Partisan Gerrymandering and the Efficiency Gap

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The usual legal story about partisan gerrymandering is relentlessly pessimistic. The courts did not even recognize the cause of action until the 1980s; they have never struck down a district plan on this basis; and four sitting justices want to vacate the field altogether. The Supreme Court's most recent gerrymandering decision, however, is the most encouraging development in this area in a generation. Several justices expressed interest in the concept of partisan symmetry—the idea that a plan should treat the major parties symmetrically in terms of the conversion of votes to seats—and suggested that it could be shaped into a legal test.

In this Article, we take the justices at their word. First, we introduce a new measure of partisan symmetry: the efficiency gap. It represents the difference between the parties' respective wasted votes in an election, divided by the total number of votes cast. It captures, in a single tidy number, all of the packing and cracking decisions that go into a district plan. It also is superior to the metric of gerrymandering, partisan bias, that litigants and scholars have used until now. Partisan bias can be calculated only by shifting votes to simulate a hypothetical tied election. The efficiency gap eliminates the need for such counterfactual analysis.

Second, we compute the efficiency gap for congressional and state house plans between 1972 and 2012. Over this period as a whole, the typical plan was fairly balanced and neither party enjoyed a systematic advantage. But in recent years—and peaking in the 2012 election—plans have exhibited steadily larger and more pro-Republican gaps. In fact, the plans in effect today are the most extreme gerrymanders in modern history. And what is more, several are likely to remain *extreme for the remainder of the decade, as indicated by our sensitivity testing.*

Finally, we explain how the efficiency gap could be converted into doctrine. We propose setting thresholds above which plans would be presumptively unconstitutional: two seats for congressional plans and 8 percent for state house plans, but only if the plans probably will stay unbalanced for the remainder of the cycle. Plans with gaps above these thresholds would be unlawful unless states could show that the gaps either resulted from the consistent application of legitimate policies or were inevitable due to the states' political geography. This approach would

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neatly slice the Gordian knot the Court has tied for itself, explicitly replying to the Court's "unanswerable question" of "[h]ow much political . . . effect is too much."

INTRODUCTION

Professor Cass Sunstein once quipped that the nondelegation doctrine (which purports to limit congressional delegations of legislative authority to agencies) "has had one good year, and 211 bad ones."[1] According to the conventional wisdom, the cause of action for partisan gerrymandering[2] has not had even this one good year. The claim was not recognized until 1986, when the Supreme Court ruled that gerrymandering is justiciable but still upheld a pair of Indiana district plans that used every trick in the book to disadvantage the state's Democrats.[3] Since 1986, not

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1 Cass R. Sunstein, *Nondelegation Canons*, 67 U Chi L Rev 315, 322 (2000).

2 We note at the outset that, consistent with the metric we introduce in this Article, whenever we refer to "gerrymandering," we mean district plans whose electoral consequences are sufficiently asymmetric. We do *not* mean plans that were devised with partisan *intent*. Our conception of gerrymandering is strictly effects-based and (unlike other common conceptions) does not relate to plans' motivations or objectives. As we explain in Part I.B, the Court recently has created an opening for this sort of effects-based theory, while explicitly rejecting intent-based claims.

3 See *Davis v Bandemer*, 478 US 109, 115, 118–43 (1986) (upholding legislative plans that created single-, double-, and triple-member districts resulting in, for example,

a single plaintiff has managed to persuade a court to strike down a plan on this basis.[4] By our count, claimants' record over this generation-long period is roughly zero wins and fifty losses.[5] And adding insult to injury, a majority of the Court rejected almost every conceivable test for gerrymandering in 2004, and a plurality would have extricated the judiciary from this domain altogether.[6]

But the gloomy conventional wisdom is not quite right. In the Court's most recent gerrymandering case, *League of United Latin American Citizens v Perry*[7] ("LULAC"), several justices expressed surprising enthusiasm for the concept of "partisan symmetry"—the idea, that is, that a district plan should treat the major parties symmetrically with respect to the conversion of votes to seats. Justice John Paul Stevens raved that symmetry is "widely accepted by scholars as providing a measure of partisan fairness in electoral systems."[8] Justice David Souter noted that "[i]nterest in exploring this notion is evident."[9] And, most remarkably of all, Justice Anthony Kennedy declared that he did not "discount[ ] [symmetry's] utility in redistricting planning and litigation."[10] These comments, overlooked by almost all scholars and litigants in the aftermath of *LULAC*,[11] are the most

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Democrats receiving 51.9 percent of the vote but only 43 percent of the seats in Indiana's House of Representatives).

4 See *Vieth v Jubelirer*, 541 US 267, 279–80 (2004) (Scalia) (plurality) ("[I]n *all* of the cases we are aware of involving [redistricting], relief was denied."). See also Part I.C.

5 This count is different from the one we mention in Part III.C, because there we consider only challenges to the congressional and state house plans in our study.

6 See *Vieth*, 541 US at 277–306 (Scalia) (plurality).

7 548 US 399 (2006).

8 Id at 466 (Stevens concurring in part and dissenting in part).

9 Id at 483 (Souter concurring in part and dissenting in part).

10 Id at 420 (Kennedy) (plurality).

11 To our knowledge, only a handful of academics have seized on this language, most notably the political scientists, Professors Bernard Grofman and Gary King, who familiarized the Court with partisan symmetry in an important amicus brief in *LULAC*. See Brief of Amici Curiae Professors Gary King, Bernard Grofman, Andrew Gelman, and Jonathan N. Katz, in Support of Neither Party, *League of United Latin American Citizens v Perry*, No 05-204, *3–9 (US filed Jan 10, 2006) (available on Westlaw at 2006 WL 53994) ("King et al Brief"); Bernard Grofman and Gary King, *The Future of Partisan Symmetry as a Judicial Test for Partisan Gerrymandering after* LULAC v. Perry, 6 Election L J 1, 4 (2007) ("A majority of Justices now appear to endorse our view that the measurement of partisan symmetry can be used in . . . partisan gerrymandering claims."). See also Laughlin McDonald, *The Looming 2010 Census: A Proposed Judicially Manageable Standard and Other Reform Options for Partisan Gerrymandering*, 46 Harv J Legis 243, 265 (2009); Easha Anand, *Finding a Path through the Political Thicket: In Defense of Partisan Gerrymandering's Justiciability*, 102 Cal L Rev 917, 945–46 (2014). As we discuss

promising development in this area in decades. They provide the motivation for our effort, in this Article, to introduce a new measure of partisan symmetry and to show how it could be fashioned into a workable judicial standard.

We dub our new measure the "efficiency gap."[12] It represents the difference between the parties' respective wasted votes in an election—where a vote is wasted if it is cast (1) for a losing candidate, or (2) for a winning candidate but in excess of what she needed to prevail. Large numbers of votes commonly are cast for losing candidates as a result of the time-honored gerrymandering technique of "cracking." Likewise, excessive votes often are cast for winning candidates thanks to the equally age-old mechanism of "packing."[13] The efficiency gap essentially aggregates all of a district plan's cracking and packing choices into a single, tidy number.

An example should illustrate the intuitiveness of our measure. Take a state with 10 districts of 100 voters each, in which Party A wins 55 percent of the statewide vote (that is, 550 votes). Assume also that Party A wins 70 votes in districts 1–3, 54 votes in districts 4–8, and 35 votes in districts 9–10, and that the remaining votes are won by Party B. Then Party A wastes 20 votes in districts 1–3, 4 votes in districts 4–8, and 35 votes in districts 9–10. Similarly, Party B wastes 30 votes in districts 1–3, 46 votes in districts 4–8, and 15 votes in districts 9–10. In sum, Party A wastes 150 votes and Party B wastes 350 votes.[14] The difference between the parties' wasted votes is 200, which when divided by 1,000 total votes produces an efficiency gap of 20 percent. Algebraically, this means that Party A wins 20 percent (or 2) more seats than it would have had the parties wasted equal numbers of votes.

In our view, the efficiency gap is superior to the measure of partisan symmetry—*partisan bias*—that the Court considered in

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below, no plaintiffs since *LULAC* have argued for the adoption of a partisan symmetry test. See Part I.C.

12 In the political science article in which he previously discussed the efficiency gap, McGhee referred to it as "relative wasted votes." Eric McGhee, *Measuring Partisan Bias in Single-Member District Electoral Systems*, 39 Legis Stud Q 55, 68–69 (2014).

13 For a discussion of these terms, see *Vieth*, 541 US at 286 n 7 (2004).

14 All of these wasted vote figures are per district. For the sake of simplicity, we also assume that 50 votes are needed to win a district, not 51. Using 51 votes as the threshold instead, the efficiency gap is 20.6 percent in favor of Party A. See Part II.A (going through this calculation in greater detail in Figure 1).

LULAC.[15] (Partisan bias refers to the divergence in the share of seats that each party would win given the same share, typically 50 percent, of the statewide vote.[16]) The crucial problem with partisan bias is that it is calculated using a hypothetical election result rather than the actual election outcome. To determine how many seats a party would win if it received 50 percent of the statewide vote, the party's actual vote shares in each district are *shifted* by the difference between 50 percent and the party's actual statewide vote share. Above, for example, Party A's vote shares in each district would be reduced by 5 percent (since it won 55 percent of the statewide vote), while Party B's vote shares would be increased by 5 percent.

This shifting is troubling for several reasons. First, it relies on what is known as the "uniform swing assumption," the premise that vote switchers are present in equal numbers in each district.[17] Given the clustering that characterizes modern residential patterns,[18] this assumption is often inaccurate. Second, it is fanciful in many cases to consider what might happen if the parties' statewide vote shares were both 50 percent (let alone if they *flipped*, as another common formulation of partisan bias supposes).[19] In states like Massachusetts or Utah, shifts of this magnitude are so improbable that they yield useless results.[20] And third, even in more competitive states, shifting can give rise to odd conclusions. Above, for instance, Party A would lose 7 out of 10 districts if its vote share in each district swung uniformly downward by 5 percent. This means the plan has a partisan bias of 20 percent *against* Party A—even though Party A won 8 of the 10 districts in the election that actually occurred.

Turning from the abstract to the concrete, what efficiency gaps have current and historical district plans exhibited? We

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15 See *LULAC*, 548 US at 464–68 (Stevens concurring in part and dissenting in part) (discussing partisan bias).

16 See id at 466 (Stevens concurring in part and dissenting in part).

17 See Part II.C.

18 See Nicholas O. Stephanopoulos, *Spatial Diversity*, 125 Harv L Rev 1903, 1915 (2012) (discussing Tobler's Law, which states that clustering is an almost universal geographic phenomenon).

19 See Grofman and King, 6 Election L J at 8 (cited in note 11) ("[I]f a party is able to muster a certain fraction of votes, then it should get the same number of seats as the other party would if that party had received the same voter support.") (emphasis omitted).

20 Consider, for example, Boris Shor and Nolan McCarty, *The Ideological Mapping of American Legislatures*, 105 Am Polit Sci Rev 530, 544 (2011) (suggesting that ideologically polarized states may not be likely to have significant vote share shifts between election cycles).

computed the gaps for all states with at least eight congressional districts, and all state house plans for which results were available, for all elections from 1972 to 2012.[21] This represents the most comprehensive dataset ever assembled to study gerrymandering in the modern era.[22] We found, first, that both the congressional and the state house distributions had median efficiency gaps of close to zero and were roughly symmetric in shape. Contrary to claims that Republicans benefit from redistricting because of their more efficient spatial allocation,[23] the typical plan in recent decades has not been notably skewed in either party's favor. Second, however, we also documented an alarming rise in the efficiency gap in the 2012 election. At the congressional level, the average plan had an absolute gap of 0.94 seats in the 1970s and 1980s, 1.09 seats in the 1990s and 2000s, and *1.58* seats in 2012. At the state house level, the average plan had an absolute gap of 4.76 percent in the 1970s and 1980s, 5.10 percent in the 1990s and 2000s, and *6.07 percent* in 2012.[24] The severity of today's gerrymandering is therefore unprecedented in modern times.

Third, we decomposed the data into a series of charts showing, for each decade, each plan's *average* efficiency gap as well as how the gap varied from election to election. (For current plans, we illustrate how the gap would change given shifts in voter sentiment derived from historical data.) These charts confirm the account of the efficiency gap centering around zero overall but rising rapidly in recent years. They also reveal that many plans' gaps vary substantially over the plans' lifetimes. In many cases, in fact, a plan whose average gap favors one party will feature a gap favoring the *other* party at some point during the decade. Lastly, the charts make it possible, for the first time, to identify gerrymanders that are both severe *and* entrenched. In

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[21] We use "state house plans" to refer to plans for all lower houses of state legislatures.

[22] For noteworthy examples of works studying gerrymandering in earlier periods, see generally Gary W. Cox and Jonathan N. Katz, *Elbridge Gerry's Salamander: The Electoral Consequences of the Reapportionment Revolution* (Cambridge 2002); Andrew Gelman and Gary King, *Enhancing Democracy through Legislative Redistricting*, 88 Am Polit Sci Rev 541 (1994); Gary King and Robert X. Browning, *Democratic Representation and Partisan Bias in Congressional Elections*, 81 Am Polit Sci Rev 1251 (1987).

[23] See, for example, Jowei Chen and Jonathan Rodden, *Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures*, 8 Q J Polit Sci 239, 241 (2013).

[24] These figures all are absolute values. We use raw seats for Congress and seat shares for state houses throughout the Article, for reasons detailed below. See Part III.A.

the current cycle, for example, the Florida, Ohio, Pennsylvania, and Virginia congressional plans have gaps of at least two seats that are unlikely to dissipate given plausible changes in voters' preferences. Likewise, the Idaho, Indiana, Kansas, Massachusetts, Michigan, Missouri, North Carolina, Ohio, Oklahoma, Rhode Island, Virginia, Wisconsin, and Wyoming state house plans have gaps of at least 8 percent that also are unlikely to fade away in future elections.

The efficiency gap, then, is both superior to partisan bias and easily calculable across states and over time. It also could be converted straightforwardly into doctrine. In *LULAC*, Justice Stevens suggested that the Court's approach to one person–one vote claims could serve as a template for a gerrymandering test.[25] This is a very auspicious analogy, in our view. First, just as in that domain there is a population deviation threshold (10 percent) above which plans are presumptively unlawful and below which they are presumptively valid,[26] so too could key levels be specified in the gerrymandering context. To take into account both the severity and the durability of gerrymanders, we recommend setting the bar at *two seats* for congressional plans and *8 percent* for state house plans[27]—with the added caveat that the plans not be expected, based on sensitivity testing, ever to have an efficiency gap of zero over their lifetimes. At present, these thresholds would result in the plans named above being deemed presumptively unconstitutional.[28]

Second, just as a state may *rebut* the presumption of unconstitutionality in a one person–one vote case,[29] so too should it have the chance to mount a defense in a gerrymandering dispute. In the former context, the presumption is rebutted if the state shows that its plan's population inequality resulted from the consistent application of a legitimate redistricting policy.[30]

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25 See *LULAC*, 548 US at 468 & n 9 (Stevens concurring in part and dissenting in part).

26 See *Brown v Thomson*, 462 US 835, 842 (1983) ("Our decisions have established, as a general matter, that an apportionment plan with a maximum population deviation under 10% falls within this category of minor deviations.").

27 See text accompanying notes 202–03.

28 That is, the Florida, Ohio, Pennsylvania, and Virginia congressional plans, and the Idaho, Indiana, Kansas, Michigan, Missouri, North Carolina, Ohio, Oklahoma, Rhode Island, Tennessee, Wisconsin, and Wyoming state house plans.

29 See, for example, *Brown*, 462 US at 842–43.

30 See, for example, *Mahan v Howell*, 410 US 315, 328 (1973) (upholding population deviations above 10 percent in a plan because they "advance[d] the rational state policy

The same sort of showing should suffice in the gerrymandering context, as should a demonstration that no plan with a smaller efficiency gap could have been drawn due to the state's underlying political geography. At this doctrinal stage, of course, cartographic evidence would be crucial. The state would try to prove that no map with a smaller gap was possible while still accomplishing its other objectives. The plaintiff, for its part, would strive to produce a map that attained the state's goals to the same extent but that featured a smaller gap. Success by the plaintiff would result in the presumption continuing to bind.

The Article proceeds as follows. Part I describes the doctrinal opportunity created by the Court's positive comments about partisan symmetry in *LULAC*. Interestingly, this opportunity remains unexplored nine years after the decision. Part II defines our new measure of partisan symmetry, the efficiency gap, and discusses some of its useful properties. It also compares the efficiency gap to partisan bias and identifies some of the gap's limitations. Part III presents empirical evidence about the efficiency gaps of congressional and state house plans over the 1972–2012 period. It highlights as well the gaps of plans that have given rise to gerrymandering litigation. Lastly, Part IV develops one option for incorporating the efficiency gap into a doctrinal test. In the first stage of the analysis, a plan's gap would be compared to the legal threshold; in the second stage, a state could argue that a gap above the threshold was unavoidable.

One final introductory point about this Article's timeliness: Though many plans continue to be fair, the problem of gerrymandering has never been worse in modern American history. The efficiency gaps of today's most egregious plans dwarf those of their predecessors in earlier cycles. We therefore find ourselves at a historical moment not unlike that confronted by the Court in the 1960s. Just as in that era population deviations had skyrocketed thanks to urbanization and district lines left untouched for decades, so too have today's efficiency gaps reached new heights thanks to technological advances and unbridled partisan aggression. Two generations ago, the Court moved decisively to end the scourge of malapportionment. In our view, the time has come for it to do the same with gerrymandering.

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of respecting the boundaries of political subdivisions"). For a discussion of the rebuttable presumption, see *Brown*, 462 US at 843.

I. THE DOCTRINAL OPPORTUNITY

Until recently, there would have been no reason for us to write this Article. Just about every potential partisan gerrymandering standard already had been proposed to—and rejected by—the Court. But in *LULAC*, for the first time in twenty years, five justices suggested they were open to adopting a gerrymandering standard. In particular, they wrote favorably about the concept of *partisan symmetry*, the idea that a district plan should treat the major parties symmetrically with respect to the conversion of votes to seats. Surprisingly, though, not a single gerrymandering plaintiff since *LULAC* has argued for the implementation of a partisan symmetry test. The doctrinal opportunity created by *LULAC* thus remains open and judicially uncharted.

In this Part, we define the contours of this opportunity. We first survey the Court's case law prior to *LULAC*, whose two highlights were the tentative embrace of a standard that no plaintiff could meet in *Davis v Bandemer*,[31] followed by the rejection of almost every conceivable test in *Vieth v Jubelirer*.[32] We next highlight the promising comments about partisan symmetry made by a majority of the Court in *LULAC*. But we also identify the concerns expressed about symmetry by Justice Kennedy—concerns we believe the standard we set forth in Part IV fully addresses. Lastly, we summarize the Sisyphean efforts of gerrymandering plaintiffs in the years since *LULAC*. We offer some speculation too as to why these plaintiffs may have failed to seize the opening presented by the Court.

A. Pre-*LULAC*

Although there were scattered hints in earlier Court decisions,[33] the 1983 case of *Karcher v Daggett*[34] marked the first time a justice wrote explicitly about partisan gerrymandering. A majority of the Court resolved the dispute purely on one person–one vote grounds, striking down New Jersey's congressional plan

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31 478 US 109 (1986).

32 541 US 267 (2004).

33 See, for example, *Gaffney v Cummings*, 412 US 735, 751 (1973); *Fortson v Dorsey*, 379 US 433, 439 (1965) (suggesting that a district plan might be invalid if it "would operate to minimize or cancel out the voting strength of racial *or political* elements of the voting population") (emphasis added).

