The Loser’s Bonus: Political Geography and Minority Party Representation

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Abstract

In a majoritarian system where support for two parties is geographically clustered, the minority party is better off with a system of smaller winner-take-all districts than with a polity-wide winner-take-all system. We use automated districting simulations of U.S. states to measure the magnitude of this “loser’s bonus” in each state, and contrast long-term patterns of partisan representation in the House and Senate. We demonstrate that Republicans benefit from the loser’s bonus in most of the large states of the Northeast and West Coast, while the Democrats benefit elsewhere. On balance, the loser’s bonus is beneficial to the Republicans, and the size of U.S. Congressional districts relative to urban clusters of Democrats is quite well suited for the representation of Republicans in Congress. Our results have implications not only for policy debates and patterns of representation in the United States, but also in other majoritarian democracies with a high correlation between population density and voting behavior.

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Introduction

Perhaps one of the most striking developments in U.S. politics over the last 50 years has been the dramatic growth of the correlation between population density and voting behavior. American cities—even small cities and towns—now vote overwhelmingly for Democrats. In virtually every city, the vote share of Republicans increases as one exits the city center and enters the suburbs, eventually transitioning to comfortable Republican majorities in the exurbs and surrounding rural periphery.

Sharp differences between the electoral behavior of urban and rural voters are not unique to the contemporary United States. From 19th-century limited-franchise elections to contemporary European national elections and the Brexit referendum, from Latin America to Africa, it is often the case that the interests and identities that animate voting behavior in democracies are highly correlated with population density.

A classic observation in the field of political geography is that legislative representation is shaped in fundamental ways by the superimposition of winner-take-all districts on geographic clusters of like-minded voters. When partisan competition is organized around a conflict between groups that are geographically clustered according to population density, the spatial scale at which voters are partitioned into districts can determine which party wins and loses (Gudgin and Taylor 1979; Johnston et al. 2001).

Perhaps no one is more acutely aware of this than the Democrats in the United States, who in recent years frequently fall short of legislative majorities in the House of Representatives and many state legislatures in spite of receiving more votes than the Republicans in statewide and national popular vote totals.
This paper contributes to a nascent literature that returns to the notion, rooted in the classics of British political geography, that at least part of the Democrats’ difficulty in transforming votes to seats goes beyond partisan gerrymandering, and lies in the basic task of sub-dividing the U.S. states—with their dense clusters of Democrats and dispersed ribbons of Republicans—into winner-take-all districts (Cottrell 2015; Erikson 1972, 2002; Goedert 2014; Jacobson 2003).

Chen and Rodden (2013, 2015) for example, demonstrate that a wide range of computer-generated districting plans adhering to traditional redistricting principles of compactness and contiguity would have produced disproportionate Republican legislative majorities in Florida even without the intentional gerrymandering by the legislature that inflated it even further in practice.

This literature has been preoccupied with the normative claim that a party with half of the votes should receive half of the seats (see, e.g. McGann (2013)). Much of the empirical literature is aimed at assessing the extent to which districting plans fall short of that standard—a concept known as “electoral bias.” Chen and Rodden (2013) analyzed an actual tied election, and the vast majority of empirical papers attempt to simulate hypothetical tied elections for analytical purposes by inflating the vote share of the losing party across districts (Gelman and King 1994; King and Browning 1987; McGann et al. 2015).

This approach to electoral bias was developed in the context of hotly contested British, Australian, and New Zealand parliamentary elections in the middle of the 20th century, when the vote shares of the two major parties were consistently within a few percentage points (Brookes 1960; Johnston 1977). However, in the modern era of American political polarization, states like Florida and Pennsylvania are exceptions to the rule; most are dominated,
at least in federal elections, by one party. Thus the exercise of simulating hypothetical tied elections is often quite unrealistic and potentially misleading in states like Alabama and New York.

While normative questions about fairness and the impact of gerrymandering are crucial questions for American democracy, they have diverted attention from a related question that has motivated the classic works of political geography outside the United States: how does the simple act of drawing winner-take-all districts on top of geographic clusters of co-partisans affect representation?

If we leave aside the prevailing American debates about gerrymandering and race and focus exclusively on political geography, the U.S. states offer an ideal opportunity to develop and test for the first time some of the basic hypotheses that were introduced by Gudgin and Taylor (1979) in their classic political geography textbook. Above all, the U.S. states in the early 21st century offer tremendous cross-sectional diversity in both partisanship and political geography, while providing a very attractive natural experiment: at-large statewide representation is used in the Senate while states are subdivided into winner-take-all districts in the House of Representatives. Moreover, unlike the pioneering British geographers working on these questions in earlier decades, we now have a nationwide geo-referenced precinct-level data set to work with.

