Measuring Gerrymandering: Improving Upon the Efficiency Gap

Holly Abrams & Dr. Brad Fox   *Austin Peay State University*

The Problem: Gerrymandering

Gerrymandering is the act of redrawing district lines so as to favor one political party over another.

Current Solution: The Efficiency Gap

$$EG = \frac{Net\ Wasted\ Votes}{Total\ Votes}$$

Votes are considered "wasted" if they are cast for the losing party, or if they are votes for the winning party over the 50% threshold needed to win the election.

Issues with The Efficiency Gap

- No votes should ever be considered "wasted"
- Does not address extremist candidates
- Increases polarization and weakens political competition

The Beginning of a New Metric

$$\frac{S_m - (2 - C^*)V_m}{\frac{1}{2} - 2V_m^2}$$

S_m - Marginal number of seats won by winning party

V_m - Marginal number of votes won by winning party

C^* - average of competitiveness in each district

$$S_m = \left(\frac{Seats\ won\ by\ winning\ party}{\#\ of\ districts}\right) - \frac{1}{2}$$

$$V_m = \left(\frac{Votes\ for\ winning\ party}{total\ votes}\right) - \frac{1}{2}$$

$$C^* = average\ of\ all\ districts'\ C_i^{*'}s$$

$$C_i\ for\ each\ district = \frac{absolute\ value\ of\ difference\ in\ votes}{total\ votes}$$

$C_i's$ will fall into one of 3 categories:

Competitive	Potentially Competitive	Non-Competitive
If $C_i \leq 0.1$ Then $C_i^* = \frac{1}{2}C_i$	If $0.1 < C_i \leq 0.3$ Then $C_i^* = C_i$	If $C_i > 0.3$ Then $C_i^* = \frac{C_i + 1}{2}$

Conclusion:

- The efficiency gap has been relied on heavily to detect gerrymandering, but it is far too simple to account for the complexity of the modern political scene.
- While this new metric is a step in the right direction, it can still be improved upon. Using the efficiency gap, states are said to be gerrymandered if their efficiency gap is greater than 8%. This new metric needs a threshold to determine when a state has been gerrymandered.