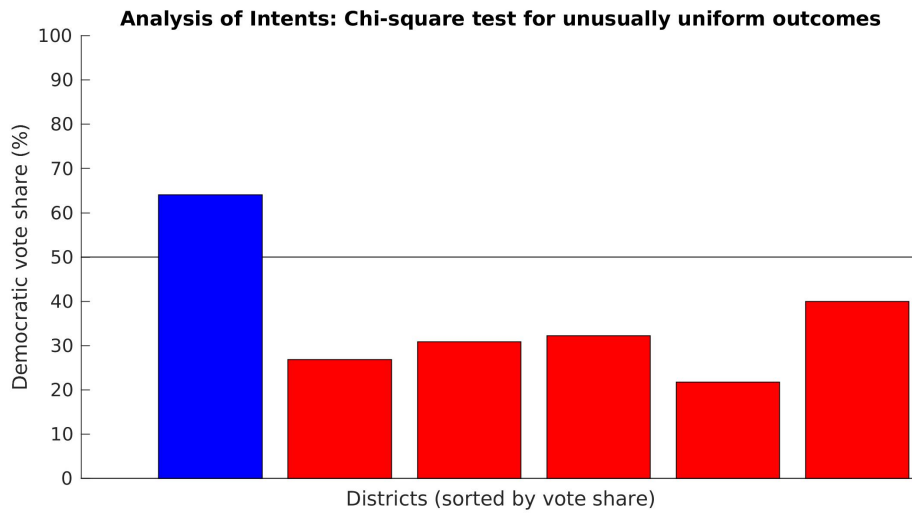
If a political party wishes to create for itself an advantage, it will pack its opponents to win overwhelmingly in a small number of districts, while distributing its own votes more thinly. To test for a lopsided advantage, one can compare each party's winning margins and see if they are systematically 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): Can't compare win margins. For this test, both parties must have at least two seats.

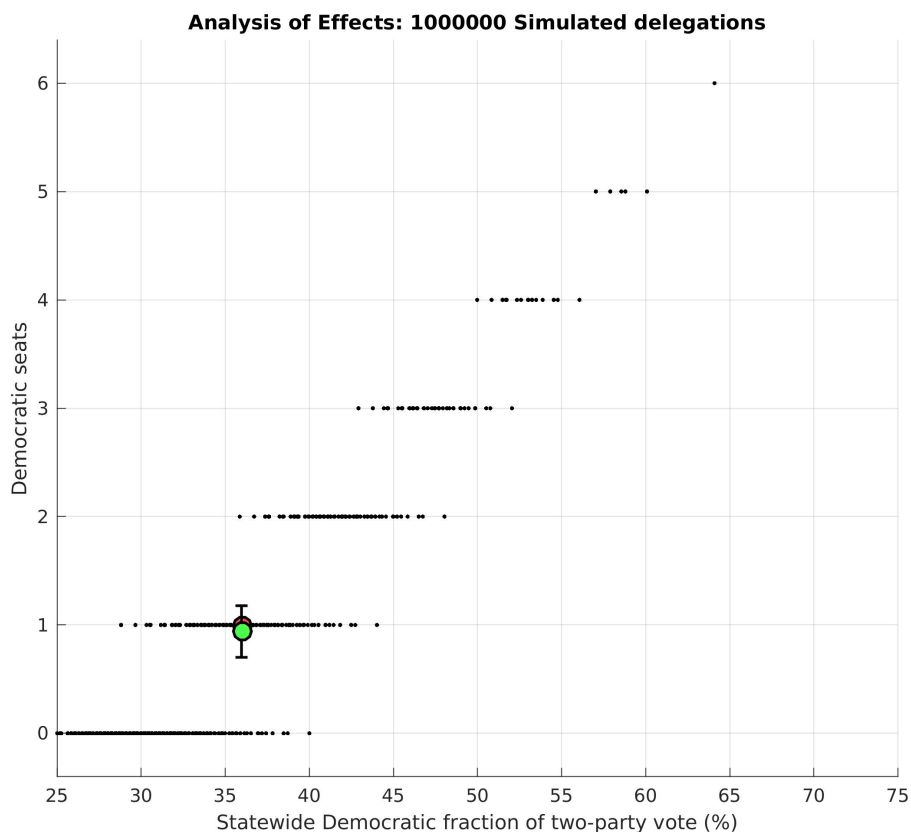
Second Test of Intent: Probing for consistent advantages for one party (mean-median difference and/or chi-square test): The choice of test depends on whether the parties are closely matched (mean-median difference) or one party is dominant (chi-square test of variance).

When 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 6.8%. 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 36.0%, and Democrats won 1 seats. 21987 fantasy delegations with the same vote share had an average of 0.9 Democratic seats (green symbol), with a standard deviation of 0.2 seats (see error bar). The actual outcome (red symbol) was therefore advantageous to Democrats. 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.