

**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF WISCONSIN**

WILLIAM WHITFORD, ROGER ANCLAM, )  
EMILY BUNTING, MARY LYNNE DONOHUE, )  
HELEN HARRIS, WAYNE JENSEN, )  
WENDY SUE JOHNSON, JANET MITCHELL, )  
ALLISON SEATON, JAMES SEATON, )  
JEROME WALLACE, and DONALD WINTER, )

No. 15-cv-421-bbc

Plaintiffs, )

v. )

GERALD C. NICHOL, THOMAS BARLAND, )  
JOHN FRANKE, HAROLD V. FROEHLICH, )  
KEVIN J. KENNEDY, ELSA LAMELAS, and )  
TIMOTHY VOCKE, )

Defendants. )

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**PLAINTIFFS’ ADDITIONAL PROPOSED FINDINGS OF FACT  
IN SUPPORT OF THEIR OPPOSITION TO DEFENDANTS’ MOTION FOR  
SUMMARY JUDGMENT**

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In accordance with Federal Rule of Civil Procedure 56 and this Court’s Procedure to be Followed on Motions for Summary Judgment, II.B., plaintiffs respectfully submit the following additional proposed findings of fact (“APFOF”) in support of their opposition to defendants’ motion for summary judgment.

**FACTS**

**I. Plaintiffs’ Experts and Their Analyses.**

1. Simon Jackman is a Professor of Political Science at Stanford University who teaches classes on American politics and statistical methods in the social sciences. (Jackman Rpt. (Dkt. 62) at p. 1.)

2. Professor Jackman has authored and published many articles in peer-reviewed journals over the last decade on a variety of subjects in his field, including the properties of electoral systems and election administration. (Jackman Decl. (Dkt. 58-2) at pp. 3-7.)
3. Kenneth Mayer is a Professor of Political Science at the University of Wisconsin-Madison, and a faculty affiliate at the University's LaFollette School of Public Affairs. He teaches courses on American politics, the presidency, Congress, campaign finance, election law, and electoral systems. (Mayer Rpt. (Dkt. 54) at p. 2)
4. Professor Mayer has published numerous articles in peer-reviewed journals on the topics of American politics, the presidency, Congress, campaign finance, election law, and electoral systems. (Mayer Rpt. (Dkt. 54) at pp. 3-4; Mayer Decl. (Dkt. 59-1) at pp. 2-7.)
5. Both Professor Mayer and Professor Jackman were already highly experienced in studying and analyzing the principles of partisan symmetry on which the efficiency gap is based before this lawsuit was filed, and both are have years of experience as political scientists on which they base their calculations of the metrics for any district plan.
6. Wasted votes are votes that are cast either for a losing candidate ("lost votes") or for a winning candidate but in excess of what he or she needed to prevail ("surplus votes"). (Jackman Rpt. (Dkt. 62) at pp. 15-16.)
7. The efficiency gap measures the extent to which one party's voters are more cracked and packed than the other's, and so provides a single intuitive figure (expressed as a negative value for a pro-Republican gap and a positive value for a pro-Democratic gap) that can be used to assess the existence and extent of partisan gerrymandering and to compare one plan's partisan impact to another's. (Jackman Rpt. (Dkt. 62) at pp. 15-16.)

8. Professor Jackman calculated the efficiency gap for every state house election for which data was available over the period from 1972 to 2014, using actual election results. To do so, he did not aggregate wasted votes district by district, but rather used a simplified computation method based on statewide electoral data. (Jackman Rep. (Dkt. 62) at p. 16.)
9. Defendants' expert, Professor Goedert, "concur[s] that th[e] shortcut [used by Professor Jackman] is an appropriate and useful summary measure of [the] efficiency gap." (Goedert Rpt. (Dkt. 51) at p. 5; Goedert Dep. (Dkt. 65) at 70:17-73:2.)
10. Using the simplified method for Wisconsin's Current Plan, Professor Jackman arrived at an efficiency gap of -13% in 2012 and -10% in 2014. (Jackman Rpt. (Dkt. 62) at p. 4.)
11. Professor Jackman also found that, from 1972 to 2010, not a single map in the country was as asymmetric as the Plan in its first two elections, and that there is nearly a 100% likelihood that the Plan will continue to disadvantage Democrats throughout its lifespan. (Jackman Rpt. (Dkt. 62) at pp. 4-5, 63-73.)
12. Professor Jackman opined that any plan that gives rise to an efficiency gap of 7% or more in its first election is likely to create a partisan advantage that will endure for the remainder of the decade. (Jackman Rpt. (Dkt. 62) at pp. 56-69; Jackman Rebuttal Rpt. (Dkt. 63) at pp. 5-17; Jackman Decl. Ex. D (Dkt. 58-4) at pp. 1-6.)
13. Unlike Professor Jackman, Professor Mayer used the full method to calculate the efficiency gap, tallying wasted votes on a district-by-district basis. (Mayer Rpt. (Dkt. 54) at pp. 5-10.)
14. Also unlike Professor Jackman, Professor Mayer did not use actual vote totals. Instead, because he was comparing an actual with a hypothetical plan, he used a regression

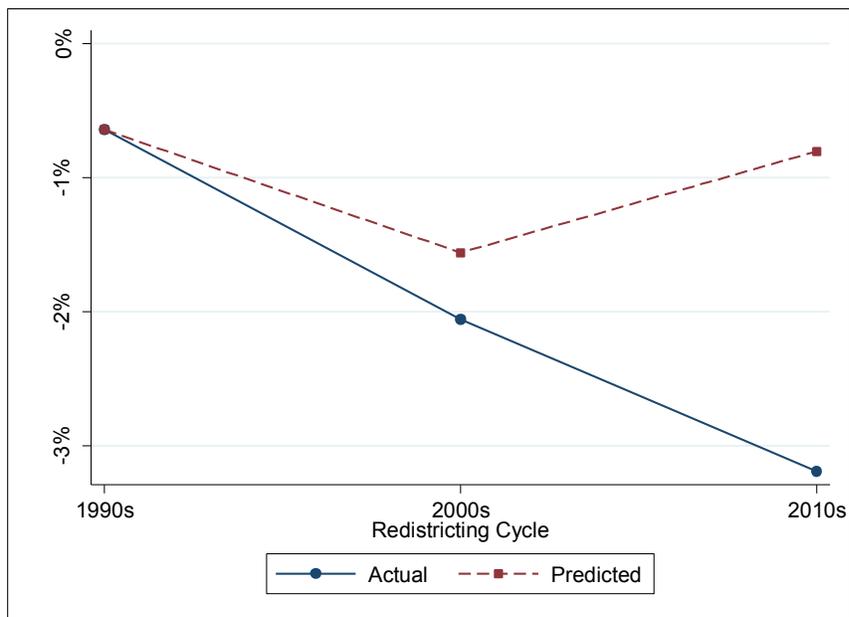
analysis to estimate what the wasted votes would have been in each district, under both the Current Plan and his Demonstration Plan. (Mayer Rpt. (Dkt. 54) at pp. 8-18.)

15. Professor Mayer's results were remarkably similar to those generated by Professor Jackman using actual results, with Professor Jackman calculating a -13% efficiency gap for the Current Plan in 2012 and Professor Mayer calculating a -12% efficiency gap for the Current Plan in 2012. (Jackman Rpt. (Dkt. 62) at p. 72; Mayer Rpt. (Dkt. 54) at p. 46.)
16. Professor Mayer also found that his Demonstration Plan would have had an efficiency gap of only -2% in 2012, which is more than 80% smaller than the Current Plan. (Mayer Rpt. (Dkt. 54) at p. 46.)
17. Professor Mayer further determined that the baseline partisanship estimates prepared *prior* to the 2012 election by the Legislature's consultant, Professor Keith Gaddie, corresponded to an efficiency gap of -12% for the Current Plan. (Mayer Rpt. (Dkt. 54) at p. 46.)

## **II. National Trends in the Efficiency Gap and Their Explanations.**

18. Professor Jackman's work shows that over the modern redistricting era, from 1972 to 2014, the average efficiency gap of state house plans has been -0.5%, or almost exactly zero. (Jackman Rpt. (Dkt. 62) at p. 35.)
19. Over the modern redistricting era, from 1972 to 2014, the average efficiency gap for congressional plans has been almost exactly zero. (Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 U. Chi. L. Rev. 831, 869-70 (2015), [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2457468](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2457468).)

20. In the last three redistricting cycles, however, state house plans have become steadily more pro-Republican, with their average efficiency gap dropping from -0.6% in the 1990s to -2.1% in the 2000s to -3.2% in the 2010s. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 20.)
21. The proportion of plans that were designed by Republicans in full control of state government increased from about 10% in the 1990s to about 20% in the 2000s to about 40% in the 2010s. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 19; Trende Dep. (Dkt. 66) at 79:11-23.)
22. By comparison, fewer than 20% of current plans were designed by Democrats in full control of the state government. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 19.)
23. The chart below shows how the average efficiency gap of state house plans would have changed from the 1990s to the 2010s if the distribution of party control over redistricting had remained constant over this period.

