



What's Wrong with the Efficiency Gap

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A M E R I C A N E N T E R P R I S E I N S T I T U T E

Executive Summary

For over 30 years, the Supreme Court has held that partisan gerrymandering can theoretically violate the US Constitution. However, the Court has never struck down a plan as a partisan gerrymander. This is because the Court has been unable to agree on a judicially manageable standard to determine how much gerrymandering is too much.

In recent years, political scientists and mathematicians have offered various metrics to measure partisan gerrymandering. One of these tests, the efficiency gap, made headlines when federal courts in Wisconsin and North Carolina used the statistic to justify striking down maps. As of this writing, the North Carolina case is pending before the Supreme Court.

The efficiency gap is an interesting metric that likely tells us something about gerrymandering. It is a flawed metric, however, for several reasons. For example, the efficiency gap can be changed if a party runs an unusually strong candidate or has an incumbent unexpectedly die or retire. This creates a substantial problem: It is difficult, and at times impossible, to sort out how much of an efficiency gap is due to these

factors and how much of it is due to gerrymandering. Likewise, the efficiency gap does not account directly for partisan clustering, which can also influence its score. It is also pseudo-normative, smuggling in several assumptions about what a gerrymander actually is; by adopting it, a court may be deciding things it does not even realize it is deciding. Finally, the efficiency gap does not truly answer the question of how much gerrymandering is too much. It merely pushes the question back a step, arbitrarily selecting a cutoff and then placing a statistical gloss on it.

Nevertheless, the Court should not abandon policing partisan gerrymandering altogether. Justice Anthony Kennedy once warned about a state simply declaring that all the state's seats should go to Republicans or Democrats. A similar result could be obtained and would be equally damaging to democracy if a state were to completely abandon all traditional redistricting criteria to push through a map that would tend to elect only its partisans. To help police the outer limits of gerrymandering, the Court should consider proceeding on a rational review standard.

What's Wrong with the Efficiency Gap

Sean Trende

The Supreme Court of the United States has struggled to define the limits of partisan gerrymandering for over 30 years. For over a decade, the Court had been largely silent on the matter. Then, in 2016, a federal court in Wisconsin struck down a map as a partisan gerrymander for the first time in decades. In that case, *Gill v. Whitford*, plaintiffs urged the Court to adopt a test based largely on a statistic known as the “efficiency gap,” which defines a gerrymander in terms of “wasted votes.”¹ Although the Court did not accept the plaintiffs’ invitation to apply the efficiency gap directly, a federal court in North Carolina and a state court in Pennsylvania have since spoken favorably of the efficiency gap, albeit to different degrees.

In June 2018, the Supreme Court reversed the Wisconsin court decision on a procedural issue known as “standing.” It sent the case back to the district court, where plaintiffs amended their complaint to add additional plaintiffs that comply with the standing requirement. The North Carolina case is currently pending before the Supreme Court, while the remand of the *Whitford* decision is currently stayed, pending the Supreme Court’s decision. Cases pending in federal courts in Michigan and Ohio raise efficiency gap-related issues as well. Obviously, if the Supreme Court accepts the North Carolina challenge, efficiency gap claims will multiply. But even if it turns away the challenge, plaintiffs will likely try their hands in state courts, where they have found a receptive audience on at least one occasion (in Pennsylvania).

Since we will likely be dealing with claims arising from the efficiency gap for quite some time, this report provides an overview of the major arguments

for and against it. It explains the motivation behind the efficiency gap, the statistic itself, and the potential problems with the gap. The report concludes that while the efficiency gap is a conceptually useful tool for an academic understanding of gerrymandering, it is deeply problematic when used as part of a legal test. While this report will not give an exhaustive account of every nuance of the efficiency gap—the expert testimony in these cases stretches over hundreds of pages—a careful reader should emerge with a solid understanding of the legal test, how the statistic is calculated, and its drawbacks.²

A Brief History of Gerrymandering Litigation

For much of the Court’s history, redistricting was considered beyond the reach of the Court’s jurisdiction. In Justice Felix Frankfurter’s memorable turn of phrase, redistricting was seen as a “political thicket” into which the Court ought not enter.³ This changed with a flurry of cases in the early 1960s. These began with *Baker v. Carr*, which held that the Court could consider cases involving malapportionment (whereby states draw legislative districts with unequal numbers of residents).⁴ It continued through *Gray v. Sanders*, striking down the county unit system of government and announcing the “one-person, one-vote” standard.⁵ Soon after, *Reynolds v. Sims* struck down malapportioned state legislative districts, and *Wesberry v. Sanders* struck down malapportioned congressional districts.⁶ Collectively, these cases are sometimes

referred to as the “reapportionment revolution,” and they greatly reshaped the American political landscape.

These cases, however, did not directly deal with what we might consider “political malapportionment,” more commonly known as gerrymandering. In *Gaffney v. Cummings*, the Court observed that some entry of politics into redistricting was inevitable.⁷ But the Court would wait over a decade before confronting the question of just how much politics was too much in *Davis v. Bandemer*.⁸ In that case, the Court was presented with legislative lines Indiana Republicans drew to their benefit. A fractured Court held that this map did not violate the equal protection clause. As with *Baker*, a majority of the Court agreed that redistricting was a thicket into which the Court could conceivably wade, with only Chief Justice Warren Burger and Justices Sandra Day O'Connor and William Rehnquist disagreeing with that conclusion. The remaining justices split, however, on whether Indiana's redistricting violated the Constitution.

Justices Byron White, William Brennan Jr., Thurgood Marshall, and Harry Blackmun concluded that gerrymandering claims would be justiciable only when a voter's influence on the political process could be shown to be consistently degraded, and they expressed concern that a single election was insufficient for doing so. They concluded that, under the facts presented, the map could not be struck down. By contrast, Justices Lewis Powell Jr. and John Paul Stevens found a constitutional violation under the facts presented, on the theory that a plan designed with no justification other than to preserve the political power of the party in power should be found unconstitutional. For them, the shapes of the districts and adherence to established political subdivisions were key portions of the inquiry.

