Measuring Partisan Fairness

Dr. Lisa Handley

Redistricting Criteria Priority Pyramid

based on the U.S. Constitution, federal law and the Michigan State Constitution

U.S. Constitution: equal population

Voting Rights Act of 1965

Contiguity

Communities of interest

No disproportionate advantage to any political party

No favoring or disfavoring incumbents or candidates

Consideration of county, city, township boundaries

Reasonable compactness

Michigan State Constitution
Article IV, Section 6

13(d) Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness.

U.S. Constitution: equal population

Voting Rights Act of 1965

Contiguity

Communities of interest

No disproportionate advantage to any political party

No favoring or disfavoring incumbents or candidates

Consideration of county, city, township boundaries

Reasonable compactness

Election Results

District	Party A	Party B	Total Votes	Percent of Votes	
				Party A	Party B
1	279	120	399	69.9%	30.1%
2	172	198	370	46.5%	53.5%
3	167	192	359	46.5%	53.5%
4	148	212	360	41.1%	58.9%
5	185	180	365	50.7%	49.3%
6	139	193	332	41.9%	58.1%
7	169	201	370	45.7%	54.3%
8	179	206	385	46.5%	53.5%
9	234	99	333	70.3%	29.7%
10	178	199	377	47.2%	52.8%
TOTAL	1850	1800	3650	50.7%	49.3%

- 10 districts of equal populations – 500 persons per district.
- Turnout varies some across the 10 districts, from 332 to 399 voters.

Comparing Votes to Seats

| District	Party A	Party B	Total Votes	Percent of Votes	
				Party A	Party B
1	279	120	399	69.9%	30.1%
2	172	198	370	46.5%	53.5%
3	167	192	359	46.5%	53.5%
4	148	212	360	41.1%	58.9%
5	185	180	365	50.7%	49.3%
6	139	193	332	41.9%	58.1%
7	169	201	370	45.7%	54.3%
8	179	206	385	46.5%	53.5%
9	234	99	333	70.3%	29.7%
10	178	199	377	47.2%	52.8%
TOTAL	1850	1800	3650	50.7%	49.3%

- Party A wins 3 seats with 50.7% of the vote.
- Party B wins 7 seats with 49.3% of the vote.

How is Partisan Bias Introduced?

- ***Cracking*** – spreading a party's supporters across many districts relatively thinly so that their votes are all cast for losing candidates