This paper exploits this opportunity by developing and measuring a concept we call the “loser’s bonus.” In a system with single-member districts, the party that receives fewer votes in a polity-wide election will often win at least some seats due to the fact that clumps of its supporters are concentrated within districts so as to produce local majorities. For example, Democrats have dim hopes to win Senate seats, but are able to win two urban Congressional
seats in overwhelmingly Republican Tennessee. Republicans are able to string together sufficient rural and suburban voters to win several seats in overwhelmingly Democratic New York and California, even though Senate seats are typically out of reach.

We show that while Democrats are more geographically concentrated than Republicans in virtually every state, the extent and spatial scale of this phenomenon varies a great deal across states according to the geography of the state’s historical industrialization and settlement patterns. Democrats are relatively dispersed at the scale relevant for Congressional districting in states that lack large cities, e.g. Arkansas, West Virginia, Iowa, New Hampshire, and Connecticut. In contrast, Democrats are highly clustered at this scale in states with one or more major cities, including Texas, Georgia, Illinois, and Pennsylvania.

We show that in states where the scale of spatial clustering of Democrats is sufficiently low, the loser’s bonus is small, and we should not expect substantial differences between state-wide and districted elections. However, when Democrats are highly clustered in large cities, the loser’s bonus is quite beneficial to Democrats in states where they constitute a long-term minority, like Utah and Tennessee, and a boon to Republicans in states like Illinois or New York where they are the minority party. Summing over states, we discover a striking asymmetry: Republicans gain far more from the loser’s bonus than Democrats.

The goal of this paper is to turn attention away from such factors as incumbency bias and gerrymandering and measure the size of the loser’s bonus’ in each state that can be attributable purely to the necessity of carving up its political geography into winner-take-all districts. We achieve this by conducting repeated districting simulations of each state using a nationwide geo-referenced precinct-level data set from the 2008 presidential election.

Next, we leave our simulations behind and ask whether these insights can help shed light
on actual outcomes of Senate and House elections. We demonstrate that the combination of political geography and districting alone can explain why the Democrats are at a substantial disadvantage in the House relative to the Senate once we hold constant the malapportionment of the latter in favor of Republicans. Republicans benefit handsomely from the loser’s bonus in large, industrialized states with many Congressional seats, while the Democrats benefit on a smaller scale in states with fewer Congressional seats.

Our findings have important implications for representation and debates about institutional reform in the United States. First, the apportionment of electoral votes according to Congressional districts would be quite advantageous for the Republicans. Second, redistricting reforms aimed at partisan symmetry would have different partisan effects in different states. A statutory or court-ordered requirement of partisan symmetry would help the Democrats in some states but hurt them in others. Moreover, this paper has broader implications for countries, especially federations like Canada and Australia, where partisan support is highly correlated with population density and legislative representation is based on winner-take-all districts at multiple geographic tiers.

Partisan geography in the United States

We begin by providing the rather striking stylized facts of contemporary American political geography that serve as the starting point for our analysis. We have collected election results from 185,160 precincts in every U.S. state except Oregon, where we were unable to obtain data. These precinct-level data reveal a strong positive correlation between precinct-level population density and the Democratic vote share in presidential elections. This relationship
is statistically significant in every state except Alaska, Hawaii, and New Hampshire. Historical county-level data show that the correlation between population density and Democratic voting has been increasing substantially with each recent election (Rodden 2015).

A useful way to visualize this pattern is presented in Figure 1. We have calculated the distance between the center of New York City (defined as Central Park) and the centroid of every precinct in the continental United States (except Oregon). We plot this distance on the horizontal axis, such that the far right of the graph corresponds to New York and the far left corresponds to California and Washington. The vertical axis represents the Republican share of the two-party vote in the 2008 presidential election. Each “stalactite” is a city. The top, thick part of each stalactite is a relatively Republican exurb, and as the stalactite narrows, one traverses the middle and inner suburbs and finally the city center, where Obama’s vote share reaches 100 percent at the tip of the stalactite. The band of dots at the top of the graph above the stalactites captures the Republican vote share in each state’s rural periphery.

![Figure 1: Distance from New York and Republican Presidential vote share, 2008](image-url)
As one moves from East to West in Figure 1, one sees that the mean Republican vote share is relatively low in the original Northeastern manufacturing core—even in exurban and rural areas—though it still surpasses the national average (46%) in many suburban and rural precincts. As one moves outside the manufacturing core into the South and Midwest and eventually the Mountain West, the mean Republican vote share increases substantially, but this is driven mainly by suburban and rural voters: the stalactites associated with more isolated industrial centers like Birmingham, Memphis, Kansas City, and Denver are just as pronounced as in the original manufacturing core. Finally, when one reaches the West Coast, the Eastern pattern is seen once again: heterogeneous but Republican-leaning suburbs surround large and overwhelmingly Democratic cities.

The clustering of humans into cities, and hence the relative geographic concentration of Democrats, is not limited to densely populated and overwhelmingly Democratic states like New York or New Jersey. There are significant urban clusters of Democrats even in states like Kentucky, Kansas, and Utah. Thus the contemporary geographic concentration of Democrats can be seen in both Democratic and Republican states alike. The political geography displayed in Figure 1 is also partitioned into states in a way that generates substantial heterogeneity in the level and scale of concentration, both in Democratic and Republican states.