With the justices unable to agree on a standard, gerrymandering law again lay more or less dormant for another two decades. Although there were occasional attempts to convince the Court to take up the issue once again. In *Badham v. Eu*, for example, the Court rejected an opportunity to hear a case arising from California Democrats' attempt to re-gerrymander the state in response to a voter initiative rejecting the

1982 Democratic plan. Chief Justice Rehnquist, Justice Stevens, and Justice Anthony Kennedy voted to hear the case.⁹ But such attempts were unavailing.

The Court broke its silence in 2004. Following the 2000 decennial census, Pennsylvania Republicans took advantage of their complete control of redistricting to reduce the size of the Democratic delegation. The state was slated to lose two districts after the 2000 reapportionment, and Republicans set out to convert the 10–10 delegation into a 13–6 Republican advantage. Although the gerrymander did not quite work—Republican George Gekas lost his matchup with Tim Holden in the first election—plaintiffs argued that the map was a clear attempt to gerrymander the state in Republicans' favor.¹⁰

The Court once again split badly. Chief Justice Rehnquist, along with Justices O'Connor, Antonin Scalia, and Clarence Thomas, would have declared redistricting to be a political issue beyond the reach of the Court. Justice Kennedy concurred in the judgment, holding out hope that a manageable standard might someday be reached, while simultaneously rejecting the principle laid out by the plaintiffs: that a majority of the voters should necessarily be able to elect a majority of the legislators. Justice Kennedy also rejected the standards suggested by the dissenting justices, which focused on factors such as whether districts were bizarrely shaped, whether traditional redistricting principles were abandoned, or whether a map entrenches a particular party.

The Court's latest pronouncement on redistricting—at least until 2018—came in *League of United Latin American Citizens (LULAC) v. Perry*.¹¹ LULAC involved two challenges to Texas' 2003 redistricting. The first challenge, which was partially successful, claimed that Texas had violated the Voting Rights Act in various districts. The second challenge was a partisan redistricting claim, suggesting that the state legislature had operated with impermissible partisan intent when redrawing the state's congressional districts in the middle of the decade.

On the latter point, the Court held that the mid-decade redistricting did not violate the Constitution, with only Justices Stevens and Stephen Breyer dissenting on these claims. While LULAC's

reach was fairly limited, Justice Kennedy's plurality opinion, joined by Justices David Souter and Ruth Bader Ginsburg, expressed some interest in "partisan asymmetry" as a foundation for future gerrymandering claims. Partisan asymmetry tests involve examining what the outcome of elections would be if results were flipped—the idea being that a party that wins seven of 10 districts with 60 percent of the vote should win three of 10 districts with 40 percent of the vote.¹² Kennedy thought this concept was interesting but nevertheless concluded that asymmetry alone was an insufficient basis for finding a redistricting violation.

The Court ended the 2000s in much the same way it ended the 1980s. There was a majority on the Court that was prepared to take up a partisan gerrymandering claim, but there was not a majority on the Court that was prepared to endorse a particular standard. Indeed, even justices who proposed standards failed to agree on any particular one.

The Efficiency Gap

In 2014, a political scientist named Eric McGhee published an article in *Legislative Studies Quarterly* titled "Measuring Partisan Bias in Single-Member District Electoral Systems."¹³ Much of the article is dedicated to an academic debate over the theoretical measurement of gerrymandering, which is beyond the scope of this report. What *is* within the scope of this report is McGhee's proposed metric for measuring gerrymandering: the efficiency gap.

The efficiency gap is motivated by the following basic theory: When parties try to draw maps to benefit themselves, they wish to maximize the number of districts they can win. They do this by "wasting" as many of the other party's votes as possible—that is, maximizing the number of votes that do not contribute to winning a seat. This can be accomplished in one of two ways. First, under McGhee's construction, a party wastes votes when it falls short of winning a seat. Second, a party wastes votes when it wins a seat but does so with more votes than are needed to win the seat.

The efficiency gap thus purports to test the "packing" and "cracking" of districts. If Republicans take Democrats who are sufficient in number to form a district and spread them out over two or three districts that Republicans tend to win, under this argument, those Democrats have been cracked. Their votes will be wasted, absent an upset, whereas in a single district only those votes in excess of a majority will be wasted. Packing and cracking themselves are amorphous concepts in this context: At times it seems as though a district is labeled "packed" if a Democrat wins and "cracked" if it loses. Nevertheless, this is the motivating theory behind the efficiency gap, and this report will continue using this nomenclature.

When parties try to draw maps to benefit themselves, they wish to maximize the number of districts they can win.

At the same time, assume enough Democrats are present to create slim majorities in two districts. Instead, Republicans combine them into a single district. In McGhee's understanding, Democratic voters are packed into one district. This expresses itself in the efficiency gap once again through wasted votes. The Democrats would waste few votes with slim majorities in two districts but would waste large numbers of votes in the packed district.

Table 1 helps make this a little less abstract. Imagine a state with a slight Democratic lean that has three districts. When not gerrymandered, geography dictates a Democratic lean: Republicans have 30,000 more wasted votes than Democrats have.

But suppose that Republicans control redistricting in our hypothetical state. In District 1, perhaps tendrils are extended out to take in Democrats in neighboring

Table 1. Illustration of Efficiency Gap Calculations in Hypothetical State

	Population	Partisanship	Wasted Democratic Votes	Wasted Republican Votes	Net Wasted Democratic Votes
Natural State of the Districts					
District 1	100,000	60 Percent Democratic	10,000	40,000	-30,000
District 2	100,000	60 Percent Democratic	10,000	40,000	-30,000
District 3	100,000	40 Percent Democratic	40,000	10,000	30,000
Packing and Cracking Scenario					
District 1	100,000	90 Percent Democratic	40,000	10,000	30,000
District 2	100,000	35 Percent Democratic	35,000	15,000	20,000
District 3	100,000	35 Percent Democratic	35,000	15,000	20,000

Source: Author.

counties. Those voters are therefore packed into a single district. The number of wasted votes here skyrockets, as Democrats “spend” many more votes than they need to win. Thus, 70,000 Democrats still remain in our state—enough to create an additional Democratic district—but those votes are split between two districts. So the Democrats “spend” a lot of votes here but do not get an actual win in return. The result is a massive swing in wasted votes, commensurate with a “natural” 2–1 Democratic map becoming transformed into a 2–1 GOP map.