34 462 US 725 (1983).

because of its total population deviation of 0.7 percent.[35] But in a concurrence, Justice Stevens contended that the plan actually should have been invalidated because it was a pro-Democratic gerrymander.[36] His proposed approach for identifying unlawful gerrymanders was to examine (1) "whether the plan has a significant adverse impact on an identifiable political group," (2) "whether the plan has objective indicia of irregularity," and (3) "whether the State is able to produce convincing evidence that the plan nevertheless serves neutral, legitimate interests of the community as a whole."[37]

Just three years after *Karcher*, the full Court turned its attention to gerrymandering in *Bandemer*.[38] Six justices agreed that gerrymandering was not a "political question" but rather a "justiciable controversy" fully amenable to resolution by the courts.[39] But the majority splintered with respect to the applicable standard as well as the fate of the Indiana state legislative plans before it. A plurality held that "unconstitutional discrimination occurs only when the electoral system . . . will consistently degrade . . . a group of voters' influence on the political process as a whole," and concluded that the Indiana plans did not meet this demanding standard.[40] In contrast, Justice Powell argued for a totality-of-the-circumstances test similar to the one advocated by Justice Stevens in *Karcher*.[41] District compactness, respect for political subdivisions, and the propriety of the redistricting process were the key factors to consider—and, in his view, they all revealed the Indiana plans' illegality.[42]

In the eighteen years between *Bandemer* and the justices' next foray into this doctrinal terrain, not a single plaintiff managed to convince a court to strike down a district plan on partisan gerrymandering grounds.[43] The trouble for claimants was twofold. First, *Bandemer*'s requirement that a plan "*consistently*

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35 See id at 731–44.

36 See id at 761–65 (Stevens concurring).

37 Id at 751 (Stevens concurring).

38 *Bandemer*, 478 US at 113 (White) (plurality).

39 Id at 118, 125–27 (White) (plurality).

40 Id at 132 (White) (plurality).

41 See id at 173 (Powell concurring in part and dissenting in part).

42 See *Bandemer*, 478 US at 173–74 (Powell concurring in part and dissenting in part).

43 See *Vieth*, 541 US at 279–80 (Scalia) (plurality) ("[I]n *all* of the cases we are aware of involving that most common form of political gerrymandering [that is, the drawing of district lines], relief was denied.").

degrade"[44] voters' influence meant that challenges brought prior to the first election under a plan, or even after one or two elections, universally failed. Courts simply could not be sure that a party's electoral disadvantage would be durable rather than transient.[45] Second, *Bandemer*'s reference to voters' influence "on the political process *as a whole*"[46] convinced many courts that electoral disadvantage alone was not enough to call a plan into question. Losses at the polls had to be combined with efforts to prevent a party's supporters from registering or voting—efforts that typically did not occur in this era.[47]

When the Court rejoined the fray in *Vieth*, a plurality invoked plaintiffs' dismal post-*Bandemer* record as a rationale for declaring all partisan gerrymandering to be nonjusticiable. "[*Bandemer*'s] application has almost invariably produced the same result . . . as would have obtained if the question were nonjusticiable: Judicial intervention has been refused."[48] The plurality (joined here by Justice Kennedy)[49] also rejected every putative standard suggested by the *Bandemer* Court, the appellants, and the dissenting justices. Both the *Bandemer* plurality's approach and that of Justice Powell were judicially unmanageable, in the *Vieth* plurality's view.[50] So too was the appellants' proposal of (1) predominant partisan intent, (2) systematic packing and cracking of a party's voters, and (3) a party's inability to translate a majority of votes into a majority of seats.[51] And so too were Justice Stevens's intent-based test,[52] Justice Souter's elaborate five-part framework focused on disregard for traditional

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44 *Bandemer*, 478 US at 132 (White) (plurality) (emphasis added).

45 See, for example, *La Porte County Republican Central Committee v Board of Commissioners of the County of La Porte*, 43 F3d 1126, 1128 (7th Cir 1994) ("Plaintiffs have not offered to prove that the districts in La Porte County have frustrated the will of a majority (or even a minority) of *voters*, for even one election."); *Legislative Redistricting Cases*, 629 A2d 646, 664 (Md 1993); *Pope v Blue*, 809 F Supp 392, 396 (WD NC 1992) (three-judge panel).

46 *Bandemer*, 478 US at 132 (White) (plurality) (emphasis added).

47 See, for example, *Martinez v Bush*, 234 F Supp 2d 1275, 1346 (SD Fla 2002) (three-judge panel); *Marylanders for Fair Representation, Inc v Schaefer*, 849 F Supp 1022, 1040 (D Md 1994) (three-judge panel); *Badham v March Fong Eu*, 694 F Supp 664, 670 (ND Cal 1988) (three-judge panel) ("[N]or are there allegations that anyone has ever interfered with Republican registration, organizing, voting, fund-raising, or campaigning.").

48 *Vieth*, 541 US at 279 (Scalia) (plurality).

49 See id at 308 (Kennedy concurring in the judgment) ("The plurality demonstrates the shortcomings of the other standards that have been considered to date.").

50 See id at 281–84, 290–91 (Scalia) (plurality).

51 See id at 284–90 (Scalia) (plurality).

52 See *Vieth*, 541 US at 292–95 (Scalia) (plurality).

districting principles,[53] and Justice Breyer's minority entrenchment standard.[54]

But *Vieth* did not close the door entirely on partisan gerrymandering claims. Justice Kennedy declined to join the plurality's justiciability holding, meaning that gerrymandering remains a viable cause of action even after the decision—albeit without any test for courts to apply. In his separate opinion, Justice Kennedy lamented that "the parties have not shown us, and I have not been able to discover . . . statements of principled, well-accepted rules of fairness that should govern districting."[55] The unspoken predicate is that *if* such rules were brought to his attention, he would be willing to consider adopting them.[56] Justice Kennedy also speculated that the First Amendment may prove a more fertile source for gerrymandering standards than the Equal Protection Clause.[57] And most importantly for our purposes, neither the plurality nor Justice Kennedy made any critical comments about the concept of partisan symmetry. (Though it was not, of course, before them in the case.)

B. *LULAC*

Partisan symmetry *was* before the Court when it next tackled gerrymandering, in *LULAC*, thanks to an amicus brief submitted by a group of political scientists.[58] And remarkably, given the pessimism in *Vieth* that any standard could be found, a majority of the justices (including Justice Kennedy) went out of their way to express their interest in the idea. We thus agree with two of the brief's authors, Professors Bernard Grofman and Gary King, that *LULAC* "marks a potential sea change in how the Supreme Court adjudicates partisan gerrymandering claims."[59] But we caution that Justice Kennedy also voiced a number of misgivings about symmetry. These misgivings must be addressed before symmetry can become the basis for judicial intervention in this area.

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53 See id at 295–98 (Scalia) (plurality).

54 See id at 299–301 (Scalia) (plurality).

55 Id at 308 (Kennedy concurring in the judgment).

56 See *Vieth*, 541 US at 312–13 (Kennedy concurring in the judgment) ("[N]ew technologies may produce new methods of analysis that make more evident the precise nature of the burdens gerrymanders impose on the representational rights of voters and parties.").

57 See id at 314–16 (Kennedy concurring in the judgment).

58 See King et al Brief at *9–11 (cited in note 11).

59 Grofman and King, 6 Election L J at 4 (cited in note 11).

Justice Stevens was by far the most avid advocate of partisan symmetry in *LULAC*.[60] He first defined the term as a "require[ment] that the electoral system treat similarly-situated parties equally."[61] This also is how we conceive of symmetry: it is satisfied when a district plan does not discriminate between the parties with respect to the conversion of votes to seats, and vice versa. Justice Stevens next observed that symmetry is "widely accepted by scholars as providing a measure of partisan fairness in electoral systems."[62] He then proceeded to apply one particular measure of partisan symmetry, *partisan bias*, to the Texas congressional plan at issue.[63] Partisan bias refers to the divergence in the share of seats that each party would win given the same share of the statewide vote.[64] Because Republicans likely would have won twenty of Texas's thirty-two seats (62.5 percent) if they had received 50 percent of the statewide vote, leaving only twelve seats for Democrats (37.5 percent), Texas's plan had a pro-Republican bias of 12.5 percent.[65] It "constitute[d] a significant departure from the symmetry standard" and, in Justice Stevens's view, should have been struck down for this reason.[66]

Justice Stevens also offered two suggestions for how the concept of symmetry could be converted into doctrine. First, the Court could hold that a sufficiently large deviation from symmetry (he floated 10 percent as a possibility) "create[s] a prima facie case of an unconstitutional gerrymander."[67] The burden then would shift to the state to present a legitimate justification for its highly asymmetric plan.[68] This two-step sequence, it bears noting, is nearly identical to the Court's framework for

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60 Of course, neither Justice Stevens nor Justice Souter, who also expressed interest in partisan symmetry in *LULAC*, is still on the Court. Their replacements' views on the subject are not yet known. But if the usual ideological lines hold, then it is likely that Justice Kennedy remains the swing vote on this issue.

61 *LULAC*, 548 US at 466 (Stevens concurring in part and dissenting in part), quoting King et al Brief at *4–5 (cited in note 11).

62 *LULAC*, 548 US at 466 (Stevens concurring in part and dissenting in part).

63 See id at 467–68 (Stevens concurring in part and dissenting in part).

64 See id at 466 (Stevens concurring in part and dissenting in part).

65 See id at 465–68 (Stevens concurring in part and dissenting in part).

66 *LULAC*, 548 US at 467 (Stevens concurring in part and dissenting in part). See also id at 466 (Stevens concurring in part and dissenting in part) (concluding that Texas's plan was "inconsistent with the symmetry standard, a measure social scientists use to assess partisan bias").

67 Id at 468 n 9 (Stevens concurring in part and dissenting in part).

68 See id at 468 (Stevens concurring in part and dissenting in part).

one person–one vote claims at the state legislative level.[69] Second, the Court could recognize a departure from symmetry as "one relevant factor in analyzing whether, under the totality of the circumstances, a districting plan is an unconstitutional partisan gerrymander."[70] This proposal is perhaps too close for comfort to some of the tests rejected in *Vieth*,[71] but it also bears some resemblance to the Court's methodology in vote dilution cases under the Voting Rights Act.[72]

The other members of the Court's left wing did not quite share Justice Stevens's excitement, but they all made positive comments about partisan symmetry too. Justice Souter (joined by Justice Ginsburg) noted the "utility of a criterion of symmetry as a test" and remarked that "[i]nterest in exploring this notion is evident."[73] He added, "Perhaps further attention could be devoted to the administrability of such a criterion at all levels of redistricting and its review."[74] Similarly, Justice Breyer joined portions of Justice Stevens's opinion[75] and referred favorably to the empirical evidence on symmetry that he marshaled.[76] Justice Breyer further observed, disapprovingly, that deviations from symmetry may cause a plan to "produce a majority of congressional representatives even if the favored party receives only a *minority* of popular votes."[77]

This leaves us, as we are often left, with the Court's swing voter, Justice Kennedy.[78] To the surprise of almost every observer, he expressed in *LULAC* at least some openness to the use of

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69 See id (Stevens concurring in part and dissenting in part), citing one person–one vote precedents such as *Brown v Thomson*, 462 US 835 (1983), and *Cox v Larios*, 542 US 947 (2004).

70 *LULAC*, 548 US at 468 n 9 (Stevens concurring in part and dissenting in part).

71 Not surprisingly, it is especially similar to Justice Powell's approach in *Bandemer*—which Justice Stevens endorsed, and which was based on Justice Stevens's own opinion in *Karcher*. See notes 41–42.

72 Voting Rights Act of 1965, Pub L No 89-110, 79 Stat 437, codified as amended at 42 USC § 1971 et seq. The final stage of a vote dilution challenge is a multifactor totality-of-the-circumstances inquiry. See *Thornburg v Gingles*, 478 US 30, 79–80 (1986).

73 *LULAC*, 548 US at 483 (Souter concurring in part and dissenting in part).

74 Id at 484 (Souter concurring in part and dissenting in part). In some respects, this Article can be seen as a response to Justice Souter's call for further analysis of the administrability of partisan symmetry.

75 See id at 447 (Stevens concurring in part and dissenting in part).

76 See id at 491–92 (Breyer concurring in part and dissenting in part).

77 *LULAC*, 548 US at 492 (Breyer concurring in part and dissenting in part).

78 See Samuel Issacharoff, Pamela S. Karlan, and Richard H. Pildes, *The Law of Democracy: Legal Structure of the Political Process* 182 (Thomson Reuters 4th ed 2012) ("Justice Kennedy is the likely decisive vote for any future partisan gerrymandering claims.").

partisan symmetry as a test for gerrymandering. In the key sentence of his opinion, he wrote that he did not "altogether discount[ ] its utility in redistricting planning and litigation."[79] Other justices immediately seized on this language. Justice Stevens "appreciate[d] Justice Kennedy's leaving the door open to the use of the standard in future cases."[80] Likewise, Justice Souter cited this passage when he commented that "[i]nterest in exploring this notion is evident."[81]

But Justice Kennedy also raised several serious concerns about symmetry. First, he observed that "[t]he existence or degree of asymmetry may in large part depend on conjecture about where possible vote-switchers [ ] reside."[82] In other words, to determine how symmetric a plan is, at least using the partisan bias metric, it is necessary to estimate the results of a hypothetical election in which certain voters switch their ballots from one party to the other. This estimation requires assumptions to be made about where these vote switchers are located—assumptions that are controversial and often incorrect.[83] Second, Justice Kennedy was wary of invalidating a plan "based on unfair results that would occur in a hypothetical state of affairs."[84] His preference was to wait until an election actually had occurred and the asymmetry had become concrete rather than conjectural. As he wrote, "a challenge could be litigated if and when the feared inequity arose."[85]

Third, Justice Kennedy was unsure how to select an asymmetry threshold below which a plan would be upheld and above which a plan would be presumptively unlawful. Neither the parties nor the political scientists' amicus brief provided the Court

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79 *LULAC*, 548 US at 420 (Kennedy) (plurality).

80 Id at 468 n 9 (Stevens concurring in part and dissenting in part).

81 Id at 483 (Souter concurring in part and dissenting in part).

82 Id at 420 (Kennedy) (plurality). See also id (noting the existence of "different models of shifting voter preferences").

83 The specific assumption that typically is made to calculate partisan bias is "uniform partisan swing." The assumption stipulates that parties' district-specific vote shares change (or "swing") by the same margin as their statewide vote shares. For example, if Democrats received 45 percent of the vote in a state, and a researcher wanted to know how many seats they would have won if they had received 50 percent, the researcher simply would add 5 percentage points to the actual Democratic vote share in each district. The assumption often generates accurate seat share estimates, but still is considered "neither theoretically nor empirically satisfying" by political scientists. Simon Jackman, *Measuring Electoral Bias: Australia, 1949–93*, 24 Brit J Polit Sci 319, 335 (1994). We discuss the assumption in greater detail in Part II.C.

84 *LULAC*, 548 US at 420 (Kennedy) (plurality).

85 Id (Kennedy) (plurality).

with empirical data about the asymmetry of current or historical plans. In the absence of such data, he did not see how the Court could choose "a standard for deciding how much partisan dominance is too much."[86] Finally, Justice Kennedy did not believe that asymmetry should constitute the *entirety* of the Court's test for gerrymandering. Asymmetry can be produced by factors other than a desire to disadvantage one's political opponents, including the geographic distribution of the parties' supporters and compliance with traditional redistricting criteria such as compactness, respect for political subdivisions, and respect for communities of interest.[87] Therefore, "asymmetry *alone* is not a reliable measure of unconstitutional partisanship."[88]

C. Post-*LULAC*

In the wake of *LULAC*, one might have expected gerrymandering plaintiffs to pounce on the opportunity presented by the Court. As Grofman and King wrote shortly after the decision, "Now that members of the Supreme Court have singled out the deviation from partisan symmetry . . . we anticipate that there will be new partisan gerrymandering challenges brought."[89] But this prediction turned out to be incorrect. Plaintiffs did file multiple gerrymandering suits in the most recent cycle of redistricting litigation, but not one of them even referred to—much less argued for the adoption of—partisan symmetry as the relevant standard. Why not? The likely explanations are inattention to the Court's gerrymandering precedents, ignorance of quantitative political science methodology, and fatalism about the viability of this cause of action. But whatever the reason, the fact remains that, years after its creation, a sterling doctrinal opportunity is still unexplored by the courts and available for the taking.

By our count, plaintiffs in eight states brought partisan gerrymandering challenges against congressional or state legislative

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86 Id (Kennedy) (plurality). But see id at 468 n 9 (Stevens concurring in part and dissenting in part) (responding that "it is this Court, not proponents of the symmetry standard, that has the judicial obligation to answer the question of how much unfairness is too much").

87 See *Vieth*, 541 US at 309 (Kennedy concurring in the judgment) ("[I]f we were to demand that congressional districts take a particular shape, we could not assure the parties that this criterion, neutral enough on its face, would not in fact benefit one political party over another.").

88 *LULAC*, 548 US at 420 (Kennedy) (plurality) (emphasis added).

89 Grofman and King, 6 Election L J at 33 (cited in note 11).

district plans during the 2010 cycle.[90] Some of these claimants suggested tests very similar to the ones the Court rejected in *Vieth*. For example, the Alabama Legislative Black Caucus argued that "[t]raditional or neutral districting principles may not be subordinated in a dominant fashion by . . . partisan interests"—a formulation essentially identical to Justice Stevens's.[91] Other groups, most notably the Illinois League of Women Voters, tried to convert Justice Kennedy's exposition on the First Amendment in *Vieth* into a workable standard. These efforts all failed for the simple reason that district plans "do[ ] not prevent any [party] member from engaging in any political speech."[92]

Still other plaintiffs, in particular the Illinois Republican Party, advocated oddly specific effects tests based on their states' unique political circumstances. Not surprisingly, the courts declined to constitutionalize inquiries such as whether a plan "keeps at least 10 percent more constituents of Democratic incumbents in the same district as their representative than it does constituents of Republican incumbents,"[93] or whether "[m]ore than two-thirds of incumbent pairings pit minority-party incumbents against each other."[94] A final set of claimants admitted their own befuddlement, made no proposals at all, and beseeched the courts to "treat partisan gerrymandering cases

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[90] See *Perez v Perry*, 26 F Supp 3d, 612, 622–24 (WD Tex 2014) (three-judge panel); *Alabama Legislative Black Caucus v Alabama*, 988 F Supp 2d 1285, 1289 (MD Ala 2013) (three-judge panel); *Baldus v Members of Wisconsin Government Accountability Board*, 849 F Supp 2d 840, 854 (ED Wis 2012) (three-judge panel); *Committee for a Fair and Balanced Map v Illinois State Board of Elections*, 835 F Supp 2d 563, 567–79 (ND Ill 2011) (three-judge panel); *Fletcher v Lamone*, 831 F Supp 2d 887, 903–04 (D Md 2011) (three-judge panel); *Radogno v Illinois State Board of Elections*, 2011 WL 5868225, *2–4 (ND Ill) ("Radogno II") (three-judge panel); *League of Women Voters v Quinn*, 2011 WL 5143044, *1–4 (ND Ill); *Radogno v Illinois State Board of Elections*, 2011 WL 5025251, *5–7 (ND Ill) ("Radogno I") (three-judge panel); *Perez v Texas*, 2011 WL 9160142, *10–11 (WD Tex); *Pearson v Koster*, 359 SW3d 35, 41–42 (Mo 2012); *Gonzalez v State Apportionment Commission*, 53 A3d 1230, 1254 (NJ Super App Div 2012); *State v Tennant*, 730 SE2d 368, 390 (W Va 2012).

[91] *Alabama Legislative Black Caucus*, 988 F Supp 2d at 1295 (quotation marks omitted). See also, for example, *Radogno II*, 2011 WL 5868225 at *4 (rejecting a proposed multifactor test that, like Justice Souter's approach in *Vieth*, focused on disregard for traditional districting principles).

[92] *League of Women Voters*, 2011 WL 5143044 at *4. See also, for example, *Radogno I*, 2011 WL 5025251 at *7 ("But what is the connection between the alleged burden imposed on Plaintiffs' ability to elect their preferred candidate and a restriction on their freedom of political expression? There is none.").