In order to provide a more concrete and relevant measure of the relative geographic concentration of Democrats that corresponds to the scale of actual Congressional districts, we perform the following calculations. For each state, we calculate the percentage of an average Democratic voter’s nearest 700,000 neighbors who are also Democrats. Specifically, to identify a voter’s set of nearest neighbors, we draw a circle centered around the voter’s
residential location and just large enough to contain a population of 700,000. We then calculate the relative proportion of Democrats voters within this circle. We consider circles of 700,000 population because this is approximately the average size of a US congressional district nationwide, as of the 2010 Census.

Intuitively, this measure indicates the degree to which Democratic voters are geographically concentrated in the regions where Democrats are residually located. We are specifically measuring geographic concentration at the level of a hypothetical, average-sized Congressional district centered around each Democratic voter. This measure thus gives us a direct indication of the level of partisan clustering most relevant for the drawing of Congressional districts.

We perform this calculation for all Democratic and Republican voters, and within each state, the averages for Democratic and Republican voters are plotted in Figure 2. Specifically, in the left plot in Figure 2, the vertical axis depicts, within each state, the percentage of an average Democrat’s nearest 700,000 neighbors who are also Democratic voters. The horizontal axis depicts the statewide Democratic vote share. The right plot in Figure 2 displays the analogous calculations for Republican voters within each state.

The left plot in Figure 2 demonstrates that within most states, Democratic voters are, by our measure, geographically clustered to a significant degree. The states that are furthest from the 45 degree line are those where Democrats are highly clustered in space at the scale used to construct Congressional districts. These include Democratic-leaning states like Maryland, New York, and Washington, swing states like Pennsylvania and Missouri, as well as Republican-dominated states like Texas, Tennessee, and Utah.

Only a small number of rural states, such as West Virginia, New Hampshire, and Maine,
display a relative symmetry in the distribution of Democratic voters across space, indicating a lack of Democratic voter clustering. These states typically have several small cities but no major metropolitan agglomeration and thus no major Democratic voter concentrations. This group includes Democratic New England states like Connecticut, swing states like Iowa and New Hampshire, and Republican states like West Virginia and Arkansas, as well as states like Mississippi and South Carolina where not only are cities small, but dispersed rural African American populations remain as a legacy of slavery.

By contrast, the right plot in Figure 2 suggests that Republican voters in most states are not nearly as geographically clustered. In this plot, most states are relatively close to the 45 degree line, indicating that the average Republican voter’s nearest 700,000 neighbors are similar in partisanship to the overall statewide voter partisanship. Even states such as Maryland and Tennessee, both of which display extreme Democratic voter clustering, have a general lack of Republican voter concentration.
The Geographic Concentration of Democratic Voters
(Note: Each voter’s nearest 700,000 neighbors are identified by drawing a circle centered around the voter just large enough to contain a 700,000 population)

The Geographic Concentration of Republican Voters
(Note: Each voter’s nearest 700,000 neighbors are identified by drawing a circle centered around the voter just large enough to contain a 700,000 population)

Figure 2: Relative Clustering of Democratic and Republican voters at the Scale of Congressional Districts in 49 U.S. States

In Figure 3, we directly compare the geographic concentration of Democratic and Republican voters across the states. For each state, the blue asterisk indicates the difference between the statewide Democratic vote share and the percentage of the average Democrat’s nearest 700,000 neighbors who are Democrats. Higher values thus indicate a greater degree of Democratic voter clustering, while values around zero indicate a lack of clustering. Red circles indicate the analogous measurement of Republican voter clustering within each state. This Figure reveals that almost all states have a significantly higher level of Democratic voter clustering than Republican clustering, with Maryland, Texas, and Utah exhibiting particularly large assymetries in partisan voter concentration.
The Geographic Concentration of Democratic and Republican Voters

Figure 3: The Geographic Concentration of Democratic and Republican Voters

Figure 4 returns to the portrayal of Figure 1, zooming in on four states selected to typify the cross-state heterogeneity that will be exploited in the remainder of the paper. Before moving on, it is useful to foreshadow our main argument using these examples. Thinking in one geographic dimension for simplicity, districting can be conceptualized as a process of drawing vertical partitions in Figure 4, each containing enough dots to include roughly
700,000 voting-age individuals. In states where the relative concentration of Democrats is low, e.g. South Carolina or Connecticut, the result of this process is that the losing party can expect rather similar results in statewide and districted elections because it does not have sufficiently large contiguous clusters of supporters to facilitate local majorities.