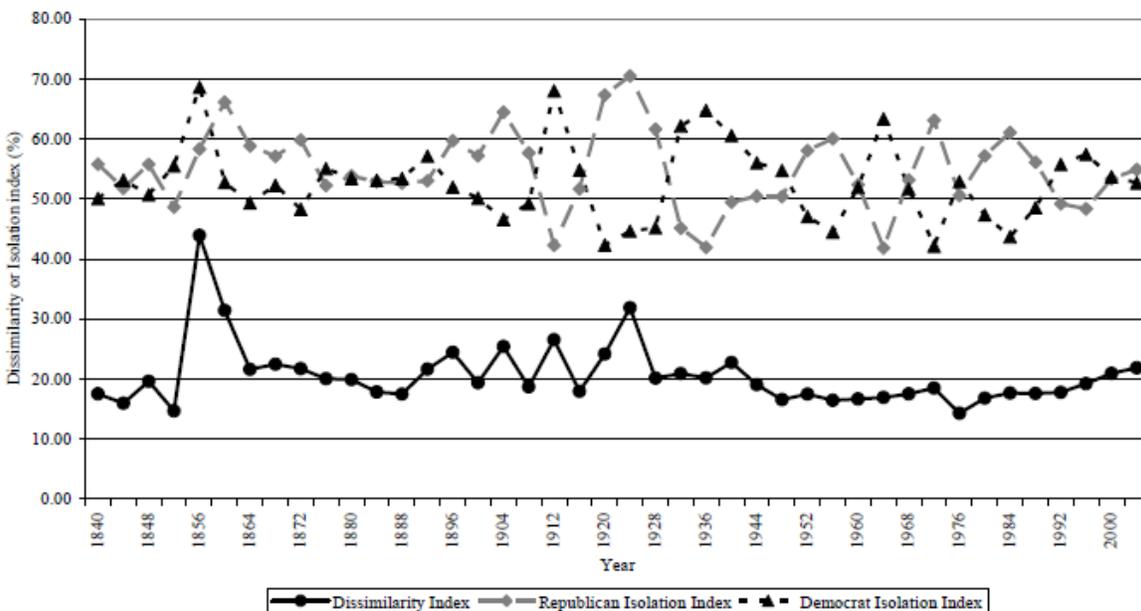


(Jackman Rebuttal Rpt. (Dkt. 63) at p. 20; Jackman Decl. Ex. F (Dkt. 58-6).)

24. The average efficiency gap would barely have changed if the distribution of party control over redistricting had remained constant from 1990 to 2010, going from -0.6% only to -0.8%. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 20.)

25. Edward Glaeser and Bryce Ward calculated what is known as the isolation index for Democratic and Republican voters by county from 1840 to 2004. This index indicates, for the average Democratic or Republican voter, what share of his or her fellow county residents are also Democrats or Republicans. (Edward L. Glaeser & Bryce Adam Ward, *Myths and Realities of American Political Geography* (2005) (Dkt. 59-3) at pp. 5-6.)

26. As the below chart reveals, over the last half-century, both Democratic and Republican isolation scores have been close to 50%, oscillating over a range from roughly 40% to 60%.



(Edward L. Glaeser & Bryce Adam Ward, *Myths and Realities of American Political Geography* 39 (2005), Mayer Decl. Ex. C (Dkt. 59-3) at p. 39.)

27. In the final election covered by the Glaeser and Ward study (2004), “[t]he isolation index . . . was 53.4 percent for Republicans and 52.6 percent for Democrats.” Thus “[t]he isolation measures show even less of a trend.” (Mayer Decl. Ex. C (Dkt. 59-3) at p. 6.)
28. For both 2012 and 2014, Professor Goedert constructed models with a measure essentially identical to the efficiency gap as the dependent variable, along with the following independent variables: whether a plan was designed by Democrats or Republicans in full control of the state government or through a bipartisan or nonpartisan process; each state’s proportions of black and Hispanic residents; each state’s level of urbanization; the Democratic share of the statewide vote; and the number of seats in each state. (Nicholas Goedert, *Gerrymandering or Geography? How Democrats Won the Popular Vote But Lost the Congress in 2012*, Res. & Pol. (2014), Goedert Dep. Ex. 20 (Dkt. 65-2) at p. 6; Nicholas Goedert, *The Case of the Disappearing Bias: A 2014 Update to the “Gerrymandering or Geography”* (2015), Goedert Dep. Ex. 21 (Dkt. 65-3) at p.13; Goedert Dep. (Dkt. 65) at 79:24-80:3.)
29. Both of Professor Goedert’s models have large R-squared values (0.829 in 2012, 0.570 in 2014), indicating that the models account for a large fraction of the variance in the efficiency gap. (Goedert Dep. Ex. 20 (Dkt. 65-2) at p. 6; Goedert Dep. Ex. 21 (Dkt. 65-3); Goedert Dep. (Dkt. 65) at 79:24-80:3.)
30. Professor Goedert’s models can be used to predict what the efficiency gap would have been in 2012 and 2014 in a state that resembled the country as a whole—demographically, geographically, and electorally—if that state’s plan was designed through a bipartisan or nonpartisan process. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 15-16; Goedert Dep. (Dkt. 65) at 90:12-18.)

31. Plugging the appropriate values of the independent variables into the models reveals that the typical state would have had a *pro-Democratic* efficiency gap of 0.7% in 2012, and a pro-Democratic efficiency gap of 1.6% in 2014, if its map had been drawn by a court, a commission, or divided state government. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 15-16.)
32. But, as explained in Professor Jackman's rebuttal report, "there are several issues with [Jowei Chen & Jonathan Rodden, *Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures*, 57 Q.J. Pol. Sci. 239 (2013)] that make it inapplicable here." (Jackman Rebuttal Rpt. (Dkt. 63) at p. 20.)
33. Chen and Rodden's simulated plans completely ignore the Voting Rights Act as well as state legal requirements such as respect for political subdivisions and respect for communities of interest, which are in effect in a majority of states. (Jackman Rebuttal Rpt. (Dkt. 63) at pp. 20-21; Goedert Dep. (Dkt. 65) at 154:20-55:3; Trende Dep. (Dkt. 66) at 67:10-21.)
34. Chen and Rodden use only presidential election results from 2000 in their analysis. They do not use state legislative election results (which are more relevant to the issue of state legislative partisan gerrymandering) or results from more recent years. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 21.)
35. Chen and Rodden's simulated maps do not actually constitute a representative sample of all possible maps that satisfy their criteria. Because of flaws in their simulation algorithm, their maps capture only an arbitrary subset of the entire solution space. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 21; Benjamin Fifield et al., *A New Automated Redistricting Simulator Using Markov Chain Monte Carlo* (2015), Jackman Decl. Ex. H (Dkt. 58-8) at pp. 2-3.)

36. Chen and Rodden’s results are directly contradicted by other recent work using a nearly identical methodology. Roland Fryer and Richard Holden also simulated plans with contiguous, compact, and equipopulous districts for multiple states. But they found that, “[u]nder maximally compact districting, measures of Bias are slightly *smaller* in all states except [one].” And not only are the biases slightly smaller, they are also slightly *pro-Democratic* in all cases. (Roland Gerhard Fryer & Richard Holden, *Measuring the Compactness of Political Districting Plans*, 54 J.L. & Econ. 493 (2011), Goedert Dep. Ex. 18 (Dkt. 65-1) at pp. 514-15; Jackman Rebuttal Rpt. (Dkt. 63) at p. 21.)
37. The only other evidence defendants cite in support of their claim that Democrats are becoming more clustered nationwide is the opinion of their expert (Sean Trende) based on his analysis of a set of maps comparing county-level presidential election results in 1996 and 2012 in the West South Central region of the country. (Trende Decl. (Dkt. 55) ¶¶ 66-68.)
38. Trende admits that there are no “peer-reviewed studies that have analyzed the geographic clustering of Democratic and Republican voters by examining trends in counties won by each part[y]’s presidential candidate.” (Trende Dep. (Dkt. 66) at 51:6-11.)
39. Trende admits that the maps he relied upon make no adjustment for counties’ wildly divergent populations. (Trende Dep. (Dkt. 66) at 52:25-53:3; Goedert Dep. (Dkt. 65) at 186:5-7.)
40. Trende admits that the maps do not display each party’s margin of victory in each county. (Trende Dep. (Dkt. 66) at 52:3-6.)
41. Trende admits that the maps are based on presidential rather than state legislative election results. (Trende Dep. (Dkt. 66) at 53:25-54:13.)

42. Trende admits that the maps do not generate any quantitative measure of partisan clustering over time, but rather are simply meant to be “eyeball[ed].” (Trende Dep. (Dkt. 66) at 59:2-8.)

### **III. Wisconsin’s Political Geography**

43. The three-judge federal district court in *Baumgart v. Wendelberger*, 2002 WL 34127471 (E.D. Wis. May 30, 2002) did not consider likely electoral effects, and adopted a plan more similar to that submitted by the Republican intervenors than to the one offered by the Democratic intervenors. (*Id.* at \*7; Mayer Dep. (Dkt. 52) at 121:7-16.)