- ***Packing*** – concentrating a party's supporters into a few districts so that their votes will elect candidates with far more than 50% plus one vote threshold required to win
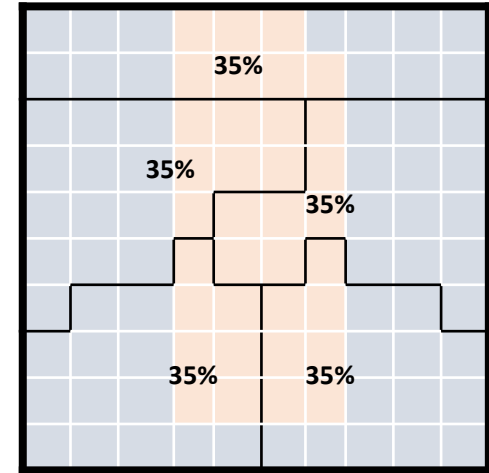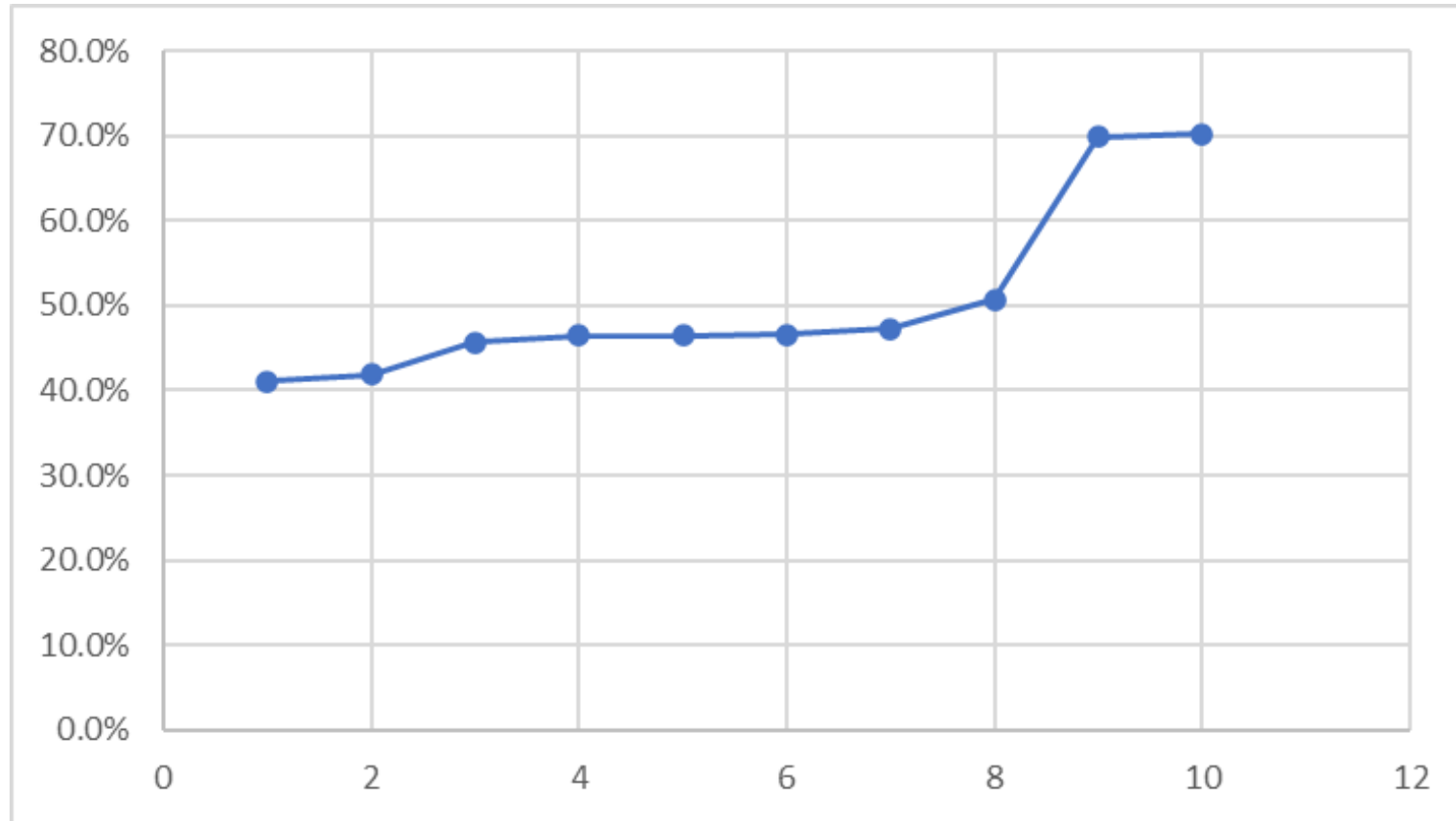
Plan that cracks Party A supporters across 5 districts
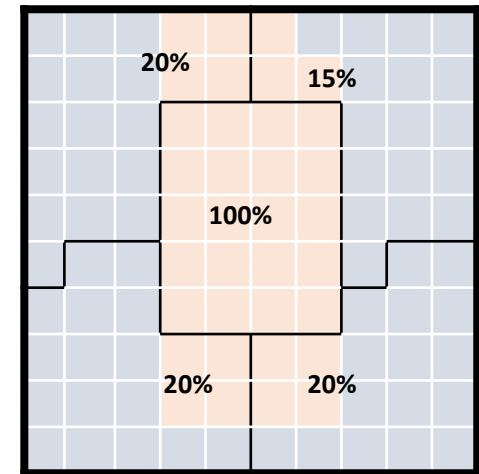
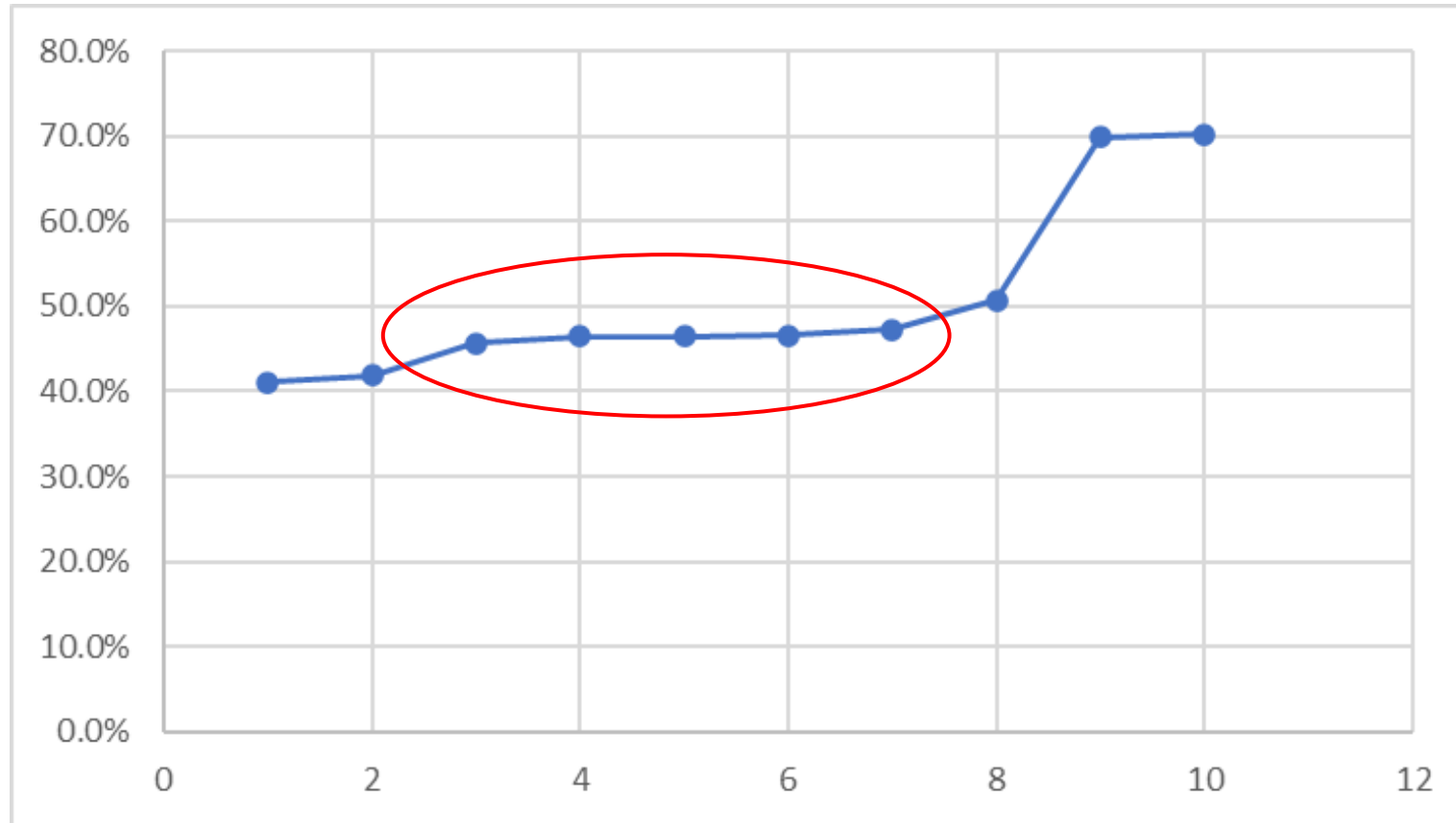Plan that packs Party A supporters into single district