Figure 4: Political Geography in Four U.S. States

However, in states with highly clustered Democrats, districting generates a predictable loser’s bonus. In states like New York, Democrats are inefficiently clustered in New York City, which is much larger than the scale of a Congressional district, and in upstate cities that are much smaller, such that a number of majority-Republican districts emerge in the suburbs.
of New York City and in upstate New York. In states like Tennessee, even though the rural
and suburban Republican vote shares (and hence the overall statewide vote share) are high,
Democrats are clustered in Memphis and Nashville in sufficient numbers that partitioning
schemes reward the Democrats with urban seats.

Districting and the Loser’s Bonus

One of the enduring contributions of Gudgin and Taylor (1979) is the observation that in a
two-party system, when there are distinct geographic clusters of votes for the two parties—
for example working-class and professional neighborhoods within towns—and when the size
of districts is larger than the homogeneous clusters, the distribution of partisanship across
districts will often approximate a normal distribution, and the votes-to-seats relationship
tends toward something like the familiar “cube law” identified by Kendall and Stuart (1950).

Figure 5: Hypothetical polity with a tied election
In the contemporary United States, where the urban core of most cities is overwhelmingly Democratic, suburbs are heterogeneous, and exurbs and rural areas are Republican, the analogous scenario is one in which urban core areas are uniformly small relative to the size of Congressional districts. To see this, let us examine a stylized example of a state, portrayed in Figure 5, with four cities. Each square is a census unit containing 5,000 people. Let us imagine that the voting behavior of each unit is completely homogeneous. In blue squares, all 5,000 votes go to Democrats. In red squares, all 5,000 voters are Republicans. In this example, there are four completely Democratic cities, each containing 20,000 voters (four census units), the boundaries of which are illustrated with gray dashed lines. Each city is surrounded by a ring of politically heterogeneous suburbs. In each city, the blue and red squares are perfectly balanced in the first ring of suburbs, such that the Republican vote share is 50 percent. However, in the exurban and rural census units that lie beyond, the Republican vote share reaches 60 percent. This spatial pattern, captured by the graph on the right in Figure 5, is quite typical of U.S. cities and their surroundings.

In this hypothetical state, the number of Democrats and Republicans is exactly equal, but the Democrats are more geographically clustered than the Republicans. The implications of this asymmetric clustering for political representation depend crucially on the scale of districts relative to the size of the clusters. Imagine that this polity must be divided into districts of 80,000 individuals. Let us set aside the possibility of partisan gerrymandering, and impose a grid that creates 9 compact, square-shaped districts, as in Figure 6. The cities are small relative to the scale of the districts, such that each city only accounts for a quarter of a district. The distribution of partisanship across districts is captured in the symmetric histogram on the right. Five of the districts are toss-ups, two are won by the Democrats,
and two by the Republicans.

Figure 6: Hypothetical polity with small cities relative to the scale of districts

Next, let us consider scenarios in which one of the parties suffers from a scandal or benefits from a strong economy and the election is no longer tied. To do so, we simulate 10,000 elections in which one census unit is randomly selected to switch from the Democrats to Republicans, then do the same for two, three, and so on until the Republicans win all of the census units. We conduct the same exercise in the opposite direction. For each scenario, we calculate the average seat share across all simulations. The resulting vote-seat curve is displayed with the dashed line in Figure 7. The symmetric distribution of Democrats and Republicans across districts means that the translation of votes to seats resembles a standard S-shaped majoritarian vote-seat curve.
For comparison, the dotted black line represents a statewide winner-take-all system, in which the party with a majority of votes wins all of the seats. The vertical distance between the dotted line and the dashed line is the loser's bonus. For instance, when receiving 40 percent of the votes, the Republicans can expect to receive 12 percent of the seats due to the fact that its supporters are able to win some rural-leaning districts. This bonus is perfectly symmetric for the two parties.

This example is meant to capture states, like Iowa, New Hampshire, and Connecticut, where all of the cities are small relative to the size of Congressional districts, and the asymmetric clustering of Democrats is minimal. To see what happens when cities are large relative to the size of districts, as in states like Pennsylvania, Michigan, Tennessee and New York,
let us imagine that each census unit now accounts for 20,000 rather than 5,000 individuals, but the target size of a district is still 80,000 people. This would necessitate a districting scheme like that illustrated in Figure 8.

Figure 8: Hypothetical polity with small cities relative to the scale of districts

This generates four politically homogeneous urban districts. When the statewide vote is tied, the asymmetric urban clustering of the Democrats now undermines their representation. As can be seen in the histogram on the right, there is still a large density of suburban toss-up districts, but the Democrats only win majorities in the four urban districts, while the Republicans have majorities in 8 exurban and rural districts. With half the vote, the expected Republican seat share is 56 percent. This is an example of the classic case of electoral bias owing to an inefficient geographic clustering described by Brookes (1960), Johnston (1977), and Gudgin and Taylor (1979).

