**Assessing Proportionality as a Redistricting Standard**

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Abstract

The Supreme Court recently passed on applying a symmetry standard to cure the problem that partisan gerrymandering poses to representative government in America. In this paper, I argue that while symmetry is a good metric, we need a standard that is easier to understand and implement, and I conclude that proportionality is that standard. I create and evaluate a measure of partisan balance in all 50 states and assess the degree to which the state deviate from proportionality in the last decade. I consider ways in which those drawing maps might try to get around a proportionality requirement, and discuss how federal courts are very unlikely to implement such a standard which means such a standard will likely have to be pushed through legislative avenues rather than judicial.

**Introduction**

Redistricting has long been a contentious issue, though over the course of the last decade or so its public prominence clearly has increased. This can largely be attributed to increased attention paid to partisan gerrymandering. Moreover, redistricting related litigation this cycle has lasted for the entire decade with the Supreme Court hearing a case from Texas in April of 2018 and a series of partisan gerrymandering decisions released at the very end of the 2018 term (*Gill v. Whitford*, *Benisek v. Lamone*, and *Harris v. Cooper*).

 Since the Supreme Court again passed on the opportunity to bless symmetry as a manageable standard for partisan gerrymandering, it is time to consider other standards, and, at the same time, admit that reformers best hopes for instituting redistricting reform may not through federal courts.

 In this paper I articulate a redistricting fairness standard based on proportionality, arguing this is the easiest standard to understand and implement. The quest for a manageable standard has been at the heart of the judiciary’s problem of dealing with gerrymandering. Since the single member district system usually leads to non-proportional outcomes it is difficult, though not impossible, for a judge to figure out when the map-makers have gone too far with extracting a partisan advantage from a set of district boundaries.

**Background**

 Partisan gerrymandering is using the redistricting process to extract an advantage for one party, at the expense of the other party. Gerrymandering is not a modern phenomenon and it goes back further than the most famous oddly shaped district in Massachusetts approved by Governor Elbridge Gerry. Patrick Henry use artful districts to try to deprive his political rival, James Madison out of a congressional seat in 1789, though he failed[[1]](#footnote-1) (Hunter 2011). Griffith (1907) documents instances of gerrymandering back to the colonial period – in Pennsylvania assembly in the early 1700’s (pg 26-27) and the governor of North Carolina drew some districts with far fewer people in them than others to secure more seats in the lower colonial house for his party (page 28). This strategy would be exploited until the 1960’s and the series of court cases that we now refer to the “one person one vote” revolution (*Baker v. Carr* and its progeny).

Fast-forward 2010 and while the malapportionment problems for redistricting have largely been solved by the court system, partisan gerrymandering has not. In 1986 the Supreme Court ruled that partisan gerrymandering was a violation of the equal protection clause in the Constitution (*Davis v. Bandemer* 478 U.S. 109), but they failed to articulate standards that would allow other courts to identify when a map had gone too far. *Bandemer* was vacated in 2004 by *Vieth v. Jubelirer* 541 U.S. 267 and since that time the issue has been in legal limbo – not strictly legal, but at the same time not illegal (McGann et al 2015 and 2016). David Daley (2016) documents the Republican REDMAP program prior to the 2010 elections that concentrated the party’s efforts in electing more Republican governors and state legislators to increase the number of states in which the Republicans would have control of the redistricting process. The GOP’s efforts paid off handsomely in 2010 and this set the stage for increasing the number of Republican seats in Congress and in state legislatures around the country. This set the stage for the last litigation-filled decade and a renewed interest in measuring and putting a halt to partisan gerrymandering.

A gerrymandered map is nearly always challenged in court, and the Democrats sued in many different states alleging both racial and partisan gerrymandering. One such case was a Democratic challenge to Wisconsin’s electoral districts and the plaintiff convinced 2 federal judges on a 3-judge panel that there sufficient evidence that the Republicans used the redistricting process to unfairly entrench themselves in power to a degree unwarranted by the proportion of votes that they received (*Whitford v. Gill*, W.D. Wis. Nov. 21, 2016).

**Proportionality**

While some of the methods detailed above can certainly help alleviate the problem of biased electoral maps in the U.S., my preferred method is to require proportionality – the congressional delegation and state legislatures in each state should closely adhere to the underlying partisanship of that state. The share of seats should be proportional to the share of the votes. Many electoral systems assign seats in direct relation to each party’s share of the votes. I find this to be the natural choice for the seats-votes relationship, in large part because we can easily judge fairness. This is the fundamental reason we find ourselves in the current legal quagmire – because the SMD system does not usually yield proportional outcomes (it is non-linear), which means it is hard for us to say what share of the seats a party should get with a 62 percent share of the vote. The best we can do is insist on symmetry – where both parties are “treated equally” under a map – so if one party actually gets 60 percent of the seats with 52 percent of the vote, the other party, hypothetically, should also be able to get 52 percent of the seats with they win 60 percent of the statewide vote using the same map. Why did the four liberal justices in the *Vieth* case each come up with their own new standard, and why did Justice Kennedy not like any standard that was proposed? Because it’s tricky – the answer to the question of “what is the best standard” is not obvious.

 Proportionality provides a quick and easy standard that anyone can understand and it makes sense. We don’t have to explain how and why that the single member district system doesn’t yield proportional outcomes at all. Does this mean I propose we switch to a party list system like they use in Argentina or Poland or Spain? No. While I would support such a move, it would require a major overhaul of our entire electoral system and may even require amending the Constitution, which is notoriously difficult to do. While the SMD system does usually lead to outcomes in which the majority party gets a greater share of the seats than their share of the votes, this doesn’t have to be the case. Our SMD electoral system can be made to yield proportional outcomes almost all the time.

So how would it work? One “real life” example of a redistricting provision to ensure purposefully drawing fair districts comes from a recent initiative in Ohio. This was a ballot initiative from a group called Voters First. It appeared on the ballot in November 2012 as Initiative 2 and lost 63% to 37%. Here is the language as it appeared on the ballot:

**“Representational fairness**: Balances the number of districts leaning toward each party so that the number of districts leaning toward each party closely corresponds to the preferences of the voters of Ohio, as determined using actual election results from recent representative statewide elections.”

