Using Legislative Districting Simulations to Measure Electoral Bias in Legislatures

Jowei Chen
University of Michigan

&

Jonathan Rodden
Stanford University

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ABSTRACT: When one of the major parties in the United States wins a substantially larger share of the seats than its vote share would seem to warrant, the conventional explanation lies in overt partisan or racial gerrymandering. Yet this paper uses a unique data set from Florida to demonstrate a common mechanism through which substantial partisan bias can emerge purely from residential patterns. When partisan preferences are spatially dependent and partisanship is highly correlated with population density, any districting scheme that generates relatively compact, contiguous districts will tend to produce bias against the urban party. We apply automated districting algorithms driven solely by compactness and contiguity parameters, building winner-take-all districts out of the precinct-level results of the tied Florida presidential election of 2000. The simulation results demonstrate that with 50 percent of the votes statewide, the Republicans can expect to win around 59 percent of the seats without any "intentional" gerrymandering. This is because urban districts tend to be homogeneous and Democratic while suburban and rural districts tend to be moderately Republican. Thus in Florida and other states where Democrats are highly concentrated in cities, the seemingly apolitical practice of requiring compact, contiguous districts will produce systematic pro-Republican electoral bias.

Can one political party have a long-term legislative advantage over another simply because of the residential locations of voters? This paper builds on classic observations in the political geography literature and mobilizes new data and empirical techniques to demonstrate that this partisan advantage indeed occurs quite dramatically. We use detailed precinct-level voting data, first from Florida and then from several other states to illuminate a pattern whereby urban centers are densely packed with leftists, while right-wing voters form more modest majorities in suburban and rural areas. We show that when contiguous winner-take-all electoral districts are imposed on this relatively common residential pattern, the right-wing party will tend to win significantly more than its proportionate share of legislative seats, even without any intentional partisan or racial gerrymandering in the drawing of districts.

The main goal of this paper is to identify electoral bias that would emerge purely because of partisan residential patterns, as distinct from bias that may be driven by legal constraints or the intentions of partisan cartographers. In order to do this, we make use of repeated computer simulations of the legislative districting process. Before expanding our analysis to a broader group of states, we focus in detail on simulations using precinct-level election results from Florida, where voters were evenly split between Bush and Gore in the 2000 election. We demonstrate that because of the concentration of Democrats in cities, a seemingly apolitical districting process that merely requires legislative districts to be geographically compact and contiguous will repeatedly produce a significant pro-Republican bias in the overall distribution of legislative seats.

The motivation for this analysis comes in part from recent developments in electoral politics in Florida and other U.S. states. In recent presidential elections, attention has focused on the large and evenly divided states of Ohio, Michigan, Pennsylvania, and especially Florida. Yet while the outcomes of presidential and other statewide votes indicate razor-thin margins and a number of victories for Democrats in these states, the Republicans were able to maintain comfortable majorities in the U.S. Congressional delegations and both chambers of the state legislatures, generally surviving even the strong statewide swings toward the Democrats in 2006 and 2008. Even in heavily Democratic New York, the resilience of Republican control of the state senate has been astounding. For many observers, the explanation is clear: in addition to the advantages of incumbency, crafty Republicans controlled the districting process, and they were able to pack Democrats into a relatively small number of districts to generate a more efficient distribution of support for Republicans.[1] In some states, the same effect may have been created by the majority-minority districts that were required or inspired by the Voting Rights Act (See, e.g. Brace, et al. 1987, Hill 1995, Lublin 1997, Cameron, Epstein and O'Halloran 1996, Shotts 2001, 2003, Grigg and Katz 2005). In Florida, South Carolina, and elsewhere, partisan and racial gerrymandering blur together, as seat-maximizing Republicans and minority Democrats form an uneasy alliance to defend districts that increase minority representation while further "packing" Democrats.

Critics of partisan and racial gerrymandering display maps of districts with odd shapes and bizarre subdivisions of municipalities that would make Elbridge Gerry blush. To reform advocates, gerrymandering and electoral bias are serious challenges to democracy with a straightforward solution: strip politicians of their power to draw districts, and following the example of Britain and its other former colonies, create "non-partisan" districting boards, constraining them to draw compact, contiguous districts that respect municipal boundaries while upholding the requirements of the Voting Rights Act. Advocacy groups have introduced referenda to this effect in a number of states in recent years, and the movement is gaining momentum around the country. At the same time, the Supreme Court may eventually insert itself into questions pertaining to the constitutionality of partisan gerrymandering, with a majority of justices now willing to at least consider the

[1] See, e.g., www.fairdistrictsflorida.org and www.lwv.org

development of a workable standard for judging some asymmetric vote-seat curves to be a violation of the equal protection clause (Grofman and King 2007).

The rhetoric of reformers and the debates among judges and lawyers largely adopt the assumption that partisan bias is the result of intentional, strategic behavior by those who control the districting process, or an unfortunate but unavoidable side-effect of majority-minority districts. To the extent that scholars have noticed that electoral bias in the large Eastern and Midwestern states tends to systematically favor Republicans, this is often viewed as an outgrowth of the Republicans' good fortune to control the districting process in those crucial states during recent rounds of redistricting (see Hirsch 2003).

This paper explores a different explanation with roots in classic works of British and Commonwealth political geography. Gudgin and Taylor (1979) show that in a competitive two-party system, if the cross-district support distributions of the two parties are skewed, the party with too many of its supporters packed into the districts of the tail of the distribution will suffer in the transformation of votes to seats. Writing in the 1970s about Britain, they conjecture that due to the inevitability of densely-packed support in coalfields and manufacturing districts, Labour unavoidably faced a right-skewed support distribution, causing it to suffer from a less efficient transformation of votes to seats than the Conservatives. Rydon (1957) and Johnston (1976) provide similar descriptive accounts of electoral bias in Australia and New Zealand respectively. Erikson (1972, 2002), Jacobsen (2003), McDonald (2009a, 2009b) and Rodden and Warshaw (2009) have made similar observations about the relative concentration of Democrats in urban U.S. House districts in the post-war period.

Building on this literature, this paper explores the possibility that due to residential patterns of Democrats and Republicans, many of the observed patterns of electoral bias in the United States would appear even without overt partisan or racial gerrymandering. It does so by examining a large set of hypothetical districts in addition to the much smaller set that we observe in practice.

Focusing on the example of Florida, we begin with a basic observation about the geographic distribution of partisanship in the United States: Democrats tend to be highly clustered in densely populated urban precincts, while Republicans are more evenly distributed in the relatively sparse precincts of the suburban, exurban, and rural periphery. Thus precincts in which Democrats typically form majorities tend to be more homogeneous than precincts in which Republicans form majorities, but more importantly, when those precincts must be combined with neighboring precincts in order to form winner-take-all districts, the nearest neighbors of Democratic precincts are more likely to be Democratic than is the case for Republican precincts.

After demonstrating these facts with some simple spatial statistics, we use automated districting algorithms to show that when geographically contiguous districts are drawn on top of this very typical American partisan geography in a way that is blind to partisanship and race, the Democrats can expect well below 50 percent of the seats when they obtain 50 percent of the vote. This bias against the urban party does not require any intentional manipulation of maps by its opponents, and it does not require majority-minority districts.

We could have used any of a number of urbanized states for our in-depth analysis, but we choose the notorious 2000 Florida presidential election for both substantive and methodological reasons. First, districting reformers in Florida have invested enormous energy and resources into passing a referendum in 2010 that aims for the type of party- and race-blind districting process that our algorithm attempts to implement. More importantly, we choose Florida because it allows us to examine Republican seat shares under various hypothetical districting schemes with the knowledge that the underlying election was an exact tie. Our simulations indicate that if Florida is divided into any reasonable number of districts, with no attention given to race or partisanship in the districting process, Republicans will hold an electoral majority in approximately 58-61% of these districts. Furthermore, we show that as Florida is hypothetically divided into larger numbers of smaller districts, the size of this bias decreases. But in order for the pro-Republican electoral bias to disappear with our simulation approach, Florida would need to be divided into an impracticably large number of legislative districts.

The relationship uncovered in our simulations is clearly reflected in observed electoral bias in Florida. Analysis of data from actual district-level election returns in both chambers of the Florida legislature as well as the Florida delegation to the U.S. Congress indicates that Republicans can indeed expect a large seat advantage with 50 percent of the vote. In short, while we do not claim that efforts at minority representation or Republican gerrymandering are inconsequential, we demonstrate that a substantial share of Florida's observed electoral bias can be accounted for without them, and may not go away even if they are successfully abolished.

In the penultimate section, we extend our simulation approach to a sample of XX additional states. In states where support for Democrats is concentrated in densely populated areas, our simulations indicate that as in Florida, party- and race-blind districting schemes tend to create pro-Republican bias. However, we also see that there are several states in which Democrats are not especially concentrated in cities, and in these states, the simulations produce either no bias or pro-Democratic bias. This larger number of states also allows us to further validate the simulation approach by demonstrating that the key characteristics of our simulated districts track closely with those of the districting plans currently in place. We argue that this type of cross-state comparison of simulated and real districting plans holds potential as a way of identifying instances in which intentional partisan or racial gerrymandering are most consequential.