Following the approach described above, the bold black line in Figure 7 derives the vote-
seat curve for this example. Several features of this curve are noteworthy. First, the curve is flatter and closer to proportionality than the dashed curve, and hence the loser’s bonus is larger for both parties. First consider the Democrats. Because of their greater geographic clustering at the scale relative for drawing districts, they are able to win more seats when they perform badly (on the right side of the graph) than in the example where cities were small relative to the scale of districts.

Likewise, because the support for the Democrats is so concentrated at the scale relevant for districting, the Republicans are able to string together suburban and rural voters in districts that they win with slim majorities, and relative to the scenario portrayed by the dashed line, they are able to enjoy a larger loser’s bonus. For instance, rather than winning around 12 percent of the seats with 40 percent of the votes, in this scenario they can win around 37 percent of the seats.

The most noteworthy thing about the black line in Figure 7 is that it displays an asymmetry not present in the dashed curve. When the Democrats receive 40 percent of the vote, for instance, they can only expect 30 percent of the seats. The Republicans can actually expect a majority of seats with only 46.5 percent of the votes. By contrast, the Democrats can only expect 39 percent of the seats with 46.5 percent of the votes. In general, throughout the middle part of the graph, where the statewide election is relatively competitive, the Republicans can expect a larger loser’s bonus than the Democrats when cities are large relative to the size of districts.

Figure 7 builds on the intuition of Calvo and Rodden (2015): A two-party system with perfect geographic dispersion of partisanship, such that a party with 45 percent of the overall vote receives 45 percent of the votes in each district, is equivalent to a statewide winner-
take-all system like that depicted with the dotted line— the election winner receives all of the seats. At the other extreme, if parties’ support is perfectly segmented such that each district is homogeneous, representation becomes perfectly proportional to the vote share. Thus the vote-seat curve becomes flatter as partisan support becomes more clustered.

The wrinkle here is that when population density and voting behavior are highly correlated and dense cities are sufficiently large relative to the size of districts, the urban party is more concentrated within districts than the rural party, generating a skew in the distribution of party support across districts, and an asymmetric flattening of the vote-seat curve.

Measuring the loser’s bonus

First steps in establishing the logic of urbanization and asymmetric clustering were taken by Gudgin and Taylor (1979), but these insights have not been systematically tested using data from observed elections. A recent paper by Cottrell (2015) simulates a large number of hypothetical electorates using a computational modeling approach, generalizing the insights from the examples above about the relationship between asymmetric partisan clustering and the asymmetric flattening of the vote-seat curve. Instead of generating synthetic electorates through computational modeling, the central task of this paper is to exploit the observed political geography and partisanship demonstrated by the U.S. states, focusing in each state on the loser’s bonus by contrasting the expected outcome of at-large elections with the expected outcome of districted elections.

The goal of our empirical analysis is to estimate the loser’s bonus arising purely from the imposition of partitions on a state’s partisan geography. That is, we wish to avoid
drawing inferences from implemented districting plans that may have been colored by efforts to favor the incumbent party or comply with the Voting Rights Act. In our stylized examples, geographic space had only longitude and no latitude, and with equal-population districts, discretion in districting was not possible. In the real world of American redistricting, politicians have considerable discretion over the way urban, suburban, and rural voters are partitioned into districts. For instance, if the Democrats are able to form a majority in a state like Illinois and can draw radial districts from Lake Michigan out into the Chicago suburbs, they might be able to reduce the anticipated hefty “loser’s bonus” that would be enjoyed by Republicans because of the inefficient concentration of Democrats in Chicago.

Initially we wish to hold these factors constant, not because they are unimportant, but because they might obscure the underlying logic of partisan geography. In order to do so, we generate our own partitions using a districting simulation algorithm that generates compact, contiguous, equal-population districts in each state. The simulation algorithm is described in detail in the Appendix.

Next, we need a way of estimating the mapping of presidential votes to seats associated with these simulated districts. We estimate a district-level logit model for each Congressional election from the 110th to the 113th Congress, where actual Republican House victories are a function of presidential votes. We then use this logit model to estimate predicted Republican win probabilities based on the district-level McCain vote share for each simulated district in each simulated plan. We can then calculate the predicted Republican seat share associated with each plan. We simulated hundreds of plans for each state, and we plot the average Republican seat shares across simulations for each state with red markers in figure ??, against the statewide McCain vote share on the horizontal axis.
The red markers represent estimates of Republican win probabilities from the simulations, and are sized to correspond to the number of districts in the state. The blue line represents the estimated probability of Republican victory in a statewide election. The black dotted line represents proportionality.

The blue line corresponds to the predicted probability of victory—estimated from the logit model of Congressional districts—associated with a specific McCain vote share. By plotting the predicted probability of victory for a Republican candidate in a generic state with a specific McCain vote share, we mean to capture the expected outcome of an at-large statewide district on a comparable scale.