My reading of the language indicates that they would use several recent statewide elections to try to discern a breakdown of the Ohio state electorate between the two parties. Then the redistricting authority, whomever that would be, would have to, as one of the first principles, try to draw districts in such a way that the political data indicates a breakdown of the seats that matches the partisan breakdown of the recent elections. So perhaps using the last two presidential, gubernatorial, and senatorial elections the average vote for the Republican was 53% and the Democrats average 47%. Thus in order to maintain representational fairness the new map for the congressional delegation and the state legislature should have a similar breakdown.

**Choosing which elections to use**

 The biggest problem with a proportional method is in deciding which elections to use as the basis to determine the vote share, which also determines the seat share for both parties. The parties will differ on which elections to use both before the map is drawn to measure the statewide breakdown, and then also after the map is drawn to determine the likely partisanship of each of the districts. In the former each party will want to include elections that maximize their political potency, and in the latter they will want to include elections that reduce their implied electoral power. So both parties will have to agree on which elections to include in both of these measures and one way to limit the amount of political or legal maneuvering is to insist that whichever elections are used to measure statewide strength are also use to measure the political leanings of the districts after the lines are drafted.

 It is possible that both sides can agree on a set of elections in advance – perhaps it would be using the average of the two-party vote for presidential, gubernatorial, and senatorial elections in the decade prior to redistricting. I think these are the obvious choices to serve as the basis for determining the partisan shares. All of the elections are high profile, should include high-quality candidates, and those candidates are usually well funded. Thus, while there will be some variance from year to year and election to election, the average of these elections is a perfectly reasonable measure of the partisanship of the state. However, there are, from time to time, uncontested elections in the Senate. In 2014, Jeff Sessions in Alabama had to primary or general election opponent on the ballot.[[2]](#footnote-2) What do we with uncontested elections? Do we allocate 100 percent of the vote to the party that won? That clearly isn’t fair to the Democrats. Should we not include this election at all in calculating the partisanship of the state? That’s not fair for the Republicans. If any Democrat had run, he or she would have attracted tens of thousands of votes since there are indeed Democrats in Alabama. At the same time, the fact that a statewide election went uncontested is a signal that the Republican Party and Senator Sessions are both very popular in Alabama. I think a reasonable decision rule would be to assign 75% of the vote to the winning side if such an election goes uncontested.

 Thus, both major parties are incentivized to never let a major statewide election, like Governor or Senator, go uncontested (it is hard to imagine having an uncontested presidential election). Moreover, even in the face of overwhelming odds of actually winning, like a Democrat facing Senator Sessions in the example above, the Democratic Party can benefit themselves by running a high quality candidate since there is more at stake than just this seat in the Senate. Absent a meaningful candidate, not only do the Democrats continue to lose this seat, they also have one election in which they are only allocated 25 percent of the vote. Single member district systems have many problems, one of the most important is that many votes get “wasted” – all of the votes for the losing candidate are wasted for instance. However, by adding this second layer of important to statewide elections, we revitalize the importance of all of these losing votes. Every single vote will count and every single vote will matter in the sense that they higher average percentage their party’s candidates get, the higher the baseline for their party when it comes time to redistrict.

**Why Not Use Congressional or Legislative Elections?**

Since we are using these data to redraw congressional and state legislative electoral boundaries, why not use the previous ten years of data from these elections? The biggest problem with results from these elections is the substantial variance on candidate quality and the relatively high number of uncontested elections. Again, the goal here is to agree on a measure of how Democratic and how Republican any particular state is. The proposed solution is certainly not the only method, though I think it is the best. Could a state use party registration? Sure, as long as both parties think registration reflects the strength of their party statewide. First, some states, like Texas, do not ask you to register with a party, and while most states do have voters register with a party, many voters choose to register as an independent or undeclared. Indeed in states with open primary elections, registering as an independent has a distinct advantage – they voter can choose which primary election to participate, while registered partisans can only vote in their party’s primary. So for example, in 2014 in Alaska, there were 68,630 registered Democrats, 132,125 Republicans, 178,521 undeclared registrants, and 82,168 voters registered as “Non-partisan.”[[3]](#footnote-3)

**Minor Parties**

 A related problem is what to do with an election in which a third party candidate receives a significant percentage of the vote, or even wins an election. These elections are trickier to deal with and I suspect the best answer might be to not include them in the process. Quite often a third party candidate is more popular to the voters of one side or the other. For instance, in the 2000 election Pat Buchanan was more popular with Republican voters and Ralph Nader was more popular with Democrats. This is not to say that they draw votes exclusively from one party or the other, but that they predominantly do so. Thus, the effects of a third party candidate are likely to affect one side more than the other, which means the vote percentages for the two major party candidate may not be reflecting of the partisanship of the state. For instance, in 2006 Joe Lieberman, the incumbent Democratic Senator from Connecticut lost the Democratic primary election to Ned Lamont. However, Lieberman ran in the general election as an independent and won. Indeed, despite not being a candidate from either major party, Lieberman received a majority of the statewide vote (Lamont received about 40 percent of the vote and the Republican candidate only attracted just under 10 percent of the vote).[[4]](#footnote-4) So what percent of the vote do we assign to each party in this case? The ten percent for Republicans is clearly to low, as is the 40 percent for the Democrats. Rather than trying to agree on how to allocate Lieberman’s votes, it is probably much easier to simply exclude such an election.

 Many American elections have minor party or independent candidate in the general election. While, as I mentioned previously, these candidates can bias the share of the vote that the two major party candidates get, most of the time we can simply ignore their votes – eliminating them from the calculus in determining the share of the vote for the major party candidates. As an example, take the 2010 Arizona Senate election. Senator John McCain retained his seat by beating Democrat Rodney Glassman. But there were also seven other candidates who are officially reported to have received votes in this election. The Libertarian party and Green Party candidate received 80,097 and 24, 603 votes respectively. In addition there are five other candidate that got between 7 and 5,938 votes. So Glassman received 34.65 percent of the overall vote and McCain got 58.86 percent. However, we want to calculate these percentages based on the two-party vote. So we use as the denominator just the McCain votes and the Glassman votes. McCain received 1,005,615 votes and Glassman got 592,011. This results in a Republican percentage of 62.94 and a Democratic percentage of 37.06.[[5]](#footnote-5)

 The whole point of aggregating these elections is to get a fair measure of the underlying partisanship (in terms of the two major parties) of the state. Thus, when there is a statewide election that for some reason clearly does not reflect this split, then it should not be used in this calculation. Can the partisanship of a state change over the course of time? Naturally, this happens in every state. This partisanship calculation should be redone prior to every time a state redraws electoral boundaries – so at least once a decade. However, if a state redraws legislative or congressional boundaries in the middle of a decade for some reason – perhaps the state is ordered to redrawing some or all of its boundaries by a court as a result of some litigation, or the state simply decides to redraw the lines.