44. The average efficiency gap of the Wisconsin state house redistricting plan from 1972-1980 was -0.3% and it was drawn by divided government. (Jackman Rpt. (Dkt. 62) at p. 72; Jackman Decl. Ex. F (Dkt. 58-6) at p. 3.)

45. The average efficiency gap of the Wisconsin state house redistricting plan from 1982-1990 was -1.9%, and it was drawn by a court. (Jackman Rpt. (Dkt. 62) at p. 72; Jackman Decl. Ex. F (Dkt. 58-6) at p. 11.)

46. The average efficiency gap of the Wisconsin state house redistricting plan from 1992-2000 was -2.4%, and it was drawn by a court. (Jackman Rpt. (Dkt. 62) at p. 72; Jackman Decl. Ex. F (Dkt. 58-6) at p. 18.)

47. The average efficiency gap of the Wisconsin state house redistricting plan from 2002-2010 was -7.6%, and it was drawn by a court. (Jackman Rpt. (Dkt. 62) at p. 72; Jackman Decl. Ex. F (Dkt. 58-6) at p. 25.)

48. The average efficiency gap for the Demonstration Plan drawn by Professor Mayer is calculated by averaging the efficiency gaps for the three scenarios that Professor Mayer used in conducting his sensitivity testing. These are “D minus 5” (1.96%); “My Plan

Incumbent Baseline” (3.71%); and “D plus 3” (3.85%), resulting in an average efficiency gap of -1.9% (Mayer Rebuttal Rpt. (Dkt. 64) at p. 26.)

49. In his rebuttal report, Professor Mayer plugged in Wisconsin’s values for Goedert’s models’ independent variables (6.6% black, 6.5% Hispanic, 70.2% urbanized, 50.8% Democratic in 2012, and 47.2% Democratic in 2014) and assumed a bipartisan or nonpartisan redistricting process. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 15-16.)
50. The results of this analysis were a *pro-Democratic* efficiency gap of 1.9% in 2012, and a *pro-Democratic* efficiency gap of 4.4% in 2014. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 15-16; Goedert Dep. (Dkt. 65) at 85:7-20.)
51. In his rebuttal report, Professor Mayer calculated measures of the isolation and concentration of Wisconsin’s Democratic and Republican voters. One of these measures was the isolation index, which indicates, for the average Democratic or Republican voter, how much more heavily Democratic or Republican his or her ward is than the state as a whole. A Democratic isolation score of 10%, for example, means that the average Democratic voter lives in a ward that is 10% more Democratic than the state in its entirety. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 16-17; Edward Glaeser & Jacob Vigdor, *The End of the Segregated Century* (2012), Mayer Decl. Ex. D (Dkt. 59-4) at p. 3.)
52. The other measure of the isolation and concentration of Wisconsin’s Democratic and Republican voters, Global Moran’s I, shows how spatially clustered Democratic or Republican voters are. It varies from -1 (perfect dispersion) to +1 (perfect clustering). (Mayer Rebuttal Rpt. (Dkt. 64) at pp 16-17; Su-Yeul Chung & Lawrence A. Brown, *Racial/Ethnic Sorting in Spatial Context: Testing the Explanatory Frameworks*, 28 *Urb. Geo.* 312 (2007), Mayer Decl. Ex. E (Dkt. 59-5) at p. 322.)

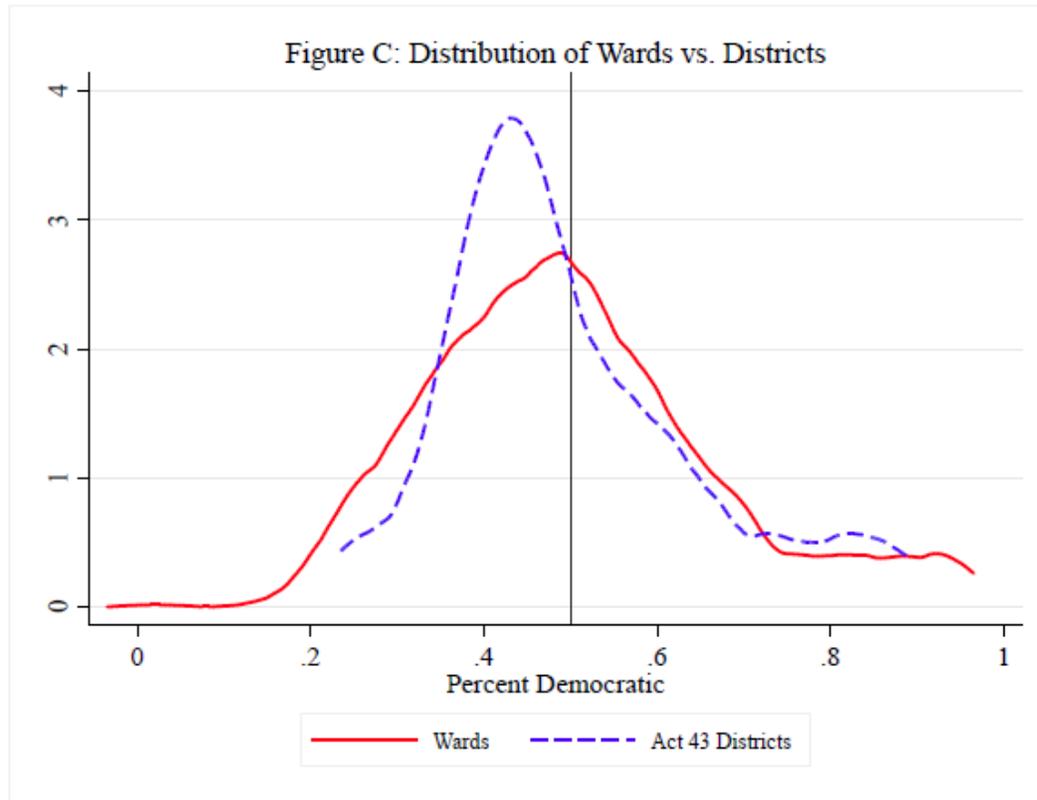
53. For Wisconsin, the below table displays the Democratic isolation, Republican isolation, Democratic clustering, and Republican clustering scores for all available years (2004-2014 for the isolation index and 2012-2014 for Global Moran's I).

<b>Year</b>	<b><u>Democratic Isolation</u></b>	<b><u>Republican Isolation</u></b>	<b><u>Democratic Clustering</u></b>	<b><u>Republican Clustering</u></b>
2004	20%	21%		
2006	16%	17%		
2008	15%	14%		
2010	15%	17%		
2012	14%	12%	0.68	0.69
2014	23%	20%	0.75	0.68

(Mayer Rebuttal Rpt. (Dkt. 64) at pp. 17-18.)

54. At all times, Democratic and Republican voters were about equally isolated and about equally clustered. In some years, Democratic voters were slightly more isolated (2008, 2012, 2014) and clustered (2014). In other years, Republican voters were slightly more isolated (2004, 2006, 2010) and clustered (2012). (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 17-18.)

55. In his rebuttal report, Professor Mayer compares the partisan distribution of Wisconsin's *wards* with that of the Current Plan's *districts*.



(Mayer Rebuttal Rpt. (Dkt. 64) at pp. 11-12.)

56. Both packing and cracking are evident in the Current Plan’s district distribution, which peaks at around 42% Democratic and has a long Democratic tail. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 11-12.)

57. The current ward distribution for Wisconsin is almost perfectly symmetric in its shape, and its peak is very close to 50% Democratic. (Mayer Rebuttal Rpt. (Dkt. 64) at 11-12.)

58. In combination, the histograms at APFOF ¶ 54 above “reveal that Act 43’s designers were able to distort a fairly neutral ward distribution into a far more advantageous district distribution, through gerrymandering.” (Mayer Rebuttal Rpt. (Dkt. 64) at p. 12; Goedert Dep. (Dkt. 65) at 166:7-13, 169:3-15.)

59. In violation of usual practice, the current ward boundaries were determined after the Current Plan’s districts had already been drawn (Jason Stein & Patrick Marley, *GOP*

*Redistricting Maps Make Dramatic Changes*, Milwaukee Journal-Sentinel (July 8, 2011), Earle Decl. Ex. D (Dkt. 57-4).)

60. The partisan index used by defense expert Sean Trende, is used “almost exclusively by political commentators,” and is used “less frequently in academic research.” (Mayer Rebuttal Rpt. (Dkt. 64) at p. 5.)
61. Trende admits that he cannot “identify any peer-reviewed studies that have analyzed the geographic clustering of Democratic and Republican voters by examining trends in County Partisan Indices” (Trende Dep. (Dkt. 66) at 56:2-6.)
62. Trende admits that the maps he uses do not adjust for Wisconsin counties’ very different populations (Trende Dep. (Dkt. 66:7-17) at 58; Goedert Dep. (Dkt. 65) at 185:19-186:4.)
63. Trende admits that the maps he uses are based on presidential rather than state legislative election results, covering only two elections (Trende Dep. (Dkt. 66) at 56:9-58:9.)
64. Trende admits that the maps he uses do not generate any “quantitative scores for Democratic and Republican clustering,” but rather must be “eyeball[ed]” by the viewer. (Trende Dep. (Dkt. 66) at 59:2-8; Trende Decl. (Dkt. 55) ¶ 25.)
65. Trende admits that while “there are about 10 adjacent red counties in the southeast corner of the state,” it is impossible to identify “any clusters of 10 very blue counties anywhere in the state.” (Trende Dep. (Dkt. 66) at 62:22-63:2.)