Finally, the concluding section addresses debates about redistricting reform and the role of the courts in adjudicating claims of partisan bias. While it may seem quite reasonable to outlaw the use of political and demographic data in the districting process and delegate the job to independent boards or even computer programmers with a mandate only to maximize compactness, contiguity, and respect for municipal boundaries, in many large, urban states this might lock in rather than ameliorate partisan bias even without any consideration of the Voting Rights Act. Moreover, if reformers or judges wish to reduce partisan bias, they should ignore the intentions of cartographers and push for an empirical standard that assesses whether a districting plan is likely to treat both parties equally (e.g. King et al 2006 or Hirsch 2009).

1. Political Geography and Electoral Bias

1.1. The Geographic Distribution of Democrats and Republicans

Electoral maps from recent U.S. presidential elections communicate rather clearly that in much of the United States, support for Democrats is highly clustered in densely populated city centers, declines gradually as one traverses the suburbs and exurbs, and levels off in largely Republican rural areas. An additional observation is that in the rural periphery, there are scattered pockets of strong support for Democrats in smaller agglomerations associated with 19th century industrial activity along railroad lines, canals, and rivers, as well as in college towns.

FIGURE 1 HERE

In order to display the relationship between population density and voting behavior, we have matched precinct-level results from the 2000 presidential election to precinct boundary files produced by the census department, and using GIS software, we have generated block-group estimates of election results, which we plot against population density data from the census in Figure 1.[2] The relationship between population density and Democratic voting is striking in general, but there is some cross-state heterogeneity. The relationship is most pronounced in the most industrialized and urbanized states, including Florida, but it is less pronounced or lacking altogether in less industrialized Southern states with large rural African American populations and in relatively sparse Western states.

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[2] The coverage of states was limited by our ability to match the precinct-level election results with GIS boundary files.

FIGURES 2 AND 3 HERE

It is important to note that the densely populated urban districts in the lower right corners of the scatter plots in Figure 1 are not randomly distributed in space; many of them are in close proximity to one another. Zooming in on Florida, Figure 2 provides a map of results of the 2000 presidential election, where the centroid of each block group is represented as a dot the goes from blue to red according to the Bush vote share. This map demonstrates that support for Democrats (blue) was highly concentrated in downtown Miami and the other coastal cities to its immediate North, as well as downtown Orlando, Tampa, St. Petersburg, Daytona, Gainesville, Jacksonville, Tallahassee, and Pensacola, as well as a few other smaller cities. The suburbs of these cities, along with rural Florida, while largely leaning Republican, are fairly heterogeneous.

Figure 3 provides another way to visualize the spatial arrangement of partisanship in Florida. We have calculated the distance in kilometers between the centroid of Miami's central business district, and the centroid of every census block group in Florida. Figure 3 displays this distance on the horizontal axis, and the Bush vote share on the vertical axis. As one moves along the horizontal axis, one travels further and further from Miami, eventually ending up in the panhandle on the far right side of the graph. Close to the origin of the graph are a large number of extremely Democratic precincts in downtown Miami, and as one moves out from the city center, across the Miami River to the South is an intense patch of Republican support in Little Havana (see the Miami inset in Figure 1), but as one moves further North along the coast, one continues to pass through a large number of densely populated and extremely Democratic neighborhoods before reaching more heterogeneous suburban neighborhoods where the Bush vote share, on average, only slightly exceeds 50 percent. The tips of each of the other "stalactites" in Figure 3 is a city center, where well over 90 percent of the votes went to Gore. The counties in which Florida's largest cities are located are each marked with a separate color, and the identity of the largest city in the county is indicated in the legend. In each case, as one moves outward from the city center, the Bush vote increases, and each city is surrounded first by a very mixed area and then a suburban periphery that returned solid but not overwhelming support for Bush, and then a rather heterogeneous but moderately Republican periphery. This pattern can also be seen clearly in the insets for Orlando, Jacksonville, and Tampa in Figure 2. Graphs and maps like Figure 2 and 3 look extremely similar in all of the other urbanized states of Figure 1 that are characterized by high correlations between population density and voting.

Two important facts emerge in Figures and 2 and 3 that have important consequences for districting. First, Democrats are far more clustered within homogeneous precincts than are Republicans. For example, while Bush received over 80 percent of the vote in only 80 precincts, Gore received over 80 percent in almost 800 precincts. Second, by observing the clustering of dots in Figure 2 and the stalactite shape of cities and their surroundings in Figure 3, one can see that the Democratic precincts tend to be closer to one another in space than Republican precincts. That is, the nearest neighbors of predominantly Democratic precincts are more likely to be predominantly Democratic than is the case for Republican precincts.

Some simple spatial statistics allow us to move beyond mere visualization of this relationship. First, we can identify the nearest neighbor of every precinct, defined as the precinct with the most proximate centroid, and ask whether that neighbor has the same partisan disposition. No matter what cut-off we use to differentiate "Democratic" and "Republican" precincts (e.g. lower than 40th vs. higher than 60th percentile values of Bush share, 30th vs. 70th, etc.), we find that indeed, the nearest neighbors of Democratic precincts are significantly more likely to be Democratic than is the case for Republicans, whose neighbors are more heterogeneous.

Alternatively, rather than forcing precinct partisanship to be binary, it is useful to examine the extent to which each precinct's election results are correlated with those of its neighbors, and ask whether the extent of this "spatial association" is higher in Democratic than in Republican districts. Luc Anselin's (1995) local index of spatial association (LISA) is well suited to this task. For each precinct, i, the local index of spatial association is given by:

$$I_i = \frac{Z_i}{m_2}\sum_j W_{ij} Z_j$$

where:

$$m_2 = \frac{\sum_i Z_i^2}{N}$$

and Z_i is the deviation of Bush share with respect to the mean across all precincts, N is the number of precincts, and W_{ij} is a matrix of weights with ones in position i,j whenever precinct i is a neighbor of precinct j, and zero otherwise. We define "neighbors" as precincts that share any part of any boundary.[3]

FIGURE 4 HERE

Overall, I_i is much higher for Democratic precincts than for Republican precincts. For instance, the average local spatial association for the most Democratic quartile of precincts is just over 2, while the index averages 1.16 for the most Republican quartile. A better way to see this is in Figure 4, which displays I_i for each precinct using an extruded map, where the height of each extrusion corresponds to the extent of spatial association, and the color moves from blue to red as the Bush vote share increases. Figure 4 shows clearly that the most Democratic precincts in Florida's city centers are also those with the highest levels of local spatial association; that is, they are surrounded by other very Democratic precincts. The Republicans do have a couple of pockets of high spatial association, specifically little Havana, suburban Jacksonville, and the Panhandle, but on the whole, Republican precincts tend to be located in more heterogeneous neighborhoods.

1.2. Implications for Electoral Bias

[3] The results are very similar if we use other types of contiguity or distance-based spatial weights matrices.

Whether the work is done by incumbent politicians, districting boards, or computer algorithms, the process of building electoral districts involves stringing together contiguous census blocks. The goal of this paper is to take seriously the rhetoric of reform advocates and implement a districting process in which those blocks are assembled in a way that is insulated from the strategic manipulation of minority groups, incumbents, or party leaders. For instance, what happens if one randomly selects one of the dots in Figure 1 and starts randomly connecting it with surrounding dots until selecting enough dots to draw a state legislative district or Congressional district, and then selects another dot and starts again?

This process is likely to undermine the representation of Democrats in two ways. First, when the initial seed is a precinct in one of Florida's large cities like Miami, Jacksonville, or Tampa, somewhere in one of the "stalactites" in Figure 3, the city is sufficiently large even relative to U.S. Congressional districts that one will likely combine extremely Democratic districts with other extremely Democratic districts to form a district that, in redistricting parlance, is "packed" with Democrats. On the other hand, with the exception of the very heart of little Havana, it is difficult to find a precinct in Florida that, when randomly chosen as the initial seed, would yield a similarly pro-Republican district. This is because in addition to being more heterogeneous internally, Republican precincts tend to be located in heterogeneous (suburban and rural) areas. For instance, after starting with a rural, extremely pro-Republican precinct, in order to reach the population threshold, one must string together precincts that are further from one another and hence more heterogeneous, perhaps even picking up pockets of Democrats in small cities and on the fringes of larger cities.

This highlights an additional problem for Democrats with this type of districting scheme. While some medium-density pro-Democratic districts might conceivably come together to form Democratic districts along the Eastern Coast, there are also small but isolated pockets of strong Democratic support in the medium-density railroad towns and manufacturing centers of the 19th century, like Ocala or Pensacola, especially those, like Tallahassee and Gainesville, that ended up with colleges and universities. When the size of districts is large relative to these small clusters of Democrats, they are likely to be subsumed in districts with comfortable but not overwhelming Republican majorities.

In short, the complex process of migration, sorting, and residential segregation that generated the spatial distribution of partisanship in Florida has left the Democrats with a more geographically concentrated support base than Republicans. Our supposition is that when districts are imposed on this geography without explicit attention to minimizing electoral bias, the result will be a skew in the distribution of partisanship across districts. This skew is at the heart of electoral bias.