**An Example**

 While there are some issues to work out in terms of which elections are going to count towards the partisan breakdown of the state, this method is simple, easy to understand, and is objectively fair. Single member district electoral systems were preferable to at-large elections because it moves election results closer to proportionality. The majority party can win all the seats in an at-large electoral system, but when we divide the state into several districts the minority party is almost certain to pick up some seats. However, SMDs tend to produce outcomes in which the majority party, in a two-party system gets a winner’s bonus (i.e. seats beyond the proportion of the two-party vote that they receive). We have treated this tendency as a “feature” of a SMD system rather than a bug. I think we should rethink the disproportionality as a problem with single member districts and actively do something to fix it. Using an average of recent statewide elections is a simple, straightforward way to do this. Here is an example of how it would work and some of the issues with this metric.

 In Table 1, I have the data for all presidential, senatorial, and gubernatorial elections from 2000-2010. Generally speaking Connecticut is a Democratic state and the numbers reflect that. The Republican candidates only win two of the statewide elections over the course of this decade – the 2002 and 2006 Governors’ races. The problematic election in this example is the 2006 Senatorial election. This is the election in which incumbent Senator Joe Lieberman lost in the Democratic primary election to Ned Lamont and ended up running as an Independent candidate in the general election. So the general election had three viable candidates: Lieberman, Lamont, and the Republican nominee, Alan Schlesinger. Lieberman won the general election with 564,095 votes. Lamont received 450,844 votes and Schlesinger received 109,198 votes. So what should be done with this result in terms of calculating the partisan balance for Connecticut? Technically and independent candidate won, though Lieberman was clearly part of the Democratic Party, so do we ignore Lamont’s votes and just calculate the percentages based on Lieberman and Schlesinger? Or do we pool Lieberman and Lamont’s votes to both count for the Democrats? It is difficult to argue that Schlesinger’s vote totals accurately represent the strength of the Republican Party in Connecticut at this time. He received less than 110,00 votes and the next lowest vote total for a Republican over this decade is just under 450,000 votes. Thus, it is probably best to simply exclude this election in our calculations. A reasonable argument could be made to impute a Democratic vote percentage of 75 percent for this election. In this case, I think there is enough uncertainty about how this election should reflect the overall partisan balance, that I would exclude it from the average. Excluding this election results in an average of 54.92% for the Democrats. Including an imputed value of 75% leads to an average of 56.93%, two percent higher for the Democrats. While this two percent wouldn’t affect congressional redistricting given there are only five seats, so by either measure the delegation should be 3-2 in favor of the Democrats, it could affect the seat breakdown in state legislative redistricting. There are 151 seats in the Connecticut General Assembly, which is the lower house of the state legislature. So the two percentage points would translate into about three additional seats for the Democrats.

Table 1. Statewide Elections for Connecticut, 2000-2010

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Office | Dem Votes | Rep Votes | Dem Percent |
| 2000 | President | 816,015 | 561,094 | 59.26% |
| 2000 | Senate | 828,902 | 448,077 | 64.91% |
| 2002 | Governor | 448,984 | 573,958 | 43.89% |
| 2004 | President | 857,488 | 693,826 | 55.27% |
| 2004 | Senate | 945,347 | 457,749 | 67.38% |
| 2006 | Governor | 398,220 | 710,048 | 35.93% |
| 2006 | Senate | 450,844 | 109,198 | N/A |
| 2008 | President | 997,772 | 629,428 | 61.32% |
| 2010 | Governor | 567,278 | 560,874 | 50.28% |
| 2010 | Senate | 636,040 | 498,341 | 56.07% |
| Average |  |  |  | 54.92% |

 An added benefit from using a proportionality standard is that it incentives both parties to do get as many votes as they possible can in these statewide elections. Which is to say, there is something more at stake than just winning the election for Senate or Governor – the results will be part of a simple formula to determine the appropriate partisan split in the congressional delegation and both legislative chambers. Regardless of whether the party’s nominee is winning or losing by a large margin, every single vote still matters. Winning 55-45 is better than winning 54-46 because it improves the party’s fortunes when that result is one of a handful of elections that is used to determine the appropriate partisan split.

Could a proportionality standard be exploited? Any standard is going to have loopholes or methods in which it can be exploited and using statewide elections to set a partisan proportion for redistricting is no different. If a state is split 62-38 in favor of the Democrats by our measures of recent statewide elections, we expect the map-makers to draw districts such that Democrats are likely to win 62 percent of them and Republicans are likely to win 38 percent of them. But what exactly does that mean? How are we to measure whether a district is a Democratic one or a Republican one? I propose using the exact same data that were used to find the statewide average initially. These data are available at very small levels of geography, typically called a precinct or a voting tabulation district (VTD). This is of course, the same type of data that map-makers use to measure the partisan strength of the districts that they are drawing, so it makes good sense to use them for our purposes here as well.

I am assuming here that the process of redistricting is unchanged state to state. Which is to say most states draw new maps after the census and pass them into law like any other state law – through the legislature and then approval from the governor. Other states, like California and Arizona use redistricting commissions. The process is irrelevant because the proportional method requires certain outcomes and we need not worry too much about the process. However, if the Democrats or Republicans control the process in a certain state, could they still try to advantage themselves despite a requirement for proportionality? Yes. How might they do this? They could draw districts for the opposing party that narrowly favors that party – perhaps a district that splits 51-49. Thus, a small movement in statewide partisan sentiment could shift one or more of these districts to the majority party. While the majority party is somewhat limited in its ability to this based on geography and the number of opposition voters in the state, this is still a concern. This is where we can utilize the concept of symmetry. If there is a district that is split 51-49 for one party, then there should be another district that is split that way for the other party. Thus, either party can win additional seats if there is a relatively small movement in voting behavior amongst voters in the state.