To complete the calculation of the statistic, the net number of wasted votes is divided by the total number of votes cast. This is the final efficiency gap statistic: It is the net percentage of votes cast in a state for a particular party that is wasted. This is a bit of an odd locution, but if a reader understands the calculation of net wasted votes in the previous

paragraphs, it readily makes sense. Put differently: Texas will tend to produce more wasted votes than New Hampshire, simply because more votes are cast there. Dividing by the total number of statewide votes allows New Hampshire and Texas to be more directly compared.

Returning to the hypothetical, there are a *net total* of 30,000 wasted Democratic votes in the first scenario, out of 300,000 cast, for an efficiency gap of 0.1 (or 10 percent of the total votes). In the second scenario, there are a total of 70,000 wasted Democratic votes, out of 300,000 cast, for an efficiency gap of 0.23. We can see, then, how intentionally wasting votes can lead to a high efficiency gap. The problem, however, is that gerrymandering is not the only thing that can waste votes. Trying to sort out how much of an efficiency gap is due to gerrymandering and how much is due to these other factors is a complex task.

The Efficiency Gap Test

McGhee's efficiency gap was not, in and of itself, a legal test. To transform the statistic into a test, plaintiffs contrived the following three-part test. (The specifics of the test vary from litigation to litigation, but the gist is the same.¹⁴) First, plaintiffs must prove that a map was drawn with partisan intent. Second, plaintiffs must prove that the map actually had the effect of depriving voters of their right to representation. Third, if plaintiffs do manage to prove the above, the burden shifts to the state to prove that there are neutral, nonpolitical justifications for the deprivation of rights.

The first prong will often be met easily in cases in which a party controls both houses of a state legislature and the governorship. How it fares in cases in which a map is drawn by a partisan redistricting commission or a court is another matter altogether. The plaintiffs in the Wisconsin litigation suggested at one point that the high efficiency gap seen under the court-drawn map for the 2000s may have been attributable to partisan leanings on that court, and Republicans famously litigated the Arizona map for the 2010s all the way to the Supreme Court—twice.

The second prong is more complex. It requires the Court to evaluate the efficiency gap in the first year of implementation. If the efficiency gap exceeds a certain threshold in the first election that a plan is in effect (0.07 for a legislature, 0.075 for a large state, and 0.12 for a small state), then the plan is presumed to have succeeded in wasting sufficient votes for a particular party as to warrant judicial scrutiny.¹⁵

The third prong is vague. It is unclear which tests would be sufficient for proving that outside factors (such as geography) account for the efficiency gap, and is it unclear what exactly needs to be accomplished by the test. Consider a situation in which a plan has an efficiency gap of 0.1 in the first year of implementation and a defendant demonstrates that natural factors would result in an efficiency gap of 0.05. Assume further that the threshold for litigation is set at 0.07. Does a state have to demonstrate that geography would account for 50 percent, 70 percent, or 100 percent of the observed distortion? Straight-faced arguments can be made for any of these positions, and it is

unclear whether there is any objective way to resolve them. Having examined the statistic and the test, we now turn to problems with the test.

The Cutoff Is Arbitrary. The first problem, discussed in more detail below, is that the cutoff involved in efficiency gap litigation is arbitrary. In the Wisconsin litigation, Simon Jackman, a well-respected political scientist from Stanford University at the time (today at the University of Sydney), suggested that maps should be subjected to judicial scrutiny when the absolute value of the efficiency gap for state assembly districts in the first enacted year rose above 0.07.¹⁶ This contrasts with the 0.08 threshold recommended by the authors of the efficiency gap for such cases.¹⁷

Moreover, it is unclear what *units* the efficiency gap should be measured in. In the North Carolina litigation, Jackman suggested that in a state with more than 15 congressional districts, scrutiny should begin with an efficiency gap of 0.075, while a state with fewer than 15 congressional districts should be subjected to scrutiny with an efficiency gap of 0.12.¹⁸ As explained below, Jackman suggested these thresholds because they coincided roughly with a gerrymander of one congressional district.

By contrast, in the original article setting forth the efficiency gap, Nicholas Stephanopoulos and McGhee argued for subjecting plans to scrutiny when they would deprive a party of two *seats* in Congress.¹⁹ This sort of shift from percentages to seats is arguably “necessary,” given that “the efficiency gap becomes lumpier when there are fewer seats, because each seat accounts for a larger proportion of the seat total, and the efficiency gap thus shifts more as each seat changes hands.”²⁰ This shift of one seat is consequential, as is the shift from seats to percentage points, since a measurement in seats would create something of a sliding scale from state to state.

In addition, states with fewer than *seven* congressional districts are, at least for now, beyond scrutiny; the efficiency gap would apply only to states with seven or more congressional districts. Even this cutoff is arbitrary, as Stephanopoulos and McGhee suggest an eight-seat threshold in their original article

(as did Jackman in the Wisconsin litigation).²¹ With a seven-seat threshold, of the 43 states that have more than one district, 19 states, consisting of 70 congressional districts, will have to have some additional test devised. Using an eight-seat cutoff, that number grows to 22 states, containing 81 congressional districts.

Beyond that is the question of the *form* of the efficiency gap. There are actually two different efficiency gap formulas. The formula used by Stephanopoulos and McGhee is a simplified version: “*Efficiency Gap* = *Seat Margin* – 0.5 – (2 x *Vote Margin* – 0.5).”²² This report will avoid getting into the details too much, since it turns out that this simplified formula has a mathematical error in the proof and holds true only when turnout in every district is equal. Regardless, this illustrates the dangers of applying “new” social science to Supreme Court jurisprudence because, once adopted, it can take a constitutional amendment to dislodge it.