2. Automated Districting and Electoral Bias

Studies of electoral bias typically flow from the normative premise that a party with 50 percent of the votes should receive 50 percent of the seats. Empirical studies use either aggregate data over several elections, or transformations of district-level data from individual elections, to examine the seat share that would be obtained by the parties under a hypothetical scenario of a tied election. Our goal is different. Rather than examining the bias associated with existing districting plans, which were undoubtedly influenced by efforts at partisan and racial gerrymandering, we wish to obtain an estimate of the electoral bias that would be obtained under hypothetical districting schemes that are blind to race and party.

Rather than using information from existing districts to simulate hypothetical tied elections, we use information from the precincts of a real tied election, and simulate a variety of districting plans. Building on the thought experiment introduced above, we perform a large number of automated, computer-based simulations of legislative districting plans. Our computer simulations construct these districting plans in a random, partisan-blind manner, using only the traditional districting criteria of equal apportionment and geographic contiguity and compactness of single-member legislative districts. For each of these simulated districting plans, we calculate the Bush-

Gore vote share of each single-member district, and we use this vote share to predict whether the district would have been a Democratic or Republican seat.

Because of the virtual 50-50 Bush-Gore tie in Florida, an unbiased partisan division of Florida's legislative seats would result in approximately 50% of the seats being Republican, defined as any seat having a pro-Bush majority. In other words, we are using the distribution of Bush-Gore (Republican-Democrat) vote shares across the simulated Florida districts as a measure of electoral bias.

In our automated districting simulations, we show that, despite the 50-50 split of the two-party vote statewide, Republicans (Bush voters) actually win well over 50% of the seats in the average districting plan. We repeat these simulations for a very wide range of legislature sizes. For any reasonably-sized legislature – i.e., any legislative size that might be observed in real life – we observe a significant pro-Republican electoral bias in the distribution of legislative seats. For example, when we simulate districting plans in which Florida is divided into 100 single-member districts, Republicans (Bush voters) win an average of 58 legislative seats.

We are certainly not the first to use automated districting algorithms to examine partisan bias. In fact, in the 1960s there was a brief burst of enthusiasm for automated districting as a potential solution to the problem of partisan gerrymandering (Vickrey 1961, Weaver and Hess 1963, Nagel 1965). Our work builds directly on the recent work of Cirincione, Darling, and O'Rourke (2000), who developed a GIS-based approach to automated districting, and Altman and McDonald (2009), who have developed sophisticated and flexible open-source districting tools using geographic information systems. Districting simulations have also been used by McCarty, Poole, and Rosenthal (2009) to examine whether districting generates partisan polarization. McDonald (2009) employed a team of research assistants to manually draw maps according to different criteria (e.g. compactness, respect for municipal boundaries) in order to examine the impact of those criteria.

In this section, we first describe our algorithm for automated districting, and describe how we operationalize the traditional, partisan-neutral, geography-based criteria for drawing legislative districts. We then illustrate the results of the simulations, calculating the distribution of Bush-Gore support across the newly drawn districts. Next, we demonstrate how these results flow from the logic laid out above, and then we illustrate that these simulation results generalize even when we use other Florida elections than the November 2000 Bush-Gore contest. Finally, we contrast these simulation results with observed electoral bias in Florida elections.

2.1 The Automated Districting Algorithm

As of the November 2000 election, Florida consists of 6,045 voting precincts. These precincts are the smallest geographic unit at which election results are publicly announced, so we use the precinct as the building block for our simulations. Hence, a complete districting plan consists of assigning each one of Florida's precincts to a single legislative district. Florida voters cast 5.96 million Presidential election ballots in 2000, so the average precinct cast a total of 986 presidential votes.

We perform our automated simulations using the legislative districting algorithm presented by Cirincione, Darling, and O'Rourke (2000). These authors performed computer simulations of South Carolina's congressional districting to show that the state's actual redistricting plan exhibited significant racial gerrymandering. More importantly, for our purposes, Cirincione et al. (2000) show that their districting algorithm guarantees equal apportionment of population across all legislative districts while substantially achieving geographic contiguity and compactness for nearly all simulated districts. Furthermore, these simulated districts are drawn without regard to either voter partisanship or any demographic information other than simple population counts. Hence, the simulation algorithm is designed to be a partisan-neutral and race-blind districting process, using only traditional geographic criteria.

We implement's Cirincione et al.'s (2000) automated districting algorithm as follows: Suppose we wish to divide Florida into m number of single-member legislative districts, where $m \geq 2$. First, we select one precinct at random and assign it to the first district. Next, we randomly select and add one of the precincts that borders the initially-chosen precinct. We continue building up this first district by adding more bordering precincts until the emerging district contains $1/m^{th}$ of the state's total population. Before we add each additional precinct, however, we first construct the smallest bounding box[4] that encloses all of the existing precincts of the emerging district. When randomly selecting the next precinct for the district, we first randomly choose among those bordering precincts that are already located within the bounding box. Only if the bounding box contains no unassigned precincts do we randomly select among bordering precincts located outside of the box.

Once the first district is fully apportioned, we begin construction of the second district by randomly selecting a precinct among those bordering the first district. The identical process begins anew, except that precincts assigned to the first district cannot be assigned to any further districts. We repeat this process until all m districts have been fully constructed.

Our use of precincts as the building blocks of districting plans introduces the possibility of slightly over or under-apportioned districts, and we address this problem by introducing a simple assumption allowing our simulation algorithm to split precincts. Suppose that an emerging district is currently just below the target population size – that is, it contains just under $1/m^{th}$ of the state's total population. But the addition of one new precinct would increase the district's population well over the target size. To remedy this problem, we split up the new precinct by assigning just enough randomly selected voters from the precinct to our emerging district. The remaining unassigned voters

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[4] Specifically, the bounding box is defined by the four directional (ie, east, north, etc.) extremes among the centroids of the precincts already assigned to the district.

are grouped together as a precinct to be assigned to a later district. Hence, in implementing this remedy, we are effectively assuming that all voters within a precinct are geographically contiguous with one another. This remedy also allows us to simulate districting plans that contain more districts than the total number of precincts in Florida.

Once we have divided all of Florida up into *m* districts, the districting simulation is complete. After completing this districting simulation, we aggregate the precinct-level Bush-Gore vote counts within each district, and determine whether each of the *m* districts is a Republican (pro-Bush) or a Democratic (pro-Gore) seat.

We repeat a simulation of this sort for many different hypothetical legislative sizes, ranging from a legislature of two districts to a legislature of 100,000 districts. For each legislative size, we repeat the simulation procedure 200 times, constructing an independent districting plan each time. For example, we conduct 200 independent simulations dividing Florida into 100 districts; hence, this set of simulations constructs a total of 20,000 districts, of which 11,506 (57.9%) are Republican seats.

To evaluate the accuracy of our simulation procedure, we conduct the same set of Florida districting simulations using the Better Automated Redistricting software created by Altman and McDonald (2009), which includes an implementation of the Cirincione et al (2000) algorithm. Using the Altman and McDonald software for districting plans in which Florida precincts were combined into a reasonable (2 to 200) number of districts, we obtained results that were virtually identical to those reported below.

2.2 Simulation Results

[FIGURE 5 HERE]

Our simulations reveal significant pro-Republican bias in the partisan distribution of seats in any realistically sized legislature; that is, significantly over one-half of the legislative seats have

Republican majorities. Figure 5 summarizes the distribution of seat shares produced under our simulations. In this figure, the horizontal axis represents the number of single-member districts in each simulated plan. The vertical axis reports the average percentage of these districts that have Republican majorities. For each different hypothetical legislative size, the dot represents the mean, district-level Bush vote share across the simulated districts, and the vertical line represents a 95% confidence interval. The Figure illustrates, for example, that when we conducted 200 independent simulations of dividing Florida into 100 districts, Republicans won an average of 57.9% of the seats, with a confidence interval of 57.2 to 58.6%. Overall, this plot illustrates the significant pro-Republican bias that results from the districting of the legislature based solely on the traditional principles of geographic contiguity, compactness, and equal apportionment.

[FIGURE 6 HERE]

Why does this significant pro-Republican bias arise in our districting simulations? Figure 6 illustrates the distribution of district-level Bush vote shares that emerges when we repeatedly simulate dividing Florida into 10 districts. This histogram, reminiscent of the distribution of partisanship across precincts themselves, reveals that Republicans win well over one-half of the seats because of the pattern we described earlier: Democratic voters tend to be clustered in heavily left-leaning precincts, so the Democratic party's electoral base is concentrated in a relatively smaller number of urban-based districts. The Republicans' electoral base, by contrast, is geographically spread throughout the moderately right-leaning hinterlands. As a result, for most reasonable legislative sizes, the distribution of seats across the state consists of a large number of moderately Republican districts in the rural and suburban areas and a relatively smaller number of more extreme Democratic, urban districts. Too many left-wing voters are wasted in urban, landslide Democratic districts, so the overall seat share across the state favors the Republicans.