So in order to call a district Democratic (Republican) it ought to be drawn such that the average of votes for the statewide elections favors the Democratic (Republican) Party in the district. Could a state set a minimum amount of support for each district – perhaps something like 55 percent? Sure. The distribution of support in each district will depend on the geography of the state, the compactness of the districts, whether majority minority districts are required, etc. However, there will be some leeway in how Democratic or how Republican the districts are. Brunell (2008) argues that we can avoid partisan gerrymanders by packing districts with like minded partisan, and as long as districts for both parties were packed at the same level, the result would be a congressional delegation or legislative chamber that roughly mimics the underlying partisanship of the state. The argument here is different – many political scientists, politicians, and voters were not open to the idea of drawing incredible safe districts and counting on primaries for competition. Here, there is great flexibility for individual states to draw as many competitive or safe seats as they want, with some constraint with respect to symmetry. Leaving some districts that are nearly balanced in terms of voting behavior leaves the door open for part of the delegation to change with changing voting patterns. Thus, the requirement is not dictating there will be exactly 62 percent of the legislature in the Democratic Party’s hands for the next decade, but rather given recent voting behavior districts are drawn in such a way that the Democratic Party is favored to some degree, though not guaranteed to win in 62 percent of the districts.

Another potential way to game this method would be for the party in control to draw a district in an area that is experiencing high growth. Imagine a fast growing bedroom community that is attracting relatively affluent people to move there, most of which vote for the Republican Party. So the district could be nominally Democratic at the start of the decade, but given the trends in population influx, that district could become a Republican majority before the decade is over. It is not clear that there are any easy answers to protect against this kind of district.

Proportionality as a goal for state legislative chambers across the country is relatively easy to implement, however for some smaller congressional delegations the potential for conflict is higher. For instance, a state may have four seats in Congress and the partisan split in the state is something along the lines of 60-40. How should the districts be split? Two districts each seems more unfair to me than a three to one split, since the majority party ought to get a majority of the seats. It’s true that a 75-25 seat split does not match a 60-40 partisan split, but the only other reasonable alternative is two seats for each party. Even at 55-45, I would argue a three to one split is more reasonable, though anything less than that, the delegation should probably be equal. So for those states with just a handful of seats in the U.S. Congress, we should expect *ex ante* some necessary deviations from proportionality.

**The Problem Nationally**

 While SMD’s can lead to disproportional outcomes, it helps to see just how extensive the problem really is in American politics. Overwhelmingly, the congressional and legislative delegations for the U.S. states are not proportional, or even nearly proportional. Typically the majority party is favored in electorally boundaries in such a way that they win a disproportionate share of the seats relative to their partisan strength in the state. Moreover, there are some states in which the minority party wins more seats in Congress or in the state legislature than the party indicated as the majority by our measure of partisan strength.

Figure 1 is a scatterplot of our two key variables: seats and votes. The variable “seats” is a measure of the congressional delegations of all states with at least four seats,[[6]](#footnote-6) and “votes” is the partisan balance in each state (i.e. the average of all of the relevant statewide elections in each state between 2000 and 2010). The blue line on the graph marks proportionality – 40 percent votes equals 40 percent seats, etc. The further away a state is from this line, the more gerrymandered it is. The most interesting point of this graph is how few states are near the proportional line – really only Nevada and Iowa are close to the line. All the other states are off the line, and quite a few of them are quite far from the line.

 Viewing fairness in terms of deviations from proportional does provide a different perspective on this problem. For instance, take the state of Texas, which is almost always mentioned quickly in any discussion of gerrymandering. Using this measure, it is clear that Texas is gerrymandered in favor of the Republicans; however, the state is not that far off from proportionality either. In 2012, the congressional delegation was 24-12 in favor of the GOP – so 33.3 percent Democratic. The measure of partisan balance from 2000 to 2010 for Texas is 40.4 percent (so the average for Democratic statewide elections over this period was 40.4). So there is a difference of 7 percent – the Democrats should have 40 percent of the congressional delegation, rather than one third. 40.4 percent of 36 seats is 14.5 seats. So the Democrats, in order to satisfy the proportionality requirement should have either 14 or 15 seats in the Texas Congressional delegation.

 The graph also demonstrates the advantage that the Republican Party enjoys at the moment in the House. There are far more states below the line, which indicates a Republican advantage, and there are quite a few states that are roughly 50-50 in terms of partisan balance, yet the Republicans enjoy a significant seat advantage. For instance, look at the cluster of states that includes Florida, North Carolina, Virginia, Missouri, Ohio, and Pennsylvania. These are all large states with many seats in the House, and the Republicans are advantaged in all of them. However, there are other states, like Arkansas, Oklahoma, Connecticut and Massachusetts there are far from the line, that never get mentioned in discussions of gerrymandering. While Massachusetts and Connecticut are both clearly Democratic states that does not mean that there are not significant numbers of Republican voters there. Both states congressional delegations are 100 percent Democratic. Connecticut is only 55 percent Democratic on the partisan balance metric and Massachusetts is just over 61 percent Democratic. Democrats win all nine of the seats in Massachusetts, though by the proportionality standard they should have 5.5 seats (either 5 or 6). Arkansas is the state that deviates furthest from proportionality – partisan balance is right at 50-50 and Republicans won all four of the seats in Congress in 2012. Clearly, if we respect proportional outcomes, the Arkansas delegation should be two seats for the Democrats and two for the Republicans.

Figure 1. Partisan Balance and Congressional Delegations 2012



To better visualize which states are the most egregious partisan gerrymanders, Figure 2 plots the deviations from fairness for each state with at least four seats in the U.S. House of Representatives in 2012 (just after the most recent districts were drawn). States further to the left in the graph have high deviations from proportionality that favor the Republicans, while those to the far right side of the graph have the largest deviations from proportionality that favor the Democrats. We can see that by the proportionality standard, Arkansas is the single biggest violation insofar as in terms of partisanship the state is fairly evenly balanced, but Republicans won all four congressional seats in 2012. Even more interesting about Arkansas is that Democrats controlled the governorship and both chambers of the state legislature for this round of redistricting. Going into the redistricting process only one district, the 4th, was represented by a Democrat. The state government did not make any really significant changes to the map, though they made the 1st district more winnable for a Democrat. Unfortunately for them, the Democratic incumbent chose to retire prior to the 2012 election and the Republicans ended up sweeping all four seats.