#### **IV. The Volume of Plans at Risk of Failing Plaintiffs’ Proposed Test**

66. Professor Goedert has recommended a proxy for partisan intent: whether a single party had unified control over redistricting, in the sense of holding majorities in both legislative chambers as well as the state’s governorship. (Goedert, *Gerrymandering or Geography*, *supra*, Goedert Dep. Ex. 20 (Dkt. 65-2) at p. 3; Goedert Dep. (Dkt. 65) at 39:19-40:5.)

(“The definition of partisan gerrymandering I use in my work is . . . a redistricting plan which is done under the complete control of one party. . . . [with] control over both houses of the state legislature and the governorship.”.)

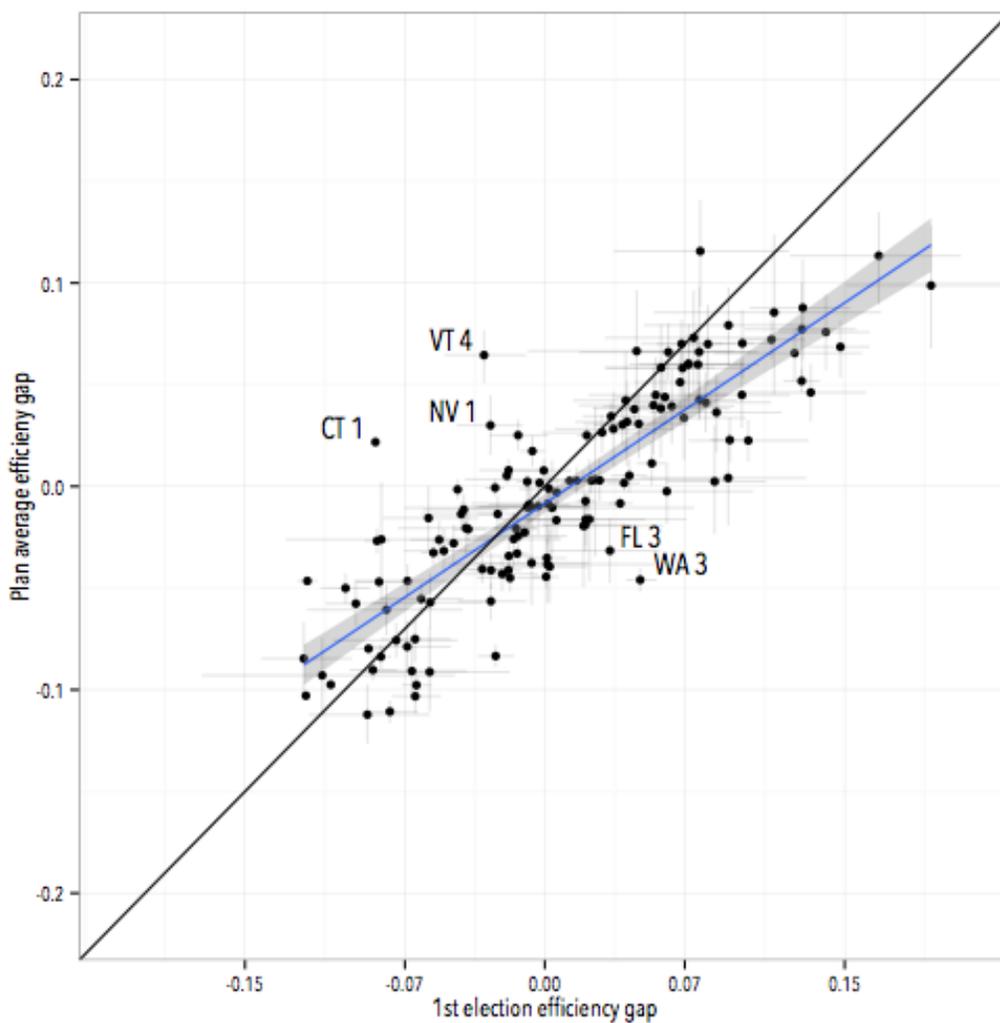
67. There are 206 distinct plans in Professor Jackman’s database. (Jackman Rpt. (Dkt. 62) at p. 7.)
68. Of the 206 plans in Professor Jackman’s database, 70 plans (or 34%) had initial efficiency gaps above 7%. (Jackman Rpt. (Dkt. 62) at p. 7.)
69. Of the 70 plans in Professor Jackman’s database that had initial efficiency gaps over 7%, 43 plans (or 21%) had initial efficiency gaps above 7% *and* unified control over redistricting by a single party. (Jackman Rpt. (Dkt. 62) at p. 7; Jackman Rebuttal Rpt. (Dkt. 63) at pp. 18-20; Jackman Decl. Ex. F (Dkt. 58-6).)
70. If the threshold is increased to 10%, 32 plans in Professor Jackman’s database (or 16%) had initial efficiency gaps of above 10%. (Jackman Rpt. (Dkt. 62) at p. 7.)
71. Of the 32 plans in Professor Jackman’s database that had an initial efficiency gap over 10%, 20 plans (or 10%) had initial efficiency gaps this large *and* unified control over redistricting by a single party. (Jackman Rpt. (Dkt. 62) at p. 7; Jackman Rebuttal Rpt. (Dkt. 63) at pp. 18-20; Jackman Decl. Ex. F (Dkt. 58-6).)
72. Of the 43 *current* plans in Professor Jackman’s database, 16 plans (or 37%) had initial efficiency gaps above 7%. (Jackman Rpt. (Dkt. 62) at p. 7.)
73. Of the 16 plans in Professor Jackman’s database that are current and have efficiency gaps over 7%, 11 plans (or 26%) had initial efficiency gaps above 7% *and* unified control over redistricting by a single party. (Jackman Rpt. (Dkt. 62) at p. 7; Jackman Rebuttal Rpt. (Dkt. 63) at pp. 18-20; Jackman Decl. Ex. F (Dkt. 58-6).)

74. Of the 43 *current* plans in Professor Jackman’s database, 11 plans (or 26%) had initial efficiency gaps above 10%. (Jackman Rpt. (Dkt. 62) at p. 7.)
75. Of the 11 plans in Professor Jackman’s database that are current and have efficiency gaps over 7%, 7 plans (or 16%) had initial efficiency gaps this large *and* unified control over redistricting by a single party. (Jackman Rpt. (Dkt. 62) at p. 7; Jackman Rebuttal Rpt. (Dkt. 63) at pp. 18-20; Jackman Decl. Ex. F (Dkt. 58-6).)
76. Professor Goedert finds that a single party with unified control over redistricting does not always seek to benefit itself. (Goedert Rpt. (Dkt. 51) at p. 10 (“In the 2000’s decade, Democrats controlled all branches of state government in California, but instead of crafting an aggressively partisan congressional map, worked closely with Republicans in the legislature to draw districts that would protect incumbents of both parties.”).)
77. The reapportionment revolution of the 1960s resulted in the invalidation of almost *every* state house, state senate, and congressional plan in the country, and “[b]oth state legislative and congressional districts were redrawn more comprehensively—by far—than at any previous time in our nation’s history.” (Gary W. Cox & Jonathan N. Katz, *Elbridge Gerry’s Salamander* (2002), Jackman Decl. Ex. J (Dkt. 620) at p. 4.)
78. The Supreme Court’s decision in *Thornburg v. Gingles*, 478 U.S. 30 (1986), construing Section 2 of the Voting Rights Act, spawned at least 800 lawsuits over the next generation. (Ellen D. Katz et al., *Documenting Discrimination in Voting: Judicial Findings Under Section 2 of the Voting Rights Act*, 39 U. Mich. J.L. Reform 643, 655 (2006), Earle Decl. Ex. B (Dkt. 57-2) at p. 655.)
79. In just the current redistricting cycle (i.e., new legislative districts based on the 2010 census), 224 cases were filed in 42 states, resulting in 23 plans being invalidated or

designed by the courts. (*Litigation in the 2010 Cycle, All About Redistricting*, <http://redistricting.ills.edu/cases.php>.)

**V. The Reliability of the First Efficiency Gap Recorded Under a Plan**

80. The below scatter plot displays the relationship between state house plans' initial and average efficiency gap values from 1972 to 2010 (including only plans with at least three recorded efficiency gaps, for which the average is more meaningful).