The plot in Figure 5 details how this pro-Republican bias increases as the legislature grows in size from two to eight districts. A legislature consisting of only two single-member districts will always have exactly one Democratic and one Republican seat, a result that follows naturally from Florida's 50-50 Bush-Gore vote share. But as the legislature grows in size, the partisan division of legislative seats begins to favor the Republicans. When the simulated legislature has eleven seats, Republicans win an average of nearly 66% of the districts.

As the size of the legislature increases beyond eleven seats, some of the medium-density Democratic clusters in suburbs and small towns that had previously been subsumed in their surrounding Republican peripheries begin to win their own seats, and thus the Republican seat share slowly declines. However, a striking result is that the Republicans always continue to control over one-half of the total seats. In fact, this pro-Republican bias never fully disappears until the size of the simulated legislature becomes unrealistically large. As the hypothetical legislature grows in size to several million seats, we approach the equivalent of a direct democracy in which each voter represents only himself or herself in the legislature and the partisan seat share is identical to the underlying population's overall partisanship by definition. Our simulation results in Figure 5 reflect this approach toward direct democracy as the hypothetical legislature becomes extremely large: As the simulated legislature grows to several thousand districts, the pro-Republican bias begins to disappear, and the Republican share of total legislative seats approaches 50%.

Nevertheless, for any districting plan of realistic size, the pro-Republican bias exhibited in our simulations is significant. Florida's state Senate and House chambers consist of 40 and 120 single-member districts, respectively, and the Congressional delegation is divided among 25 districts. Our simulations demonstrate that for these legislative sizes, Republicans should control an average of 58-61% of the seats statewide. The confidence intervals for these estimated average seat shares rule out the null hypothesis of no electoral bias.

2.3 Political geography and the simulation results

Why do Republicans win such a disproportionate share of these 25 districts? The simulations results can help shed further light on the mechanism through which the political geography of partisanship generates electoral bias. In Figure 7, we present the results of 200 independent random simulations in which Florida was divided into 25 districts.

[FIGURE 7 HERE]

Each plotted point in Figure 7 represents one of Florida's 6,045 precincts, and we plot high, medium, and low density precincts separately, referring to them loosely as urban, suburban/town, and rural. For each plotted point, the horizontal axis measures the partisanship of the precinct, as measured by Bush-Gore vote share in November 2000. The vertical axis measures the average partisanship of the 200 simulated districts to which the precinct was assigned during our simulations.

Overall, given the patterns of spatial association reported above, we are not surprised to see a generally positive correlation between the partisanship of a precinct and the partisanship of the legislative district to which the precinct was assigned. In other words, pro-Bush precincts are typically assigned to pro-Bush districts. In particular, the top and middle plots reveal that outside of dense city centers, pro-Bush precincts were almost always assigned to majority-Bush districts. Note that the lower-right quadrants of the plots—where pro-Republican precincts are assigned to majority Democratic districts—are essentially empty.

In contrast, majority-Gore precincts outside of dense urban neighborhoods very often ended up in the upper-left off-diagonal portion of these plots. In other words, while there are quite a few rural, small-town, and suburban precincts where majorities favored the Democratic candidate, they tend to be subsumed in moderately Republican districts. As described above, there are isolated pockets of support for Democrats in college towns as well as blue-collar and/or African-American enclaves in the suburbs of big cities and in small towns with a history of railroad industrialization. However, these are generally surrounded by Republican majorities, and as a result, the Democrats are poorly situated to win districts outside of the urban core.

By contrast, note the bottom plot in Figure 7 illustrates that pro-Gore precincts in urban areas were generally assigned to overwhelmingly Democratic districts during our simulations. There is a large cluster of observations at the bottom of the lower left quadrant of the bottom graph, where Democratic precincts end up in extremely Democratic districts, and few corresponding observations in the extreme upper right of any of the plots. Taken together, these plots show that because of their geographic support distribution, Democrats not only waste more votes in the districts they lose, but they also rack up more surplus votes in the districts they win. These two phenomena explain the rather extreme pro-Republican bias indicated by our simulations.

2.4 Simulations Using Alternative Florida Elections

A possible concern with our simulations is that, for a variety of reasons, Bush-Gore vote shares from November 2000 may not be an accurate measurement of voter preferences among Florida's voting precincts. One reason for this suspicion is that the two parties may have employed geographically asymmetric campaign strategies in 2000; for example, perhaps the Democrats targeted urban voters, while the Republicans targeted the hinterlands. Another reason for suspicion is that in November 2000, various non-presidential elections, such as local and Congressional races, may have affected voter turnout differently in Republican and Democratic regions of Florida. Moreover, we wish to make inferences about the roots of electoral bias in state legislative elections, and it is possible that presidential vote shares are of limited value if the state party system is sufficiently distinctive from the national party system.

To address these and other concerns about the possible uniqueness of the 2000 election, we show that our simulations produce a similar pro-Republican bias when we use alternative election results from different years and offices to measure the partisanship of simulated districts. Specifically, we re-conduct our legislative districting simulations using election results from the following Florida statewide races: 1) The 1992 Presidential election between Democrat Bill Clinton and Republican George Bush; 2) The 1994 Gubernatorial election between Democrat Chiles and Republican Jeb Bush; 3) the 1998 Gubernatorial race between Democrat MacKay and Republican Jeb Bush; and 4) the 2000 U.S. Senate race between Democrat Nelson and Republican McColumm. We choose these four races because in each election year from 1992 to 2000, these are the four races that produced the closest to a 50-50 split of the statewide two-party vote share. It is noteworthy that three of these are for statewide offices, and two are gubernatorial elections. Using each of these four sets of election results, we conduct a new set of 200 random districting simulations for each of a wide range of legislative sizes.

Overall, these new simulations, displayed in Appendix A, reveal a pattern of pro-Republican bias that is comparable to the electoral bias we find in Figure 5. In each election, for any reasonable legislature size, the Republicans win significantly more than 50% of the simulated legislative seats, even though the underlying two-party split in each of the four elections is close to 50-50.[5]

2.3. Observed Electoral Bias in Florida

Next, we ask how the bias estimates from the simulations compare with electoral bias observed with actual districting plans. The most direct comparison is to simply aggregate precinct-level results of presidential elections to the level of state and Congressional legislative districts. The 2000 presidential election provides a nice analytical opportunity since we can overlay GIS boundary files from the 1992 districting plan (drawn primarily by Democrats) that was in effect in November 2000 and sum up the raw precinct-level Bush and Gore votes within those districts, and then do the

[5] Note that some of the differences in estimated bias across elections can be explained by deviations in the overall two-party vote from 50 percent. For example, the estimated bias is unusually large in 1998 in large part because Jeb Bush won by a comfortable margin.

same for the new districts drawn up in 2002 (by Republicans). In spite of the tied election, Bush had a majority in 13 of Florida's 23 pre-redistricting Congressional seats, or around 57 percent. But in the new districts drawn up in 2002, Bush had majorities in 17 of 25, or 68 percent. Above, we used the exact same data to simulate a large number of plans with 23 and 25 districts, and the average among our simulations for this legislature size falls somewhere between that created by the Republican and Democratic districting plans.

In fact, the Republicans seem to have achieved a result that is at or slightly beyond the upper limit of the pro-Republican bias achieved by our party-blind algorithm. This dramatic pro-Republican bias was not a fluke associated with the use of 2000 data. If we apply a uniform swing to the district-level aggregates for more recent presidential elections in order to examine a hypothetical statewide tied vote, we see that Republicans formed majorities in 68 percent of the Congressional districts in 2004, and 64 percent in 2008.

When we aggregate the 2000 presidential results to the level of the 2002 state legislative districts, Bush forms majorities in 61 percent of the lower chamber districts, and 58 percent of the upper chamber districts. These plans exhibit pro-Republican bias that is roughly in line with the simulation results.

As with the simulation results, we can get very similar bias estimates if we aggregate votes in statewide rather than presidential races. But perhaps no matter which statewide elections we choose, examination of hypothetical districts in such races does not capture the dynamics of campaign strategies, advertising, candidate recruitment, and other factors that might be unique to legislative races that take place in geographic districts. Thus it is useful to check these bias estimates against some that can be obtained by using district-level results of legislative elections. Using district-level election results, we use the approach of Gelman, King, and Thomas (2008) to simulate a range of hypothetical tied elections to the state House and Senate, as well as the Florida delegation to the U.S.

Congress between 1992 and 2008.[6] These simulated elections indicate an expected Republican seat share of around 60 percent in the Florida House and Senate, and 68 percent in elections for the Florida Congressional delegation. The results must be approached with caution due to the prevalence of uncontested seats and dominant incumbents, but as with the aggregations of presidential votes, the bias is roughly similar to that uncovered by the simulations for the state legislature, and somewhat larger for the Congressional delegation.

3. Is Florida an Outlier?

The most striking result thus far is the rather consistent size of the pro-Republican bias in Florida measured through each of these rather different techniques. Moreover, it appears that much of this bias would have occurred with a simple districting scheme that is blind to race or partisanship. This raises at least two broad questions. First, to what extent does an urban concentration of Democrats generate a similar political geography of electoral bias in other states? Second, to what extent does the electoral bias that would be generated by our automated districting algorithm track electoral bias observed in actual districting plans of other states?