Again, the GOP advantage is very evident in this figure with most states having negative results: 23 of the 35 states on the graph are negative, with only 12 states favoring the Democrats. For all 35 of these states, which account for 409 of the 435 seats in the U.S. House, if we use the proportionality standard state by state, the Democrats should have 211 seats while they only won 188 in these states after the 2012 elections – a difference of 23 seats. This is including accounting for the states that elect a disproportionate number of Democrats, like Maryland and Massachusetts. Even with just these 35 states, a swing of 23 seats would put the Democrats in the majority in the U.S. House (the GOP controlled 234 seats nationwide after the election and 218 seats constitutes a majority of the House). This is good news for Democrats and bad news for the Republicans. I am not interested in advancing the Democrats, nor am I interested in helping Republicans, rather I am interested in seeing a fair translation of votes into seats. Currently using this method would help the Democrats, but in years past, and in years in the future, assuming we do not change our ways, using this method would help the Republicans.

Massachusetts is rarely mentioned as an example of gerrymandering[[7]](#footnote-7), but it is one of the states with the highest deviation from proportionality. We all know that Massachusetts is a Democratic state, but to have all nine districts by Democratic majority, that is simply unfair to roughly the 4 in 10 Republican voters in that state. Massachusetts also exemplifies the difference between standard measures of symmetry relative to using proportionality. McGann et al (2016) calculate partisan bias based on symmetry for all the U.S. states after the 2000 and 2010 rounds of redistricting. Massachusetts is one of their examples of a state without partisan bias. They note - “If the Republicans were to win 65% to 70% of the vote in Massachusetts, they would also win all ten seats” (McGann et al 2016 page 77). While hypothetically, this may be true, it is obvious that Massachusetts is in reality a partisan gerrymander given how far away the state’s congressional delegation is from proportionality.[[8]](#footnote-8)

**Figure 2. Deviations from Fairness by State for Congressional Seats 2012**



Table 2 has some summary statistics from our analysis by which party controls redistricting if the state government handled the process or if a court or a commission ultimately decided redistricting. This yields five categories – Democrat, Republican, Split partisan control, Court, or Commission. We expect the deviations in states controlled by partisans to favor their party and to be rather large. For the other three categories we expected the deviations to be lower on average and not to be systematically biased in favor of either party. Positive deviations indicate a Democratic advantage (the percentage of seats won by Democrats is larger than the partisan balance metric), while negative deviations indicate a Republican advantage. The averages (and standard deviations) presented in the table are weighted by the total number of seats in each state – giving equal weight to a state with three seats to a state with 30 seats would distort the results. Five states controlled by Democrats averaged over ten and a half percentage point advantage for Democratic candidates. However, it is interesting to note that two of these fives states, Arkansas and West Virginia, had very large deviations in favor of the Republican Party. However, both of these states have a small number of total seats in Congress – three for West Virginia and four for Arkansas. In the other three states, Illinois, Maryland, and Massachusetts, the Democrats did very well.

 In the 17 states controlled by Republicans, every single state had a Republican advantage. The range was from 7.5 points to 41.5 points with a weighted average of 20.52. Thus, not only did the GOP control far more states in which the plan was ultimately controlled by partisans, they also leveraged this advantage in every single instance. The standard deviation for the Republicans states is also much lower than the four other categories. The next category includes those states in which partisan control was split between the two parties. We expect split control to have the effect of reducing deviations since any map that survives the legislative process and is signed by the governor will necessarily be a compromise. While the weighted average for this group indicates that this may be true, looking at the range of deviations gives something of a different picture. The states ranged from nearly 30 percent deviation favoring the Republicans to a 57-point Democratic deviation. However, this wide range is largely due to the fact that most of the states in this category are small. There are nine states with only 40 seats total in this grouping, including three states with only two congressional seats (New Hampshire, Maine, and Rhode Island). Deviations are less robust in smaller states since the percentage of seats won is often times 100, which was the case for all three of these states. The deviations for all of these two-seat states were over 40 percent.

 It is difficult to develop *a priori* theoretical expectations regarding how courts and commissions will fare with respect to partisan fairness and deviations. At some level, we can argue that these districts ought to be fairer than districts drawn by partisans. McDonald (2004) finds that partisan commissions and bipartisan commissions differ on results with respect to partisan fairness. Courts are even more difficult to classify in a way that makes sense for all cases. First, there are many different reasons in which a court may be asked to intervene – partisan gerrymander, racial gerrymander, failure to draw districts that are equally populated, or a state fails to draw new maps in a timely manner. If a party brings a partisan gerrymandering lawsuit and a court finds that such a problem exists, then we could expect that the resulting map may be less partisan. If a court is tasked with drawing districts because the state government failed to do so, in my experience, judges favor a “least change” approach in which small changes are made to existing districts to equalize the population, but little else. However, judges can do as they please and judges can be partisan, so it is also not completely out of the question that a court could institute a map that favors one party. Court drawn maps on average are quite fair with only a 4 point advantage on average, though there is one outlier, Connecticut, where the deviation was over 45 percent. Again, this is a state that elects five Democrats, so the resulting deviation is necessarily quite high.

**Table 2. Congressional Deviations by Party in Control and Redistricting Authority**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **In Control** | **Number of States** | **Number of Seats** | **Average Weighted Deviation** | **Standard Deviation** | **Minimum** | **Maximum** |
| Democrats | 5 | 42 | 10.62 | 29.22 | -50.14 | 38.71 |
| Republicans | 17 | 175 | -20.52 | 7.56 | -41.47 | -7.58 |
| Split | 9 | 40 | 2.63 | 28.88 | -29.82 | 57.26 |
| Court | 5 | 79 | 3.97 | 16.51 | -9.39 | 45.07 |
| Commission | 7 | 92 | 10.45 | 11.53 | -34.21 | 37.71 |

A close examination of the U.S. House of Representatives revealed that almost no states have delegations to Congress that are proportional to the underlying partisan balance of the state. Indeed, many states were, not surprisingly, very disproportionate, usually with the majority party taking the lion’s share of the seats. Again, in the past, scholars more or less threw up their hands and declared “Well, that’s the was single member district electoral systems work.” That’s not to say that there is not a well-established literature on gerrymandering as there is. However, we also have acceded the fact that there is a “winner’s bonus” in SMD systems and, as long as the other party theoretically would yield the same number of seats given some percentage of the vote, we were fine with the outcome. The point I am driving home here is that we can make SMD systems roughly proportional and we should start insisting on it. There ought not be a “winner’s bonus” for the majority party – proportional outcomes are the obvious answer. It is a difficult case to make that a proportional outcome is unfair to either party and once we agree on proportionality, we can pay far less attention to symmetric outcomes (or the lack thereof). Next we turn to the state legislatures

**Proportionality in State Legislative Chambers**

Every state except Nebraska has a bicameral legislature to represent the views of the voters from that state and to pass state laws. The unicameral Nebraska legislature is also supposed to be non-partisan, though, parties are informally present and, in recent years, quite strong (Masket and Shor 2015). That leaves 99 chambers, all with enough seats to compare to the state partisan balance. Relative to Congress, this is an even better “laboratory” to check for how near (or far) states are to the proportional standard.