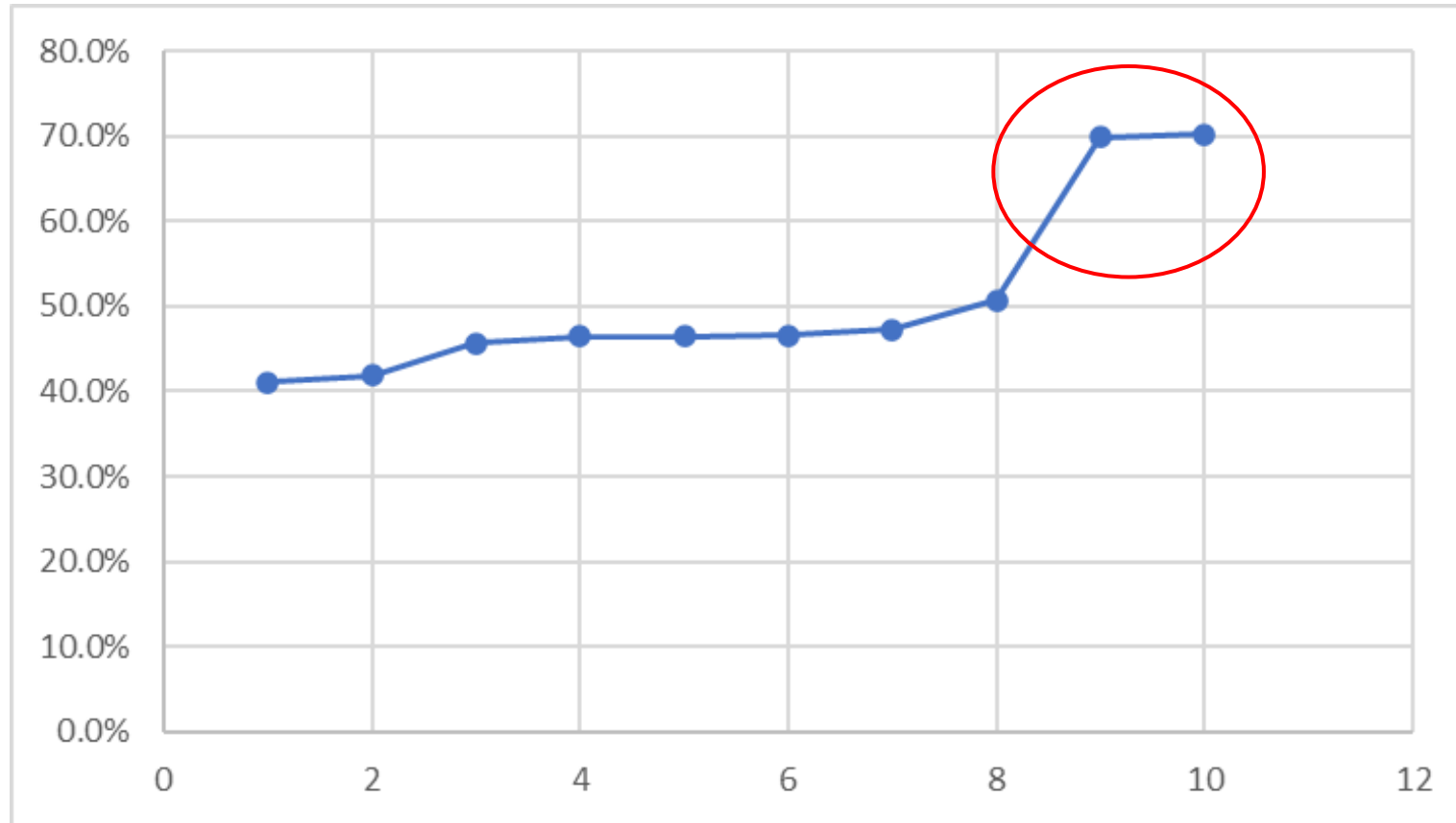# Vote Share for Party A
Sorted by % of Party A Vote