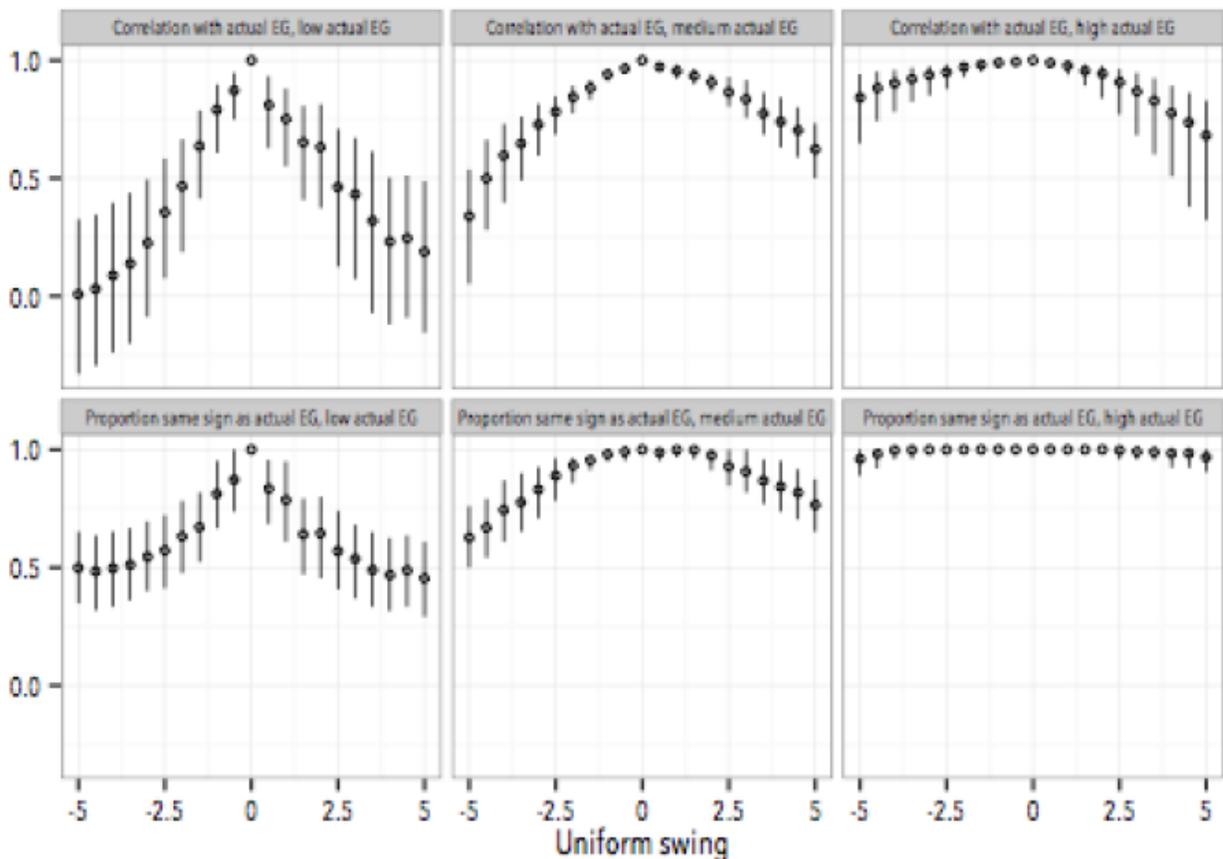


(Jackman Rebuttal Rpt. (Dkt. 63) at pp. 15-17.)

81. Plans' initial efficiency gaps explain fully *three-fourths* of the variation in their average efficiency gaps. (Jackman Rebuttal Rpt. (Dkt. 63) at pp. 15-17.)
82. For an initial efficiency gap of 7% in a Republican direction, for example, the average efficiency gap is predicted to be 5.3%, and there is more than a 96% likelihood that the average will be pro-Republican. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 16.)
83. For an initial efficiency gap of 7% in a Democratic direction, the average efficiency gap is forecast to be 3.7%, and there is roughly a 90% likelihood that the average will be pro-Democratic. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 16.)
84. Wisconsin's Current Plan, which opened with a pro-Republican efficiency gap of 13.3%, it is likely have an average efficiency gap of 9.5% over its lifetime, with more than a 99.9% likelihood of exhibiting a pro-Republican mean. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 16.)
85. Professor Jackman carried out the sensitivity testing recommended by Professor Goedert, which he called "an important acknowledgement of the fluctuations observed in efficiency gap as electoral tides shift." (Goedert Rpt. (Dkt. 51) at p.15; Jackman Decl. Ex. D (Dkt. 58-4).)
86. Professor Jackman also used the uniform swing methodology employed and endorsed by Professor Goedert. (Goedert Rpt. (Dkt. 51) at p. 22; Goedert Dep. (Dkt. 65) at 123:12-20; Jackman Decl. Ex. D (Dkt. 58-4).)
87. Professor Jackman shifted the actual 2012 and 2014 election results by up to five points in each direction, and then recorded the efficiency gaps produced by each shift. (Jackman Decl. Ex. D (Dkt. 58-4) at pp. 1-2.)

88. Election swings of this magnitude encompass “the vast majority of state legislative elections from 1972 to 2012,” and thus illustrate how the current plans would perform under almost all plausible electoral conditions. (Jackman Decl. Ex. D (Dkt. 58-4) at p. 2; Goedert Dep. (Dkt. 65) at 126:16-127:10.)

89. The below figure divides the current plans’ actual efficiency gaps into three categories: small (absolute value below 3%), medium (absolute value between 3% and 7%), and large (absolute value above 7%). For each category, the figure then shows the *correlation* between the plans’ actual and predicted efficiency gaps, as well as the proportion of actual and predicted efficiency gaps *with the same sign*, given different vote swings.



(Jackman Decl. Ex. D (Dkt. 58-4) at p. 4.)

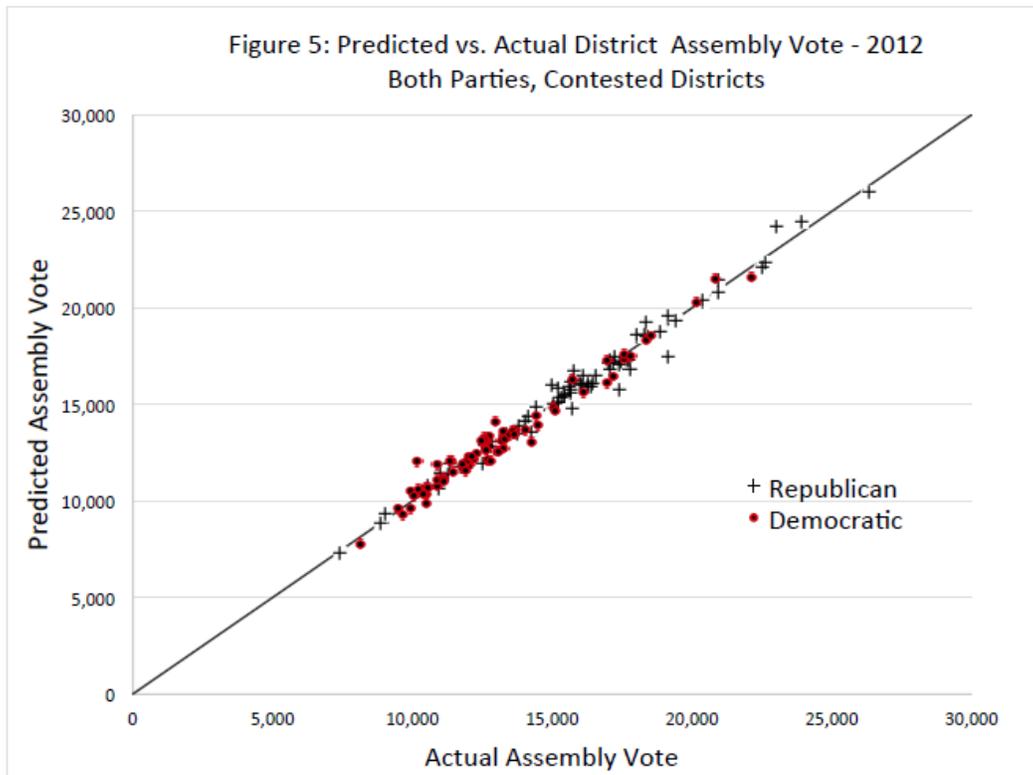
90. The chart in APFOF ¶ 89 shows that for plans with large actual efficiency gaps, the correlation between their actual and predicted values is very high (always above 0.7 and usually above 0.9) for all vote swings. (Jackman Decl. Ex. D (Dkt. 58-4) at p. 4.)
91. The chart in APFOF ¶ 89 shows that for plans with large actual efficiency gaps, the proportion of their actual and predicted efficiency gaps with the same sign is even higher—nearly 100% for all vote swings. (Jackman Decl. Ex. D (Dkt. 58-4) at p. 4.)
92. Professor Jackman found that a 7% threshold would drive down the rate of false positives to minute levels, below 5%. A slightly higher threshold of around 8% would reduce the rate of false positives all the way to zero. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 12.)
93. Professor Jackman calculated, for different efficiency gap thresholds, the proportion of plans that either (1) would fall below the threshold or (2) if above the threshold, would exhibit an efficiency gap of the same sign throughout their lifetimes. On the Republican side the proportion is roughly 96% for an efficiency gap threshold of 7%. On the Democratic side a 7% efficiency gap threshold is associated with an almost identical confidence rate of 93% (Jackman Rpt. (Dkt. 62) at p. 67.)