**Lower Chambers of State Legislatures**

**Figure 3. Partisan Balance and Lower Chambers of State Legislatures 2012**



\*Data points indicate the percent of seats held by Democrats after the 2012 legislative elections for lower chambers of state legislatures in all states except Nebraska. Partisan Balance is the average of all presidential, senatorial, and gubernatorial elections in each state (with some exceptions see text in this chapter for a description) from 2000 through 2010. The line indicates proportionality (i.e. partisan balance is equal to the percent Democrat in the chamber).

In Figure 3 there are 20 states above the proportionality line, and 29 below it. This indicates that, like in the U.S. House, the Republicans are advantaged in more states than the Democrats. Again, credit is due to the GOP’s REDMAP program that sought to win majorities in state legislatures and more governorships in 2010. Since redistricting happens prior to years ending in “2”, elections in years ending in “0” are the most important in each decade. Republicans also lucked out in terms of timing as 2010 was a banner year for them not just because they spent more money that year, but also because it was a midterm election with a Democratic President – which almost always bodes well for the opposition party. One suspects that the Democrats will be matching the Republican effort in 2020.

Again, we can see there are only a couple states like Louisiana, Arkansas, Iowa, Illinois, and Washington that are at or very near the proportionality line. Most states are between five and fifteen percentages points away from proportionality. The good news is that there is a strong positive correlation between these two variables, simple r=.81, indicating that the more Democratic (Republican) the state, the more Democrats (Republicans) in the lower chamber of the legislature. The best fitting line for the scatterplot (not shown), is steeper than the line of proportionality. Again, this is exactly what we would expect with a SMD system – in the competitive region the responsiveness of the seats-votes curve is higher than one, and it is exactly equal to one for proportional systems.

Figure 4. Percent Disproportional for Lower Chambers of State Legislature for States that Favor the Republicans



\*Data points indicate the distance from proportionality (Democratic seats held-partisan balance) for lower chambers of state legislatures after the 2012 legislative elections. This figure is for just those states in which the Republicans were favored.

Figure 4 shows the 29 states that favor the Republican Party in terms of deviations from proportional outcomes. Wyoming, North Dakota, and Missouri are the three biggest offenders on this metric. These three states are not at the top of the list when we usually hear about partisan gerrymandering. Texas is one of the least offensive states of this grouping with less than a five percentage point advantage for the majority Republican Party in that state. The Wyoming lower chamber split 52-8 in favor of the GOP after the 2012 elections. The partisan balance in that state is just over 33 percent. So Wyoming is obviously a Republican state, but should the majority party win 66 percent of the vote and nearly 87 percent of the seats? The Democrats control 1,101 seats as of 2012 in these 29 states. The Republicans won 1,927 seats. If outcomes were proportional the Democrats could expect to win just over 1,400 seats.

Figure 5. Percent Disproportional for Lower Chambers of State Legislature for States that Favor the Democrats



\*Data points indicate the distance from proportionality (Democratic seats held-partisan balance) for lower chambers of state legislatures after the 2012 legislative elections. This figure is for just those states in which the Democrats were favored.

Figure 5 shows the 20 states in which the Democrats have more seats in the lower chamber as of 2012 than proportionality would suggest. Hawaii, Massachusetts, and Rhode Island are the three biggest offenders. These states are also heavily Democratic ones, so again, the “winner’s bonus” rears its ugly head. Not to be repetitive, but by using the standard of proportional outcomes we are talking about states that are almost never mentioned in discussions about partisan gerrymandering. This should change. In the 20 states the Democrats control 492 seats and the Republicans control 282. If a proportional standard were in effect the Democrats would win around 415 seats.

**Upper Chambers of State Legislatures**

Next we turn to the upper chambers of state legislatures across the country. We expect the upper chambers to be similar to those in the lower chambers. While upper chambers are smaller than lower chambers in each of the states, which could lead to lower levels of proportionality *ceteris paribus*, there are enough seats in most state chambers that expecting large differences from the other chambers is not warranted. There is more lag in upper chamber seats because many states have longer terms and/or staggered elections for upper chambers. Still the differences should not be too dramatic

**Figure 6. Partisan Balance and Upper Chambers of State Legislatures 2012**



\*Data points indicate the percent of seats held by Democrats after the 2012 legislative elections for upper chambers of state legislatures in all states except Nebraska. Partisan Balance is the average of all presidential, senatorial, and gubernatorial elections in each state (with some exceptions see text in this chapter for a description) from 2000 through 2010. The line indicates proportionality (i.e. partisan balance is equal to the percent Democrat in the chamber).

Figure 6 is a scatterplot for all states except Nebraska indicating where each state is in terms of partisan balance (which is constant for states across all of these analyses) and the percentage of seats held by Democrats after the 2012 elections. The graph looks very similar to that for the lower chambers, though there are differences. Notably, New York, which scores highest on partisan balance for Democrats, is below the proportionality line. Given the recent history of redistricting in New York, though, this makes sense. The two parties have struck a bargain that allows the Democrats to control drawing districts for the lower house and the Republicans control the upper house. This allows the Republicans to continue to exert more power in state politics than they ought to given how the state votes on statewide elections. Oregon, Washington, Virginia, Mississippi, and Arizona are right on or just barely off the line indicating seats and votes are in proportion to one another. There are more states below the line than above the line – the Republicans are advantaged in upper chambers just as they are in lower chambers and in the U.S. House. There are 29 states below the line and 20 above, just like in the lower chamber, though the mix of states is slightly different.