The choices made above are not immaterial. In their law review article, Stephanopoulos and McGee identify only four states that would trigger court scrutiny under the 2012 plan: Florida, Ohio, Pennsylvania, and Virginia.²³ The metric suggested in the North Carolina litigation would subject over half the plans from that year to judicial scrutiny, most of which were drawn by Republicans. None of this is intended to suggest bad faith by the plaintiffs’ *experts*, who, again, are well-respected professionals. The problem goes to using the efficiency gap as a legal test, something I explore in greater detail further below.

The Imputation of Uncontested Races Is Difficult. The efficiency gap calculations above are reasonably straightforward, but they involve elections in which major party candidates are running in all the districts. In the real world, it is not at all uncommon for candidates to run unopposed, especially in uncompetitive districts. How do we handle these races? We *impute* the results of the election. Imputation is a well-worn statistical concept, and there are multiple approaches to conducting such imputations. Some of these approaches are simple: One could simply take the average result of the most recent competitive elections.

But the more reliable approaches are complex. In his expert report in the North Carolina litigation, Jackman uses Markov Chain Monte Carlo runs, including 25,000 burn-in iterations, followed by an additional 150,000 iterations, saving every 30th iteration.²⁴ This is clearly an accepted approach to imputation, but it is not often encountered in a typical statistics class, to say nothing of a political science class. It is also difficult to implement.

First, it takes, by my count, approximately 20 pages of computer code to implement. Second, Jackman, who wrote a leading textbook on Bayesian applications in social sciences, initially produced results with negative vote totals for some races. However, he was able to fix these, and it appears that they only minorly affected his results. But what would have happened had he not faced a hostile expert witness combing through his results? More importantly, if a leading expert in the field can make mistakes here that could have easily gone undetected, how are we to expect run-of-the-mill map drawers to draw acceptable maps? Third, by undertaking these imputations—which will comprise a substantial number of races evaluated—we find ourselves in the same universe of counterfactual claims against which Justice Kennedy warned in *LULAC*.

Finally, different imputation strategies can result in radically different outcomes. In the litigation that took place in Ohio, Chris Warshaw, a political scientist with a background in statistical methodology, used a different imputation technique than Jackman used. The differences were at times substantial. For example, in Alabama in 1984, Jackman had calculated an efficiency gap of approximately 0.11. Warshaw, by contrast, calculated an efficiency gap of 0.0153. That difference—which is a difference between almost no efficiency gap and an efficiency gap that is almost actionable—is almost entirely due to the different imputation techniques used. The upshot of this is that at some point, the outcome of a case is likely to rest on a court adjudicating between different statistical imputation techniques.

The Efficiency Gap Is Unstable. One of the core portions of the plaintiffs’ typical case is that the efficiency gap thresholds that they select are high

enough that, if a plan crosses that threshold in the first year of implementation, the plan will likely always waste votes for the other side. Again, the specific tests vary from case to case and article to article, but the idea of a *stable* efficiency gap is at the core of their theory.

This flies somewhat in the face of McGhee's initial finding that efficiency gaps are *not* stable and, indeed, that the power of maps drawn with partisan intent tends to decrease over time. The most recent cycle also challenges these assumptions, as maps drawn in New Jersey and Virginia, which had substantial pro-Republican efficiency gaps in their first years of implementation, showed substantial pro-Democratic efficiency gaps in 2018.

Setting that aside, however, it is unclear that the efficiency gap thresholds selected by plaintiffs accomplish their goals. Using calculations from Jackman's report²⁵ and a data set of efficiency gap results extending back to 1972, we can look at various metrics for evaluating the stability of the statistics. Using Jackman's estimates, an efficiency gap threshold of 0.075 (the threshold for large states) would result in about half the maps in the data set being subjected to scrutiny. Even at 0.12 (the threshold for smaller states), around a quarter of maps are flagged.

Suppose, though, that we want to know whether we have unfairly struck down maps. In other words, we want to know the probability that a map subject to scrutiny will always have a consistent sign (the probability that the map will always favor one party or the other). On this metric, the efficiency gap scores well. At thresholds of 0.075 and 0.12, about 90 percent of the maps subjected to scrutiny will consistently favor one party or the other.

On other metrics, however, the efficiency gap performs much worse. Suppose we are interested in knowing what percentage of the maps that consistently favor one party or the other will be subjected to judicial scrutiny. At a threshold of 0.075, about 60 percent of maps will be flagged, and at a threshold of 0.12, only a quarter of such maps will be flagged. Or suppose we want to know the percentage of maps that are not subjected to judicial scrutiny that, in fact, waste votes for one party or the other over

the lifetime of the plan. That rate is a bit more than 60 percent under both the 0.075 and 0.12 threshold.

I can go on, but the bottom line is that the efficiency gap test flags a large number of plans but frequently does so incorrectly, and vice versa. Overall, the accuracy of the test is a little bit more than a coin flip. It classifies accurately in about 60 percent of cases at a threshold of 0.07 and in a little less than 50 percent of cases at a threshold of 0.12. Courts can decide for themselves what is the most important. Indeed, they might decide that the most important factor is that there are relatively few false positives. But they should go in with open eyes, knowing that a large number of maps that end up consistently wasting votes for one party or the other will not be flagged under an efficiency gap test, in addition to the states that will never be subjected to scrutiny because they have too few districts.

The efficiency gap test flags a large number of plans but frequently does so incorrectly.

The problem here is a disjunction between the efficiency gap in theory and the efficiency gap in practice. In theory, mapmakers manipulate votes. In practice, mapmakers only have decent guesses as to how those votes will actually fall. Incumbents die or fall prey to scandals, strong challengers emerge, and wave elections swamp safe districts. These will tend to produce irregular efficiency gaps over time.

To see this more clearly, most people agree that Sen. Joe Manchin (D-WV) is in an unusually strong position for a Democrat in West Virginia, and if he were to retire, Republicans would have an excellent shot at his seat. At a congressional district level, this means that a mapmaker who assumes that a congressional version of Sen. Manchin continues to run—think Rep. Mike McIntyre (D-NC)—may believe that

his district will tend to waste a lot of Republican votes. If he retires, however, large numbers of Democratic votes will be wasted. These types of contingencies are difficult for a mapmaker to game out.