**VI. Efficiency Gap Calculations for Wisconsin’s Current Plan and Demonstration Plan**

94. Professor Mayer’s Demonstration Plan’s efficiency gap “cannot be estimated by simply rearranging the votes cast in actual Assembly contests into a new district configuration, as the votes cast for specific Assembly candidates in each district are a function of the electoral environment in that district and whether a race is even contested by both parties.” (Mayer Rpt. (Dkt. 54) at pp. 5-6.)
95. “A large literature has developed around the problem of estimating the likely election results in redistricting plan alternatives.” (Mayer Rpt. (Dkt. 54) at p. 6.)

96. The key insight of the literature on estimating the likely election results in redistricting plan alternatives is that *exogenous* variables such as presidential election results can be used to *predict* election results at the level of the map at issue. There is no dispute among scholars that this sort of modeling is the appropriate (in fact, the only) way to assess proposed maps under which no elections have been held. (Bruce E. Cain, *Assessing the Partisan Effects of Redistricting*, 79 Am. Pol. Sci. Rev. 320 (1985), Jackman Decl. Ex. K (Dkt. 621); Andrew Gelman & Gary King, *Estimating the Electoral Consequences of Legislative Redistricting*, 85 J. Am. Stat. Ass'n 274 (1990), Jackman Decl. Ex. I (Dkt. 58-9).)
97. This is why the Legislature's consultant, Professor Keith Gaddie, used the exact same method to predict the Current Plan's election results. (Goedert Dep. Ex. 25 (Dkt. 65-4).)
98. Professor Mayer's model incorrectly predicted the winners in only two districts: District 51 (actual Republican vote: 51.9% vs. predicted Republican vote: 49.9%) and District 70 (actual Republican vote: 49.7% vs. predicted Republican vote: 50.1%). (Mayer Rpt. (Dkt. 54) at pp. 24-25; Mayer Dep. (Dkt. 52) at 87:22.)
99. Professor Mayer's incorrect predictions for the Wisconsin Assembly races in 2012 are balanced, one for each party, meaning that in the aggregate, Professor Mayer's model forecast the partisan distribution of contested districts (56 Republican, 16 Democratic) with perfect accuracy. (Mayer Rpt. (Dkt. 54) at pp. 24-25.)
100. The R-squared value for Professor Mayer's model of the Republican Assembly Votes regression is 0.99, and the R-squared value for Professor Mayer's model of the Democratic Assembly Votes regression is 0.98. (Mayer Rpt. (Dkt. 54) at pp. 24-25; Mayer Dep. (Dkt. 52) at 125:11-17.)

101. The model's precision is apparent in the below scatter plot, which compares the actual Assembly vote to the predicted Assembly vote for all contested districts. The fit between the actual and predicted values is more or less perfect, with the two sets of scores tightly hugging the regression line.



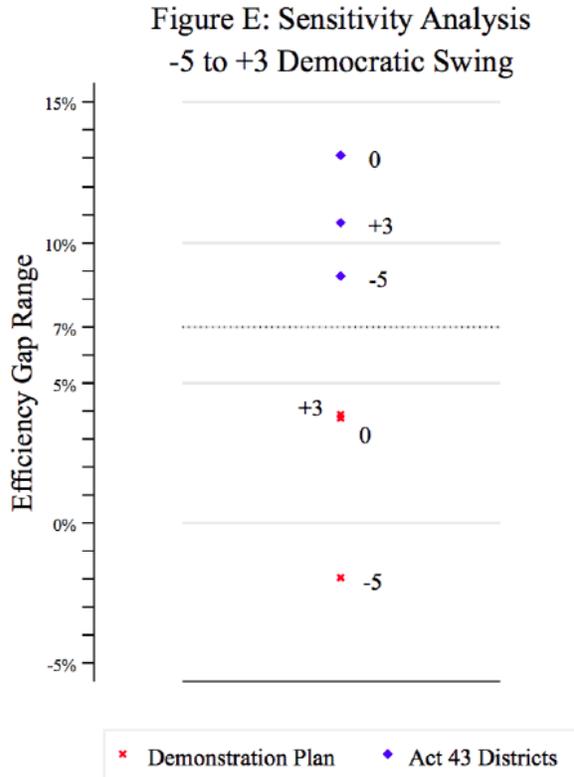
(Mayer Rpt. (Dkt. 54) at p. 23.)

102. Table 8 of Professor Mayer's report shows a later permutation of his model that "sets all incumbency variables to zero." (Mayer Rpt. (Dkt. 54) at p. 29.)

103. Professor Mayer created the model whose results are shown in Table 8 for the same reason that the Legislature's consultant, Professor Gaddie, did: to determine "what the vote would usually do without an incumbent in the district." (Mayer Rebuttal Rpt. (Dkt. 64) at p. 22; Goedert Dep. Ex. 25 (Dkt. 65-4).)

104. Professor Mayer also created the model to account for the facts that “incumbents can be defeated, retire, run for higher office, or switch parties over a plan’s decade-long lifespan,” and that “[a] map’s authors will typically want to ensure that their projections do not depend on particular incumbents continuing to run in particular districts.” (Mayer Rebuttal Rpt. (Dkt. 64) at p. 24.)
105. The “no incumbents” version of the model was not intended to predict the winners of the Current Plan’s districts in 2012. To make such predictions, it would render an analysis unreliable to discard relevant information about candidates, and the first form of the model, discussed above, did not do so. (Mayer Dep. (Dkt. 52) at 52:19-53:19.)
106. The “no incumbents” version of the model was intended to determine how the parties would fare in contested districts without incumbents, thus enabling an apples-to-apples comparison between the Current Plan and the Demonstration Plan. “This is a more accurate method of determining the baseline partisanship of a district, as it removes the effect of incumbents, who may or may not be running in an alternative plan. This baseline process is standard in the discipline, and was used by the expert retained by the state legislature.” (Mayer Rpt. (Dkt. 54) at p. 31; Mayer Dep. (Dkt. 52) at 63:15-24, 70:4-17.)
107. Using Professor Gaddie’s correct estimate for District 86 (55.08% Republican), the Current Plan’s predicted efficiency gap *rises* from 12.36% to 13.29% due to the addition of one more Republican seat. (Mayer Rpt. (Dkt. 54) at p. 31; Mayer Dep. (Dkt. 52) at 63:15-24, 70:4-17.)

108. Because “election results in Wisconsin (and in most states) are extremely highly correlated from one election to the next,” predicted efficiency gaps will be very similar no matter which elections they are based on. (Mayer Rebuttal Rpt. (Dkt. 64) at p. 23.)
109. Wisconsin’s “2008 county level presidential vote and the 2012 county level presidential vote are almost perfectly correlated ( $r^2=0.96$ )”. (Mayer Dep. (Dkt. 52) at 75:3-15.)
110. With respect to incumbency, Professor Mayer “used the actual incumbents who ran in the plan’s districts” for the Current Plan, and “geocoded incumbents’ home addresses and then identified which districts had incumbents residing in them” for the Demonstration Plan. (Mayer Rebuttal Rpt. (Dkt. 64) at p. 24; Goedert Dep. (Dkt. 65) at 145:21-25.)
111. Incorporating incumbency caused the Current Plan’s efficiency gap to rise from 11.7% to 13.0%. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 24-25.)
112. Incorporating incumbency caused the Demonstration Plan’s efficiency gap rose from 2.2% to 3.7%. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 24-25.)
113. The gulf between the efficiency gaps of the Current Plan and the Demonstration Plan remained essentially unchanged (9.5% without incumbency, 9.3% with incumbency). (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 24-25.)
114. Professor Mayer used the uniform swing methodology endorsed by Professor Goedert to simulate the largest Democratic and Republican wave elections of the past three decades: 2006 (with a Democratic vote share 3% higher than in 2012) and 2010 (with a Democratic vote share 5% lower than in 2012). (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 26-27.)
115. The outcomes of Professor Mayer’s sensitivity testing are displayed in the below chart



(Mayer Rebuttal Rpt. (Dkt.59-2) at pp. 26-27.)

116. The results of the uniform swing analysis conducted by Professor Mayer for the Current Plan show that its efficiency gap varies from 8.8% (in the Republican wave scenario) to 10.7% (in the Democratic wave scenario) to 13.0% (in 2012). (Mayer Rebuttal Rpt. (Dkt.59-2) at pp. 26-27.)

117. The results of the uniform swing analysis conducted by Professor Mayer for the Demonstration Plan show that its efficiency gap varies from -2.0% (in the Republican wave scenario) to 3.7% (in 2012) to 3.9% (in the Democratic wave scenario). (Mayer Rebuttal Rpt. (Dkt.59-2) at pp. 26-27.)

118. At all times under the uniform swing analysis conducted by Professor Mayer, the Current Plan's efficiency gap is greater than |7%|, and the Demonstration Plan's is well below that absolute value. (Mayer Rebuttal Rpt. (Dkt. 64) at pp. 26-28.)