In order to provide the necessary cross-state perspective, we have attempted to link 2000 precinct-level data reported by county governments with corresponding GIS boundary files provided by the census department. The use of completely different precinct identifiers in the two data sets

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[6] We use the JudgeIt II R package. In conducting the analysis, we have aggregated precinct-level results of U.S. Senate, presidential, and gubernatorial elections to the level of state and Congressional legislative districts. These aggregated results, along with district-level results of past legislative elections (within each redistricting cycle) and a dummy variable capturing whether or not an incumbent is running in each district, serve as covariates in this analysis.

makes this a difficult challenge. While improved coordination between the census department and state election officials will soon allow for a more complete data set for more recent elections, thus far we have only been able to complete the matches for 2000 in 19 states. We have applied exactly the same automated districting algorithm introduced above, and produced graphs like those in Figure 5.

The only difference is that since elections in other states were not tied, before doing the simulations we applied a uniform swing to the precinct-level results in order to examine the seat share in a "hypothetical" tied election. We then pluck out the average bias estimates across all simulations corresponding to the number of districts in each state's lower chamber, its upper chamber, and its U.S. Congressional delegation. A useful feature of the 2000 presidential election is the fact that it was very close in a number of states, so that the uniform swing used to achieve a hypothetical tie is not a far stretch of the imagination. However, in consistently lopsided states like Massachusetts or Oklahoma, a hypothetical tied election requires a good deal of imagination.

Figure 1 revealed that the extent to which Democrats are spatially concentrated in urban areas varies considerably across states. We capture this heterogeneity in a very simple way by using block-group-level data and regressing, state by state, the Democratic vote share in the 2000 presidential election on logged population density, weighting by the block group's population. This coefficient is displayed on the horizontal axis of Figure 8. The vertical axis displays the average estimated Republican vote share obtained from our simulations of the state's Congressional and state legislative districts. Observations above .5 indicate that on average, the districting algorithm produced districts that would turn tied elections into Republican legislative majorities.

FIGURE 8 HERE

Figure 8 suggests that Florida is not an outlier. The correlation between population density and Democratic voting is even higher in several other states, and in most of them, the simulations consistently produced even higher levels of pro-Republican bias than in Florida. Average bias in favor of Republicans was substantial—surpassing five percent of legislative seats—in around half the states for which simulations were possible, and in no state did the simulations produce substantial bias in favor of the Democrats. While more refined analysis of all 50 states is needed once the data are available, it appears that in some of the largest and most urbanized U.S. states, even without overt racial or partisan gerrymandering, the Democrats are at a disadvantage in translating votes to seats simply because their voters are inefficiently clustered in urban areas. According to the simulations, the Democrats do not suffer from this problem in Western and Southern states where their voters are more efficiently spread out in space.

Next, it is useful to take the comparison of simulated and observed electoral bias beyond Florida, both as a reality check for the simulations and as a way of identifying outlier states, which might be flagged as "intentionally" or "overtly" gerrymandered. Again, it is useful to aggregate the precinct-level presidential results on which we base our simulations to the level of actual legislative districts. Gerald Wright has done this for the 2000 presidential election using the districting schemes in place in 2000 and after the 2002 redistricting. Using his data, we apply the uniform swing to the district-level Bush/Gore votes in order to examine hypothetical tied elections, and for both chambers of the state legislature and the state Congressional delegation, we calculate the share of seats that would be won by Republicans. In Figure 9, we plot this against the average Republican seat share emerging from the simulations for the corresponding legislative size, using separate colors for each legislative body.

[FIGURE 9 HERE]

The Northeast quadrant, in which the vast majority of the cases fall, indicates pro-Republican bias on both indicators. The Northwest quadrant indicates anomalous cases in which the simulations indicated some slight underlying pro-Democratic bias, but the distribution of support across actual districts favors the Republicans.

First, the positive correlation between the simulation estimates and those based on actual districts provides a useful validation of the simulation results. For the most part, the large industrialized states where the simulations produced large pro-Republican bias are the same states where the actual districting plans produced similar bias. We have included a 45-degree line, so that any observation above (below) the line indicates that the estimate of pro-Republican bias from the existing plan exceeds (falls short of) that from the race- and party-blind simulations. Most of the districting plans are clustered rather close to the 45 degree line, suggesting that in many states, electoral bias would not necessarily disappear if partisan politicians, minority advocates, and the justice department were simply taken out of the picture.

But more importantly, the graph points to the potential of the simulation approach in identifying outliers. First, there are several conspicuous outliers where the observed pro-Democratic bias is much larger than the simulated bias.   Some are Southern states with rather notoriously non-compact majority-minority districts. The South Carolina and Mississippi Congressional delegations are especially interesting in this regard. The simulations suggest that, probably because of their dispersed, rural African American populations and lack of urban concentration of Democrats, a simple algorithm based on compactness and contiguity would actually favor the Democrats. But this potential advantage is completely reversed by the actual Congressional district boundaries. In the state legislatures, the simulations predict very modest pro-Republican bias, but the observed bias is quite pronounced. At the very least, it is plausible that majority-minority districts provide part of the answer. These graphs demonstrate why, as in Florida, Republicans are such staunch advocates of minority representation in these states.

Some of the outliers might be explained with pure partisan gerrymandering. For instance, the Democrats have controlled the districting process in the New York Assembly, while the Republicans have maintained greater influence in the Senate. In Figure 9, though still modestly biased against the Democrats, state House plans are below the 45-degree line, indicating that Democrats have done somewhat better for themselves than would be achieved under party-blind districting. The Senate plans, thought they demonstrate a 10-point bias that has helped the Republicans maintain senate control in a very Democratic state, are no different than what would be predicted from the automated simulations. Given the pronounced concentration of Democrats in New York's 19th century cities, the job of "packing" and "cracking" requires little creativity on the part of Republicans.

The graphs also display interesting differences before and after the 2002 redistricting. Georgia produced a famously pro-Democratic plan in 2002, and the graphs demonstrate a sudden drop for Georgia from above to below the 45-degree line. As discussed above, the shift from a Democratic to a Republican redistricting plan in 2002 moved the Florida Congressional districting plan in the opposite direction. One can also see a similar move associated with the Republican Congressional districting plan for Virginia.

A careful econometric analysis of cross-state and cross-chamber variation in electoral bias must wait for the implementation of simulations for a larger number of states as the data become available, but this initial cross-state comparative exercise demonstrates the usefulness of automated districting simulations as a baseline against which to compare historical plans as well as the plans that are proposed and eventually adopted in the current and future rounds of redistricting. Even from this small sample of states, an important lesson emerges: substantial observed electoral bias is not necessarily evidence of intentional racial or partisan gerrymandering.

5. Conclusion

This paper has demonstrated that in contemporary Florida and other urbanized states, partisans are arranged in geographic space in such a way that the vast majority of districting schemes favoring contiguity and compactness will generate substantial electoral bias in favor of the Republican Party. This result is driven largely by the partisan asymmetry in voters' residential patterns: Democrats live disproportionately in dense, homogeneous neighborhoods in large cities that aggregate into landslide Democratic districts, or are clustered in minor 19th century industrial agglomerations that are small relative to the surrounding Republican periphery. Republicans, on the other hand, live in more sparsely populated suburban and rural neighborhoods that aggregate into geographically larger and more politically heterogeneous districts. This phenomenon appears to explain a large part of the pro-Republican bias observed in recent legislative elections in Florida as well as other urbanized states.

Our findings do not conclusively demonstrate whether intentional gerrymandering occurs or produces important partisan effects. In a related literature, scholars have taken sharp positions in favor (e.g. Crespin et al. 2007) and against (Abromowitz, Alexander, and Gunning 2006, Mann 2007, McCarty, Poole, and Rosenthal 2009) the hypothesis that gerrymandering affects polarization in the House of Representatives, and scholars have also examined the impact of gerrymandering on the incumbency advantage (Friedman and Holden 2009). A related literature examines the impact of racial gerrymandering on electoral bias (e.g. Hill 1995, Shotts 2001, 2003). Our results cannot be interpreted as clear evidence for or against the hypothesis that racial or partisan gerrymandering causes substantial electoral bias. Rather, our results caution against the temptation to conflate observed electoral bias with intentional gerrymandering. We show that in Florida and many other urbanized states, the Republicans would benefit from substantial electoral bias even if they cede control of the districting process altogether and place it in the hands of computer algorithms or independent boards, so long as these "apolitical" district-drawers ignore political or demographic data and simply draw compact, contiguous districts. While we have not examined the role of municipal boundaries, it stands to reason that an emphasis on respect for municipal boundaries would only strengthen the results presented above (see McDonald 2009b). In fact, the only way for Democrats to obtain a seat share that approximates their vote share in Florida would be to strategically draw wedge-shaped districts emanating from downtown Miami and Tampa into the suburban and rural periphery, yet these would surely draw the attention of the Justice Department.