The Efficiency Gap Fails to Account for Clustering. Supreme Court justices have observed that the clustering of Democrats tends to result in natural gerrymanders.²⁶ That is, since cities tend to be overwhelmingly Democratic, while the rural and suburban areas of states are not as overwhelmingly Republican, geographically compact districts that keep communities of interest together will tend to produce districts that naturally waste Democratic votes. Thus, without politically motivated districts, the expectation over time is for a Republican bias in most plans.

This raises interesting normative questions about what, exactly, a gerrymander is. Is it a map drawn without respect to partisanship? If so, we should expect to see Republican biases in maps. Or is a gerrymander a map that takes partisanship into account, but only to correct naturally existing partisan bias to produce maps that do not waste votes?

These questions have no easy answers, and no answer may exist. Indeed, the efficiency gap litigation purports to give a nod to the idea that natural bias exists in maps, by allowing a state to demonstrate that a large efficiency gap is due to factors such as natural clustering. At the same time, the plaintiffs' analyses, such as the sensitivity analysis from the previous section, assume there is a zero baseline for most states.

Moreover, it is unclear exactly what we are to do with this. Are states required to explain away all of an efficiency gap, or are they only required to explain away efficiency gaps beyond whatever a state's partisan baseline might be? Perhaps they should be allowed efficiency gaps up to 0.075 or 0.12, but with the efficiency gaps somehow adjusted to take account of the state's baseline. Again, one can make a case for any of these, but the answer given will largely be subjective. Yet these are exactly the sorts of calls courts will have to make, sooner or later.

But perhaps most importantly, the advocates of the efficiency gap quietly take a hard stance on

what a gerrymander looks like by relegating this to a defense. To see this, consider a case such as Illinois (discussed in more detail below).²⁷ You would be hard-pressed to find someone who believed that the map did not represent an attempt by Democrats to draw as many districts in their favor as reasonably possible. Due to the natural clustering of Democratic partisans in Chicago, and the need to draw four majority-minority districts in Cook County, the state tends to produce Republican-leaning maps naturally.²⁸ Indeed, the Illinois gerrymander at times has had a Republican-leaning efficiency gap.

If you believe that a fair map is one drawn with minimal respect to politics, then this is a gerrymander. Yet, there is no way to challenge the map, because geography only comes into play as a defense. The efficiency gap will be small, or even pointing in the wrong direction, making it impossible to challenge this map. It bears repeating: Perhaps you think that such maps are not, in fact, gerrymanders. It is a defensible stance. But this is a normative conclusion being snuck into the legal test under the guise of objective social science.

Many Efficiency Gap Gerrymanders Are Not Gerrymanders. The sensitivity analysis outlined above checks whether efficiency gap scores are consistent: whether maps that favor a party by a certain amount in the first year tend to favor that same party over the lifetime of the plan. What it does not do is check whether the results are sensible. The definition of a "sensible" efficiency gap score is necessarily subjective, yet these sorts of construct checks are not foreign to political science.

A model that suggested that a Democratic presidential candidate was likely to win Wyoming by a substantial amount while losing California in a close national election would probably be looked at askance, and rightly so. Similarly, measures of ideology, such as DW-NOMINATE, are respected in part because they provide reasonable outcomes; it does not place Bernie Sanders as, say, the third-most conservative senator or Sen. Mike Lee (R-UT) as the second-most liberal. But the efficiency gap does produce results of this kind. While we cannot undertake

an exhaustive evaluation here, we can look at a few of the “greatest hits.”

Take Alabama in the 1990s. Democrats held a 27–8 advantage in the state senate and an 81–23 lead in the House, and they controlled the governorship.²⁹ Yet the plan presents with a Republican efficiency gap in 1992, 1996, and 1998. In 1994, it presented as a Democratic gerrymander. This example highlights two things. First, the efficiency gap statistic sometimes produces absurd results due to the vagaries of elections. Second, whether maps can be challenged in court will often depend on the vagaries of the first year of implementation.

If 1992 had been a better Republican year, on the order of 1994, safe Democratic incumbents such as Rep. Glen Browder (D-AL) and Rep. Bud Cramer (D-AL) probably would have faced more competitive elections, and more Republican votes would have been wasted without those incumbents being truly threatened. (Indeed, this is exactly what the map was intended to do.) But simply because 1992 was a reasonably good Democratic year, Republicans would have been unable to challenge this gerrymander. To further illustrate some of the problems with the efficiency gap, imagine that a Republican legislature had drawn the exact same map. The outcomes over time would have been the same, but Democrats would have been able to challenge the map as a Republican gerrymander, even though they would have been willing to draw this map. (We know this because they did.)

Or consider the California maps from the 1980s. The original “Burtonmander”—a map that was so favorable to Democrats that voters struck it down in a referendum—does present with an actionable efficiency gap,³⁰ but just barely. It has an efficiency gap of 0.0796. More importantly, the successor map, which Justices Stevens and Kennedy and Chief Justice Rehnquist would have taken up in *Badham v. Eu*, is not actionable and presents as a Republican-leaning map in some years.³¹

Georgia’s redistricting in 2002 gives a nice example of how gerrymanders can fall apart in the first year of implementation. Democrats in Georgia controlled the state legislature with substantial majorities and the governorship. They produced a map

intended to produce an 8–5 Democratic majority that was described as “arguably the most convoluted [map] in the nation.”³² A district on the south side of Atlanta looked something like a poodle prancing across the state. The 11th district stretched down from the foothills of the Appalachian Mountains to Columbus, Georgia, with an arm extending almost to Atlanta. Salients from the 8th and 1st districts bifurcated what can only be called two “lobes” of the 3rd district, which were held together by a portion of Bibb County.³³

The map has a Democratic-leaning efficiency gap but is not actionable. This is a result of a few tight races breaking the “wrong” way. Democrats intended on winning the 11th and 12th districts, and had they done so, the efficiency gap would have been around 0.16, more than enough to allow Republicans to challenge the plan. These districts were decided by fewer than 10,000 votes combined.³⁴ If 2002 had not been a good Republican year, and if Democrats had not nominated the son of the Senate majority leader for one district—who was arrested four times and involved with multiple failed business ventures—it probably would have been actionable.