To explore that further, Table 3 shows the values for all states and both chambers in terms of how far each state is from proportionality (second and third columns). The fourth column shows the absolute value of the difference between the lower and upper chamber differences. Since it is rare for one chamber to be redistricted by a different authority than the other chamber in a state – we would expect both chambers to favor the same party. This is true in 40 of the 49 states. Sometimes these differences aren’t particularly large or meaningful – take Washington for instance – in the lower chamber the Democrats have 1.57 percent more seats than proportional, and in the upper chamber the Republicans enjoy a 1.49 percentage advantage. The state does a great job of getting both chambers very near to the overall partisan balance in the state. On the other hand, there is Kentucky in which the Democrats are favored by 8.51 in the state House of Representatives, and the Republicans have a 7.60 percent advantage in the state Senate. Kentucky, like New York, has split control of the two state legislative chambers, with Democrats in the majority in the House and the Republicans controlling the Senate. The two chambers do not try to affect the outcome in the other chamber, which explains why we have such a large partisan difference in this state. West Virginia has the largest gap between the two chambers – nearly 20-point difference. The House of Delegates was drawn in such a way that Republicans won 5 percent more seats relative to the partisan balance and in the Senate, the Democrats won nearly 15 percentage points more seats compared to a proportional split. Both of these chambers were still controlled by Democrats by large margins, but in the House of Delegates the map was drawn in such a way that more Republicans won in percentage terms than in the House.

Table 3. Differences From Proportionality in Upper and Lower Chambers and the Difference Between the Two Chambers

|  |  |  |  |
| --- | --- | --- | --- |
| State | LowerDifference | UpperDifference | Lower-Upper |
| NJ | 5.11 | 5.11 | 0.00 |
| WY | -20.29 | -20.29 | 0.00 |
| NC | -13.19 | -13.03 | 0.17 |
| PA | -5.95 | -5.77 | 0.19 |
| SC | -4.51 | -4.03 | 0.47 |
| CA | 11.64 | 12.56 | 0.92 |
| CO | 3.14 | 2.04 | 1.10 |
| GA | -12.06 | -13.44 | 1.38 |
| UT | -13.92 | -15.34 | 1.43 |
| ID | -15.64 | -14.21 | 1.43 |
| TX | -3.76 | -1.72 | 2.04 |
| AK | -4.23 | -6.73 | 2.50 |
| WA | **1.57** | **-1.49** | 3.06 |
| MO | -16.66 | -19.77 | 3.10 |
| ME | 16.45 | 13.14 | 3.30 |
| FL | -11.82 | -15.15 | 3.33 |
| AZ | **-2.73** | **0.60** | 3.33 |
| OR | 3.03 | -0.30 | 3.33 |
| OK | -12.76 | -16.47 | 3.71 |
| MN | 1.60 | 5.34 | 3.73 |
| ND | -19.12 | -15.33 | 3.79 |
| DE | 5.63 | 1.68 | 3.95 |
| SD | -16.02 | -20.31 | 4.29 |
| CT | 10.64 | 6.19 | 4.45 |
| MD | 11.08 | 16.04 | 4.96 |
| IN | -12.87 | -17.87 | 5.00 |
| LA | -0.83 | -6.06 | 5.23 |
| NM | **-1.72** | **3.51** | 5.24 |
| KS | -10.37 | -15.87 | 5.50 |
| AL | -1.81 | -7.32 | 5.51 |
| RI | 32.89 | 27.38 | 5.51 |
| WI | -15.16 | -9.10 | 6.06 |
| IA | **-1.93** | **4.13** | 6.06 |
| MS | 8.90 | 2.14 | 6.76 |
| TN | -16.19 | -23.55 | 7.36 |
| IL | 1.45 | 9.08 | 7.63 |
| MA | 20.58 | 28.71 | 8.13 |
| AR | -1.66 | -10.14 | 8.48 |
| MT | -15.99 | -6.99 | 9.00 |
| OH | -7.73 | -16.83 | 9.09 |
| NH | **3.91** | **-5.76** | 9.67 |
| HI | 23.99 | 33.72 | 9.73 |
| VT | 14.52 | 25.01 | 10.49 |
| NV | 17.27 | 5.36 | 11.90 |
| MI | -8.42 | -23.21 | 14.78 |
| KY | **8.51** | **-7.60** | 16.11 |
| VA | **-16.42** | **1.95** | 18.37 |
| NY | **8.27** | **-10.68** | 18.95 |
| WV | **-5.13** | **14.40** | 19.53 |

State Legislatures, like seats in the U.S. House are highly disproportionate to the strength of the two major parties in each state. No one familiar with SMD electoral systems is surprised by this fact. But what should be surprising is that many states are highly disproportionate, and by this measure, many states that we usually think of as being gerrymandered are not, like Texas, and many states that rarely get mentioned, like Massachusetts are.

One important way that legislatures do deviate from congressional redistricting is for the equal population requirement in redistricting. For Congress, the remappers’ hands are tied – unless there is a good reason for deviations between districts within a state, those districts are drawn to be exactly equal in population. The courts have allowed state legislative districts to deviate from ideal population within a state in large part because the Constitutional justification for requiring equal population in Congress and in state legislatures is different. However, allowing for deviations of up to ten percent does provide whoever is drawing those districts an easy tool for partisan gerrymandering (See Brunell and Manzo 2014).

**Possible Manipulations of a Proportional System**

Let’s assume for a minute that a state, or many states, has adopted a system in which the redistricting authority, whether it is the state government or a commission, is forced to use proportionality when redrawing congressional and state legislative electoral boundaries. Are their still avenues in which the map could be shaped to help one party at the expense of the other? Yes. While the outcomes may indeed be proportional, which is a very positive outcome, that does not mean that there are not methods of “hurting” the other side.

First, the remappers could still engage in what some people have called “kidnapping” or “hijacking”. Both of these strategies typically affect incumbents, though they could be used to discourage a known high-profile challenger from running for office as well. If the Republicans are in charge of redistricting and there are one or two high profile Democrats that the GOP would love to see “retire” from office, the map could be drawn so that the overall outcome is proportional, while still making it hard or even impossible for these targeted incumbents from winning reelection.

Hijacking is term used to describe a situation in which districts are drawn in such a way that two incumbents are drawn into the same district. We usually say Incumbent A is in District X if his or her home is within that district. Constitutionally, one need only live in a particular state in order to win a seat in Congress or the Legislature. Naturally, this is quite a bit harder to do when one lives in a different district that the one there are running in – the incumbent is open to accusations of “carpet-bagging.” So voters usually expect an elected official to live in the district in which they are running. So if the GOP draws a district in which two popular Democratic incumbents live, these two representatives are put in a difficult situation since only one of them will be able to represent the district. They can run against one another in the primary; one incumbent could move to another neighboring district; one incumbent, sensing defeat, could declare that they are retiring from office at the end of the term.