Given our results, it is curious that a group of left-wing Florida interest groups has recently supported a ballot measure that would generate a non-partisan districting process focusing on compactness, contiguity, and respect for municipal boundaries. One of their main goals is apparently the destruction of non-compact minority-heavy districts that are favored by a unique alliance of Republicans and minority Democrats, both of whom opposed the initiative. Our simulations are meant to mimic the type of districting process that the reformers apparently favor. Our results suggest that while it is at least plausible that such a non-partisan process would reduce some of the bias observed since 2002 by pulling Florida back toward the 45 degree line in Figure 9, Democratic reform advocates are likely to be disappointed, since their efforts would potentially lock in a powerful source of pro-Republican bias.

Although presidential and statewide elections have been quite close over the last decade, the Republicans have consistently controlled between 60 and 70 percent of the seats in the state legislature and U.S. Congressional delegation. Beyond the electoral bias in the transformation of votes to seats that we illustrate in this paper, Ansolabehere, Leblanc, and Snyder (2005) describe another, more subtle impact of the asymmetric distribution of partisans across districts. It is conceivable that because of the extent to which liberals are packed into urban districts, the Democratic platform, or at least its perception by Florida votes, is driven by its legislative incumbents—a small group of leftists from Miami-Dade and Broward counties who never face Republican challengers—which in turn makes it difficult for the party to compete in the crucial moderate districts. This hypothesis may help to explain why the Democrats consistently receive higher vote shares in presidential than in state races.

It is striking that political geography can turn a party with a persistent edge in statewide registration and presidential voting into something approaching a permanent minority in legislative races. Although unlikely, it is possible to imagine that a future Supreme Court might entertain the notion that this situation reaches the rather high bar for justiciability of partisan gerrymandering laid out in *Davis v. Bandemer* (1986), where a gerrymander must be shown to have essentially locked a party out of power in a way that frustrates "the will of the majority." The recent opinions of the pivotal justices, however, betray a notion that a claimant would need to demonstrate that an "egregious" gerrymander is intentional. The key finding of this paper is that dramatic partisan asymmetries in expected seat shares with 50 percent of the vote naturally arise under traditional districting criteria without any partisan manipulation at all.

Our simulations from Florida elections underscore the practical importance of distinguishing between electoral bias resulting from residential patterns and bias resulting from the intentional placements of boundaries (Gudgin and Taylor 1979, Wildgen and Engstrom 1980). From a normative perspective, it is quite reasonable to argue that the former is just as troubling as the latter. Yet curiously, reform advocates—many of them Democrats—have assumed that the problem with partisan bias lies in the manipulation of maps by strategic politicians. As a result, rather than advocating reforms that would explicitly require partisan symmetry in the translation of votes to seats (see, e.g. King et al 2006, Hirsch 2009), they have pushed for reforms that would outlaw the use of political or demographic data and place districting powers in the hands of experts or computer programmers with a mandate to produce compact, contiguous districts that respect municipal boundaries and maintain "communities of interest."

Finally, this paper has introduced a new cross-state comparative research program. A worthy goal for future research is to apply the techniques developed in this paper to a large number of states in order to assess the prevalence of pro-Republican bias and the conditions under which it is most acute. Preliminary analysis suggests that a similar pattern prevails in recent elections in much of the upper Midwest and Northeast, where Democrats are highly concentrated in dense, homogeneous cities, and Republicans maintain modest majorities in more heterogeneous suburbs, towns, and rural areas. In fact, while this geographic pattern has emerged only recently in parts of the South, it has existed at least since the New Deal in the Northeastern manufacturing core (Fenton 1966). In future work, we intend to explore the long-term evolution of electoral bias as a function of urbanization and industrialization. Furthermore, building on the analysis in this paper, it may be possible to contrast observed bias with “latent” bias lurking in the distribution of partisans across districts, and in so doing, help to quantify the impact of more overt racial or partisan gerrymandering.

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Figure 1: Population Density and Republican Presidential Vote Share, Census Block Groups

