Criteria and Accountability Measures

Compactness Accountability Measurements

There are a wide variety of mathematical tests for compactness. These tests are best used to compare plans or to identify districts within a plan that are less compact than others.

A number of tests focus on the district perimeter. These are essentially tests of boundary contortion. Under these methods, a district with smooth boundaries will be scored as more compact than a district with more jagged or "squiggly" boundaries. A commonly referenced measure of boundary contortion is the "Polsby- Popper" test.

Other methods focus on area dispersion, or how far the district spreads out from a central area. Under these measures, a district with many "fingers" or "tendrils" would be less compact. Commonly referenced measures of dispersion include the "Reock" test.

Finally, some measures focus on population dispersion within a district. These tests focus on the relationship of housing patterns in a district to the district boundaries. Examples include the "Population Circle" and "Convex Hull" tests.

Modern redistricting software should be able to perform several tests of compactness. Any redistricting plan should include a report that gives the results of at least one perimeter measure, at least one area dispersion measure, and at least one population dispersion measure for each district.

The Efficiency Gap

Nicholas Stephanopoulos and Eric McGhee have devised a metric of partisan symmetry called the *efficiency gap*. The *efficiency gap* is the difference between the parties' respective *wasted votes* in an election, divided by the total number of votes cast. Wasted votes are ballots that don't contribute to victory for candidates, and they come in two forms: *lost votes* cast for candidates who are defeated, and *surplus votes* cast for winning candidates but in excess of what they needed to prevail. When a party gerrymanders a state, it tries to maximize the wasted votes for the opposing party while minimizing its own, thus producing a large efficiency gap. In a state with perfect partisan symmetry, both parties would have the same number of wasted votes.

Example: a state has five districts with 100 voters each, and two parties, Party A and Party B. Suppose also that Party A wins four of the seats 53 to 47, and Party B wins one of them 85 to 15. Then in each of the four seats that Party A wins, it has 2 surplus votes (53 minus the 51 needed to win), and Party B has 47 lost votes. And in the lone district that Party A loses, it has 15 lost votes, and Party B has 34 surplus votes (85 minus the 51 needed to win). In sum, Party A wastes 23 votes and Party B wastes 222 votes. Subtracting one figure from the other and dividing by the 500 votes cast produces an efficiency gap of 40 percent in Party A's favor.

The efficiency gap has several properties that make it ideal for measuring the extent of gerrymandering. First, it directly captures the packing and cracking that are at the heart of every biased plan. Surplus votes for winning candidates are the definition of packing, and lost votes for defeated candidates the essence of cracking. The efficiency gap tells us exactly how big the difference between the parties' wasted votes is.

Over

Second, as an arithmetical matter, the efficiency gap represents a party's *undeserved seat share*: the extra fraction of seats a party wins relative to a neutral plan. Above, for instance, if Party A and Party B had each wasted the same number of votes, Party A would have won two seats and Party B three. Instead, Party A won *four* seats, or 40 percent (two out of five) more than it should have. This is precisely what the efficiency gap reveals.

Third, the efficiency gap can be calculated for any election, no matter how uncompetitive. This is not the case for other partisan symmetry metrics (which only work for close races).

Lastly, the gap is computed using actual rather than hypothetical election results. Again, this is not true for other metrics (which ask what would happen in a fictional tied election).

In summary, a gerrymander *is*, in fact, is a plan that results in one party wasting many more votes than its opponent. The efficiency gap tells us exactly how big the difference between the parties' wasted votes is.

Voting Rights Act (VRA) Compliance

Rather than using voting data to draw districts, polarized voting analysis data is used as an **assessment after drawing draft districts**. It measures whether the totality of circumstances provide minority voters with an opportunity to elect representatives of their choice as required by the Voting Rights Act. Polarized voting analysis data studies the election data—particularly local voting patterns by race and ethnicity, gleaned from careful statistical analysis of precinct-by-precinct election results over multiple cycles to assess VRA compliance. Without understanding local voting patterns, it is very difficult to tell whether minority communities' practical ability to elect candidates of choice has been impaired. Without such information, it is equally difficult to tell whether new district lines preserve or restore such opportunity. The census does not provide this information. Critical information, including data from legislative primaries in a state with polarized partisan pockets and data from local elections, is essential to measure compliance.

"Racially polarized voting" means voting in which there is a difference, as defined in case law on enforcement of the federal Voting Rights Act (42 U.S.C. Sec. 1973 et seq.), in the choice of candidates or other electoral choices that are preferred by voters in a protected class, and in the choice of candidates and electoral choices that are preferred by voters in the rest of the electorate. Specific methodologies for estimating group voting behavior have been approved in applicable federal cases to enforce the federal Voting Rights Act (42 U.S.C. Sec. 1973 et seq.) and should be used to test for racially polarized voting.

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