At the same time, when Republicans drew a map in *their* favor in 2006, narrow Democratic wins in two districts, Georgia’s 8th and 12th districts—this time by a combined 1,308 votes—shielded the map from scrutiny.³⁵ Had those Democrats retired, had a handful of voters changed their minds, or had 2006 been a better Republican year, this map would probably be actionable. Again, events in the first year of implementation that were outside the control of mapmakers’ theoretical expectations save an otherwise-objectionable map.

Additionally, consider Illinois. In 2002, Republicans and Democrats in the legislature and governorship came together to produce a bipartisan map.³⁶ Because of the state’s natural packing, this map produced an actionable Republican lean in every year of implementation, including in 2008, by which point Democrats held 12 of 19 seats.³⁷ Obviously, this would not really be actionable, as it would likely fail the first prong of the plaintiffs’ test. But it does go to what the efficiency gap statistic itself actually measures. If it is

really just measuring gerrymandering, we would not expect to see results like this. These sorts of results illustrate how the efficiency gap takes in more than simple gerrymandering (although gerrymandering is part of the story).

Then look at Illinois in 2012. As mentioned above, Democrats aggressively redrew the map to favor their party, with districts stretching from the city of Chicago into the suburbs.³⁸ Yet this map actually has a Republican lean over the lifetime of the plan. As noted above, this is significant because, under the test devised by plaintiffs, Republicans would not be able to challenge this map. Perhaps this is a good result, but that conclusion is necessarily based on complex normative assumptions.

Washington State has something like a model redistricting system, in which a nonpartisan commission draws maps. Yet, according to calculations provided by Jackman in litigation, in 1978, it produced the largest pro-Democratic efficiency gap in the history of the data set and the eighth, 17th, and 19th largest gaps. This is the result of a number of close races breaking the Democrats' way. In the 1990s, the initial map produced the fourth-largest pro-Democratic gap in history: 0.2355. The next year, by contrast, produced an efficiency gap of a similar magnitude, but in the other direction; the -0.25887 efficiency gap in the Republican direction is the largest gap in history.³⁹

Again, that this was drawn by commission would insulate this map from litigation. But what does this tell us about the statistic itself? We might expect large efficiency gaps to result occasionally from neutral processes, but do we expect the largest efficiency gaps in history to do so? This seems a bit extreme, unless the efficiency gap measures quite a bit more than gerrymandering. We might also question legitimately why it *matters* that the mapmakers did not intend to waste votes; if someone has their votes wasted, perhaps the cause is arguably irrelevant.

Finally, consider North Carolina in 1992.⁴⁰ This map would seem to be a model of a partisan gerrymandering, with portions of both the 10th and 3rd districts only connected by an infinitesimally small point at times. But in 1994, this map had a Republican lean, a few votes shy of an actionable gerrymander.⁴¹

Whatever this map is, it is not a Republican gerrymander. Yet if a Republican legislature had drawn the exact same map, it would be actionable. Once again, we see the substantial influence national conditions, incumbency, and poor choices by mapmakers can have on efficiency gaps.

Again, this list is not exhaustive; about one in six maps have similar readily identifiable problems. The same issue crops up in state legislative maps; only seven of the 17 maps identified as having “unambiguous efficiency gaps” in the *Gill v. Whitford* case were drawn with unified control of the state legislature and governorship.⁴² It does illustrate, however, that the efficiency gap statistic takes in a lot more than partisan gerrymandering. This contributes to the instability in the statistic described above.

The Efficiency Gap Discourages Competitive Districts.

One of the most common complaints about gerrymandering is that it allows members of Congress to choose their constituents, entrenching themselves in Washington. The efficiency gap is largely indifferent to this issue and could even encourage it. Look back at the examples from Washington State. Those large efficiency gaps appeared because the mapmakers attempted to draw competitive districts. So the districts all tended to flip in years in which one party or the other performed well (hence the large pro-Democratic efficiency gap in 1992 and the large pro-Republican efficiency gap in 1994).

For a partisan map drawer, this is a source of uncertainty: Guess wrong about the outcome in a few districts and your modest gerrymander can become extreme. So, the safe thing to do is to draw a modest gerrymander in your favor, with extreme districts. That is, in North Carolina you would draw a map that was 7–6 or 8–5 in your party's favor, but that will *always* elect a delegation in your party's favor. This is made easier because the efficiency gap is indifferent to district shape; you can draw a map that extends from the Washington, DC, suburbs to Wytheville, Virginia, so long as it does not waste Democratic votes. Then, unless a wave election goes the opposite way in the first year of implementation, your map will likely

be safe. This is especially problematic in state legislative maps, in which a one-seat majority can mean utter control of the agenda and the chamber.

There are reasons to like this, although I suspect they are not widely shared by everyday Americans. Indeed, some political scientists have expressly argued against competitive districts. But it is a significant normative decision to put a thumb on the scales against competitive districts and one that should be read into the Constitution with some care.

The Efficiency Gap Is Proportional Representation by Other Means. America's elections are "first past the post" systems, in which the candidate who gets the most votes, regardless of whether he or she obtains an actual majority of votes, becomes the candidate for a district. This stands in contrast to systems of proportional representation, in which people vote for parties and the parties then send delegates to the legislature.

There are pros and cons to both systems of government, and your views as to which system of government is preferable will have a lot to do with your views about the relative importance of parties versus voting for the individual. But the efficiency gap is not neutral here. Instead, it privileges—albeit not exclusively—partisan proportionality above other considerations such as compactness and communities of interest. What I mean is this: A state can use these considerations to defend against partisan disproportionality, but it can also choose to ignore them without any good reason. It cannot choose to ignore partisan disproportionality without a good reason.