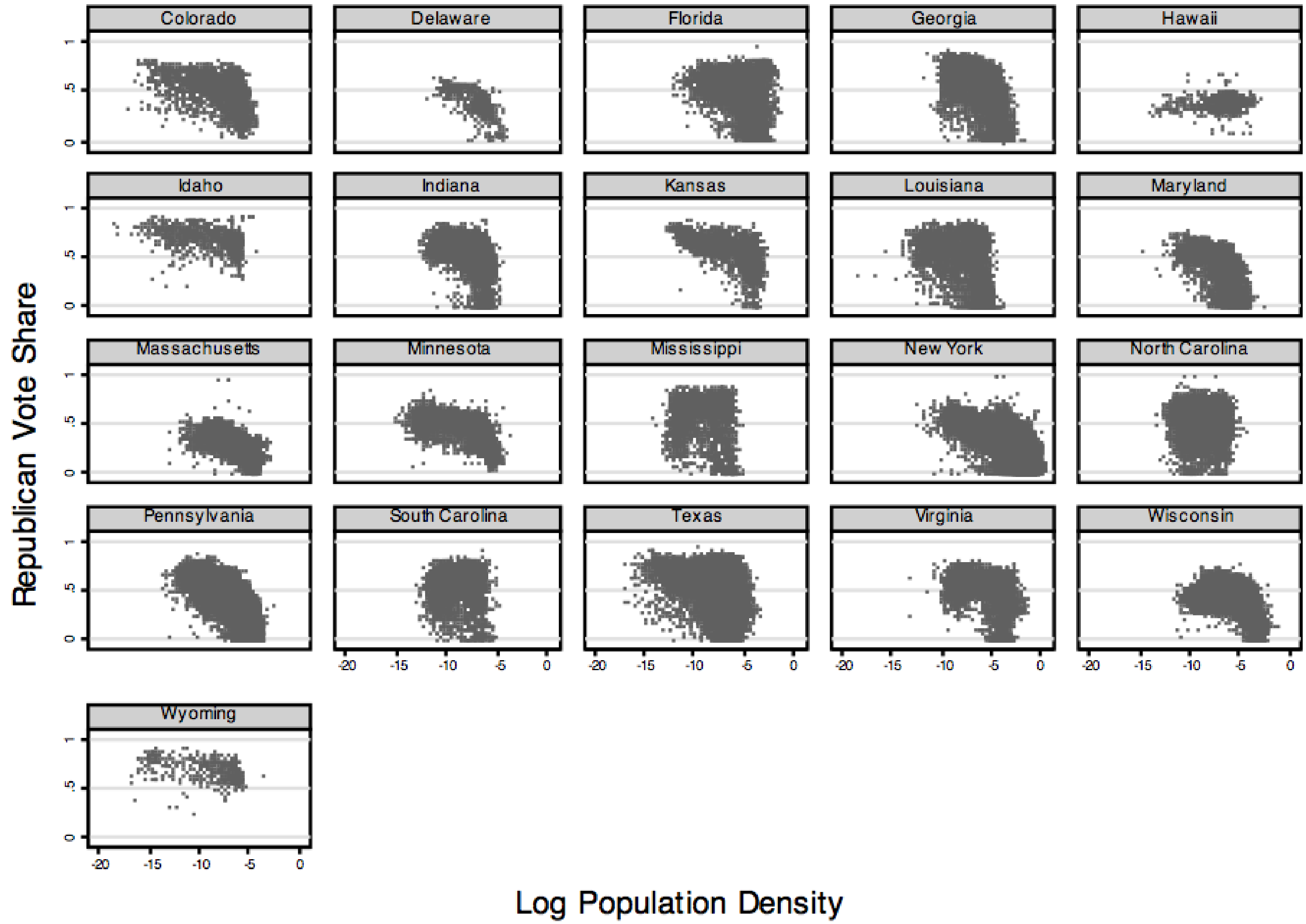


Figure 2: 2000 Bush Vote Share in Florida

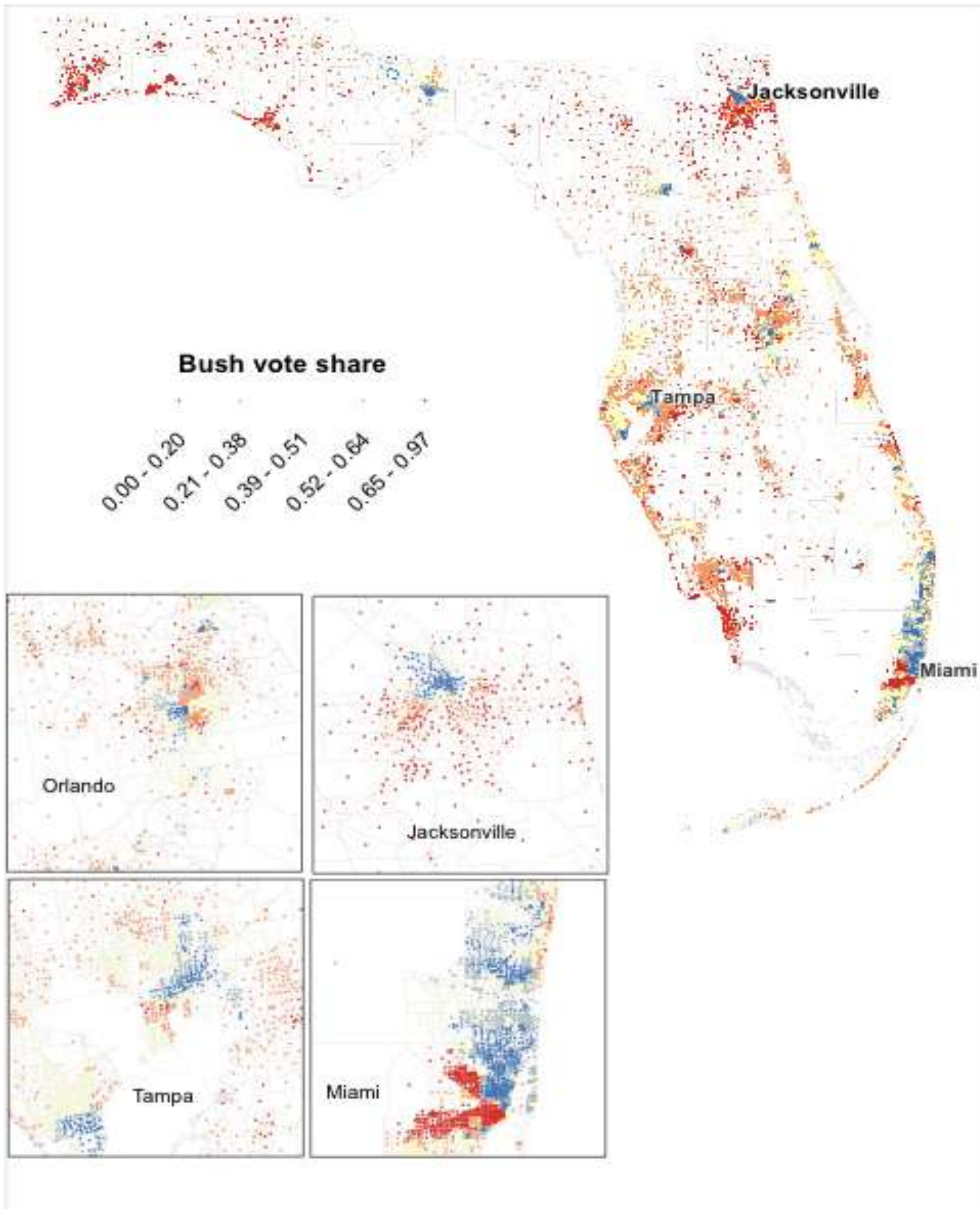


Figure 3: The spatial arrangement of partisanship in Florida

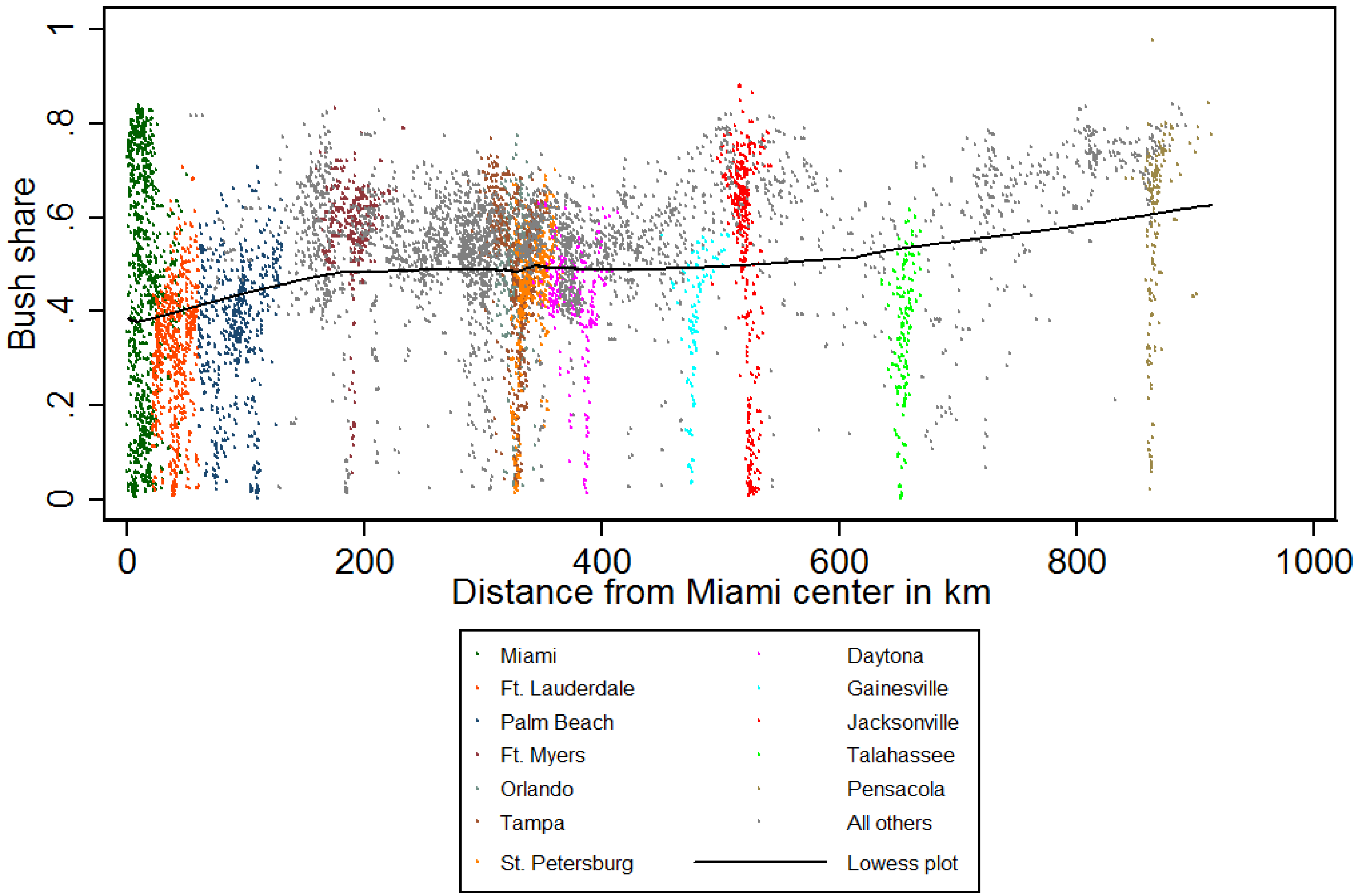


Figure 4: 2000 Bush Vote Share:

Colors correspond to Bush vote share, heights correspond to Local Index of Spatial Association