Vote Share for Party A
Sorted by % of Party A Vote

Vote Share for Party A
Sorted by % of Party A Vote

Lopsided Margins Test

District	Party A	Party B	Total Votes	Percent of Votes		Party Wins	
				Party A	Party B	Party A	Party B
1	279	120	399	69.9%	30.1%	69.9%	
2	172	198	370	46.5%	53.5%		53.5%
3	167	192	359	46.5%	53.5%		53.5%
4	148	212	360	41.1%	58.9%		58.9%
5	185	180	365	50.7%	49.3%	50.7%	
6	139	193	332	41.9%	58.1%		58.1%
7	169	201	370	45.7%	54.3%		54.3%
8	179	206	385	46.5%	53.5%		53.5%
9	234	99	333	70.3%	29.7%	70.3%	
10	178	199	377	47.2%	52.8%		52.8%
TOTAL	1850	1800	3650	50.7%	49.3%	63.6%	54.9%

- Party A is winning districts with a much higher average vote (63.6%) than Party B (54.9%).
- This indicates Party A supporters are packed into a few districts; Party B is winning (more) districts with lower vote margins.

Winning Margin = Party A average winning vote share – Party B average winning vote share

63.6 – 54.9 = 8.7

Mean-Median Difference

Party A	Percentages by District (sorted)
	41.1%
	41.9%
	45.7%
	46.5%
	46.5%
	46.5%
	47.2%
	50.7%
	69.9%
	70.3%
District median percentage	46.5%
Statewide mean percentage	50.7%
Mean-Median Difference	4.2%

Mean-Median Difference =
Party's Mean Vote – Party's Median Vote

- A difference between a party's vote share in the median district and its vote share statewide is a measure of skewness. If the median score is lower, that party must win more votes to win an equal number of districts.
- Party A's median vote share (46.5%) is 4.2% lower than its mean vote share of 50.7%, indicating the districts are skewed in favor of Party B.
- Party A would have had to win 54.2% (50.0 + 4.2) of the statewide vote to win 50% of the seats.

Mean-Median Difference Scores

Georgia 2006

Under Georgia's 2006-2010 congressional plan, the median Republican vote share was 11% higher than the mean Republican vote share.

Kentucky 1972

Under Kentucky's 1972-1980 congressional plan, the median Democratic vote share was 10% higher than the mean Democratic vote share.

From Plan Score at https://planscore.org/metrics/meanmedian/

Efficiency Gap

Efficiency gap measures the difference in the wasted votes of the two parties.