For each state in Figure 9, the loser’s bonus is the vertical distance between the middle
of the red marker and the blue line. According to the simulations, in one group of states the Republicans can expect to do much better under Congressional partitioning than under statewide districts. These include some of the largest states, including New York, Maryland, Illinois, California, Washington, and Michigan. These are states with large cities as well as smaller cities, where partitioning schemes create overwhelming victories for Democrats in big cities, while Republicans string together exurban and rural victories, often overwhelming non-metro clusters of Democrats in smaller cities and towns that are too small to form their own districts.

However, as we move past the swing states and into the solidly Republican states, we see that the loser’s bonus begins to consistently favor the Democrats, sometimes quite substantially. In states like Georgia, Texas, Tennessee, Nebraska, Kansas, Louisiana, and Utah, the Democrats can expect better outcomes under single-member Congressional districts than under at-large districts. This is because their vastly outnumbered supporters are efficiently distributed in cities, and unlike the upper Midwest and Northeast, rather few of them are wasted in Republican-leaning rural hinterlands. The simulations produce frequent Democratic victories in Atlanta, Houston, Dallas, Austin, Memphis, Omaha, New Orleans, and Salt Lake City, and occasional victories in places like Kansas City, KS, Louisville, KY, and Birmingham, AL that make Congressional districts—even without the benefit of the Voting Rights Act—a better bet for Democrats than statewide districts.

The states that are on or very close to the blue line are not only small, single-district states but also larger states with geographically dispersed Democrats. As described above, these include states where Democrats are either not especially clustered in cities, or where cities are far smaller than Congressional districts. To show this more clearly, Figure 10 plots
the absolute magnitude of the loser’s bonus in each state against an index of asymmetric Democratic clustering derived from Figure 2 above. Specifically, we calculate the difference between the share of an average Democrat’s nearest 700,000 neighbors who are Democrats and the statewide Democratic vote share.

Figure 10: Relative geographic concentration of Democrats and the absolute value of the loser’s bonus

States with only one Congressional district are not displayed. States where Senator McCain received more than 52.5 percent of the two-party vote in 2008 are displayed in red. States where his vote share was less than 47.5 percent are displayed in blue, and those where it was between 47.5 and 52.5 are displayed in purple.

Figure 10 shows that the extent to which the minority party can expect to do better under Congressional partitioning than under statewide elections is a function of the extent to which Democrats are relatively geographically clustered at the scale of Congressional
districts. While of course the loser’s bonus is quite small in purple states where presidential voting was evenly divided in 2008, the relationship between the geographic concentration of Democrats and the magnitude of the loser’s bonus is strong among both red states and blue states.

As demonstrated in Figure 9, there are several large states whose political geography generates a large loser’s bonus in favor of the Republicans. There are only two relatively large Republican states with a substantial loser’s bonus: Georgia and Texas. Thus on balance, the loser’s bonus favors Republicans. If we multiply each state’s Congressional delegation size by the logit-predicted probability that a Republican wins a statewide race and then sum over all states, we can interpret this as a hypothetical scenario in which a state’s Congressional seats are filled by a statewide at-large election rather than through geographic districts. In this scenario, our logit model predicts that Republicans would win only 46 percent of the seats. Aggregating over all states, our districting simulations produce a roughly even divide between predicted Democratic and Republican seats.

In other words, the simulations suggest that even in a world without partisan gerrymandering, incumbency bias, or the Voting Rights Act, Republicans have a geographic advantage that would make them much better off under a districted system than with winner-take-all states. The U.S. Senate, of course, is based on a partitioning scheme that over-represents the relatively rural states of the economic periphery. When we weight our statewide Republican win probabilities equally for each state and sum them, the estimated Republican seat share jumps from 46 percent to 54 percent. This analysis sheds light on the importance of Senate malapportionment in bolstering Republican representation, and suggests that with equal apportionment of senate seats, the Senate’s partitioning scheme would be more favorable for
Democrats than that of the House of Representatives. Furthermore, it suggests that even if gerrymandering were abolished, a switch to the use of Congressional districts rather than states to allocate electoral votes in presidential elections would generate a striking imbalance in favor of Republicans.

The Loser’s Bonus in Action: Recent Congressional Elections

By combining districting simulations and a simple empirical model linking Congressional victories and presidential voting, thus far we have held constant such factors as incumbency, term limits, racial representation, and partisan gerrymandering. We now ask whether our basic insights about the loser’s bonus hold up in the messier world of observed Senate and Congressional elections with long-standing incumbents and gerrymandered districts. Republican candidates won around 52 percent of all House seats contested from 1996 to the present, and around 52 percent of all Senate seats contested during that period. If we weight these Republican Senate victories by the size of the state’s Congressional delegation, however, the Republican seat share would drop all the way to 46 percent—an almost identical result to that from the simulations.