[93] *Committee for a Fair and Balanced Map*, 835 F Supp 2d at 576.

[94] *Radogno II*, 2011 WL 5868225 at *4. See also id ("Why the two-thirds requirement for incumbent pairings, as opposed to three-fifths or three-quarters?").

much like obscenity cases—courts will know one when they see one."[95] Predictably, the courts turned down this invitation.[96]

Why has no plaintiff since *LULAC* argued for a partisan symmetry test? We can only speculate, but several possibilities come to mind. First, many lawyers simply may not have noticed the favorable comments about symmetry in *LULAC*. The bulk of the decision dealt not with gerrymandering but with racial vote dilution,[97] and even the gerrymandering portions were more concerned with the mid-decade timing of Texas's redistricting than with the plan's asymmetry.[98] Moreover, Justice Kennedy did write that "asymmetry alone is not a reliable measure of unconstitutional partisanship."[99] We believe—consistent with Justice Stevens's and Justice Souter's comments[100]—that Justice Kennedy remains open to the adoption of a symmetry test, but this subtlety easily may have escaped less attentive (or obsessive) readers.

Second, the measure of partisan asymmetry applied by Justice Stevens in *LULAC*, partisan bias, is not particularly easy to compute. In its simplest form, the measure requires data about each party's vote share in each district in a plan, followed by use of the uniform swing assumption to determine each party's seat share at a hypothetical vote share point.[101] In the more sophisticated version recommended by Grofman and King, the uniform swing assumption is relaxed so that each district's shift is drawn from a random distribution, and multiple regressions are employed to predict district outcomes from historical electoral data.[102] None of this analysis is overly difficult for political scientists, but it is hardly intuitive for lawyers. Understandably,

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95 *Perez*, 2011 WL 9160142 at *11 (quotation marks and brackets omitted).

96 See, for example, *Baldus*, 849 F Supp 2d at 854; *Fletcher*, 831 F Supp 2d at 904 ("The plaintiffs here . . . offer no reliable standard by which to adjudicate their gerrymandering claim."); *Gonzalez*, 53 A3d at 1254 ("In sum, plaintiffs have not articulated any way in which the process or its results violated their rights under the Federal Constitution.").

97 See *LULAC*, 548 US at 423–47 (Kennedy) (plurality).

98 See id at 413–18, 421–23 (Kennedy) (plurality).

99 Id at 420 (Kennedy) (plurality).

100 See notes 80–81 and accompanying text.

101 See Grofman and King, 6 Election L J at 10–11 (cited in note 11). See also, for example, Nicholas O. Stephanopoulos, *The Consequences of Consequentialist Criteria*, 3 UC Irvine L Rev 669, 684 (2013) (calculating partisan bias in this way).

102 See Grofman and King, 6 Election L J at 11–14 (cited in note 11).

plaintiffs may have shied away from quantitative metrics they did not fully understand.[103]

Lastly, a cloud of defeatism hangs over the cause of action for partisan gerrymandering, perhaps prompting plaintiffs not to press such claims too vigorously. As noted earlier, not a single claimant was able to convince a court to strike down a district plan on gerrymandering grounds during the eighteen years between *Bandemer* and *Vieth*.[104] In the decade since *Vieth*, plaintiffs' record has been equally dismal: failure after failure with nary a single success.[105] Faced with such relentlessly negative precedent, aggrieved parties in the post-*LULAC* era may have *included* gerrymandering claims in their complaints, reasoning that they could do no harm, but then chosen not to *pursue* these claims with much enthusiasm. Other redistricting theories (such as unequal district population, racial vote dilution, and racial gerrymandering) have much higher success rates, and plaintiffs accordingly may have focused their energies on them.

Ultimately, the reason why plaintiffs have failed to argue for the adoption of a partisan symmetry test is immaterial for our purposes. The key facts are simply that a majority of the Court expressed interest in symmetry in *LULAC*, and that nothing has happened since *LULAC* to reduce the attractiveness of this doctrinal opportunity. In the next Part, we introduce a new measure of partisan symmetry, the *efficiency gap*, that we believe is superior to the partisan bias metric applied by Justice Stevens in *LULAC*. It addresses many of the concerns raised by Justice Kennedy, while more directly capturing the essence of the harm that is caused by gerrymandering. If and when plaintiffs recognize the opening presented to them by the Court, they should press for the efficiency gap, not partisan bias, to be used as the judicial test in this domain.

II. THE EFFICIENCY GAP

The key insight underlying the efficiency gap is that all elections in single-member districts produce large numbers of wasted votes. Some voters cast their ballots for losing candidates

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[103] See generally Arden Rowell and Jessica Bregant, *Numeracy and Legal Decision Making*, 46 Ariz St L J 191 (2014) (presenting an original empirical study suggesting that substantive legal decision-making varies with the "numeracy," or math skill, of the lawyer).

[104] See note 43 and accompanying text.

[105] See note 90.

(and so are "cracked"). Other voters cast their ballots for winning candidates but in excess of what the candidates needed to prevail (and so are "packed"). A gerrymander is simply a district plan that results in one party wasting many more votes than its adversary. And the efficiency gap indicates the magnitude of the divergence between the parties' respective wasted votes. It aggregates all of a plan's cracking and packing choices into a single number.

We begin this Part by defining the efficiency gap more formally and explaining how it is calculated. In brief, the difference between the parties' respective wasted votes is divided by the total number of votes cast, thus generating an easily interpretable percentage. Next, we explore some of the efficiency gap's interesting properties. Under typical conditions, the only figures needed to compute the gap are a party's vote margin and seat margin in an election. In addition, a gap of zero implies that a given increase in a party's vote share produces a twofold increase in the party's seat share. We then compare the efficiency gap to partisan bias. While the metrics converge in a tied election, the efficiency gap is superior in other circumstances because it does not require the results of hypothetical races to be estimated. Finally, we identify and address some of the gap's limitations. In particular, the lopsided elections that can give rise to odd conclusions are very rare, the gap's volatility can be taken into account through sensitivity testing, and uncontested seats can be addressed using certain reasonable assumptions.

A. Definition and Computation

Our analysis begins with the premise that the goal of a partisan gerrymander is to win as many *seats* as possible given a certain number of *votes*. To accomplish this aim, a party must ensure that its votes translate into seats more "efficiently" than do those of its opponent. In the plurality-rule, single-member-district (SMD) elections that are almost universal in American politics,[106] "inefficient" votes are those that do not directly

[106] SMD elections are ubiquitous at the congressional and state legislative levels, but not at lower levels of government. See Jeffrey A. Taylor, Paul S. Herrnson, and James M. Curry, *The Impact of Multimember Districts on Legislative Effort and Success* *1 (unpublished manuscript, Midwest Political Science Association, Apr 2014), archived at http://perma.cc/8SUY-XNBJ ("[T]en state legislatures, more than two-thirds of municipal governments, and a multitude of city councils . . . elect at least some members from multimember districts.").

contribute to victory. Thus, any vote for a losing candidate is wasted by definition, but so too is any vote beyond the 50 percent threshold needed (in a two-candidate race) to win a seat. If these supporters could be moved through redistricting to a different seat, they could help the party claim that seat as well without changing the outcome in the seat from which they were moved.

As a practical matter, there are always many inefficient votes in any SMD system. (In fact, exactly half the votes in each district are wasted in a two-candidate race.)[107] But a gerrymandering party does not need to eliminate *all* of its inefficient votes. It only needs to end up with *fewer* wasted votes than the opposition by winning its seats by smaller margins on average. The opposition is left winning a small number of seats by large margins, and losing a large number of seats where it claims many votes but still falls short of victory. The strategies that produce these results are often called "cracking" (splitting a party's supporters between districts so they fall shy of a majority in each one) and "packing" (stuffing remaining supporters in a small number of districts that they win handily).[108] Though the nuances vary, some kind of cracking and packing is how all partisan gerrymanders are constructed.[109]

The efficiency gap, then, is simply *the difference between the parties' respective wasted votes, divided by the total number of votes cast in the election*.[110] Wasted votes include both "lost" votes (those cast for a losing candidate) and "surplus" votes (those cast for a winning candidate but in excess of what she needed to prevail). Each party's wasted votes are totaled, one sum is subtracted

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[107] This is because victory in a two-candidate race is achieved with 50 percent of the vote (plus one). All other votes are cast either for the losing candidate or for the winning candidate but in excess of what she needed to prevail. Assume, for example, that Candidate A receives 65 percent of the vote and Candidate B receives 35 percent. Then 15 percent of Candidate A's votes and all 35 percent of Candidate B's votes are wasted—totaling 50 percent.

[108] *Vieth*, 541 US at 286 n 7 (Scalia) (plurality). For an illuminating discussion of wasted votes, see Lani Guinier, *Groups, Representation, and Race-Conscious Districting: A Case of the Emperor's Clothes*, 71 Tex L Rev 1589, 1606 (1993).

[109] A sizeable literature has articulated different strategies for achieving successful partisan gerrymanders, but the ultimate objective is always to claim a larger efficiency gap in a party's favor—either on average or for a given set of expected future outcomes. See, for example, John N. Friedman and Richard T. Holden, *Optimal Gerrymandering: Sometimes Pack, but Never Crack*, 98 Am Econ Rev 113, 115 (2008); Guillermo Owen and Bernard Grofman, *Optimal Partisan Gerrymandering*, 7 Polit Geography Q 5, 6 (1988).

[110] See McGhee, 39 Legis Stud Q at 68 (cited in note 12) (expressing this idea algebraically).

from the other, and then, for the sake of comparability across systems, this difference is divided by the total number of votes cast. Figure 1 shows how this calculation is carried out for the hypothetical district plan discussed in the Introduction.[111] The bottom line is that there are 200 fewer wasted votes for Party A than for Party B (out of 1,000 total votes), resulting in an efficiency gap of 20 percent in Party A's favor.[112]

FIGURE 1. CALCULATION OF THE EFFICIENCY GAP

	Total Votes by Party		Lost Votes by Party		Surplus Votes by Party		Wasted Votes by Party	
District	A	B	A	B	A	B	A	B
1	70	30	0	30	20	0	20	30
2	70	30	0	30	20	0	20	30
3	70	30	0	30	20	0	20	30
4	54	46	0	46	4	0	4	46
5	54	46	0	46	4	0	4	46
6	54	46	0	46	4	0	4	46
7	54	46	0	46	4	0	4	46
8	54	46	0	46	4	0	4	46
9	35	65	35	0	0	15	35	15
10	35	65	35	0	0	15	35	15
Total	**550**	**450**	**70**	**320**	**80**	**30**	**150**	**350**

The efficiency gap is the bedrock of both our positive and normative approaches in this Article. As a positive matter, we believe the gap is the essence of what critics have in mind when they refer to partisan gerrymandering. They typically conceive of gerrymandering as the systematic disadvantaging of a party through the cracking and packing of its supporters.[113] A gerrymandering metric ought to capture this concept directly, and the efficiency gap does so. At its core, it is nothing more than a tally of all the cracking and packing decisions in a district plan.

Normatively, the efficiency gap identifies a concrete harm worthy of judicial intervention. A gap in a party's favor enables the party to claim more seats, relative to a zero-gap plan, *without claiming more votes*. After voters have decided which party they support—based on whatever criteria they choose, including the attractiveness of each party's policy agenda—the votes cast

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111 See note 14 and accompanying text.

112 As in the Introduction, we assume that 50 votes, not 51, are needed to win a district. Again, the efficiency gap with a 51-vote threshold is 20.6 percent in favor of Party A. See McGhee, 39 Legis Stud Q at 68 (cited in note 12).

113 See note 133.

by supporters of the gerrymandering party translate more effectively into representation and policy than do those cast by the opposing party's supporters. The gerrymandering party enjoys a political advantage not because of its greater popularity, but rather because of the configuration of district lines. The parties do not compete on a level playing field.

B. Key Properties

Beyond its positive and normative appeal, the efficiency gap has a number of useful properties that warrant discussion. First, under circumstances that are very common in US elections, it is unnecessary to sum the wasted votes in each individual district—a process that can be somewhat cumbersome. Instead, if we assume that all districts are equal in population (which is constitutionally required), and that there are only two parties (which is typical in SMD systems), then the computation reduces through simple algebra to something quite straightforward:[114]

$$\text{Efficiency Gap} = \text{Seat Margin} - (2 \times \text{Vote Margin})$$

In this formula, "Seat Margin" is the share of all seats held by a party, minus 50 percent. "Vote Margin" is the same for votes: the share received by a party, minus 50 percent. A party has an electoral advantage when the efficiency gap is positive, and a disadvantage when it is negative.[115] When the number is equal to zero, there is no efficiency gap and so no partisan benefit derived from redistricting.

Consider once again the example from Figure 1. Party A received 55 percent of the statewide vote (550 out of 1,000 votes), and with this support won eight of the ten seats (80 percent). The plan's efficiency gap thus is $(80\% - 50\%) - 2 \times (55\% - 50\%) = 20\%$. This is the same figure we calculated earlier by actually summing all of the lost and surplus votes in the election. How might the advantage for Party A be eliminated? There are two ways. The party either could have won six seats instead of eight for the 55 percent vote share it actually received ($[60\% - 50\%] - 2 \times [55\% - 50\%] = 0$),

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[114] See McGhee, 39 Legis Stud Q at 79–80 (cited in note 12) (deriving this equation). See also, for example, King and Browning, 81 Am Polit Sci Rev at 1252 (cited in note 22) (also assuming "that there are only two parties . . . and that the legislature is composed of a set of single-member, winner-take-all districts").

[115] The directionality of the measure is purely arbitrary. One might use the second party for all measures instead, in which case negative values would imply an advantage for the first party.

or it could have received 65 percent of the vote for the eight seats it claimed ([80% – 50%] – 2 × [65% – 50%] = 0). As it is, Party A won two more seats than it would have if the parties had wasted equal numbers of votes.

The efficiency gap's second interesting property follows from these calculations. Simply put, it is a measure of undeserved seat share: the proportion of seats a party receives that it would *not* have received under a plan with equal wasted votes. Above, for example, the efficiency gap for Party A is 20 percent, which also happens to be Party A's extra seat share relative to what it would have received under a perfectly balanced plan (80% – 60% = 20%). When it is sensible to do so, this percentage can be converted to raw seats as well—in this case, two extra seats out of ten. Thus, the efficiency gap is a tangible figure with real-world meaning that laypeople can easily understand.

Third, the efficiency gap identifies a specific *relationship* between vote share and seat share that corresponds to partisan fairness across a wide range of outcomes. Specifically, each additional percentage point of vote share for a party should result in an extra two percentage points of seat share. This relationship is implied by the efficiency gap formula noted above. If the gap is zero, it can remain at this level only if any shift in seat share is twice the size of any shift in vote share. Also importantly, the relationship is *not* simply proportional, with each additional percentage point of the vote netting an additional percentage point of seats. Scholars have long recognized that SMD systems such as the American one tend to provide a "winner's bonus" of surplus seats to the majority party,[116] and the efficiency gap is consistent with this understanding. But the gap offers what scholars to date have been unable to supply: a normative guide as to how large this bonus should be.[117] To produce partisan fairness—in the sense of equal wasted votes for each party—the bonus should be a precisely twofold increase in seat share for a given increase in vote share.[118]

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[116] See, for example, Grofman and King, 6 Election L J at 9 (cited in note 11).

[117] See, for example, Gelman and King, 88 Am Polit Sci Rev at 554 (cited in note 22) (describing the "normative position that healthy representative democracies have . . . high levels of electoral responsiveness" but not offering any target level for responsiveness); Grofman and King, 6 Election L J at 9 (cited in note 11) (referring to a "'bonus' of varying sizes").

[118] According to the efficiency gap equation, a purely proportional system disadvantages the majority party, and by increasingly significant amounts as the party's vote

Fourth, the efficiency gap can be calculated for *any* district plan, including in states where one party enjoys a dominant electoral position. This feature makes it possible to evaluate plans that, to this point, have been shielded from scrutiny because one party's advantage was so great. While some have argued that only electoral systems in which redistricting could conceivably affect control of the legislature are of any practical interest,[119] this position strikes us as overly restrictive. For instance, a large number of legislatures require a supermajority to pass key legislation.[120] Indeed, in California, the only redistricting lawsuit from the last cycle concerned supermajority control of the state senate in the context of a two-thirds vote requirement for tax increases.[121] Similarly, with respect to congressional redistricting, it is not the *state* majority but the *national* one that matters. If a party can extract extra seats that it does not deserve, those seats will pay dividends in Washington, DC, whether the state is competitive or not.

Finally, the efficiency gap does not require any counterfactual analysis. It can be calculated using actual election results, without the need for any further assumptions. As we describe in further detail below, we believe *limited* counterfactual analysis can be helpful in determining the robustness of the efficiency gap in the face of shifts in voter sentiment from election to election.[122] Such analysis is especially important if an analyst thinks there is a high likelihood that election outcomes will change substantially in the near future. But these counterfactuals are not fundamental to the efficiency gap, and their size and direction—and even the methods by which they are calculated—are left entirely to the analyst's discretion.

C. Comparison to Partisan Bias

Having defined the efficiency gap and explored its key properties, we are now in a position to compare it to the measure of partisan symmetry—partisan bias—that has dominated the

share climbs. If a party receives 60 percent of the vote and 60 percent of the seats, for example, a plan would have an efficiency gap of 10 percent *against* the party.

119 See, for example, Grofman and King, 6 Election L J at 19 (cited in note 11).

120 See Jason Mercier, *Proposed Constitutional Amendments Would Require Supermajority Vote for Tax Increases* *2 (Washington Policy Center, Feb 2013), archived at http://perma.cc/JTR4-4H4B ("18 states . . . have some form of supermajority vote requirement for tax increases.").

121 See *Vandermost v Bowen*, 269 P3d 446, 473 n 31 (Cal 2012).

122 See Part III.B.

literature[123] and appeared on occasion in the case law.[124] (Partisan bias, again, refers to the divergence in the share of seats that each party would win given the same share, typically 50 percent, of the statewide vote. For example, if Republicans would win 52 percent of a state's seats with 50 percent of the state's vote, then a district plan would have a pro-Republican bias of 2 percent.)[125] We first demonstrate that the efficiency gap and partisan bias are different concepts, at least in elections that are not tied. We then argue that the efficiency gap is the superior metric because it more directly captures the essence of gerrymandering and does not require the estimation of hypothetical election results.

To begin with, it is important to note that the efficiency gap and partisan bias are deeply connected. In fact, the two measures are mathematically identical in the special case in which both parties receive exactly 50 percent of the vote. A party's vote margin is zero at this point, meaning that the efficiency gap is simply equal to the party's seat margin,[126] while a party's seat margin in a tied election is the usual *definition* of partisan bias.[127] More than a mathematical abstraction, this identity implies a critical substantive point: a party can win more than half the seats with half the votes only by exacerbating the efficiency gap in its favor. While winning more seats is the outcome that partisan bias assesses, the manipulation of wasted votes, gauged by the efficiency gap, is the activity that leads to this outcome.

But the efficiency gap and partisan bias are *not* identical for all other election results. This is because whenever an election does not produce a tie, the parties' actual vote shares in each district must be shifted in order to calculate partisan bias.

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[123] See Grofman and King, 6 Election L J at 6 (cited in note 11) (describing support for partisan bias as "virtually a consensus position of the scholarly community").

[124] See, for example, *LULAC*, 548 US at 464–68 (Stevens concurring in part and dissenting in part).

[125] See Gelman and King, 88 Am Polit Sci Rev at 543 (cited in note 22) (defining partisan bias); Grofman and King, 6 Election L J at 6–13 (cited in note 11) (same). See also Janet Campagna and Bernard Grofman, *Party Control and Partisan Bias in 1980s Congressional Redistricting*, 52 J Politics 1242, 1245 (1990) (calculating bias for a tied election); Gary W. Cox and Jonathan N. Katz, *The Reapportionment Revolution and Bias in U.S. Congressional Elections*, 43 Am J Polit Sci 812, 820 (1999) (same).