As it stands, the efficiency gap demands that states adhere to roughly a 2:1 ratio between seats won and vote share, unless a good reason is given. This is not the direct 1:1 ratio one finds in parliamentary democracies, but it is nevertheless a proportional target to which states must roughly conform. There are reasons why we might wish to privilege partisan proportionality, but there are also many theories of representation that do not involve partisanship. A court should not decide on a theory of representation without realizing it is doing so, yet this is what the efficiency gap invites.

The Efficiency Gap Does Not Solve the Fundamental Problem of Redistricting Litigation.

Finally, and perhaps most importantly, the efficiency gap does not solve the fundamental dilemma that has bedeviled the courts since the initial days of anti-gerrymandering litigation: How much gerrymandering is too much? As Justice Kennedy put it in his opinion in *LULAC v. Perry*, when discussing partisan symmetry as a measure of gerrymandering, "More fundamentally, the counterfactual plaintiff would face the same problem as the present, actual appellants: providing a standard for deciding how much partisan dominance is too much."

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The problem has *never* been that political scientists lack statistics that shed light on gerrymandering. Numbers such as Reock tests and Polsby-Popper scores have long been used to calculate the amount of distortion in a district. Partisan asymmetry—the metric proposed by amici in *LULAC*—likewise provides a stable, replicable statistic that measures at least some aspect of gerrymandering. Other metrics in use today, such as mean-median and declination, likewise provide a statistic that is replicable.

The problem with all these tests is that, rather than giving a clear definition of how much gerrymandering is too much, they simply push the inquiry back a step. An efficiency gap of 0.07 is too much gerrymandering for a large state not because an efficiency gap of 0.07 has some intrinsic meaning, but rather because it roughly correlates with a loss of a seat. But if, as the

Supreme Court has repeatedly stated, some degree of gerrymandering is inevitable in a redistricting decision, then why should one seat's worth of gerrymandering be considered too much? Why not two seats? Or 1.5? Or six?

The plaintiffs' typical response here is to claim that courts should follow the lead of the original malapportionment decisions. There, the Court evaluated plans on a case-by-case basis for some time before deciding that no malapportionment could be allowed for federal House races but that you could typically have population deviate up to 10 points for state legislative maps, and perhaps higher if some good reason for the deviation exists.

The efficiency gap litigation illustrates the deepest divide between what courts do and what social scientists do.

But there are two problems. First, this is precisely the type of ad hoc decision-making the Court has tried to avoid with these cases. Again, there have existed for decades tools for courts to use to give *some* statistical gloss to gerrymandering decisions. The problem has been drawing the line. If this was how the Court wanted to approach gerrymandering, it simply could have declared the Pennsylvania lines unconstitutional in 2002 (or the Indiana lines unconstitutional in 1986) and seen how things developed.

Second, the situations are distinguishable. It is always possible to draw district lines with minimally variant populations. If a state has 100,000 people and five districts, you can draw five districts with 20,000 residents. If a state has 100,000 people and six districts, you can draw four districts with 16,667 residents and two districts with 16,666 residents. In other words, there is a plain ideal, and any

deviations are definite and predictable: That district with 16,667 residents has 16,667 residents—full stop (leaving out the effective margin of error in the census).

Trying to develop a test for gerrymandering is different. The Court has admitted that some degree of partisan bias from legislatively drawn maps is both expected and even acceptable. Indeed, legitimate, at least facially, nonpartisan concerns such as protection of incumbents and attention to geographic issues can give rise to skewed maps because of natural processes. Moreover, given the natural variability in election outcomes, it is unclear that a clear baseline exists, to say nothing of the deviation from that baseline that we might accept.

With Justice Kennedy off the bench, it is unclear whether this will continue to be the Court's standard; it seems more likely that the Court will simply declare partisan gerrymandering claims nonjusticiable. At the same time, the efficiency gap, and related issues, are not going away, as they will likely be brought up in state litigation in the future. But the efficiency gap is just a nice statistic, not an answer to the overriding normative question. More importantly, it does not get us much closer to answering that question.

Is There Any Room for Gerrymandering Litigation?

As an extreme situation, Justice Kennedy's hypothetical oral argument during the *Whitford* case drives home a salient point: What if a legislature simply assigned its districts to Republicans? Would that be actionable? Or what if a state engaged in truly extreme gerrymandering, such as extending districts from New York City or Chicago to rural areas, to guarantee Democrats (or Republicans in analogous states) total control of the state's congressional delegation, without any respect to traditional redistricting principles?

It seems that these outcomes are not something we as a people would want, and it seems absurd to suggest that the Constitution would tolerate such outcomes. There are four potential responses. The first response brings to mind a favorite admonition from an old law

professor of mine: “If your argument boils down to ‘it cannot be,’ then it probably is.” Under this view, the desire to avoid the extreme hypotheticals above is simply outcome-based reasoning, which must necessarily be subverted to the more important question of whether the Constitution prohibits such an action. This is tough medicine, and few have the stomach for it. Moreover, if you take the idea that the Constitution guarantees some sort of right to vote seriously, it is hard to square that view with an “anything goes” view of gerrymandering.

But what if that were the case? That does not really end the inquiry. State constitutions typically place limitations on the legislature’s ability to draw gerrymandered maps, even if those limits have been subverted over time (in part, if we are being honest with ourselves, by the strict one-person, one-vote requirement). As noted repeatedly, a decision by the Supreme Court to opt out of policing gerrymandering would simply push the question to the states, where courts have been increasingly eager to place some sort of limitation on the practice and where citizens increasingly interpose nonpartisan redistricting commissions between the state legislature and the drawing of electoral district lines.

Additionally, Congress could pursue some remedies. Congress retains the power, if it so desires, to draw congressional lines for itself. While it would probably be a bad idea to set a precedent of federal legislators drawing partisan lines for their benefit, in an extreme case in which a state dedicated all its votes to one’s party, it could be justified in acting. Indeed, at least in the former case, it is arguably required to do so given its Article IV duty to maintain a Republican form of government, although the Supreme Court would likely be reluctant to command it to do so.