In other words, as in the simulations based on 2008 presidential data, Republicans appear to have a significant long-term advantage in Congressional vis-a-vis Senate elections when we account for Senate malapportionment. To demonstrate the role of the loser’s bonus in producing this effect, Figure 11 is analogous to Figure 9 above. The horizontal axis represents
the average vote share of Republican candidates across all Senate elections in a state since 1996. The blue markers represent the share of all Senate seats won by Republican candidates during the same period. The red markers capture the share of all House seats in the state won by Republican candidates during this period.

The logic of the loser’s bonus can be seen almost as clearly in the real world as in the simulations. The red markers for all of the large, Democratic states with big cities are far above the corresponding blue markers, indicating that the Republicans make up a far larger share of these states’ Congressional delegations than their Senate delegations. As we move into the Republican-leaning states, most of the red markers are below the blue markers, indicating that Democrats benefit from the loser’s bonus since they have larger House delegations than Senate delegations.
Figure 11: The Loser’s Bonus in Congressional elections, 1996-2016

The red markers capture the share of all House seats in the state won by Republicans from 1996 to 2016. States with two or fewer Congressional districts are dropped. The blue markers represents the share of all Senate seats won by Republican candidates from 1996 to 2016. The black dotted line represents proportionality.

Figure 11 reveals the partisan asymmetry seen throughout the paper. As in the simulations, the states experiencing a significant Republican loser’s bonus are relatively large, as is the size of the bonus. The bonus is smaller in the states where it favors Democrats, and with the exceptions of Texas and Georgia, these are smaller states with relatively few Congressional districts. It is also evident that the loser’s bonus does not kick in clearly for the Democrats until they are a relatively small long-term minority of voters, while it is present
in almost all cases where the Republicans are a long-term minority—even when they are
only a slight minority—and the Republican advantage in the House over the Senate extends
even to cases where Senate races have been evenly divided in the long run.

Part of this advantage is surely driven by gerrymandering by Republican legislatures in
recent redistricting cycles in states like Florida and Michigan. But the loser’s bonus enjoyed
by Republicans is also rather striking—with seat shares roughly proportional to long-run vote
shares—in states like Illinois, California, New Jersey, and Washington, where Republicans
did not draw the districts.

**Discussion and Conclusions**

This paper has provided a new approach to classic questions linking political geography,
winner-take-all districts, and representation. Unlike most of the existing literature, we make
no assumptions about what a “fair” or “just” vote-seat curve looks like, and we avoid the
common practice of simulating tied or reversed elections in order to capture the notion
of asymmetric electoral bias. It is difficult to know what a normatively acceptable vote-
seat curve should look like in a state where one party is as dominant as the Massachusetts
Democrats or the Alabama Republicans, and hypothetical tied Congressional elections are
very difficult to imagine in these contexts.

Instead, we ask a related but distinct question: given their underlying geographic sup-
port bases, which representation scheme—statewide winner-take-all districts or Congres-
sional districts—is more advantageous for which party? We use automated redistricting
simulations to empirically evaluate the notion of the loser’s bonus. As long as the parties are
not perfectly geographically dispersed, the minority party can hope for a larger seat share under a districted system than under a statewide system. We show that the magnitude of this bonus is a function of the extent to which the parties’ support bases are geographically concentrated at the relevant spatial scale for drawing districts.

In the contemporary United States, where population density is highly correlated with Democratic voting, these patterns of partisan concentration are largely a function of patterns of urbanization and industrialization. Democrats win statewide majorities in early-industrializing states of the Northeast, upper Midwest, and West Coast, where their support is often highly concentrated in cities in such a way that allows suburban and rural Republicans to win large numbers of seats in the House of Representatives. In states that industrialized later, many of which are less populous, Republicans are dominant in statewide elections, but Democrats are able to pick up seats when Democrats are sufficiently concentrated—that is, when cities are sufficiently large. Aggregating across all states, the absolute size of the former effect is larger than the latter, and the Republicans are unambiguously better off with a system of winner-take-all districts at the current scale of around 700,000 voters per district.

By no means do these results suggest that gerrymandering is unimportant. On the contrary, by comparing our simulations with enacted districting plans in notoriously gerrymandered states like Pennsylvania, North Carolina, Wisconsin, and Florida, one can rule out the claim that urban geography is solely to blame for asymmetries in the transformation of votes to seats. Nevertheless our approach in this paper was to hold such factors as gerrymandering and incumbency constant in order to focus on geography. This provides lessons that may be useful for debates about redistricting reform. First of all, our simulations suggest that we
should not expect the structural advantage of Republicans in the House of Representatives to disappear if districting is blind as to partisanship and focuses exclusively on compactness and contiguity.