[126] Specifically, if we insert a vote share of 50 percent into the efficiency gap equation, we obtain:

> Efficiency Gap = Seat Margin – 2 × Vote Margin = Seat Margin – 2 × (50% – 50%) = Seat Margin.

[127] See Grofman and King, 6 Election L J at 8 (cited in note 11).

Typically these vote shares are shifted so as to mimic a tied election, though sometimes they are shifted to mimic the flipping of the parties' statewide performances.[128] Whatever the rationale for the shifting, it causes partisan bias to diverge from the efficiency gap, which is computed using the observed election results. The parties' seat shares in a *counterfactual* election are the key determinant of partisan bias, while the parties' wasted votes in the *actual* election are the crucial input for the efficiency gap.

Figure 2 uses election simulations to depict more fully the relationship between the efficiency gap and partisan bias. We simulated 201 redistricting plans of 25 seats each, with the parties' statewide vote shares ranging from 25 percent to 75 percent.[129] We then calculated both the efficiency gap and partisan bias for each simulated plan and determined the difference between them. If the measures capture the same idea, the results should cluster around the horizontal zero line for all vote shares. Instead, they are identical at the point where both parties receive 50 percent of the vote, very similar (though not identical) for a few percentage points above and below this point, and then highly divergent after that. In other words, the further an election is from being tied, the more uncorrelated the efficiency gap and partisan bias become.

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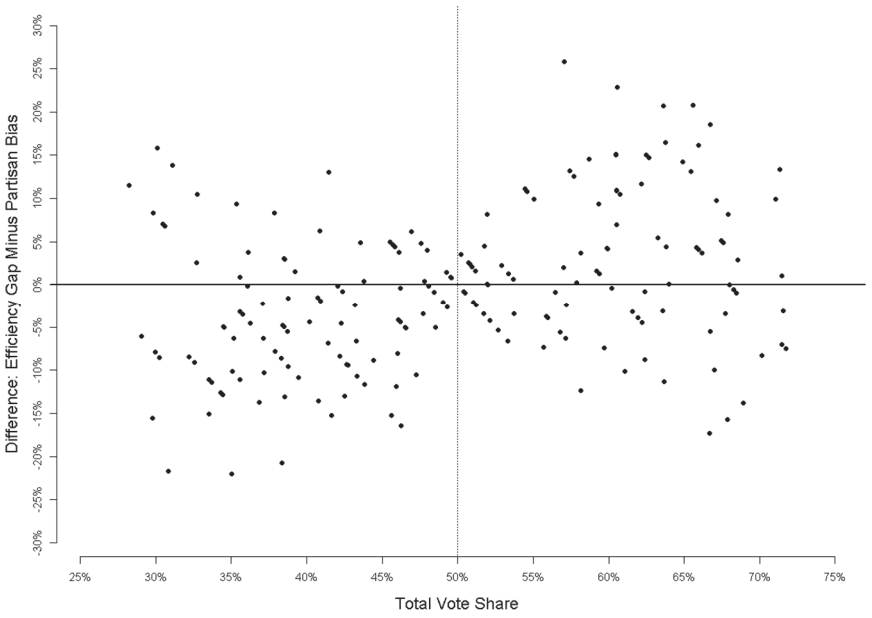
[128] See id.

[129] Specifically, we started with a statewide vote share of 25 percent and moved up in increments of 0.2 percent until we reached 75 percent, for 201 total plans. For each point along the way, we sampled 25 districts from a normal distribution with that mean and a standard deviation of 15 percent. Any districts whose seat shares were shifted above 100 percent or below 0 percent were assigned to those two values, respectively. Each of these groups was symmetric in expectation, but in practice, many deviated from perfect symmetry due to random chance.

FIGURE 2. EFFICIENCY GAP AND PARTISAN BIAS FOR SIMULATED DISTRICT PLANS



In earlier work, one of us used empirical data from state legislative elections to make much the same point. In competitive elections (those closer than 55 percent–45 percent), partisan bias is an excellent predictor of a party's seat share in a model that also controls for the party's vote share (coefficient = 0.73).[130] But in *uncompetitive* elections, the predictive power of partisan bias essentially disappears (coefficient = -0.07).[131] By comparison, the efficiency gap is a perfect predictor of seat share in both competitive and uncompetitive elections (coefficient = 1.0).[132] The predictive power of partisan bias is thus a function of how closely it converges on the efficiency gap (which it does fully in a tied election).

If the efficiency gap and partisan bias are distinct concepts, why is the former preferable to the latter as a measure of gerrymandering? The most basic answer relates to the meaning of gerrymandering, while the subtler reasons involve issues with the calculation of partisan bias. Starting with the more fundamental

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130 See McGhee, 39 Legis Stud Q at 67 (cited in note 12).

131 See id.

132 See id at 69.

point, when observers assert that a district plan is a gerrymander, they usually mean that it systematically benefits a party (and harms its opponent) in actual elections.[133] They do *not* mean that a plan would advantage a party in the hypothetical event of a tied election, or if the parties' vote shares flipped. In common parlance, a plan is a gerrymander if it enables a party to convert its votes into seats more efficiently than its adversary—even if this edge would vanish under different electoral conditions. The efficiency gap reflects this understanding, while partisan bias does not.

Turning next to the calculation of partisan bias, it is problematic, first, because it relies on the uniform swing assumption: the premise that vote switchers are present in equal numbers in each district.[134] Even the more advanced version of the metric introduced by Professors Gelman and King "requires the statistical assumption of *approximate uniform partisan swing*,"[135] that is, the supposition that "districts swing along with the statewide mean . . . but only on average (due to the random error term [ ])."[136] It is only by shifting district vote shares by (more or less) uniform amounts that the results of the crucial hypothetical election can be estimated.

Unfortunately, the assumption of uniformity is often inaccurate, even in its approximate version. The geographic distributions of the parties' supporters are highly heterogeneous,[137]

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[133] See id at 57 ("Some version of efficiency is typically the core concept of interest in the literature on redistricting."). See also, for example, *Bandemer*, 478 US at 141 (White) (plurality) ("The election results obviously are relevant to a showing of the effects required to prove a political gerrymandering claim under our view."); *Karcher*, 462 US at 751 (Stevens concurring) (suggesting a test for gerrymandering that asks "whether the plan has a significant adverse impact on an identifiable political group"). Notably, even proponents of partisan bias sometimes conceive of gerrymandering as "the degree to which an electoral system unfairly favors one political party in the translation of statewide . . . votes into the partisan division of the legislature." Gelman and King, 88 Am Polit Sci Rev at 543 (cited in note 22).

[134] See notes 82–83, 101–02, and accompanying text.

[135] Grofman and King, 6 Election L J at 12 (cited in note 11). See also id at 11–12 & n 44 (collecting relevant works by Gelman and King).

[136] Andrew Gelman and Gary King, *A Unified Method of Evaluating Electoral Systems and Redistricting Plans*, 38 Am J Polit Sci 514, 521 (1994). See also Gelman and King, 88 Am Polit Sci Rev at 555 (cited in note 22) ("Our method can be seen as a generalization of uniform partisan swing.").

[137] See Chen and Rodden, 8 Q J Polit Sci at 245–46 (cited in note 23) (finding a very high level of spatial autocorrelation for Democratic voting preferences in Florida); Stephanopoulos, 125 Harv L Rev at 1940–41 (cited in note 18) (same for an array of US Census variables throughout the country). See also Jackman, 24 British J Polit Sci at 331 (cited in note 83) ("[W]hen we estimate bias . . . we measure manipulation of the

meaning that a given shift in the statewide vote is likely to result in variable shifts at the district level. For instance, a statewide swing of 5 percent in the Republican direction might produce much larger pro-Republican swings in districts full of independent voters who voted for a charismatic Democrat in the previous election. But it might produce no pro-Republican swing at all in polarized districts made up of staunch partisans whose political views are largely set.[138] Moreover, districts' partisan swing is a partially endogenous phenomenon that can be influenced by the parties' own campaign strategies. If the parties focus their efforts in some districts but not in others (as they routinely do), then uneven shifts at the district level are even more probable.[139]

The second problem with the calculation of partisan bias is that it *cannot* be computed for highly uncompetitive systems (at least not sensibly). In such systems, the vote share shifting that would have to be assumed to simulate a tied election (let alone the flipping of the parties' performances) is simply too implausible to be taken seriously. As proponents of partisan bias concede, "the methodology we propose is intended only for jurisdictions where the politics is competitive enough that it is empirically feasible to develop reliable expectations what each party would receive in seats if it won a given sized majority of the votes."[140] It is precisely because enormous vote share shifts

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electoral system *conditional* on a spatial distribution of partisan support. As the spatial distribution changes, so too will the bias . . . of the electoral system.").

138 In the 2006 election for the US House of Representatives, for example, there was a mean pro-Democratic swing of 4.2 percent in contested districts—with a standard deviation of 6.1 percent. The pro-Democratic swing ranged from a low of -19.2 percent to a high of 34.6 percent. See Christian R. Grose and Bruce I. Oppenheimer, *The Iraq War, Partisanship, and Candidate Attributes: Variations in Partisan Swing in the 2006 U.S. House Elections*, 32 Legis Stud Q 531, 533 (2007).

139 See, for example, Jenni Newton-Farrelly, *Wrong Winner Election Outcomes in South Australia: Bias, Minor Parties and Non-uniform Swings* *5 (South Australian Parliament Research Library, Apr 1, 2010), archived at http://perma.cc/WAZ7-JVGP (describing how the uniform swing assumption failed when "[t]he [Australian Labor Party] ran the most successful defensive marginal seats campaign seen in South Australia," so that "[m]any of the biggest swings occurred in safe Labor seats and in fairly safe Liberal seats," while marginal Labor seats barely swung at all). See also Jackman, 24 British J Polit Sci at 335 (cited in note 83) (finding that the uniform swing assumption was wrong by an average of 4 percent in Australian elections in the early 1980s).

While we use some uniform swing analysis to conduct our sensitivity tests, these tests are not fundamental to the measurement of the efficiency gap. At any rate, one could easily conduct the sensitivity tests using assumptions other than uniform swing.

140 Grofman and King, 6 Election L J at 19 (cited in note 11). See also Gelman and King, 88 Am Polit Sci Rev at 545 (cited in note 22) ("We therefore limit our analysis to

are unrealistic that, as we noted above, partisan bias diverges from the efficiency gap so markedly in uncompetitive elections.[141]

But even though partisan bias is inapplicable to uncompetitive systems, gerrymandering is still possible—and ought to be measurable—in these settings. A party can manipulate district lines so that its votes translate more efficiently into seats whether it receives 50 percent or 70 percent of the statewide vote. Notably, almost *half* of recent state legislative elections have been so uncompetitive that partisan bias cannot be calculated for them reliably.[142] A metric that is so confined in its scope is of limited value.

One might respond that the question of majority control carries special normative weight, and so what happens in uncompetitive systems, in which majority control is not at stake, is of little interest. But as we have argued, this position is untenable when applied to US House elections, in which the relevant majority is national rather than local. It is somewhat more valid when applied to state legislative elections, at least in states without supermajority requirements. But supermajority requirements are pervasive, and so hardly irrelevant. Moreover, changing the *size* of a majority party's control is likely to have policy consequences even if majority control itself is not at issue. Even in today's polarized environment, cross-party coalitions are reasonably common at the state legislative level, suggesting that the minority party might be able to pull policy more in its direction as its numbers increase, even if it does not control the agenda entirely.[143]

The final problem with the calculation of partisan bias is that it can sometimes lead to quite counterintuitive results. These oddities tend to occur when seats that actually are won by one party are assigned to the *other* party when vote shares are shifted to simulate the hypothetical election. (In earlier work, one of us has referred to this phenomenon as seats entering the "counterfactual window.")[144] Take, for example, the ten-district

'competitive electoral systems,' which we define as states in which each political party managed to garner a majority of seats or votes in at least one election between 1968 to 1988.").

141 See notes 129–32 and accompanying text.

142 See McGhee, 39 Legis Stud Q at 66 (cited in note 12) (noting that in 44 percent of these elections the majority party received more than 55 percent of the statewide vote).

143 See Shor and McCarty, 105 Am Polit Sci Rev at 540, 546 (cited in note 20) (showing a wide range of polarization levels in state legislatures).

144 See McGhee, 39 Legis Stud Q at 62 (cited in note 12).

plan we used earlier to show how the efficiency gap is computed.[145] Since Party A received 55 percent of the statewide vote, its district-specific vote shares need to be reduced by 5 percent (and Party B's increased by 5 percent) to determine the plan's partisan bias. As Figure 3 shows, this shifting causes five districts (districts 4–8) that in fact were won by Party A to be allocated to Party B in the hypothetical tied election. The plan therefore has a partisan bias of 20 percent *against* Party A (since Party B would win seven of the ten districts in a tied election), even though the plan has an efficiency gap of 20 percent *in favor of* Party A (since Party A actually won eight of the ten districts). This scenario sharpens the point with which we began our critique of partisan bias: because the metric assesses the results of a counterfactual election, it sometimes may be unmoored entirely from the actual election outcomes that are of primary concern.

FIGURE 3. CALCULATION OF PARTISAN BIAS

	Actual Votes by Party		Actual Winner by Party		Shifted Votes by Party		Shifted Winner by Party	
District	A	B	A	B	A	B	A	B
1	70	30	1	0	65	35	1	0
2	70	30	1	0	65	35	1	0
3	70	30	1	0	65	35	1	0
4	54	46	1	0	49	51	0	1
5	54	46	1	0	49	51	0	1
6	54	46	1	0	49	51	0	1
7	54	46	1	0	49	51	0	1
8	54	46	1	0	49	51	0	1
9	35	65	0	1	30	70	0	1
10	35	65	0	1	30	70	0	1
Total	**550**	**450**	**8**	**2**	**500**	**500**	**3**	**7**

The conclusion we draw from this analysis is that there is no good reason to use partisan bias as a measure of gerrymandering. It is conceptually flawed because it focuses on hypothetical rather than actual election results. And as a practical matter, it cannot sensibly be computed for the many electoral systems that are uncompetitive, while it converges on the efficiency gap as systems become more competitive. Partisan bias therefore is either an invalid metric (in uncompetitive elections) or a redundant one (in competitive settings).

[145] See Part II.A.

D. Limitations

Up to this point, we have introduced the efficiency gap and emphasized its advantages over partisan bias. Next we consider the measure's possible limitations. There are three in particular: (1) the unexpected results that begin to emerge when one party receives an extraordinarily high vote share; (2) the metric's instability over time; and (3) the measure's sensitivity to the treatment of uncontested seats. But none of these limitations is crippling. Sufficiently high vote shares are very rare; the gap's volatility can be addressed through sensitivity testing; and sensible assumptions for uncontested seats tend to dampen rather than exaggerate the gap.

As we have noted, the efficiency gap is useful for evaluating fairness across a range of plans, even ones in which one party significantly outperforms the other.[146] But for any system in which one party *truly* dominates its opponent—specifically, when one party receives more than 75 percent of the statewide vote—the efficiency gap can produce results that at first glance seem strange. When one party receives 75 percent of the vote, a plan with a gap of zero will give that party 100 percent of the seats.[147] And once a party holds all the seats, any additional vote share above 75 percent will suggest a growing gap in favor of the *opposing* party. This outcome is technically correct: when a party already holds all the seats, additional votes are wasted since they cannot contribute to more victories. Nonetheless, it fails to capture the idea of fairness at stake in redistricting, since the majority party in this situation could hardly be said to suffer a disadvantage.

That said, this scenario is easily identified in any redistricting analysis. All an analyst must do is flag elections in which a party received at least 75 percent of the statewide vote and 100 percent of the seats. More to the point, results this lopsided are extremely rare. No party has received more than 75 percent of the aggregate vote in state legislative elections since 1982, and there are only 18 such cases out of 800 in congressional elections (all of them either in the South or in states with fewer than four House districts).[148] And even in *these* cases, the majority party

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146 See text accompanying notes 140–42.

147 Per the formula introduced in Part I.B, $(100\% - 50\%) - 2 \times (75\% - 50\%) = 0$.

148 For this congressional calculation, we excluded all uncontested seats, since they are especially likely to bias the outcome compared to the larger number of seats at stake in legislatures. The specific cases are: Alaska (2000, 2002, 2004), Hawaii (1984, 1992,

did not always win every single seat, meaning that the actual universe of potentially odd outcomes is smaller still. Accordingly, this is not a problem that is especially relevant to real-world redistricting.

The efficiency gap's potentially more important limitation is instability. While in theory the efficiency gap *could* be constant over time—it remains fixed so long as seat shares and vote shares move together in the two-to-one ratio specified by the formula—as a practical matter it tends to fluctuate. In fact, in the original exposition of the measure, one of us showed that most redistricting plans are volatile enough that their precise consequences cannot be forecast with great accuracy. Specifically, a plan's efficiency gap in one election is a relatively weak predictor of its gap in the next election (coefficient = 0.23) in a model that also includes a variety of other factors.[149] Many partisan gerrymanders therefore are not solid enough to avoid coming undone in the face of changing political winds.

However, this instability is not so much a weakness of the measure as it is a property of the elections themselves. The parties' vote shares vary much more over the life of a district plan than is commonly realized: by up to 5.5 percent in either direction for most state house plans over a typical decade, and by up to 7.5 percent for most congressional plans.[150] It is relatively unsurprising that seat shares do not change in tandem pursuant to the two-to-one ratio, and that the efficiency gap thus swings from election to election. By comparison, partisan bias is fairly stable.[151] But this relative stability is an artifact of the measure itself, stemming from the fact that it shifts all actual election results to the point of the hypothetical election. This shifting negates all uniform swings that may have occurred, and even negates any *non*-uniform swings that fail to move any districts into or out of the counterfactual window.[152]

Moreover, to say that many gerrymanders come undone is not to say that they *all* evaporate. As we illustrate in the next Part, some district plans in previous cycles indeed featured large

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2008), Louisiana (2000), Mississippi (1990), North Dakota (1984, 1986), South Dakota (1998), Vermont (1982, 1984, 1990, 1992, 1996), West Virginia (1998), and Wyoming (1984).

149 See McGhee, 39 Legis Stud Q at 72–74 (cited in note 12). By comparison, the equivalent coefficient for partisan bias is 0.68. See id.

150 See Part III.B.

151 See McGhee, 39 Legis Stud Q at 56 (cited in note 12).

152 See id at 59.

and durable efficiency gaps over multiple elections. They persisted in benefiting a particular party, year in and year out.[153] As for the plans currently in effect, sensitivity testing can determine their stability in the face of a wide range of future electoral shifts. So long as certain plans would remain unbalanced over an array of potential outcomes—as several indeed would, per the next Part's calculations—the case for judicial intervention is unaffected. In fact, it is strengthened, because then courts can be more confident that the plans' distortion is a lasting rather than an ephemeral phenomenon.

Finally, the efficiency gap can be sensitive to the treatment of uncontested seats. These seats pose a tricky problem for any measure of gerrymandering (including partisan bias).[154] Since gerrymanders redistribute voters in order to pack and crack the opposition, determining the degree of packing and cracking requires knowing how many people in each district support each party. This support need not be unconditional: it can change over time in response to the candidates, the parties' platforms, the parties' relative performances in office, and so forth. Indeed, this variation is the essence of the sensitivity testing we describe in greater detail below.[155] But the notion of support hinges on freedom of choice: voters must be able, in principle, to select more than one option. Absent such a choice, we simply do not obtain any information about voters' preferences.

Uncontested races by definition offer no choice at all: they require voters to support one party, and deny them the opportunity to reveal their true sympathies. Indeed, the one thing we can say with virtual certainty about an uncontested race is that its outcome would have been different had it been contested. The *winner* might have been the same, but the *share of the vote* for the winner almost certainly would have been lower. For example, in 95 percent of state legislative districts with uncontested Democrats, Republicans managed at least 12 percent of the vote when the same district was contested in other elections. Likewise, in 95 percent of cases with uncontested Republicans, Democrats garnered at least 21 percent of the vote when they ran a

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153 See Part III.B.