But perhaps there is a fourth option, one that would recognize the genuine danger posed by these extreme results yet would also recognize the difficulty involved in policing gerrymandering at a granular level: Perhaps maps should be evaluated under rational review. Under this lenient standard, courts simply ask whether there is some legitimate government interest that is served by the governmental action in question.

What would this look like for gerrymandering litigation? It would actually bring the question back to how Justices Powell and Stevens approached it in their *Davis* dissent and even how Justice Breyer would have endeavored to approach the question in *Vieth v. Jubelirer*: looking to see what justifications could be offered for a district. However, both opinions sought to fashion approaches that allowed courts to separate the wheat from the chaff and, in so doing, foundered on the shoals of a manageable standard.

Instead, rational review would start with a strong presumption that what we are looking at is wheat and then would look for any justification buttressing such a presumption. Such justifications could be simple, such as a desire for compactness. They could be complex, such as “communities of interest,” which at times could result in defending serpentine districts, such as the 3rd Congressional District of Maryland (which keeps together white working-class enclaves in the state).⁴³

Would this strike down many districts that have been drawn? Perhaps some of the North Carolina districts from the 1992 or original 2012 redistricting would have run afoul of such a test, and perhaps some of the Pennsylvania districts from 2012 would have been in trouble. But few districts would ultimately be struck down. However, this is a feature, not a bug. Parsing improper motive from legitimate motive is difficult, and it is arguably something that should be done infrequently.

However, this would mitigate concerns about the outer limits of partisan advantage coming to pass. A state that sought to apportion all its seats to Republicans would not be able to point to nonpartisan reasons for doing so. Likewise, a state that is willing to stretch New York City districts into upstate New York, and subvert all consideration to partisan ones, would find itself stymied.

Conclusion

Judges have always had a wary relationship with social science. It sits at the heart of many legal questions. Yet, as the social sciences have become more

advanced and employed more intricate statistical techniques, they have increasingly resembled, in Chief Justice Roberts' memorable (and unfortunate) turn of phrase, "sociological gobbledygook."⁴⁴

Like most individuals trained in statistics and political science, I cringed at the comment. But what this report hopefully underscores is that this was not the only cringeworthy comment at oral argument. Later on, Justice Elena Kagan remarked, "What—what I'm suggesting is that this is not kind of hypothetical, airy-fairy, we guess, and then we guess again. I mean, this is pretty scientific by this point."⁴⁵

In truth, the efficiency gap is anything but. The implementation of this test forces the Court to make numerous normative judgments, outlined above, even if such judgments are not spelled out explicitly. Moreover, the task of answering the question of how much gerrymandering is too much is not advanced at all by this litigation; it is merely glossed over with a numeric patina accentuated by slick charts. (It is with a tip of the cap to Jackman that I report that one of his charts crashed the Ohio State University political science department's printer.)

Indeed, the efficiency gap litigation illustrates the deepest divide between what courts do and what social scientists do. The constant retort to the problems observed above with the efficiency gap is that a regression analysis demonstrates that Republican-drawn maps have more heavily Republican efficiency gaps than do Democratic maps. I have minimal quibbles with this and admit that the efficiency gap has *something* to do with gerrymandering.

The problem is that regression analysis measures, as the name suggests, regression to mean—or, in other words, what expectations of a relationship between two variables should be on average. These relationships are teased out over time, and if the weight of social science begins to turn against a finding, it can be updated relatively easily. Courts, by contrast, proceed on a case-by-case basis and are slow to change. It will not be easy to undo the efficiency gap if it turns out to work poorly, and in the meantime, courts will have to explain to Republican voters in Illinois or North Carolina why they cannot challenge what appear to be reasonably plain gerrymanders (or Democrats in the right circumstances, such as in Georgia in 2006).

Perhaps courts will be willing to put their credibility on the line and make such calls. Perhaps they are eager to make the normative distinctions the efficiency gap demands. But if so, they should do so with wide eyes and not with the illusion that what they are engaging in is a purely scientific undertaking.

About the Author

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Notes

1. Brennan Center for Justice, “Gill v. Whitford,” May 17, 2019, <https://www.brennancenter.org/legal-work/whitford-v-gill>.
2. In the interests of full disclosure, I was a paid expert witness for the state in both the Wisconsin and North Carolina efficiency gap litigation, and this report draws from the expert report I filed in the latter case. I think the Court should find a limited, usable test at some point in the future, and I suggest a potential one in this report. But to paraphrase then-Solicitor General Elena Kagan in 2009: If you ask me whether I have a position as to the way these states lose, if they have to lose, the answer is very much yes. I think adopting the efficiency gap is genuinely problematic and that we should hope future courts pass on the opportunity to employ it.
3. *Colegrove v. Green*, 328 US 549, 556 (1946).
4. *Baker v. Carr*, 369 US 186 (1962).
5. *Gray v. Sanders*, 372 US 368 (1963).
6. *Reynolds v. Sims*, 377 US 533 (1964); and *Wesberry v. Sanders*, 376 US 1 (1964).
7. *Gaffney v. Cummings*, 412 US 735 (1973).
8. *Davis v. Bandemer*, 478 US 109 (1986).
9. *Badham v. March Fong Eu*, 568 F. Supp. 156 (N.D. Cal. 1983).
10. *Vieth v. Jubelirer*, 541 US 290 (2004).
11. *League of United Latin American Citizens v. Perry*, 548 US 399 (2006).
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22. Eric McGhee, “Measuring Efficiency in Redistricting,” *Election Law Journal* (December 2017).
23. Stephanopoulos and McGhee, “Partisan Gerrymandering,” 837.
24. Jackman, “Assessing the Current North Carolina Congressional Districting Plan,” 46.
25. Jackman, “Assessing the Current North Carolina Congressional Districting Plan,” 46.
26. *Vieth v. Jubelirer*, 541 US 290 (2004).
27. Christopher Ingraham, “America’s Most Gerrymandered Congressional Districts,” *Washington Post*, May 15, 2014, <https://www.washingtonpost.com/news/wonk/wp/2014/05/15/americas-most-gerrymandered-congressional-districts/>.
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