Second, our results shed light on possible consequences of reform proposals or judicial tests that would encourage those drawing Congressional districts to achieve so-called partisan symmetry in the transformation of votes to seats (Grofman and King 2007; McGann et al. 2015). The existing literature has paid little attention to the impact of such rules in lopsided states. Using the traditional approach to electoral bias, in an overwhelmingly Republican state like Tennessee, the presence of two majority-Democratic districts would be viewed as significant evidence of partisan bias against Democrats (see e.g. McGann et al. (2015)). This is because when generating a hypothetical tied election, districts in suburban and rural Tennessee would be artificially inflated to somewhere just below a 50 percent Democratic vote share, and the super-majorities of Democrats in Memphis and Nashville-based Congressional districts would minimize Democratic seat gains in the hypothetical tied election. However, if we focus on the real world of lopsided Tennessee elections, we see that the clustering of Democrats in Nashville and Memphis is actually the Democrats’ saving grace. If a redistricting reform compelled legislators or a commission to seek out partisan symmetry in unusual scenarios like tied elections, they would be forced to break up Memphis and Nashville and link their fragments with the surrounding suburbs and rural areas, potentially destroying the loser’s bonus and handing every seat to the Republicans.

Recent redistricting reforms in states like Missouri and Michigan are beginning to focus explicitly on the notion of partisan fairness. Further thought must go into the definition and tests of fairness in states where elections are typically lopsided. Our results indicate
that breaking up urban Democratic bailiwicks, “unpacking” them in the pursuit of partisan symmetry, is potentially helpful for the Democrats in states like Illinois with strong Democratic majorities. But in states like Tennessee or Utah that are characterized by long-term Republican majorities, similar maneuvers could actually resemble “cracking” gerrymanders that favor the Republicans.

An additional set of reform proposals pertains to the allocation of electoral votes in presidential elections. If all states followed the example of Maine and Nebraska and allocated their electoral votes by Congressional district rather than by state, the result would provide a powerful advantage to the Republicans.

Reformers have also become interested in changing the size of the United States House of Representatives by drawing a larger number of smaller districts, bringing the United States into line with other majoritarian democracies like the UK or Canada. The approach taken in this paper suggests that partisan representation in the United States is shaped by the size of urban agglomerations relative to the size of legislative districts. By focusing on the United States Congress and exploiting variation across states, we have held the size of districts constant and focused on cross-state variation in the relative urban concentration of Democrats. The logic is the same, however, if we hold constant the relative urban concentration of partisans and vary the size of districts. An obvious goal for further research is to examine how the magnitude of the loser’s bonus changes with the scale of districts in each U.S. state.

Finally, the most important contribution of this paper is to use a rich source of variation in partisanship and political geography to test some arguments from the classic political geography literature that have been largely ignored since their introduction by Gudgin and Taylor (1979). Above all, when one party’s support is more geographically concentrated than
its competitors at the relevant scale for drawing electoral districts, the concentrated party is
punished for its concentration when its vote share is high, but rewarded when its vote share
is low. Calvo and Rodden (2015) demonstrate that this is true for British parties as their
support waxes and wanes over time, and here we show that it is true using a cross-section
of U.S. states.

Our approach might also be useful in other advanced industrial federations with two-
tiered systems of representation including winner-take-all districts. In both Canada and
Australia, left parties are more successful in the long run in some regions than others, and in
all regions, left voters are highly concentrated in urban agglomerations while right voters are
more geographically dispersed in suburbs and rural areas. Even beyond the left-right partisan
orientation of advanced industrial democracies, we have clarified a logic whereby asymmetric
geographic clustering can effect the transformation of votes to seats in predictable ways in a
variety of other contexts where voting behavior is correlated with population density.
References


Appendix: The districting algorithm

For each state, we determine the target population of each district in order to produce the required number of Congressional districts, $n$. Each precinct is treated as a building block, and our goal is to create $n$ districts with equal population. We do so as follows:

1. To begin the simulation procedure, each of the precinct building blocks represents a single district. Hence, there are thousands of districts in each state, each containing only one building block at the outset.

2. Randomly select one of these districts and denote it as district $i$.

3. Among the neighboring districts that border district $i$, select the one whose centroid is geographically closest to the centroid of $i$, and denote it as district $j$.

4. Merge district $i$ together with district $j$ in order to form a single new district.

Steps 2 through 4 are repeated over and over again until there are $n$ districts. At this point in the procedure, these districts are geographically contiguous and highly compact due to the nearest distance criterion employed in step 3. However, the districts are not guaranteed to be equally populated. Hence, repeated iterations of steps 5 through 8 are designed to achieve an equitable distribution of population across the simulated districts. These steps iteratively reassign precincts to different districts until equally populated districts are achieved.

5. Among all pairs of districts that border one another, identify the pair with the greatest disparity in district population. Within this pair, let us denote the more populated
district as $m$ and the less populated district as $l$.

6. Identify the set of all precincts currently within district $m$ that could be reassigned to district $l$ without violating the geographic contiguity of either district.

7. For each precinct $p$ satisfying the criterion in step 6, define $D_p$ as precinct $p$’s geographic distance to the centroid of district $m$ minus its distance to the centroid of district $l$.

8. Among the set of precincts that satisfy the criteria in Step 6, select the precinct with the highest value of $D_p$ and reassign it from district $m$ to district $l$. 