## VII. General Properties of the Efficiency Gap

119. Eric McGhee compiled a set of 501 state house elections from 1970 to 2003, and then constructed a pair of very simple models. In both cases, party seat share was the dependent variable, and party vote share was one of the independent variables. The other independent variable was either partisan bias (an older measure of partisan symmetry) or the efficiency gap. Partisan bias turned out to be a relatively poor predictor of party seat share, with a coefficient of only 0.246. But the efficiency gap turned out to be a *perfect* predictor, with a coefficient of exactly 2.0. (Eric McGhee, *Measuring Partisan Bias in Single-Member District Electoral Systems*, 39 *Legis. Stud. Q.* 55 (2014), Jackman Decl. Ex. G (Dkt. 58-7) at p. 67.)
120. In its full form, as calculated by Professor Mayer, the efficiency gap aggregates the parties' wasted votes district by district. (Mayer Rpt. (Dkt. 54) at pp. 5-6.)
121. However, this district-by-district aggregation is unnecessary when districts have equal turnout. In this case, the efficiency gap can be calculated using the formula  $(S - 0.5) - 2(V - 0.5)$ , where  $S$  is a party's statewide seat share and  $V$  is a party's statewide vote share. (Jackman Rpt. (Dkt. 62) at p. 16.)
122. This formula is not a different measure of the efficiency gap, as it produces exactly the same values as district-by-district aggregation when there is equal district turnout. This is why defendants' expert, Professor Goedert, "concur[s] that this shortcut is an appropriate and useful summary measure of [the] efficiency gap." (Goedert Rpt. (Dkt. 51) at 5; Goedert Dep. (Dkt. 65) at 70:17-71:1.)
123. Districts are never exactly equal in their turnout. But America's very strict equal population rule—the most rigid in the world—ensures that they are never too different

either. (Nicholas O. Stephanopoulos, *Our Electoral Exceptionalism*, 80 U. Chi. L. Rev. 769 (2013), Earle Decl. Ex. 1 (Dkt. 57-1) at pp. 797, 806.)

124. In 2012, the Current Plan had an efficiency gap of -11.7% using the full method and -9.9% using the simplified method, a difference of only 1.8%. Similarly, the Demonstration Plan had an efficiency gap of -2.2% using the full method and -0.8% using the simplified method, a difference of only 1.4%. (Mayer Rpt. (Dkt. 54) at p. 46; Jackman Rpt. (Dkt. 62) at p. 71.)

125. There were three cases in Professor Jackman's database of state house elections in which all races were contested: Michigan in 1996; Michigan in 2014; and Minnesota in 2008. Professor Jackman also identified six successive state senate elections in Michigan in which all races were contested, from 1994 to 2014. (Jackman Rpt. (Dkt. 62) at p. 25; Jackman Dep. (Dkt. 53) at 61:12-62:17; Jackman Decl. Ex. E (Dkt. 58-5).)

126. The efficiency gap for the Michigan House in the 1996 election using the full method was -6.7%, using the simplified method was -7.5%, and therefore the difference was 0.8%. (Jackman Decl. (Dkt. 58-5) at pp. 1-5.)

127. The efficiency gap for the Michigan House in the 2014 election using the full method was -13.4%, using the simplified method was -13.1%, and therefore the difference was 0.3%. (Jackman Decl. (Dkt. 58-5) at pp. 5-10.)

128. The efficiency gap for the Minnesota House in the 2008 election using the full method was -0.8%, using the simplified method was 1.4%, and therefore the difference was -0.6%. (Jackman Decl. (Dkt. 58-5) at pp. 10-16.)

129. The efficiency gap for the Michigan Senate in the 1994 election using the full method was -3.5%, using the simplified method was -4.1%, and therefore the difference was 0.6%. (Jackman Decl. (Dkt. 58-5) at pp. 16-17.)
130. The efficiency gap for the Michigan Senate in the 1998 election using the full method was -9.7%, using the simplified method was -10.3%, and therefore the difference was 0.6%. (Jackman Decl. (Dkt. 58-5) at pp. 17-19)
131. The efficiency gap for the Michigan Senate in the 2002 election using the full method was -10.3%, using the simplified method was -10.4%, and therefore the difference was 0.1%. (Jackman Decl. (Dkt. 58-5) at pp. 19-20)
132. The efficiency gap for the Michigan Senate in the 2006 election using the full method was -18.7%, using the simplified method was -18.4%, and therefore the difference was -0.3%. (Jackman Decl. (Dkt. 58-5) at pp. 20-22.)
133. The efficiency gap for the Michigan Senate in the 2010 election using the full method was -14.6%, using the simplified method was -14.4%, and therefore the difference was -0.2%. (Jackman Decl. (Dkt. 58-5) at pp. 22-24)
134. The efficiency gap for the Michigan Senate in the 2014 election using the full method was -22.8%, using the simplified method was -21.8%, and therefore the difference was 1.0%. Jackman Decl. (Dkt. 58-5) at pp. 24-25.)
135. In elections in which all races were contested, there was a correlation of 0.997 between the full method's and the simplified method's efficiency gap calculations (and the two methods never varies by more than 1%) (Jackman Rpt. (Dkt.58-1) at p. 25; Jackman Dep. (Dkt. 53) at 40-41, 61-62; Jackman Decl. Ex. E (Dkt.58-5); PFOF ¶¶ 121-130.)

136. When the simplified method is used, the  $(S - 0.5) - 2(V - 0.5)$  formula implies that for the efficiency gap to be zero, there must be a 2:1 relationship between seat share and vote share (also known as “responsiveness”). (Jackman Rpt. (Dkt. 62) at pp. 17-18.)
137. As Professor Goedert has explained in his report and other work, a responsiveness of 2 “conform[s] with the observed average seat/votes curve in historical U.S. congressional and legislative elections.” (Goedert Rpt. (Dkt. 51) at p. 6; Goedert Dep. (Dkt. 65) at 95:17-21.)
138. At the congressional level, the seat/vote curve had “an average slope of 2.02 for the past 40 years.” (Goedert, *Gerrymandering or Geography*, *supra*, at 7, Goedert Dep. Ex. 20 (Dkt. 65-2) at p. 7.)
139. Professor Goedert “assume[s] that a party should expect to win a proportion of seats in line with historical patterns” – fearing a responsiveness of 2 – and then compares the party’s actual seat share “with the expected seat share under a ‘fair map’ with...a historically average seats-votes curve.” (Nicholas Goedert, *Gerrymandering or Geography? How Democrats Won the Popular Vote But Lost the Congress in 2012*, *Research & Pol.*, Apr.-Jun. 2014, Goedert Dep. Ex. 20 (Dkt. 65-2) at p. 7.)
140. The 10% population deviation threshold, used in one person, one vote cases, was set only after the Court first struck down plans with deviations of 20%, 26%, and 34%, and upheld plans with deviations of 8% and 10%, over roughly a decade. (Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 U. CHI. L. REV. 831, 890-91 (2015), publicly available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2457468](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2457468).)

141. In setting a test for partisan gerrymandering, with respect to the second prong of the proposed test, the Court could supplement any threshold with the sensitivity testing recommended by defendants' expert, Professor Goedert. (Goedert Rpt. (Dkt. 51) at p. 15.)
142. Plaintiffs' Demonstration Plan complies at least as well with all federal and state requirements, but has an efficiency gap more than 80% smaller. (Mayer Rpt. (Dkt. 54) at pp. 37, 46.)
143. The California state legislative plan for 1972-1980 had an average efficiency gap of 2.5% (Jackman Rpt. (Dkt. 62) at p. 7.)
144. The New Mexico state legislative plan for 2012-2014 had an average efficiency gap of -1.6% (Jackman Rpt. (Dkt. 62) at p. 7.)
145. Roughly equal wasted votes, not any kind of seat-vote relationship, is the essence of the efficiency gap, and can be described as a measure of "relative wasted votes." (Eric McGhee, *Measuring Partisan Bias in Single-Member District Electoral Systems*, 39 *Legis. Stud. Q.* 55 (2014), Jackman Decl. Ex. G (Dkt. 58-7) at p. 68.)
146. Professor Goedert explained in his report that the 2:1 seat-vote relationship "conform[s] with the observed average seat/votes curve in historical U.S. congressional and legislative elections." (Goedert Rpt. (Dkt. 51) at p. 6; Goedert Dep. (Dkt. 65) at 95:17-21.)
147. Partisan bias denotes "the extent to which a majority party would fare better than the minority party, should their respective shares of the vote reverse," and so it is compatible with any seat-vote ratio. "An electoral system may have any degree of partisan bias, no matter what level of responsiveness happens to exist." (Bernard Grofman & Gary King, *The Future of Partisan Symmetry as a Judicial Test for Partisan Gerrymandering After*

LULAC v. Perry, 6 Election L.J. 2, 6 (2007), <http://gking.harvard.edu/files/jp.pdf>, at p. 9.)