An example of hijacking happened in the 2000 round of redistricting in the Pennsylvania. The Republicans drew a map that, among other things, paired Democratic incumbents Frank Mascara and John Murtha. In drawing what amounted to most of Mascara’s old district, the lines stopped quite literally just short of Rep. Mascara’s house. Mascara thought about running in the adjacent district, but that district leaned Republican now. So, Mascara ran against Murtha in the Democratic primary and lost (See Toobin 2003). Both political parties engage in this kind of behavior. It was reported that Democratic leader in the New York State Assembly Sheldon Silver, who has since been arrested on corruption charges, used the redistricting process to get rid of a “romantic rival”.[[9]](#footnote-9) It is alleged that Speaker Sheldon had Assemblyman Dan Burling’s district redrawn to encourage a popular mayor to run against Burling in the primary. Burling chose not to run for reelection following the 2012 redrawing of his district.

Kidnapping is related to this notion though the resulting district is one in which two incumbents from different parties live within its boundaries. Naturally the district is also drawn in such a way to give the incumbent from the party in power an advantage. An example of this type of redistricting occurred in Texas in 2004, after the GOP redrew the congressional district boundaries after gaining control of both chambers of the state legislature in the 2002 election. The GOP was keen on seeing Martin Frost (D) losing his bid for reelection, so they drew a Republican favored district that also included the home of Republican incumbent Pete Sessions. In a wildly expensive and nasty campaign, Pete Sessions beat Martin Frost in the general election (see Bickerstaff 2007 for an in-depth look at the Texas redistricting in 2003).

Another potential tactic political parties might use to gain an advantage with proportional restrictions is to modify the “cracking” strategy that parties use currently. Without proportional or symmetrical restrictions redistricting is used for partisan purposes by wasting as many votes from the opposing party by packing and cracking them. Packing involves drawing districts of the opposing party that are heavily in that party’s favor. Every additional Republican vote in one district, is a Republican vote that cannot be used to win a seat in a neighboring district. Cracking is when the in-party draws their own districts in such a way that they win by a relatively small margin. If there is a proportional standard introduced cracking could conceivably be modified to try to hurt one party by drawing several of their districts so that they are just narrowly favored but with a small swing they party in control thinks they may be able to swing them in their own favor. So Democrats (Republicans) will draw a few districts that are leaning for the other party and are thus counted for that party in reaching the goal of proportionality, but if that margin is less than a percentage point, for instance, this district could be flipped.

A more specific version of the problem identified above, is that a party looking to gain an advantage might also take advantage of knowing where high levels of growth are and exploit this to turn what may be a district that favors one party at the start of the decade to one that flips to the other side as more people move into the area. For instance, there might be a rapidly expanding suburban bedroom community that is expected to see continued influx of Republican leaning voters in the near future. The district could be drawn to narrowly favor the Democrats and after a few years there may be enough new Republican voters to turn the district into one that favors the Republicans. Thus, a plan that starts the decade at proportionality after the redraw may morph into one that is less proportional near the end of the decade.

**Conclusion**

 Partisan gerrymandering is creates mistranslations of votes into seats for both the U.S. House of Representatives and state legislatures around the country. Most pundits and scholars, though not all (see Seabrook 2017), agree that gerrymandering is a serious problem that needs to be addressed. Symmetry is an important notion for understanding and measuring partisan gerrymandering (Grofman and King 2007; McGhee 2014; Stephanopoulos and McGhee 2015), though, ultimately it is just a metric and not a standard. Proportionality, on the other hand is both a metric and a standard. Implementing a proportionality standard for redistricting is fair and relatively straightforward. While it would be reasonable for someone to prefer the disproportional outcomes that single member districts typically yield, it is hard to imagine that anyone would object to proportional outcomes on the basis of unfairness. The allure of the standard is its fairness and intuitiveness. However, it is abundantly clear that this standard will not emerge from the judiciary. Federal judges have repeatedly stated that the Constitution lacks any basis for requiring proportional outcomes. Thus, any such reform will have to come via the legislature or through an initiative process.

 For instance, the dissenting Judge in the *Whitford v. Gill* case argued that most statewide measures for gerrymandering rely on the relationship between seats and votes, and underlying these methods, like symmetry, is a notion of proportionality. Judge Greisbach (pg 120) writes “the efficiency gap – or any measure that simply compares statewide votes to seats – is little more than an enshrinement of a phantom constitutional right, namely, the idea that voters for one party are entitled to some given level of representation proportional to how many votes that party’s candidates win in every assembly district throughout the state as a whole.” Federal courts have been clear about the lack of a constitutional justification for proportional representation for racial groups, voters, or political parties. Thus, instituting something akin to proportionality for the major parties will have to be done legislatively, most like through the referendum process available in some, though not all, states.

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1. Perhaps this is the first instance of a “dummymander” (See Grofman and Brunell 2005). [↑](#footnote-ref-1)
2. https://en.wikipedia.org/wiki/United\_States\_Senate\_election\_in\_Alabama,\_2014 [↑](#footnote-ref-2)
3. http://www.elections.alaska.gov/statistics/vi\_vrs\_stats\_party\_2014.05.03.htm [↑](#footnote-ref-3)
4. https://en.wikipedia.org/wiki/United\_States\_Senate\_election\_in\_Connecticut,\_2006 [↑](#footnote-ref-4)
5. http://www.fec.gov/pubrec/fe2010/2010senate.pdf [↑](#footnote-ref-5)
6. Proportionality for the U.S. House of Representatives is more difficult for smaller states. If there are only two seats the possible outcomes are severely limited. Thus for I drop all states with 1, 2, or 3 seats in the House. [↑](#footnote-ref-6)
7. A Google search (June 2016) for “Massachusetts gerrymander” yielded many hits related to the “original” Gerrymander that originated in that state. I did, find one article, in Daily Kos making the point I make here. The headline is almost apologetic - Why Massachusetts is Actually a Partisan Gerrymander.” http://www.dailykos.com/story/2011/7/28/999964/- [↑](#footnote-ref-7)
8. I should note that McGann et al (2015, 2016) are not hostile to proportionality at all, indeed they may very well support such a standard, however, their discussion of partisan bias does rely on symmetry, which can differ significantly from proportionality. [↑](#footnote-ref-8)
9. See “Sheldon Silver has some serious jealousy issues” by Kirstan Conley, Aaron Short and Bruce Golding. *New York Post*, April 18, 2016. [↑](#footnote-ref-9)