154 See Campagna and Grofman, 52 J Politics at 1247 n 7 (1990) (cited in note 125) ("One key issue is how to handle uncontested seats. [One needs] to avoid using 100% as the vote share for a party in an uncontested seat (which, for Congress, tends to bloat . . . vote share)."); Gelman and King, 38 Am J Polit Sci at 524 (cited in note 136) ("[U]ncontested elections do not fit any linear model unless explicitly controlled for.").

155 See Part III.A.

candidate for the seat. In most of these cases, the minority party's average vote share was even higher than these numbers would suggest.

For this reason, scholars often try to assign vote shares to uncontested races that reflect how voters *might* have cast their ballots *if* they had been given a choice.[156] There are several ways this assignment can be done. The most defensible is to use variables that have been shown in the past to predict vote share, and then to impute values for uncontested races based on these variables. One might also examine how uncontested districts have turned out in previous years when those same seats were contested. Or one might simply assume that the opposing party would have received a certain vote share (for example, 25 percent) had it run a candidate in an uncontested district. Clearly, these imputation approaches can be more or less sophisticated, and can bring varying amounts of information to bear on the problem.

For our analysis here, we followed two different imputation strategies. For congressional races, we obtained presidential vote share data at the district level, and then ran regressions of vote choice in contested seats on incumbency status and district presidential vote separately for each election year. From this information, we imputed values for uncontested seats. For uncontested Democrats, this procedure resulted in a mean Democratic vote share of 70 percent, with 90 percent of values falling between 56 percent and 87 percent. For uncontested Republicans, it produced a mean Democratic vote share of 32 percent, with 90 percent of values falling between 22 percent and 43 percent.

Unfortunately, we did not have presidential vote share data by state house district for all the years in our analysis, so we were forced to take a different imputation approach for these chambers. For all contested state house races, we ran a multilevel model with a fixed effect for incumbency and random effects for years, states, and districts. For uncontested districts that had been contested at some point in their lifespan, this equation assigned a single value by effectively borrowing information from other districts in the same state and election year, as well as from the same district at other points in time. For uncontested districts that were never contested, we took a random

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[156] See McGhee, 39 Legis Stud Q at 66 n 5 (cited in note 12) (using a "default setting for uncontested races, which assigns uncontested Republicans a vote share of 0.25 and uncontested Democrats a vote share of 0.75").

draw from the distribution of district random effects and used it for prediction. Despite the differences in chamber and methodology, the results were remarkably similar to those for the House. For uncontested Democrats, we calculated a mean Democratic vote share of 66 percent, with 90 percent of values falling between 52 percent and 83 percent. For uncontested Republicans, we calculated a mean Democratic vote share of 36 percent, with 90 percent of values falling between 25 percent and 48 percent.

Going forward, we encourage other scholars to explore a range of imputation techniques to ensure that the direction of a gerrymander (if not its size) is robust to any particular strategy. But this catholic philosophy has its limits. We strongly discourage analysts from either dropping uncontested races from the computation or treating them as if they produced unanimous support for a party. The former approach eliminates important information about a plan, while the latter assumes that coerced votes accurately reflect political support. Neither correctly represents how the gerrymandering party itself would view its plan.

III. GERRYMANDERING OVER TIME AND SPACE

Now that we have introduced the efficiency gap, we turn to what for many readers will be the most important question addressed by this Article: What gaps have district plans actually exhibited over the years and across the states? We begin this Part by presenting some summary statistics about the gaps of congressional and state house plans from 1972 to 2012. The gaps' distributions over this period both had medians close to zero and were roughly symmetric in shape. Thus, as a historical matter, neither party enjoyed a systematic advantage over its opponent. In recent years, however, there has been a startling rise in the level of the efficiency gap. In the 2012 election, in particular, the average absolute gap of both congressional and state house plans spiked to unprecedented heights.

We next report our findings about all of the *individual* district plans in our database. For each prior plan, we show both its average gap over its existence and the gap's full range of values during this period. For each current plan, we show its gap in the 2012 election as well as the spectrum of values the gap could take given plausible shifts in voter sentiment. One important conclusion is that most plans are reasonably fair and reasonably likely to favor different parties at different points during their lifespans. But another key point is that multiple current plans

are exceptions to this general rule. More of today's plans feature large efficiency gaps that are unlikely to dissipate than ever before in modern history.

Lastly, we single out the plans, both past and present, that have given rise to partisan gerrymandering litigation. Interestingly, the plans that plaintiffs have targeted have not featured especially large efficiency gaps. This poor record suggests that plaintiffs often have lacked accurate estimates of plans' partisan effects.[157] It also hints that courts may have acted prudently in rejecting many gerrymandering challenges. But this past prudence does not mean that courts should continue to rebuff gerrymandering suits. The efficiency gap provides exactly what litigants and courts have long been missing: a reliable assessment of plans' partisan implications.

A. Summary Statistics

We used congressional and state house election results from 1972 to 2012 to carry out our efficiency gap calculations.[158] We considered congressional plans only for states that had at least eight districts at some point during this period, because redistricting in smaller states has only a minor influence on the national balance of power. We also considered only single-member state house districts, because the efficiency gap is more difficult to compute for multimember districts.[159] Furthermore, we report

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[157] See Part III.C.

[158] For congressional election results, see *Election Information: Election Statistics* (Office of the Clerk of the US House of Representatives), archived at http://perma.cc/7UNC-HQS5. The same information is available in a more usable format in a database maintained by Professor Gary Jacobson. For state house election results, we relied on a database assembled by Professor Carl Klarner for data through 2010, and we compiled the 2012 results ourselves. See Carl Klarner, et al, *State Legislative Election Returns Data, 1967–2010* (IQSS Dataverse Network), archived at https://perma.cc/P3WP-XJ5Q.

The efficiency gap also can be calculated using *presidential* election results aggregated by district. These results have the advantage of being (mostly) unaffected by district-level candidate characteristics. For congressional plans, our findings using presidential data are similar to those we report in the Article (especially for more recent years). For state house plans, unfortunately, presidential data is unavailable for most of the period we examine, meaning we cannot use it as a robustness check.

[159] For a few state houses in particular periods, we lacked so much data (either because it was not collected or because the state had too few single-member districts) that it seemed sensible to drop the body entirely. The omitted cases are: Alaska (1972–1980), Arkansas (all years), Hawaii (all years), Louisiana (all years), Maryland (all years), Mississippi (1972–1982), New Hampshire (all years), North Carolina (1972–1990), Virginia (1972–1982), and Wyoming (1972–1990). See note 106 and accompanying text.

the efficiency gap in *seats* for congressional plans and in *seat shares* for state house plans. What matters in congressional plans is their impact on the total number of seats held by each party at the national level.[160] Conversely, state houses are self-contained bodies of varying sizes, for which seat shares reveal the scale of parties' advantages and enable temporal and spatial comparability.

Figure 4 shows the distributions of the efficiency gap for congressional and state house plans from the 1970s—the first full cycle of the modern one person–one vote era—to the present. Each plan in each election year is represented in the distributions; we do not average each cycle's plans here. The most obvious point about the curves is that their medians both are close to zero and their shapes both are approximately symmetric.[161] Both curves are tilted *slightly* in a pro-Republican direction, as reflected in their longer Republican tails and their average efficiency gaps of -0.20 seats for Congress and -0.32 percent for state houses (where negative values are pro-Republican). But this imbalance is relatively trivial. For the most part, the efficiency gap hovers around zero, and there are plans that clearly favor both parties.

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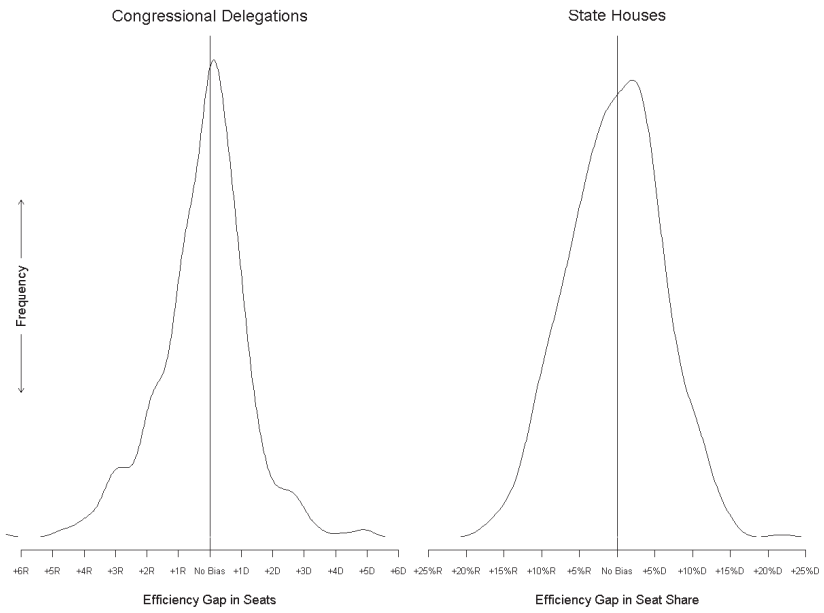
[160] See Adam B. Cox, *Partisan Gerrymandering and Disaggregated Redistricting*, 2004 S Ct Rev 409, 411 (arguing that the harms in gerrymandering of congressional plans "stem from the manipulation of the composition of Congress as a whole").

[161] For a similar finding with respect to the distribution of partisan bias at the congressional level, see King and Browning, 81 Am Polit Sci Rev at 1261–62 (cited in note 22) ("[T]he mean is almost exactly 0, and there is an approximately symmetric normal distribution around this point.").

FIGURE 4. EFFICIENCY GAP DISTRIBUTIONS, 1972–2012



Our results diverge from recent findings by other scholars that most district plans are biased in a pro-Republican direction.[162] We attribute the divergence to several factors. First, the other scholars used partisan bias as their measure of gerrymandering, not the efficiency gap.[163] As we explained earlier, partisan bias scores become increasingly uncorrelated with efficiency gap scores as elections grow less competitive.[164] Second, the other scholars calculated partisan bias using presidential election results rather than legislative election results.[165] If certain voters consistently support Republicans at the presidential level and Democrats at the legislative level, then presidential data may produce more pro-Republican estimates than legislative data.[166] And third, the other scholars studied elections only in

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[162] See Chen and Rodden, 8 Q J Polit Sci at 260–63 (cited in note 23).

[163] See id at 248.

[164] See Part II.C.

[165] See Chen and Rodden, 8 Q J Polit Sci at 248, 260–61 (cited in note 23).

[166] The relationship between presidential and legislative estimates also may vary over time. Our preliminary hypothesis is that both approaches produce similar results for modern elections, in which voters are well sorted by ideology, and more divergent

the early 2000s, a period in which we also find a pro-Republican skew.[167] Our conclusion that plans over the entire modern era have been reasonably balanced is consistent with the work of political scientists who have examined longer timespans.[168]

Next, Figures 5 and 6 chart the average *net* efficiency gap and the average *absolute* efficiency gap over time.[169] The average net gap is the mean of all plans' actual gaps in a given year, while the average absolute gap is the mean of the absolute values of all plans' gaps. The average net gap indicates the overall partisan *direction* of gerrymandering, while the average absolute gap reveals its overall *magnitude*. The average net gap plots confirm the account, hinted at above, of plans increasingly favoring Republicans over time. At the congressional level, plans in the 1970s were roughly balanced in aggregate (0.10 seats), plans in the 1980s slightly benefited Democrats (0.27 seats), plans in the 1990s slightly benefited Republicans (-0.27 seats), plans in the 2000s substantially benefited Republicans (-0.72 seats), and plans in 2012 even more dramatically benefited Republicans (-1.21 seats).[170] At the state house level, similarly, the trend has been from a modest edge for Democrats in the 1970s (1.52 percent) and

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results for past elections, in which the parties were not as ideologically coherent. We hope that future research will test this hypothesis.

[167] See Chen and Rodden, 8 Q J Polit Sci at 261, 264 (cited in note 23). See also Figures 5, 6 (showing a change in the efficiency gap over time).

[168] See, for example, Cox and Katz, *Elbridge Gerry's Salamander* at 59 (cited in note 22) (showing a pro-Republican bias in the 1950s at the congressional level followed by close to zero bias in the 1960s); Gelman and King, 38 Am J Polit Sci at 540 (cited in note 136) (same, and also showing a pro-Democratic bias in the 1970s and 1980s); Gelman and King, 88 Am Polit Sci Rev at 546 (cited in note 22) (showing a wide range of bias values for state legislative plans in the 1970s and 1980s); King and Browning, 81 Am Polit Sci Rev at 1261–62 (cited in note 22).

[169] Since we do not have exactly the same states for every year in our database of state legislative elections, we wanted to make sure that the trends we observe are not a product of this data issue. We therefore ran an ordinary least squares (OLS) regression with fixed effects for years and states. The year fixed effects represent the change over time, independent of constant state characteristics. We averaged the actual efficiency gaps for 1972 and then added the year fixed effects to that value to generate the remainder of the time series. This process produces results very similar to simple averaging.

[170] This is quite similar to the pattern that one of us found in a historical analysis of partisan bias. See John Sides and Eric McGhee, *Redistricting Didn't Win Republicans the House* (Wash Post Wonkblog, Feb 17, 2013), archived at http://perma.cc/KBW5-24V4 (showing that Democrats benefited from gerrymandering at the congressional level in the 1970s and 1980s, Republicans benefited slightly in the 1990s, and Republicans benefited significantly in the 2000s and 2012). See also Tony L. Hill, *Electoral Bias and the Partisan Impact of Independent Redistricting Bodies: An Analysis Incorporating the Brookes Method* *19 (unpublished manuscript presented at the Annual Conference of the Midwest Political Science Association, Apr 2008) (on file with authors) (same).

1980s (1.52 percent), to ever larger advantages for Republicans in the 1990s (-1.04 percent), 2000s (-2.11 percent), and 2012 (-3.67 percent).[171]

The story for the average absolute gap is somewhat different. At both the congressional and state house levels, it remained roughly constant between 1972 and 2010 (though with perhaps a slight upward tilt, especially from the 1980s onward). But it then spiked in the 2012 election to the highest peaks recorded in the modern era—1.58 seats at the congressional level, compared to an average of 1.02 seats in the four previous cycles, and 6.07 percent at the state house level, compared to an average of 4.94 percent in the four prior decades. The increase in the *magnitude* of gerrymandering thus is a very recent phenomenon, while the movement in the Republican *direction* dates back somewhat further.

These findings indicate that the growing Republican advantage in the 1990s and 2000s was due not to more severe gerrymandering but rather to some other factor: perhaps control over redistricting in more states, larger numbers of Republican incumbents eking out narrow wins, or favorable trends in voters' residential patterns. If plans in this period had been gerrymandered more aggressively than their predecessors, then their average absolute gap would have increased, not held steady. The findings also suggest that the striking outcomes of the 2012 election *are* due, at least in part, to more extreme gerrymandering. In 2012, unlike in previous years, the average absolute gap spiked just as the average net gap surged in a pro-Republican direction.[172]

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171 The pro-Democratic spike in the average net gap in 2010 is also notable. It is likely explained by a number of Democratic incumbents barely hanging on to their seats in a very pro-Republican year.

172 For a similar argument, see Anthony J. McGann, Charles Anthony Smith, and James Alexander Keena, *Revenge of the Anti-federalists: Constitutional Implications of Redistricting* *28–29, 42–50 (unpublished manuscript, 2014) (on file with authors) (attributing the rise in pro-Republican partisan bias in 2012 to more severe gerrymandering in the wake of *Vieth*).

FIGURE 5. AVERAGE NET AND ABSOLUTE EFFICIENCY GAPS FOR CONGRESSIONAL PLANS, 1972–2012

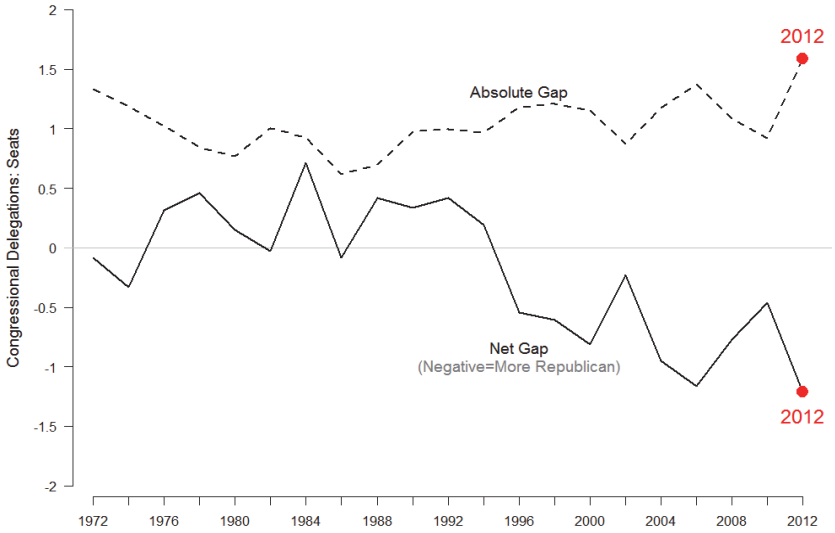
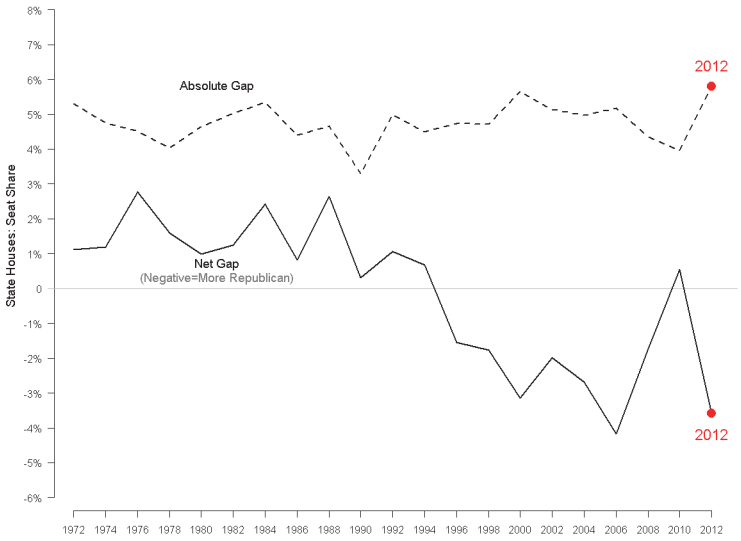


FIGURE 6. AVERAGE NET AND ABSOLUTE EFFICIENCY GAPS FOR STATE HOUSE PLANS, 1972–2012



B. Individual Plans

We turn next from summary statistics about the efficiency gap to individual district plans. This plan-level information, of course, is precisely what litigants and courts would need to assess maps' partisan fairness. Figures 7 and 8, then, display the gaps of congressional and state house plans used in the five cycles of the modern redistricting era. As before, we present the gaps in terms of seats for Congress and seat shares for state houses. When multiple plans were employed by a state in a given cycle, we depict each of them separately.[173] Furthermore, we are interested in capturing the extent to which each plan's gap changed (or would change) over its lifetime in order to gauge the robustness of the plan's partisan skew. Gerrymanders, we reiterate, can often come undone in shifting political circumstances.