148. Under the simplified method, the efficiency gap would be -7% if the party received 53% of the seats  $((0.53 - 0.5) - 2(0.55 - 0.5))$ , and 7% if the party received 67% of the seats  $((0.67 - 0.5) - 2(0.55 - 0.5))$ . The seat-vote relationship would be 0.6 in the first case  $((0.53 - 0.5) / (0.55 - 0.5))$ , and 3.4 in the second case  $((0.67 - 0.5) / (0.55 - 0.5))$ , relative to the benchmark of  $S = V = 0.5$ . (Andrew Gelman & Gary King, *Estimating the Electoral Consequences of Legislative Redistricting*, 85 J. AM. STAT. ASS'N 274 (1990), Jackman Decl. Ex. I (Dkt. 58-9) at p.9; Jackman Rpt. (Dkt. 62) at p. 16.)
149. Partisan bias is a relatively poor predictor of party seat share (McGhee, *supra*, at 67, Jackman Decl. Ex. G (Dkt. 58-7) at p. 67.)
150. The more uncompetitive a state's election, the less accurate partisan bias becomes (Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 U. CHI. L. REV. 831, 858 (2015), publicly available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2457468](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2457468).)
151. Professor Gaddie, removed the effects of incumbency from his model, imputed election results in uncontested races, and assumed equal district turnout (Mayer Rebuttal Rpt. (Dkt. 64) at p. 22.)
152. Table 2 of Professor Mayer's Report sets out the results of his initial model, which predicts district vote shares with nearly perfect precision and does not remove incumbency effects. (Mayer Rpt. (Dkt. 54) at pp. 19-28.)
153. All of Professor Jackman's calculations made no adjustments for incumbency. (Jackman Rpt. (Dkt. 62) at pp. 19-32.)

154. Professor Jackman’s sensitivity testing showed that maps throughout the nation with large efficiency gaps would remain highly asymmetric even given swings of up to five points in either party’s direction. (Jackman Decl. Ex. D (Dkt. 58-4) at pp. 1-6.)
155. The Republican leadership crafted the Current Plan the Republican-controlled Legislature passed the Current Plan with little debate (Compl. (Dkt. 1) ¶¶ 31-43.)
156. The increase in Republican unified control accounts for essentially *all* of the efficiency gap’s movement in a Republican direction. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 20.)
157. Partisan intent is often a driver of partisan impact, as shown by Professor Goedert’s work finding that unified party control over redistricting leads to a large efficiency gap boost in favor of that party. (Goedert, *Gerrymandering or Geography*, *supra*, at 6, Goedert Dep. Ex. 20 (Dkt. 65-2) at p. 6; Goedert, *Disappearing Bias*, *supra*, at 13, Goedert Dep. Ex. 21 (Dkt. 65-3) at 13.)
158. At present, the motivation for many one-person, one-vote, Voting Rights Act, and state law claims is partisan dissatisfaction at being the victim of gerrymandering. Samuel Issacharoff finds that “the absence of any real constitutional vigilance over partisan gerrymandering” causes litigants to “squeeze all claims . . . into the suffocating category of race.” (Samuel Issacharoff, *Gerrymandering and Political Cartels*, 116 Harv. L. Rev. 593, 630-31 (2002), Earle Decl. Ex. E (Dkt. 57-5) at pp. 630-31.)
159. Richard H. Pildes observes that “[t]he ‘right’ claimed” in many “political cases” is “obviously a stalking horse for other interests.” (Richard H. Pildes, *The Theory of Political Competition*, 85 Va. L. Rev. 1605, 1608 (1999), Earle Decl. Ex. F (Dkt. 57-6) at pp. 1608.)

160. For decades, the vast majority of redistricting litigation has been resolved very early in the cycle. (*Litigation in the 2010 Cycle*, All About Redistricting, <http://redistricting.ils.edu/cases.php> (showing that more than 85% of redistricting suits in the 2010 cycle have already been resolved.)
161. In assessing what cutoff would be reasonable, Professor Jackman considered whether a plan's initial efficiency gap is "large relative to those observed in the previous 40 years of state legislative elections." (Jackman Rpt. (Dkt. 62) at p. 65.)
162. In assessing what cutoff would be reasonable, Professor Jackman considered what proportion of plans either fall below a given threshold, or if above, would exhibit an efficiency gap of the same sign throughout their lifetimes. (Jackman Rpt. (Dkt. 62) at pp. 66-69.)
163. In assessing what cutoff would be reasonable, Professor Jackman considered what a series of prognostic tests reveal about the reliability of different thresholds. (Jackman Rebuttal Report (Dkt. 63) at pp. 5-14.)
164. In assessing what cutoff would be reasonable, Professor Jackman considered how a plan's initial efficiency gap is related to its average efficiency gap over its lifetime. (Jackman Rebuttal Report (Dkt. 63) at pp. 15-17.)
165. In assessing what cutoff would be reasonable, Professor Jackman considered what sensitivity testing demonstrates about the durability of plans' efficiency gaps in the current cycle. (Jackman Decl. Ex. D (Dkt. 58-4) at pp. 1-6.)
166. In his initial report, Professor Jackman examined whether most variation in the efficiency gap is *within* plans (in which case the metric would not be very trustworthy) or *between* plans (in which case it would amount to a durable plan characteristic). His results

confirmed the latter thesis. “About 76% of the variation in the *EG* estimates is between-plan variation,” indicating that “there is a moderate to strong ‘plan-specific’ component to variation in the *EG* scores,” and that “the efficiency gap *is* measuring an enduring feature of a districting plan.” (Jackman Rpt. (Dkt. 62) at pp. 48; Jackman Dep. (Dkt. 53) at 75:10-76:4.)

167. About 95% of plans from 1972 to 2014 either had initial efficiency gaps below 7% or had larger initial efficiency gaps and never once favored the opposing party. (Jackman Rpt. (Dkt. 62) at p. 67; Goedert Dep. (Dkt. 51) at 120: 24-121:1.)

168. Professor Jackman’s prognostic tests indicate that there would be almost no false positives with a 7% threshold, that is, cases where a plan’s average efficiency gap was expected to have the same sign as its initial efficiency gap, but this expectation turned out to be incorrect. (Jackman Rebuttal Rpt. (Dkt. 63) at p. 12.)

169. There is a very strong relationship between a plan’s initial efficiency gap and the size and sign of its average efficiency gap, with the former accounting for fully three-fourths of the variation in the latter. (Jackman Rebuttal Rpt. (Dkt. 63) at pp. 15-17.)

170. This tight relationship applies not just retrospectively but also prospectively. If current plans with large efficiency gaps experienced electoral tides of up to five points in either direction, their new efficiency gaps would be extremely highly correlated with their original ones, and almost certain to have the same sign. (Jackman Decl. Ex. D (Dkt. 58-4) at p. 4.)

171. Because partisan bias is calculated based on counterfactual rather than actual elections, it is essentially unaffected by the electoral swings that in fact occur. (*See McGhee, supra*, Jackman Decl. Ex. G (Dkt. 58-7) at p. 73 (noting that partisan bias exhibits “more

persistence through time”); Stephanopoulos & McGhee, *supra*, at 864 (observing that “partisan bias is fairly stable” because “it shifts all actual results to the point of the hypothetical election”).

172. Similar examples in the current cycle include Maine, where Republicans in full control of the state government authorized an advisory commission and then heeded its line-drawing recommendations, and Vermont, where Democrats in full control did the same. (Maine, All About Redistricting, publicly available at <http://redistricting.lls.edu/states-ME.php>; Vermont, All About Redistricting, publicly available at <http://redistricting.lls.edu/states-VT.php>.)
173. The only suggestion of defendants not tried out by plaintiffs’ experts is treating uncontested races as if they were decided by a margin of 100% to 0%. *See* Defs’ Br. at 49. This crude approach is guaranteed to produce errors since the voters in uncontested races are never unanimously in favor of the winning party’s candidate. (Jackman Rpt. (Dkt. 62) at p. 24; Stephanopoulos & McGhee, *supra*, at 867.) (“We strongly discourage analysts from . . . treating [uncontested races] as if they produced unanimous support for a party.”)
174. In the current cycle, the Florida, Georgia, Indiana, Michigan, North Carolina, Ohio, Rhode Island, Tennessee, Vermont, Wisconsin, and Wyoming plans were all enacted by a single party with unified control over redistricting, and all exhibited efficiency gaps above 7% in 2012. Likewise, the Alaska, California, Colorado, Connecticut, Hawaii, Iowa, Kentucky, Maine, Minnesota, Montana, Nevada, New Mexico, and Washington plans were all enacted by some other institution (a court, a commission, or divided government), and all had efficiency gaps below 7% in 2012. (Jackman Rpt. (Dkt. 62) at

pp. 7, 73; Jackman Rebuttal Rpt. (Dkt. 63) at pp. 18-20; Jackman Decl. Ex. F (Dkt. 58-6).)

175. The efficiency gap is plaintiffs' measure of partisan *effect*, not of partisan *intent*.

(Jackman Rebuttal Rpt. (Dkt. 63) at pp. 3-4.)

Respectfully submitted,

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