

## The Efficiency Gap: a Proposed Standard to Measure Partisanship in Electoral Maps

The Supreme Court has demonstrated interest in the concept of partisan symmetry as a way to achieve the core principal of, "one person, one vote". How can we measure partisan symmetry? As described in the New Republic article, "Here's How We Can End Gerrymandering Once and For All", Nicholas Stephanopoulos and Eric McGhee have devised a metric called the "efficiency gap". Stephanopoulos and McGhee define the efficiency gap as:

...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.

This example from Stephanopoulos and McGhee shows how the efficiency gap works:

[Suppose] 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 at the heart of packing, and lost votes for defeated candidates formulate the essence of cracking." A gerrymander is, "a plan that results in one party wasting many more votes than its opponent." The efficiency gap reveals the difference between the parties' wasted votes.

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 4 seats, or 40 percent (2 out of 5) more than it should have." The efficiency gap reveals this disparity.

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 a plan intended to yield, "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.