To this end, for each plan in earlier cycles, we show its average efficiency gap as well as the full range of values taken by the gap over the plan's existence. This information reveals the plan's partisan implications as they in fact unfolded. For each plan *currently* in effect, the gap's range cannot be calculated directly—the necessary elections simply have not occurred. Instead, to explore the spectrum of possible outcomes, we shift the observed 2012 vote share up and down by a uniform amount, and then record how the gap changes as a result. When choosing the scale and direction of this shifting, we wanted to remain as agnostic as possible about the future electoral path of each state. We thus used the variation that actually occurred in past elections to anchor our simulation, and selected a level of shifting that covered four out of every five prior outcomes.[174] Since each plan typically spans five elections, this approach ensures that any plan that does *not* cross the zero axis in the simulation is unlikely to do so in a given cycle. The shifts we derived from the historical data also are quite large: 7.5 percent in either direction for Congress and 5.5 percent in either direction for state houses. Accordingly, we are confident that we have devised a

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173 See, for example, Figure 7 (depicting two plans for Texas in the 2000s).

174 Specifically, we started with the aggregate vote share in each state in the first year each plan was used (usually 1972, 1982, 1992, or 2002). We then calculated the deviations from that year's outcome that occurred throughout the remainder of the redistricting cycle. These deviations gave us a sense of the range of outcomes that may ultimately transpire for the plans currently in effect. We then chose vote share shifts that covered the tenth through the ninetieth percentiles of each variable's distribution.

stringent test of gerrymanders' robustness to varying electoral conditions.

Our efficiency gap computations, combined with our sensitivity testing, lead to several important conclusions. First, many plans either are balanced to begin with or can unravel in changing political circumstances. Out of the 120 congressional plans we examined, 80 had mean efficiency gaps of less than one seat, and 59 crossed the zero axis at some point during their lifespans. Likewise, of the 167 state house plans in our study, 85 had mean gaps of below 4 percent, and 78 favored different parties at different points in the cycle.[175] It thus is only the occasional plan that has a large or durable efficiency gap. Severe and persistent gerrymandering is the historical exception rather than the rule.

Second, while a Republican advantage is more common, there are numerous examples of plans that strongly favor Democrats as well. Political scientists often argue that America's underlying political geography benefits Republicans, because Democratic supporters are concentrated in urban centers where they are likely to waste their votes in overwhelmingly safe districts.[176] As we discuss below, the spatial allocation of voters may be legally relevant as a justification for plans whose efficiency gaps exceed the key thresholds.[177] Nevertheless, there are multiple cases of plans that are biased robustly in favor of Democrats, including the Texas congressional plans in the 1970s, 1980s, and 1990s; the first California congressional plan in the 1980s;[178] the current Massachusetts and Rhode Island state house plans; and several southern state house plans in the 1970s, 1980s, and 1990s. Pronounced Republican edges may be more prevalent, but they do not exhaust the universe of unbalanced plans.

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[175] We use these levels here because they are *half* of the thresholds that we later recommend in our discussion of presumptively valid and invalid plans. See Part IV.A. In addition, a substantial portion of the plans that do not cross the zero axis were in effect for only one or two elections. Had they been used for the entire decade, they may well have crossed the zero axis too.

[176] See, for example, Chen and Rodden, 8 Q J Polit Sci at 241 (cited in note 23); Gary C. Jacobson, *Terror, Terrain, and Turnout: Explaining the 2002 Midterm Elections*, 118 Polit Sci Q 1, 19 (2003) (describing how Democratic votes are more likely to be "wasted" due to less efficient spatial distribution).

[177] See Part IV.B.

[178] California's infamous "Burton gerrymander" actually exhibits the largest efficiency gap of any congressional plan in our database. For an in-depth discussion of this plan, see Andrew J. Taylor, *Elephant's Edge: The Republicans as a Ruling Party* 40 (Praeger 2005).

Third, plans' efficiency gaps have become both larger and more pro-Republican over time. This point already was made by the time series charts we presented earlier, but it is confirmed by the plan-level data. At the congressional level, there were two plans in the 1970s with average gaps of more than two seats (one pro-Democratic and one pro-Republican), four plans in the 1980s (three pro-Democratic), four plans in the 1990s (two pro-Republican), four plans in the 2000s (three pro-Republican), and *seven* plans in 2012 (*all* pro-Republican). Similarly, at the state house level, there were six plans in the 1970s with an average gap of greater than 8 percent (four pro-Democratic), six plans in the 1980s (four pro-Democratic), five plans in the 1990s (four pro-Republican), three plans in the 2000s (two pro-Republican), and *fourteen* plans in 2012 (*twelve* pro-Republican).[179] Whether one considers aggregated or disaggregated data, it thus is clear that the scale and skew of today's gerrymandering are unprecedented in modern history.

C. Gerrymandering Litigation

The final piece of information conveyed by Figures 7 and 8 is whether a plan gave rise to partisan gerrymandering litigation. If it did, it is presented in italics and with a dotted line in the charts. Because the courts did not recognize this cause of action until the 1980s, we do not count gerrymandering-like claims that were brought in the 1970s.[180] By our count, four of the plans in our study were challenged on this basis in the 1980s, eight in the 1990s, eleven in the 2000s, and eight in the 2010s (so far).[181] Interestingly, the Court's decisions in *Vieth* and *LULAC* seem to have had only a minor dampening effect on plaintiffs' willingness to file gerrymandering suits. Plaintiffs may not have noticed the Court's signals about the sorts of theories they should

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[179] These are the same thresholds we use later in our discussion of the appropriate legal test for partisan gerrymandering. See Part IV.A.

[180] See, for example, *Gaffney v Cummings*, 412 US 735, 735–36 (1973) (dealing with a Connecticut reapportionment plan).

[181] In the interest of brevity, we do not cite all of these cases here. The citations are available from the authors. See, for example, *Radogno v Illinois State Board of Elections*, 2011 WL 5868225, *5 (ND Ill) (three-judge panel); *Martinez v Bush*, 234 F Supp 2d 1275, 1340 (SD Fla 2002) (three-judge panel); *Pope v Blue*, 809 F Supp 392, 399 (WD NC 1992) (three-judge panel); *Badham v March Fong Eu*, 694 F Supp 664, 670 (ND Cal 1988) (three-judge panel).

assert,[182] but they have capitalized on the Court's refusal to rule out gerrymandering claims entirely.

The most important point about the litigated plans is that they are *not* the ones that have exhibited the largest or most durable efficiency gaps. In the current cycle, for instance, none of the eight challenged plans satisfies the definition we set forth below of a presumptive gerrymander (that is, a gap of more than two seats for Congress, or 8 percent for state houses, that is expected to endure for the entire cycle).[183] Of the sixteen plans that do satisfy our definition, none was contested in court on this basis. The story is the same in earlier cycles. Of the twenty-three prior plans that were alleged to be unlawful gerrymanders, only five would have met our standard: Florida's congressional and state house plans in the 2000s, Texas's congressional plans in the 1990s and 2000s, and California's congressional plan in the 1980s. The numerous other plans that would have met our standard escaped any judicial scrutiny of their partisan implications.

To be fair, the litigated plans have not been *entirely* random, at least at the congressional level. The average litigated House plan has had a mean absolute efficiency gap of 1.47 seats, compared to 0.98 for unlitigated plans. Moreover, many of the plans that were not challenged on gerrymandering grounds *were* challenged on other bases, often with partisanship as the unspoken impetus for the litigation. For example, of the sixteen current plans that satisfy our definition of a presumptive gerrymander, eleven were attacked on one person–one vote, Voting Rights Act, racial gerrymandering, or state law grounds.[184]

Putting aside these caveats, why have plaintiffs been so inaccurate in the plans they have targeted? One likely answer is that they have lacked reliable information about the magnitude and durability of gerrymandering. The most common existing measure of gerrymandering, partisan bias, very rarely has been cited in litigation.[185] And, to our knowledge, there has not been

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[182] See Part I.C.

[183] See Part IV.A.

[184] See *Litigation in the 2010 Cycle*, archived at http://perma.cc/RL9S-56ZH. See also Samuel Issacharoff, *Gerrymandering and Political Cartels*, 116 Harv L Rev 593, 630–31 (2002) (noting that, in "the absence of any real constitutional vigilance over partisan gerrymandering, . . . litigants must squeeze all claims of improper manipulation of redistricting into [other categories]").

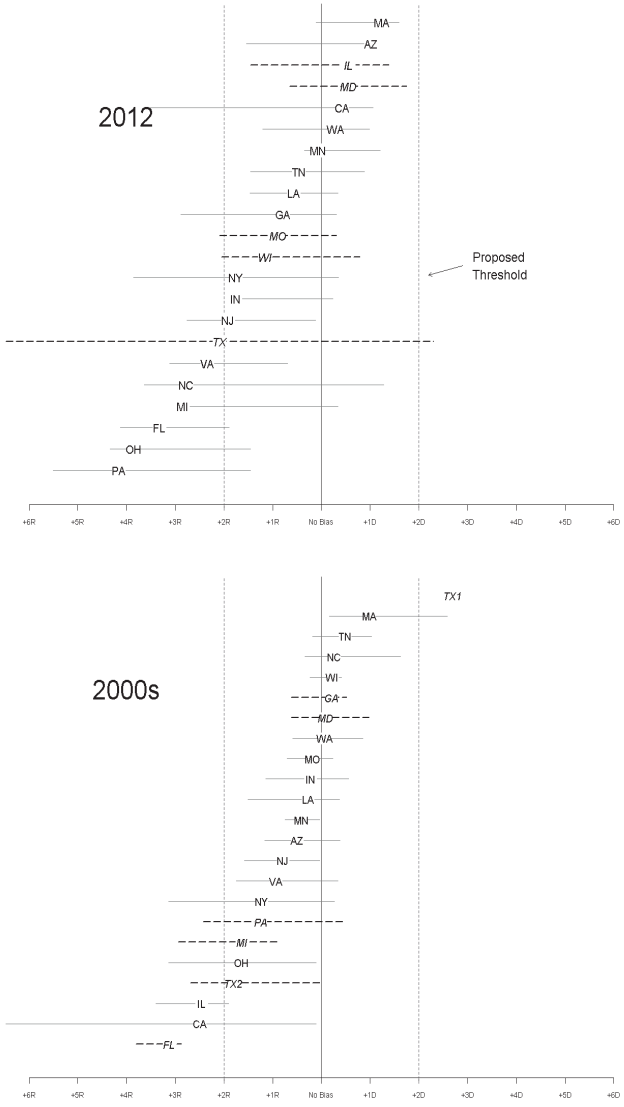
[185] A Westlaw search turns up only four gerrymandering decisions that have referred to partisan bias. See *LULAC*, 548 US at 419–20 (Kennedy) (plurality); *Good v Austin*, 800 F Supp 551, 555 (E & WD Mich 1992) (three-judge panel); *Quilter v*

any previous effort to determine the stability of gerrymandering through sensitivity testing. Plaintiffs thus have not had the necessary tools to identify especially egregious plans. Another potential answer is that, given the extremely low odds of prevailing on a gerrymandering claim, there simply may be no rhyme or reason to when one is included in a suit. The decision to assert such a claim may be essentially arbitrary, in which case one would not expect litigated plans to exhibit unusually large efficiency gaps.

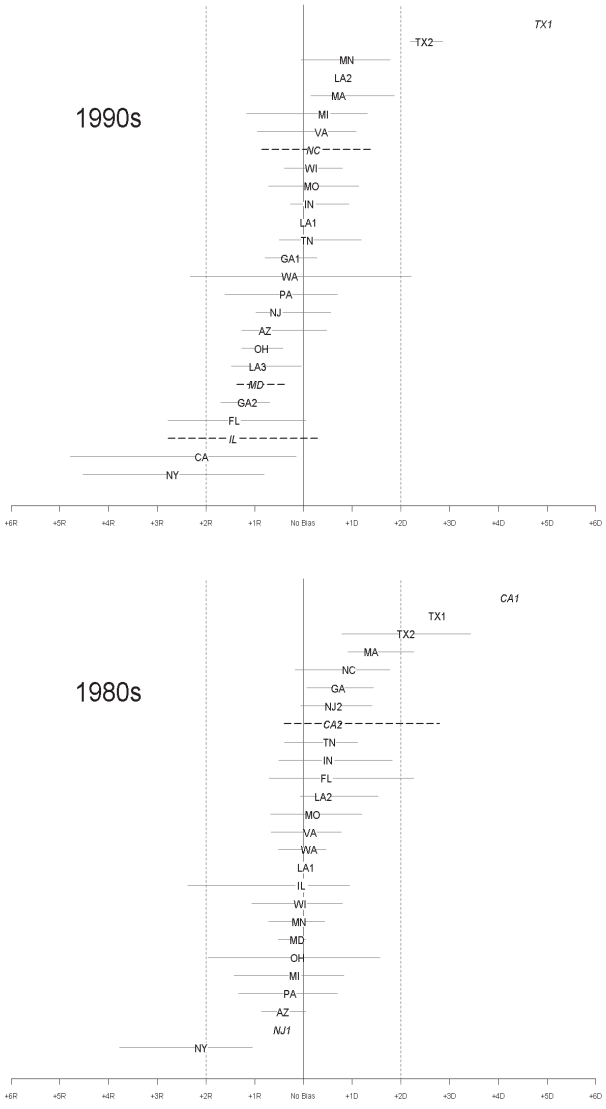
Whatever the reason may be for plaintiffs' past inaccuracy, we think it actually has positive implications for judicial intervention in the future. If past plaintiffs challenged plans almost at random, then courts acted wisely in rejecting these suits. But if future plaintiffs begin attacking only the *worst* gerrymanders—the ones with the largest and most durable efficiency gaps—then courts' prior passivity would be no justification for continued inaction. Then plaintiffs would be coming to courts not with unsubstantiated allegations but rather with hard data about plans' gaps relative to those of other states. The resulting cases would bear little resemblance to their antecedents in earlier cycles.

Voinovich, 794 F Supp 695, 733–34 (ND Ohio 1992) (three-judge panel), revd, 507 US 146 (1993); *Maestas v Hall*, 274 P3d 66, 79–80 (NM 2012).

FIGURE 7. EFFICIENCY GAPS FOR CONGRESSIONAL PLANS BY STATE, 1972–2012[186]



186 This chart includes all states that had at least eight congressional districts at any point in the relevant period.


1990s
TX1
TX2
MN
LA2
MA
MI
VA
NC
WI
MO
IN
LA1
TN
GA1
WA
PA
NJ
AZ
OH
LA3
MD
GA2
FL
IL
CA
NY
+6R
+5R
+4R
+3R
+2R
+1R
No Bias
+1D
+2D
+3D
+4D
+5D
+6D

1980s
CA1
TX1
TX2
MA
NC
GA
NJ2
CA2
TN
IN
FL
LA2
MO
VA
WA
LA1
IL
WI
MN
MD
OH
MI
PA
AZ
NJ1
NY
+6R
+5R
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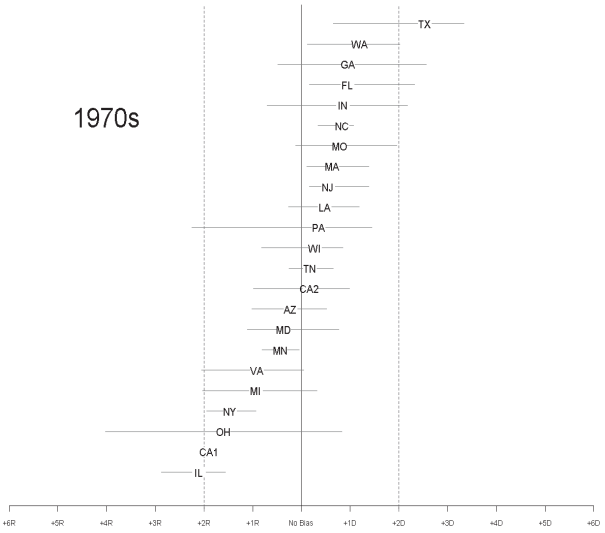
1970s
TX
WA
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NC
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MA
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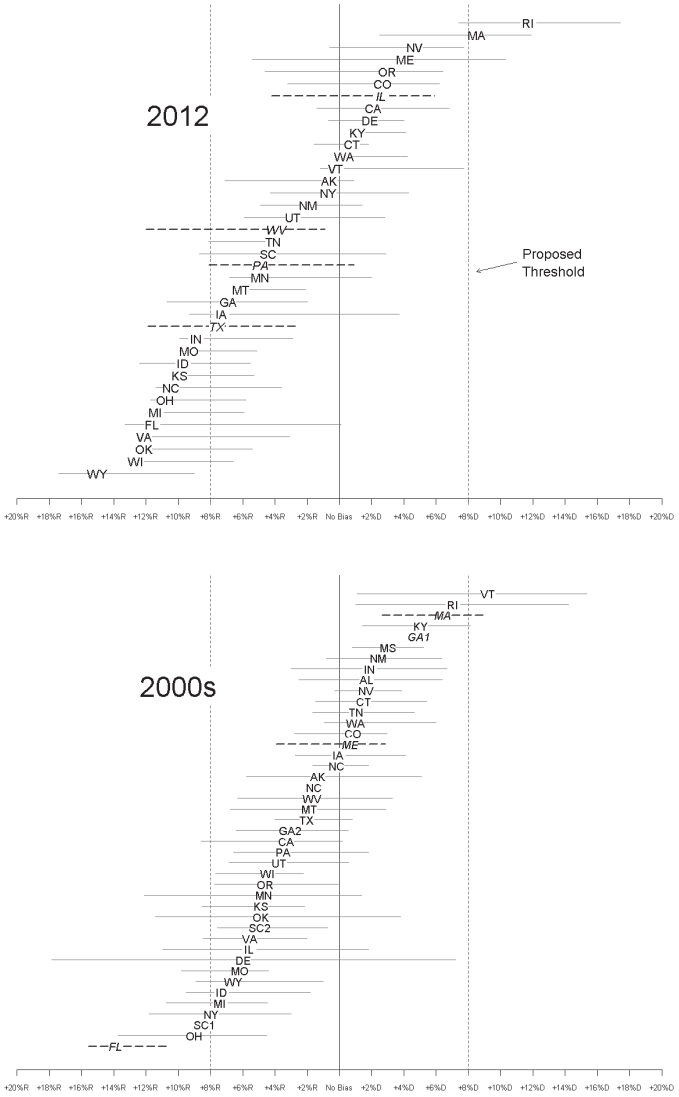
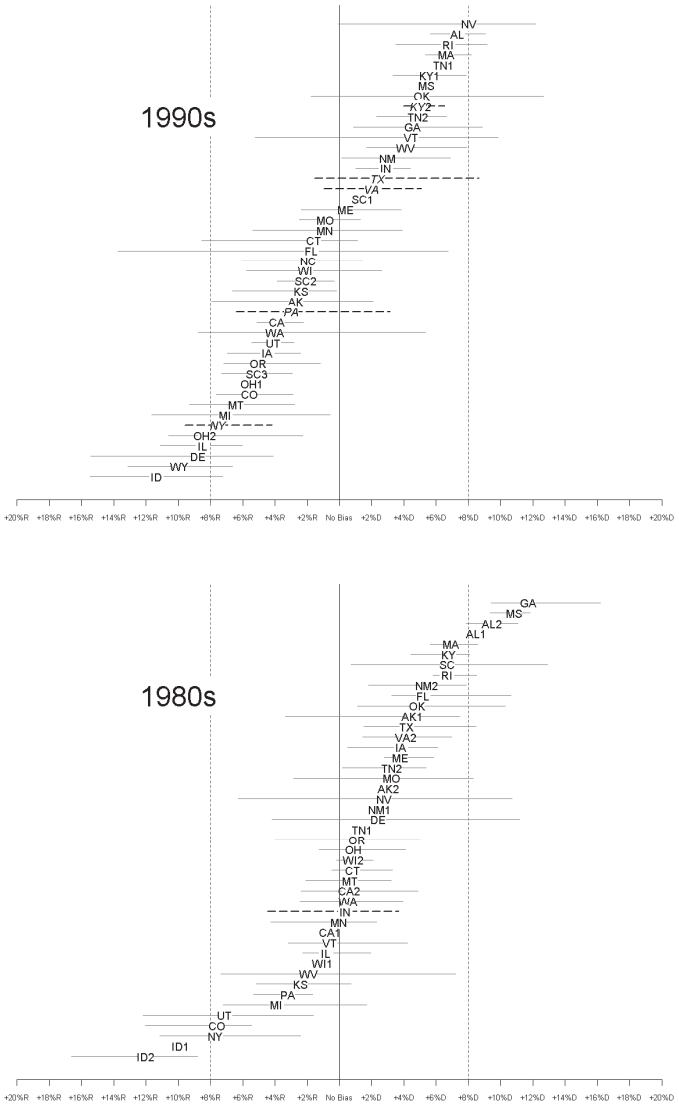
LA
PA
WI
TN
CA2
AZ
MD
MN
VA
MI
NY
OH
CA1
IL
+6R
+5R
+4R
+3R
+2R
+1R
No Bias
+1D
+2D
+3D
+4D
+5D
+6D