Wasted votes:
- Lost votes = votes cast for losing candidate
- Surplus votes = votes cast for winning candidate in excess of the 50% needed to win

Efficiency Gap =   Wasted Votes for Party A – Wasted Votes for Party B

Total Number of Votes Statewide

The efficiency gap is interpreted as the percentage of seats the favored party wins over what it would have won with a redistricting map that is politically unbiased.

Calculating the Efficiency Gap

| District | Party A | Party B | Total Votes | Lost Votes | | minimum | Surplus Votes | | Total Wasted Votes | |
				Party A	Party B	to win	Party A	Party B	Party A	Party B
1	279	120	399	0	120	200	79	0	79	120
2	172	198	370	172	0	185	0	13	172	13
3	167	192	359	167	0	180	0	12	167	12
4	148	212	360	148	0	180	0	32	148	32
5	185	180	365	0	180	183	2	0	2	180
6	139	193	332	139	0	166	0	27	139	27
7	169	201	370	169	0	185	0	16	169	16
8	179	206	385	179	0	193	0	13	179	13
9	234	99	333	0	99	167	67	0	67	99
10	178	199	377	178	0	189	0	10	178	10
TOTAL	1850	1800	3650	1152	399		148	123	1300	522

1300-522/3650 = 778/3650 = .2131

Efficiency Gap in favor of Party B is 21.3 %

This is interpreted as the percentage of seats Party B won above what would be expected in a politically neutral map.

Efficiency Gap Scores

North Carolina 2012

Under North Carolina's 2012-2014 congressional plan, votes for Republican candidates were wasted at a rate 20.3% lower than votes for Democratic candidates.
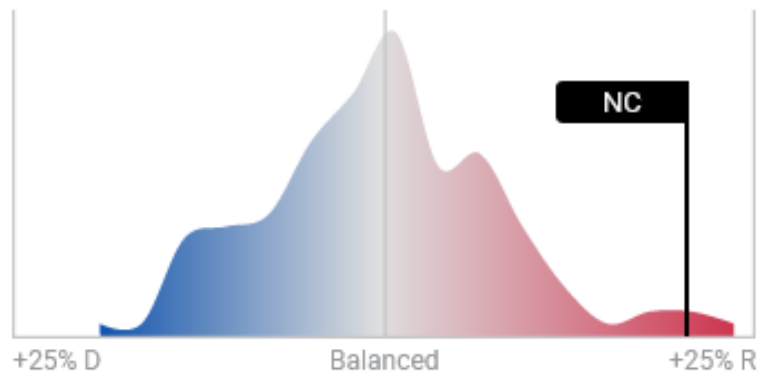
Texas 1992

Under Texas's 1992-1994 congressional plan, votes for Democratic candidates were wasted at a rate 20.3% lower than votes for Republican candidates.

From Plan Score at https://planscore.org/metrics/efficiencygap/
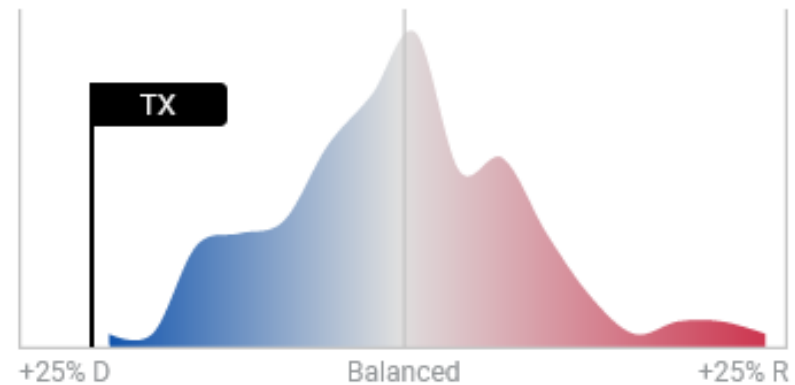
Conclusion

- Each of these measures have advantages and disadvantages associated with them. Using more than one measure is highly advisable.

- I have only described a small set of the available measures – those that are simple to understand and easy to calculate using a spreadsheet.

- No mathematical measures of partisan fairness are universally accepted, nor are they likely to produce a universally accepted yes-or-no as to whether a redistricting plan unacceptably favors one political party over the other. (The measures themselves occasionally disagree.)

- The Michigan State Constitution requires the use of accepted measures of partisan fairness. Using these measures brings some precision to the process of determining if a map is politically fair.

Declination

Vote for Party A sorted	Mean Loss and Win Percentages
41.1%	
41.9%	
45.7%	
46.5%	
46.5%	45.1%
46.5%	
47.2%	
50.7%	
69.9%	63.6%
70.3%	