FIGURE 8. EFFICIENCY GAPS FOR STATE HOUSE PLANS BY STATE, 1972–2012




1990s
NV
AL
RI
MA
TN1
KY1
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OK
KY2
TN2
GA
VT
WV
NM
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TX
VA
SC1
ME
MO
MN
CT
FL
NC
WI
SC2
KS
AK
PA
CA
WA
UT
IA
OR
SC3
OH1
CO
MT
MI
NY
OH2
IL
DE
WY
ID
+20%R +18%R +16%R +14%R +12%R +10%R +8%R +6%R +4%R +2%R No Bias +2%D +4%D +6%D +8%D +10%D +12%D +14%D +16%D +18%D +20%D
1980s
GA
MS
AL2
AL1
MA
KY
SC
RI
NM2
FL
OK
AK1
TX
VA2
IA
ME
TN2
MO
AK2
NV
NM1
DE
TN1
OR
OH
WI2
CT
MT
CA2
WA
IN
MN
CA1
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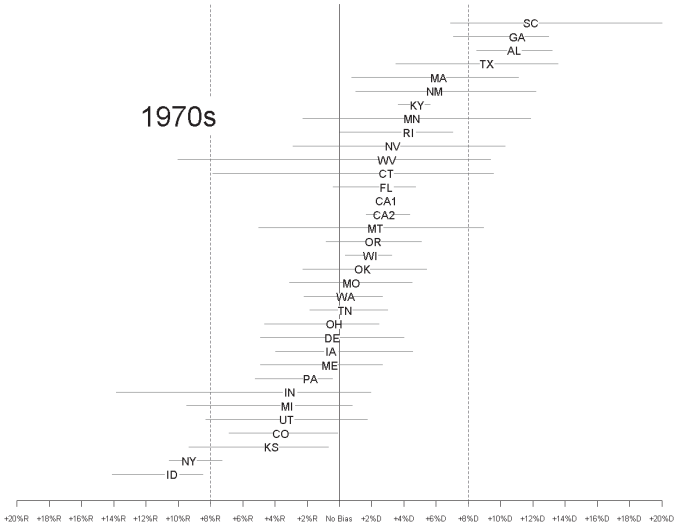

IV. A POTENTIAL TEST

The goal of this Article is not only to introduce the efficiency gap to a legal audience and to summarize its levels over time and space. It is also to show how the efficiency gap could be made the centerpiece of a doctrinal test for partisan gerrymandering. It is to show, in other words, how an approach based on the efficiency gap could exploit the opportunity created by the Court in *LULAC* while addressing the concerns raised about symmetry by Justice Kennedy.[187]

In this Part, then, we explain how we envision that the efficiency gap would operate as doctrine. First, courts would need to choose an efficiency gap threshold above which district plans would be presumptively unlawful and below which they would be presumptively valid. Our suggestion is that the bar be set at *two seats* for congressional plans and *8 percent* for state house plans—with the additional caveat that the plans not be expected, based on sensitivity testing, ever to have an efficiency gap of zero over their lifetimes.[188] Second, states whose plans have efficiency gaps above these thresholds would have the chance to show that the gaps either resulted from the consistent application of legitimate policies, or were inevitable due to the states' underlying political geography. If it is actually the case

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[187] See Part I.B.

[188] Since we have not gathered data on state *senate* plans, we do not attempt to set a threshold for them here.

that plans with gaps below the thresholds could not be drawn while still achieving the states' policies, or could not be drawn at all, then there would be no constitutional violation.

Finally, we revisit the criticisms leveled at partisan symmetry by Justice Kennedy in *LULAC*, and argue that they are unfounded with respect to the efficiency gap. The efficiency gap does not require any assumptions about where potential vote switchers might live, nor does it involve speculation about the results of specific hypothetical elections. Moreover, the empirical data we have presented enables reasonable thresholds to be selected, which then would be used not alone, but rather along with states' redistricting policies and political geography, to answer the ultimate constitutional question.

A. Setting the Threshold

The issue that most bedeviled the *Vieth* Court was how to distinguish between *some* partisan unfairness, which presumably is lawful, and *too much* unfairness, which is not. The Court stressed that "[t]he central problem is determining when political gerrymandering has gone too far," adding that the "unanswerable question" is "[h]ow much political motivation and effect is too much."[189] In the Court's view, none of the verbal formulations offered by the parties or the dissenting justices in the case could resolve this concern. Valid plans could not be told apart from invalid ones based on qualitative standards such as "predominant intent," "extremity of unfairness," or "unjustified entrenchment."[190]

The *Vieth* Court may well be right that, in the exceedingly complex area of redistricting, no qualitative test can distinguish between lawful and unlawful plans with sufficient consistency. But a qualitative test is not the only option. Another possibility is a *quantitative* approach that relies on a calculable metric of gerrymandering. Notably, a quantitative approach is how the Court answered Justice John Marshall Harlan's charge in *Reynolds v Sims*[191] that "cases of this type"—that is, cases involving claims of unequal district population—"are not amenable to the development of judicial standards."[192] Over a series of decisions,

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189 *Vieth*, 541 US at 296–97 (Scalia) (plurality).

190 See id at 284, 295, 299 (Scalia) (plurality).

191 377 US 533 (1964).

192 Id at 621 (Harlan dissenting). See also *Baker v Carr*, 369 US 186, 268 (1962) (Frankfurter dissenting) (claiming that there are no "legal standards or criteria or even reliable analogies to draw upon for making judicial judgments" in reapportionment cases).

the Court decided that *any* deviations from perfect population equality in congressional plans must be justified by legitimate policies that necessitate the inequality.[193] The Court also concluded that population deviations above 10 percent in state legislative plans must be justified in the same manner.[194] But deviations *below* 10 percent in state plans are presumptively valid unless they result from efforts to disadvantage a political or racial group.[195]

The efficiency gap makes possible the same doctrinal move in the gerrymandering context that population deviation enabled in the reapportionment context. Just as the Court was able to avoid hazy verbal formulations by adopting precise deviation thresholds, so too could it reply to *Vieth*'s "unanswerable question"[196] by specifying an efficiency gap level above which plans would be presumptively unlawful and below which they would be presumptively legitimate. This approach would neatly slice *Vieth*'s Gordian knot, informing lower courts and political actors, in clear quantitative terms, exactly "[h]ow much political . . . effect is too much."[197]

How much political effect, then, *is* too much? One option is to follow the Court's lead in the congressional reapportionment cases and to set an efficiency gap of zero as the threshold. In this case, any district plan that did not treat the parties *identically* in terms of wasted votes would be presumptively invalid. Any such plan would be upheld only if its efficiency gap either was the necessary result of a legitimate state policy, or was unavoidable given the geographic distribution of the parties' supporters. The overarching judicial goal, as in the congressional reapportionment

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193 See, for example, *Karcher*, 462 US at 730–31 ("First, the court must consider whether the population differences among districts could have been reduced or eliminated altogether . . . . [Next,] the State must bear the burden of proving that each significant variance between districts was necessary to achieve some legitimate goal."); *Kirkpatrick v Preisler*, 394 US 526, 537 (1969) (Fortas concurring).

194 See, for example, *Voinovich v Quilter*, 507 US 146, 161–62 (1993); *Brown v Thomson*, 462 US 835, 842–43 (1983) ("Our decisions have established, as a general matter, that an apportionment plan with a maximum population deviation under 10% falls within this category of minor deviations. A plan with larger disparities in population, however, creates a prima facie case of discrimination and therefore must be justified by the State.") (citations omitted); *Connor v Finch*, 431 US 407, 418 (1977).

195 See *Cox v Larios*, 542 US 947, 949 (2004).

196 *Vieth*, 541 US at 296 (Scalia) (plurality).

197 Id at 297 (Scalia) (plurality).

cases, would be to make the efficiency gap "as nearly as is practicable" equal to zero.[198]

For several reasons, we do not recommend a zero threshold. First, it would be incompatible with the Court's repeated statements in *Vieth* that *some* partisan unfairness indeed is permissible. The Court emphasized in its opinion that "segregat[ing voters] by political affiliation is (so long as one doesn't go too far) lawful and hence ordinary."[199] Right or wrong, this sentiment cannot be reconciled with a mandate that plans' efficiency gaps be reduced to zero. Second, a zero threshold would mean that almost every current plan is presumptively unconstitutional—and that almost every plan ever enacted also likely should have been struck down. Even the most zealous reformer should hesitate before advocating standards with such disruptive consequences.[200] Lastly, as we illustrated above with empirical evidence, plans' efficiency gaps vary markedly from election to election.[201] It thus is futile to insist on a gap of zero at any particular moment, because in all likelihood the gap will have assumed a non-zero value by the time of the next election.

Instead of a zero threshold, we recommend setting the bar at two seats for congressional plans and 8 percent for state house plans, with the further proviso that sensitivity testing show that the efficiency gaps are unlikely to hit zero over the plans' lifetimes.[202] Our rationale for using different metrics for congressional and for state house plans (seats and seat shares, respectively) is identical to why we presented the data differently

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198 *Karcher*, 462 US at 730, quoting *Kirkpatrick*, 394 US at 530. See also Grofman and King, 6 Election L J at 21 (cited in note 11) (suggesting minimization of partisan bias as a potential test for gerrymandering).

199 *Vieth*, 541 US at 293 (Scalia) (plurality). See also *Bandemer*, 478 US at 133 (White) (plurality) (rejecting a standard based on "minor departures from some supposed norm").

200 See *Bandemer*, 478 US at 133 (White) (plurality) (commenting that an overly "low threshold for legal action would invite attack on all or almost all reapportionment statutes").

201 See Part III.B.

202 See Grofman and King, 6 Election L J at 22 (cited in note 11) (offering as another judicial option a test employing a partisan bias threshold). These thresholds are based on the assumption that plaintiffs generally would challenge plans after they have been used for a *single* election. The thresholds should be reduced somewhat if plaintiffs were to attack plans already used in *multiple* elections. Due to reversion to the mean, the efficiency gap distributions for plans used in multiple elections are narrower than the plan-year distributions presented in Part III.A—which implies that the thresholds should be lower as well.

in the previous Part.[203] States' congressional delegations combine to form a single legislative body, the US House of Representatives, in which the parties seek to win as many seats as possible. Since aggregate House seats are the parties' main objective, it follows that the efficiency gap should be measured in seats rather than in percentage points. An eight-point gap in California simply is not commensurate, legally or politically, to an eight-point gap in Connecticut. But this logic flips for state house plans. Each state house is a self-contained entity, elected entirely by the state's own voters. State houses also vary dramatically in size, from as few as 40 members (in Alaska) to as many as 400 (in New Hampshire).[204] For discrete bodies of such divergent sizes, seat shares, not raw seats, are the appropriate unit of measurement.

We selected the two-seat threshold for congressional plans by examining their actual efficiency gaps over the last five redistricting cycles (that is, the entire period following the reapportionment revolution of the 1960s).[205] A gap of two or more seats placed a plan in the worst 14 percent of all plans in this era, roughly 1.5 standard deviations from the mean. In each of the decades we analyzed, only a handful of plans had average gaps of this magnitude. Illinois and Texas did so in the 1970s; California (the first plan), New York, and Texas (both plans) in the 1980s; California, New York, and Texas (both plans) in the 1990s; and California, Florida, Illinois, and Texas (the first plan) in the 2000s.[206] (It is too soon, of course, to compute average gaps for the 2010s.) A two-seat gap therefore indicates that a district plan is gerrymandered to an unusual extent and that the gerrymandering has an unusually large impact on the makeup of the House as a whole. Such a gap does not quite make a plan an *outlier* in the overall distribution, but it does show that the plan is far from the historical norm.

Analogously, we chose the eight-point threshold for state house plans on the basis of their efficiency gaps over the last five decades. A gap of at least eight points placed a plan in the worst 12 percent of all plans in this period, also about 1.5 standard

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203 See id at 21–22 (noting the possibility of setting a partisan bias threshold in terms of seats rather than percentage points). See also Part III.A.

204 See Alaska Const Art 2, § 1; NH Const Art 9.

205 See Cox and Katz, *Elbridge Gerry's Salamander* at 12–13 (cited in note 22) (describing redistricting in historical perspective).

206 See Figure 7.

deviations from the mean. Again, only a small minority of plans had average gaps of this size in each decade we studied. Alabama, Georgia, Idaho, New York, South Carolina, and Texas did so in the 1970s; Alabama (both plans), Georgia, Idaho (both plans), and Mississippi in the 1980s; Idaho, Illinois, Nevada, Ohio (second plan), and Wyoming in the 1990s; and Florida, Ohio, and Vermont in the 2000s. An eight-point gap for a state house plan, like a two-seat gap for a congressional plan, thus is indicative of uncommonly severe gerrymandering.[207]

A word is in order too about the sensitivity testing we suggest incorporating into the thresholds. We recommend the testing because, as we have stressed, a plan's efficiency gap may change substantially from one election to the next. It makes little sense to say that a plan is a presumptively unlawful gerrymander in one election, if in the next its efficiency gap could switch to favor the opposing party. To take into account this volatility, we propose treating a plan as presumptively invalid only if its gap exceeds the threshold we have identified *and* the gap is unlikely to hit zero over the plan's lifetime. To determine the odds of the gap hitting zero, we suggest shifting the actual election results by percentages derived from historical data—up to 7.5 percent in each direction for congressional plans and up to 5.5 percent for state house plans—and then calculating the gap for each vote share shift.[208] Only if the gap remains on the same

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[207] We also considered, but ultimately decided against, recommending a *ten*-point threshold for state house plans. The rationale for a ten-point threshold is that it would mirror the ten-point population deviation that the Court presumptively permits in the reapportionment context. See *LULAC*, 548 US at 468 n 9 (2006) (Stevens concurring in part and dissenting in part) ("It would, of course, be an eminently manageable standard for the Court to conclude that deviations of over 10% from symmetry create a prima facie case of an unconstitutional gerrymander, just as population deviations among districts of more than 10% create such a prima facie case."). But, in our view, this coincidental convergence is not a good enough reason to make the state house threshold substantially laxer than the congressional threshold. An efficiency gap of at least ten points, notably, placed a state house plan in the worst *5 percent* of prior plans, roughly *1.9* standard deviations from the mean.

Another option is to choose a threshold based on the likelihood (derived from historical data) that a plan with a certain efficiency gap in the first election after redistricting will favor the opposing party at some point during the remainder of the cycle. Using a probability of switching signs of 10 percent, this approach gives rise to approximately the same thresholds we arrived at by examining plans' overall efficiency gap distributions. In other words, plans with efficiency gaps right at our recommended thresholds in the first election after redistricting have roughly a 10 percent chance of favoring the opposing party in one of the cycle's four remaining elections.

[208] See Part III.B (discussing our sensitivity testing in more detail).

side of the zero axis in all of these calculations should the presumption of unconstitutionality apply.

What would this approach mean for the plans currently in force across the country?[209] At the congressional level, Florida, Michigan, North Carolina, Ohio, Pennsylvania, Texas, and Virginia had efficiency gaps of at least two seats in the 2012 election (all in the Republicans' favor). But the sensitivity testing shows that plausible shifts in voter sentiment could result in the Michigan, North Carolina, and Texas plans advantaging Democrats instead. Thus only the Florida, Ohio, Pennsylvania, and Virginia plans would be presumptively unlawful. At the state house level, Florida, Idaho, Indiana, Kansas, Massachusetts, Michigan, Missouri, North Carolina, Ohio, Oklahoma, Rhode Island, Virginia, Wisconsin, and Wyoming had efficiency gaps of at least eight points in the 2012 election (most but not all in the Republicans' favor). Of these plans, all but Florida's are unlikely to cross the zero axis during the rest of the decade, and so would be presumptively invalid under our proposed test.[210]

A final point about these thresholds is that they need not be adopted by courts at quite this level of specificity, at least not at once. Lacking experience with the efficiency gap, courts may be reluctant in early cases to set particular levels above which plans are presumptively unlawful and below which they are presumptively legitimate. Instead, courts may prefer to strike down plans with extremely high efficiency gaps and to uphold plans with very low gaps, while leaving it ambiguous where exactly the transition from presumptive validity to invalidity occurs. This, notably, is the path the Court took in the domain of state legislative reapportionment. In a line of cases between 1967 and 1975, the Court invalidated plans with total population deviations of 20 percent,[211] 26 percent,[212] and 34 percent,[213] while

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[209] The plans' efficiency gaps are depicted in Figures 7 and 8.

[210] A variant of this approach might be applied historically as well, examining (1) whether a plan had an average efficiency gap of more than two seats or eight points over its lifespan; and (2) whether a plan's efficiency gap ever crossed the zero axis during the decade. In the 2000s, for example, the California, Florida, Illinois, and first Texas congressional plans would have failed this test, along with the Florida, Ohio, and Vermont state house plans. See Figure 8.

[211] See *Chapman v Meier*, 420 US 1, 22 (1975) (involving a North Dakota reapportionment plan).

[212] See *Kilgarlin v Hill*, 386 US 120, 122 (1967) (involving a Texas reapportionment plan).

[213] See *Swann v Adams*, 385 US 440, 442 (1967) (involving a Florida reapportionment plan).

sustaining plans with deviations of 8 percent[214] and 10 percent.[215] It was only after this doctrinal sequence had unfolded that the Court announced that "[w]e have come to establish a rough threshold of 10% maximum deviation from equality."[216] In the gerrymandering context, likewise, the efficiency gap thresholds could emerge organically over a series of decisions. They need not be specified at the outset.

B. Presumptive Validity and Invalidity

Throughout our discussion to this point, we have spoken of *presumptive* rather than *irrebuttable* validity and invalidity. We now unpack how we think these presumptions should operate. In our view, a state whose plan's efficiency gap exceeds the relevant threshold should have the chance to argue that the gap either was the necessary result of a legitimate and consistently applied state policy, or was inevitable given the state's underlying political geography. The plaintiff then could respond by showing that a plan with a smaller gap could have been drawn while still attaining the state's goals (or notwithstanding the state's political geography). If a state successfully meets its burden, and the plaintiff fails to refute the state's position, then the presumption of unconstitutionality would be rebutted.

But before elaborating on litigants' potential claims and ripostes under this framework, it is worth asking why plans with efficiency gaps above the thresholds should not be *automatically* invalid. One answer is that justices have suggested in multiple gerrymandering cases that the pursuit of proper redistricting goals may save plans that fail to treat the parties equally. For instance, Justice Stevens commented in *Karcher* that, "[a]lthough a scheme in fact worsens the voting position of a particular group . . . it will nevertheless be constitutionally valid if the State can demonstrate that the plan as a whole embodies acceptable, neutral objectives."[217] Similarly, Justice Souter argued in *Vieth* that if a plaintiff satisfies a five-part prima facie

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[214] See *Gaffney v Cummings*, 412 US 735, 750 (1973) (involving a Connecticut reapportionment plan).

[215] See *White v Regester*, 412 US 755, 763 (1973) (involving a Texas reapportionment plan).

[216] *Brown*, 462 US at 852 (Brennan dissenting). See also *Connor*, 431 US at 418 (declaring that "'under-10%' deviations . . . [are] of prima facie constitutional validity").

[217] *Karcher*, 462 US at 759–60 (Stevens concurring). See also id at 760 ("The same kinds of justification that the Court accepts as legitimate in the context of population disparities would also be available.").

test, then the burden should shift to the state "to justify [its] decision by reference to objectives other than naked partisan advantage."[218]

Another doctrinal answer comes from the state reapportionment cases, in which the Court repeatedly has upheld plans with population deviations *above* 10 percent that resulted from policies of respecting town and county boundaries.[219] By analogy, plans with efficiency gaps above two seats or eight points should be sustained too, as long as the gaps were the product of comparable state policies. On the merits as well, we believe that a rule of automatic invalidity for plans with excessive gaps would assign too high a premium to partisan fairness. Partisan fairness is indeed a redistricting value of paramount importance. But it is not the only important value implicated by redistricting, and we do not see why it should be given doctrinal pride of place over compactness, respect for political subdivisions, respect for communities of interest, competitiveness, minority representation, and the like.[220]

These other values capture precisely the sorts of interests that states might assert as justifications for plans with efficiency gaps above the thresholds. States might argue that plans with smaller gaps simply could not have been drawn while complying with the Voting Rights Act or keeping districts sufficiently compact, competitive, or congruent with subdivisions or communities. In making such claims, states presumably would rely heavily on cartographic evidence, since only actual district maps can reveal the extent of the trade-off between partisan fairness and other redistricting goals. States also could point to academic studies indicating, among other things, that compactness is negatively correlated with partisan fairness,[221] and that the

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[218] *Vieth*, 541 US at 351 (Souter dissenting). See also id (listing "the need to avoid racial vote dilution," "one person, one vote," and "proportional representation" as legitimate state objectives).

[219] See, for example, *Brown*, 462 US at 843–44 (upholding a district with a population 60 percent below the mean because it was perfectly congruent with the county); *Mahan v Howell*, 410 US 315, 329 (1973) (upholding a Virginia plan with a total population deviation of 16 percent that was attributable to a "policy of maintaining the integrity of political subdivision lines"); *Abate v Mundt*, 403 US 182, 187 (1971) (upholding a county plan with a total population deviation of 12 percent caused by "preserving an exact correspondence between each town and one of the county legislative districts").

[220] See *Miller v Johnson*, 515 US 900, 916 (1995) (noting these principles as important in redistricting).

[221] See, for example, Chen and Rodden, 8 Q J Polit Sci at 264 (cited in note 23) (finding that simulated district plans based on "traditional districting principles of contiguity

creation of majority-minority districts may lead to partisan distortion too.[222]

Of course, a mere *assertion* that a large efficiency gap followed inexorably from the application of a legitimate state policy would fail to rebut the presumption of unconstitutionality. A state would have to present concrete proof that its objectives could not have been realized to the same extent had it devised a plan with a smaller gap. And even if the state presented such proof, the plaintiff would get its bite at the apple as well. The plaintiff could submit sample maps showing that the state's goals could have been advanced equally well by a more symmetric plan. To the extent academic evidence is probative, the plaintiff also could highlight findings that congruence with subdivisions and with communities is associated with *greater* partisan fairness,[223] and that if they are drawn correctly, majority-minority districts need not have any partisan implications.[224] It then would be the court's responsibility to determine whether the state's legitimate policy choices in fact necessitated an efficiency gap above the threshold.[225]

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and compactness will generate substantial electoral bias in favor of the Republican Party"); Stephanopoulos, 3 UC Irvine L Rev at 711 (cited in note 101) (presenting a regression model finding that the use of a compactness criterion reduces partisan fairness in state legislative elections). But see Roland G. Fryer Jr and Richard Holden, *Measuring the Compactness of Political Districting Plans*, 54 J L & Econ 493, 515 (2011) (finding that maximally compact plans would result in partisan biases of nearly zero in California, New York, Pennsylvania, and Texas).

[222] See, for example, David Epstein, et al, *Estimating the Effect of Redistricting on Minority Substantive Representation*, 23 J L, Econ & Org 499, 506 (2007); Kevin A. Hill, *Does the Creation of Majority Black Districts Aid Republicans? An Analysis of the 1992 Congressional Elections in Eight Southern States*, 57 J Politics 384, 399 (1995); David Lublin and D. Stephen Voss, *Racial Redistricting and Realignment in Southern State Legislatures*, 44 Am J Polit Sci 792, 793 (2000).

[223] See, for example, Jonathan Winburn, *The Realities of Redistricting: Following the Rules and Limiting Gerrymandering in State Legislative Redistricting* 9, 200–01 (Lexington 2008) (finding that the criterion of respect for political subdivisions curbed gerrymandering in multiple states); Todd Makse, *Defining Communities of Interest in Redistricting through Initiative Voting*, 11 Election L J 503, 510–12 (2012); Stephanopoulos, 125 Harv L Rev at 1941–48 (cited in note 18) (finding that plans whose districts are especially noncongruent with communities of interest—that is, plans with high average levels of spatial diversity—tend to have high levels of partisan bias too).

[224] See Adam B. Cox and Richard T. Holden, *Reconsidering Racial and Partisan Gerrymandering*, 78 U Chi L Rev 553, 572–79 (2011) (explaining that the creation of majority-minority districts is never a first-best Republican strategy, and actually can be an optimal Democratic strategy if African American majorities are slim).

[225] A further issue is whether there should be an upper limit to the size of the efficiency gap that can be justified by a legitimate state policy. See, for example, *Brown*, 462 US at 849 (O'Connor concurring) ("[E]ven the consistent and nondiscriminatory application of a legitimate state policy cannot justify substantial population deviations . . . where the effect

The second kind of argument a state could make is that no smaller efficiency gap was possible because of the state's underlying political geography.[226] The state may have *wanted* to enact a plan with a gap below the threshold, the claim would go, but this goal was unattainable due to the spatial distribution of the parties' supporters. Cartographic evidence again would be crucial in making this case, preferably in the form of maps showing that a smaller gap simply could not have been produced. A state also could cite recent work by political scientists showing that "in many urbanized states, Democrats are highly clustered in dense central city areas, while Republicans are scattered more evenly through the suburban, exurban, and rural periphery."[227] These residential patterns mean that "pro-Republican bias can be quite pronounced even in the absence of intentional gerrymandering."[228]

For its part, a plaintiff would aim to draw a sample map illustrating that a smaller efficiency gap in fact was possible (despite the state's political geography). The map would not only need to feature a smaller gap, but also to comply with all federal and state legal requirements. But if it could be crafted, then the state's inevitability argument would collapse. Notably, the same political scientists that have documented the edge Republicans enjoy because of their superior spatial distribution also have given advice to Democrats about how to compensate for their weaker position. "[A] clever Democratic cartographer might generate radial districts emanating from the city centers so as to break up the major agglomerations . . . . Such a . . . districting arrangement would possibly neutralize the inherent Republican

would be to eviscerate the one-person, one-vote principle."); *Mahan*, 410 US at 329 (commenting that a 16 percent total deviation "may well approach tolerable limits" despite being justified by a policy of respecting town and county boundaries). Just as the Court has raised but not resolved this issue in the state reapportionment context, so too do we flag it without offering a solution.

[226] And a third kind of argument a state could make—at the congressional level only—is that its large efficiency gap in one party's favor is offset by plans in other states biased in the *opposite* party's direction. One wrong could be seen as canceling out another. However, we do not explore this defense further because our motivation is to reduce the efficiency gaps of *all* district plans. We do not seek merely to have one gerrymander balanced by another.

[227] Chen and Rodden, 8 Q J Polit Sci at 241 (cited in note 23). See also Jonathan Rodden, *The Geographic Distribution of Political Preferences*, 13 Ann Rev Polit Sci 321, 324 (2010) (finding that in a range of countries "[l]eftists were highly concentrated in industrialized urban districts and mining regions," leading "the parties of the left to suffer in the transformation of votes to seats").

[228] Chen and Rodden, 8 Q J Polit Sci at 265 (cited in note 23).

advantages in geographic districting."[229] As long as this sort of map actually could be produced, the presumption of unconstitutionality would not be rebutted.

This doctrinal framework, with its quantitative thresholds and rebuttable presumptions, may seem overly complex. But it is more or less identical to—and, indeed, inspired by—the Court's approach to one person–one vote cases at the state legislative level. That approach has been used for decades without prompting any claims that it is judicially unmanageable.[230] And we see no reason why it would prove less workable in the gerrymandering context. The substantive issue would be different, but the logic of the cause of action would remain the same.

C. Concerns and Responses

We noted earlier that Justice Kennedy voiced a series of concerns about partisan symmetry in *LULAC*.[231] Does the efficiency gap test that we have set forth respond adequately to these concerns? As we explain below, we believe that it does. We also believe that it addresses the worry, expressed by the Court in both *Bandemer* and *Vieth*, that shifting voter preferences might erode the durability of any gerrymander.

Justice Kennedy's first misgiving about partisan symmetry was that it "may in large part depend on conjecture about where possible vote-switchers [ ] reside."[232] This critique, however, applies only to the particular measure of partisan symmetry—partisan bias—that was cited in *LULAC* by Justice Stevens and by the political scientist amici. It does not apply to *all* partisan symmetry metrics, and in particular it does not apply to the efficiency gap. As we described earlier, to calculate a plan's partisan bias, it is necessary to estimate the results of a hypothetical election in which the parties' vote shares flip (or are both equal to fifty percent).[233] The only way to estimate these hypothetical results is by assuming that the parties' vote shares shift by the

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[229] Id at 256. See also Cox and Holden, 78 U Chi L Rev at 572–79 (cited in note 224) (explaining how Democrats might use a "matching slices" redistricting strategy to their advantage). The efficiency gap distributions in Part III.A further indicate that political geography is not as unfavorable to Democrats as Chen and Rodden contend. Both distributions have medians very close to zero, around which they are spread symmetrically.

[230] See notes 194–95, 211–16, and accompanying text.

[231] See notes 82–88 and accompanying text.

[232] *LULAC*, 548 US at 420 (Kennedy) (plurality).

[233] See Part II.C.

same amount in each district.[234] But, as Justice Kennedy correctly observed, this assumption is problematic. Vote switchers are unlikely to reside in each district in the same proportions, meaning that the partisan swing from district to district is unlikely to be uniform.[235]

The efficiency gap avoids the need to estimate hypothetical election results (and, with it, the need to speculate about vote switchers' locations). The parties' respective wasted votes are calculated using actual election outcomes. No vote shares are shifted in any direction.[236] It is true that the sensitivity testing we recommend relies on a methodology similar to that of partisan bias.[237] But the testing is not used to generate our point estimates of the efficiency gap, nor is it used in our historical analysis of district plans. Moreover, even for contemporary plans, the vote share shifts we employ are smaller than those typically needed to compute partisan bias.[238] And there is no reason why a litigant could not use an assumption other than uniform swing to conduct sensitivity testing, so long as the alternative premise was justified with an argument about the political realities on the ground. In short, while uniform swing is an *option* for the efficiency gap, it is a *prerequisite* for partisan bias.

Second, Justice Kennedy was hesitant about striking down a district plan *before* an election had taken place and demonstrated the plan's partisan unfairness. "[W]e are wary of adopting a constitutional standard that invalidates a map based on unfair results that would occur in a hypothetical state of affairs. Presumably such a challenge could be litigated if and when the feared inequity arose."[239] This objection also does not apply to the doctrinal framework we have laid out. We have used only past election outcomes—not predicted future ones—to calculate the efficiency gap. If courts were to refer to our data in

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234 See *LULAC*, 548 US at 420 (Kennedy) (plurality).

235 See notes 134–39 and accompanying text.

236 See McGhee, 39 Legis Stud Q at 68 (cited in note 12) (noting that the efficiency gap "avoids many of the problems of symmetry and responsiveness and does not require any counterfactual at all").

237 See Part III.B.

238 As noted above, we use vote share shifts of up to 7.5 percent in each direction for congressional plans and up to 5.5 percent in each direction for state house plans. See Part III.B. By comparison, an election in which one party receives 60 percent of the statewide vote and the other party receives 40 percent—a common enough scenario—requires a vote share shift of *20 percent* for partisan bias to be calculated.

239 *LULAC*, 548 US at 420 (Kennedy) (plurality).

gerrymandering cases, they would be relying on "unfair results" derived not from "a hypothetical state of affairs" but rather from actual historical experience.[240]

Of course, since election outcomes *can* be forecast with reasonable accuracy, it would be reckless for political actors to enact plans with expected efficiency gaps above the thresholds. Even if these plans were immune from scrutiny prior to the first election held under them, they would be highly susceptible to invalidation immediately thereafter. And if the plans were discarded at this juncture, then so too might be many of the actors' redistricting aims. Not only would the plans' partisan skew disappear, but communities might be destabilized, competitiveness might surge, and incumbents might be imperiled (especially if the remedy took the form of a court-drawn map). To avoid such scenarios, we think political actors would be quite likely to design plans with subthreshold efficiency gaps from the outset. Even if the threat of litigation was an election cycle away, it still would be proximate enough to produce compliance in most cases.[241]

Third, Justice Kennedy did not see how, in the absence of empirical evidence, "a standard for deciding how much partisan dominance is too much" could be chosen.[242] But providing extensive data about the efficiency gap, and then showing how it could be used to select a legal threshold, are perhaps the two most important contributions of this Article. In the Article's empirical portion, we calculated the efficiency gap for congressional and state house plans over the entire modern redistricting era.[243] And earlier in this Part, we explained how the current plans' efficiency gap distributions, in combination with historical analysis, sensitivity testing, and analogies to the Court's reapportionment doctrine, could be deployed to set the crucial levels.[244] Scholars and judges may quibble about our two-seat threshold for congressional plans and our eight-point threshold for state house

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240 Id (Kennedy) (plurality).

241 See Grofman and King, 6 Election L J at 14 (cited in note 11) ("[I]f the Court required partisan symmetry . . . only after the first election, redistricters would surely anticipate this in drawing the districts in the first place, especially since it is so easy to assess the plan before the election.").

242 *LULAC*, 548 US at 420 (Kennedy) (plurality).

243 See Part III.A.

244 See Part IV.A.

plans, but it seems hard to deny that they are reasonable measures of "how much partisan dominance is too much."[245]

Justice Kennedy's fourth objection was that "asymmetry *alone* is not a reliable measure of unconstitutional partisanship."[246] In other words, the standard for unlawful gerrymandering should incorporate *both* asymmetry *and* other relevant considerations. The test we have proposed, of course, does exactly that. In the first stage of the analysis, only asymmetry (in the form of the efficiency gap) would be at issue. The key question would be whether the plan's gap is above or below the relevant threshold. But in the second stage, all sorts of other factors—redistricting criteria such as compactness, respect for political subdivisions, and respect for communities of interest, democratic values such as competitiveness and minority representation, the state's underlying political geography, and so on—would come into play. Here the dispositive issue would be whether these other factors necessitated a gap above the threshold. Under this two-step sequence, partisan fairness would not be prioritized above every competing consideration. Rather, it would be balanced against them, and could be compromised in order to achieve other pressing objectives.[247]

Finally, we address the concern, voiced by the Court in both *Bandemer* and *Vieth*, that voters' preferences may be highly volatile, in which case partisan unfairness in one election might not translate into unfairness in the next. As the Court remarked in *Bandemer*, "[A] finding of unconstitutionality must be supported by evidence of *continued* frustration of the will of a majority of the voters."[248] Or as the Court put it in *Vieth*, "Political affiliation is not an immutable characteristic."[249] Unlike all other standards proposed to date,[250] our test explicitly takes into

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[245] *LULAC*, 548 US at 420 (Kennedy) (plurality). Ultimately, though, "it is this Court, not proponents of the symmetry standard, that has the judicial obligation to answer the question of how much unfairness is too much." Id at 468 n 9 (Stevens concurring in part and dissenting in part).

[246] Id at 420 (Kennedy) (plurality) (emphasis added).

[247] The same sort of balancing, of course, occurs in the reapportionment context. Deviations from population equality are permitted in order to accomplish other goals. See notes 193–95 and accompanying text.

[248] *Bandemer*, 478 US at 133 (White) (plurality) (emphasis added).

[249] *Vieth*, 541 US at 287 (Scalia) (plurality).

[250] Grofman and King, for instance, do not incorporate sensitivity testing into any of their suggested partisan bias tests. They would calculate bias only for a tied election or at the actual vote share point. See Grofman and King, 6 Election L J at 21–25 (cited in note 11).

account the possibility that voters' attitudes may change over time. Thanks to the sensitivity testing we recommend, a plan would be presumptively unlawful only if its efficiency gap exceeded the threshold *and* the gap was unlikely to hit zero over the plan's lifetime. Moreover, the odds of the gap hitting zero are determined not by speculation but rather on the basis of historical evidence about the shifts in voter sentiment that can be expected to occur over the course of a decade. These aspects of our test distinguish it from all of the approaches the Court previously has considered and rejected, and they render it uniquely responsive to the Court's anxiety about fickle voter preferences.

CONCLUSION

The cause of action for partisan gerrymandering has lain dormant for essentially its entire existence. In *LULAC*, however, the Court hinted for the first time in a generation that the claim could yet arise from its slumber. In particular, a majority of the justices expressed genuine interest in the concept of partisan symmetry. In this Article, we have taken the Court at its word. We have introduced a new measure of partisan symmetry, the efficiency gap, that captures the essence of gerrymandering and is superior to earlier symmetry metrics. We also have calculated the efficiency gap for a vast array of congressional and state house plans over the past five redistricting cycles. And, perhaps most helpfully for the judiciary, we have developed one option for converting the efficiency gap into usable doctrine. Notably, our proposal gives a concrete reply to *Vieth*'s "unanswerable question" of "[h]ow much political . . . effect is too much"[251]—a gap of two seats for congressional plans and a gap of 8 percent for state house plans, but only if the gaps are likely to be durable.[252]

What are the odds, then, that the courts will finally put some teeth into gerrymandering claims? Certainly the *need* for a more potent doctrine has never been greater. As we have stressed, today's plans feature the largest efficiency gaps recorded in modern history. At the Supreme Court level, however, we doubt that the currently sitting justices are eager to launch another redistricting revolution. We would be surprised by an explicit *rejection* of the efficiency gap, given the justices' positive comments in *LULAC*, but we would be equally surprised if today's

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[251] *Vieth*, 541 US at 296–97 (Scalia) (plurality).

[252] See Part IV.A.

conservative Court began striking down the largely pro-Republican gerrymanders that exist across the country. The Court's more likely course is to let sleeping dogs lie.

But we are substantially more optimistic at the lower court level. In the years since *LULAC*, plaintiffs have lost their gerrymandering suits because they have ignored the Court's discussion of partisan symmetry and sought in vain to revive the standards rebuffed in *Vieth*. It would not take much—just a single resourceful plaintiff and a single creative court—for a test based on the efficiency gap to win a doctrinal foothold. And from this foothold it also would not be too implausible for the test to spread to other jurisdictions. Doctrinal experimentation and diffusion are common in election law,[253] and we see no reason why they could not occur in the gerrymandering context too. And if they *did* occur, and if they were perceived as positive developments, and if the Supreme Court's membership shifted in a favorable direction (all admittedly big ifs), then partisan symmetry might eventually be adopted as the law of the land. Then the promise of *LULAC*, the promise that motivated us to write this Article, might be fulfilled.

[253] See, for example, *Obama for America v Husted*, 697 F3d 423, 428 (6th Cir 2012) (extending the logic of *Bush v Gore*, 531 US 98 (2000), to unequal treatment of early voters); *Texas v Holder*, 888 F Supp 2d 113, 143–44 (DDC 2012) (three-judge panel), vacd and remd, 133 S Ct 2886 (2013) (applying § 5 of the Voting Rights Act to prevent a photo identification requirement from taking effect); *United States v Village of Port Chester*, 704 F Supp 2d 411, 448–53 (SDNY 2010) (invoking § 2 of the Voting Rights Act to require cumulative voting as a remedy for vote dilution).