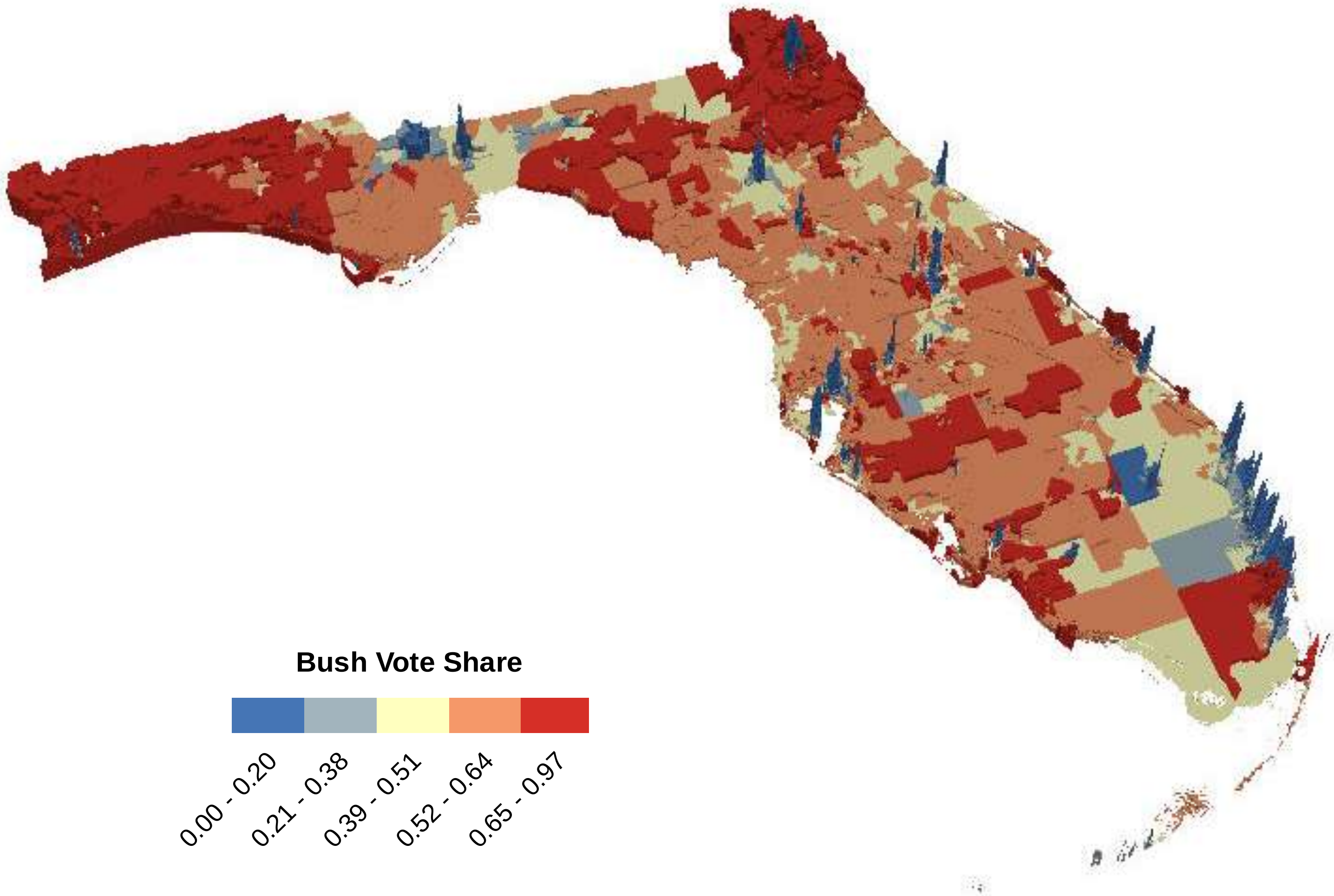


Figure 5: Results of Districting Simulations Using 2000 Bush-Gore Vote Counts

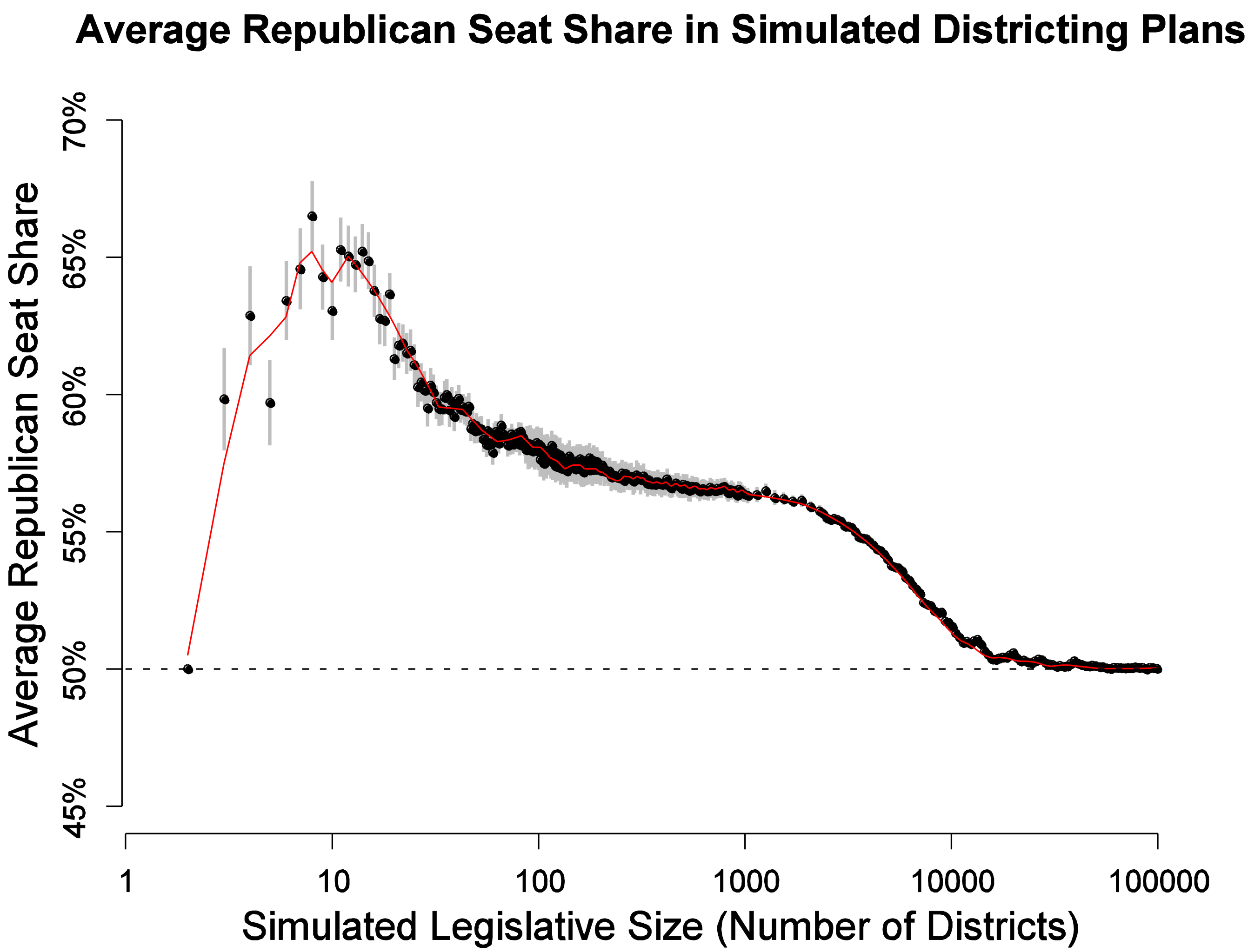


Figure 6: The Partisanship of Districts Created by Random Simulations

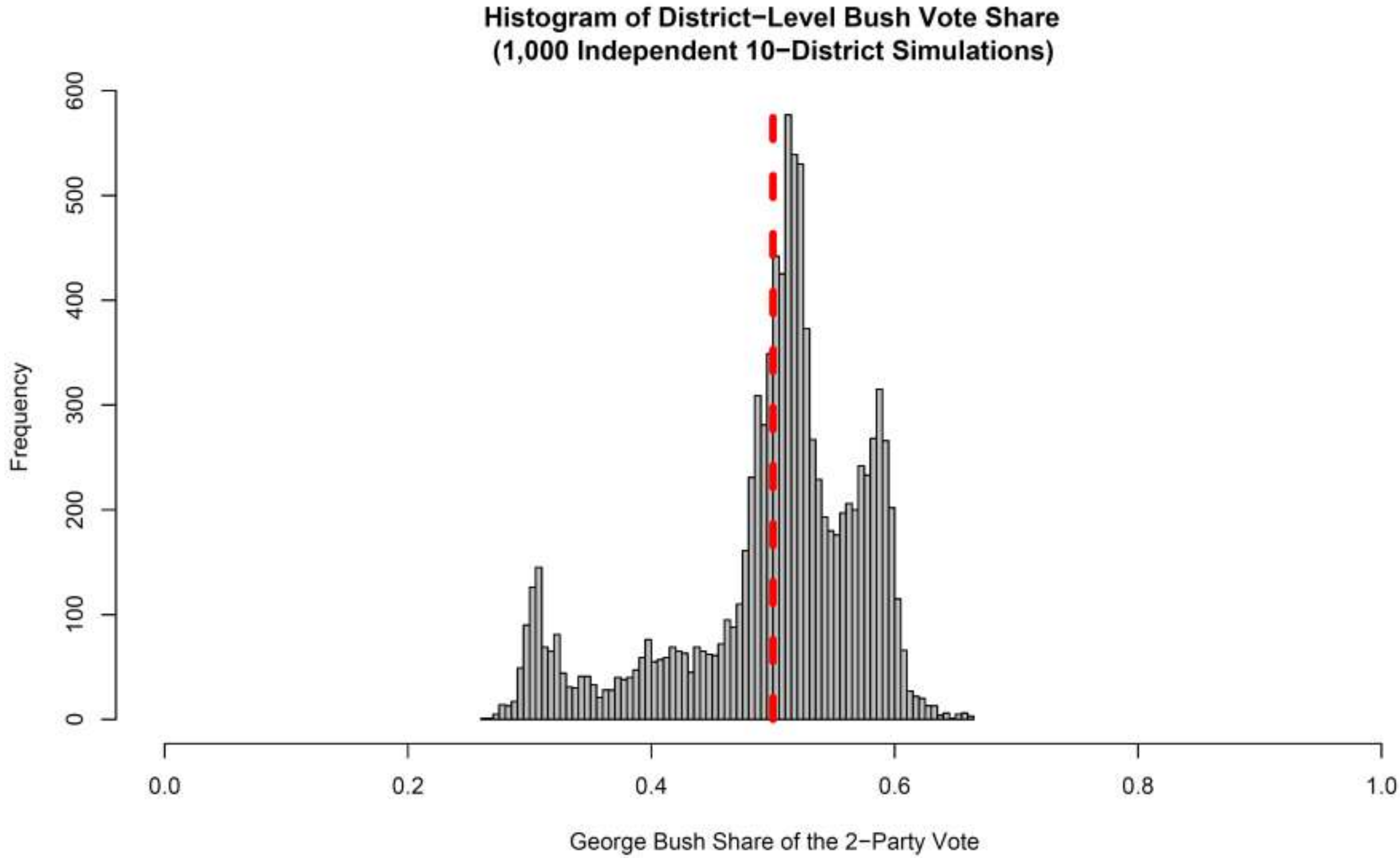


Figure 7: The Partisanship of Precincts' Assigned Districts

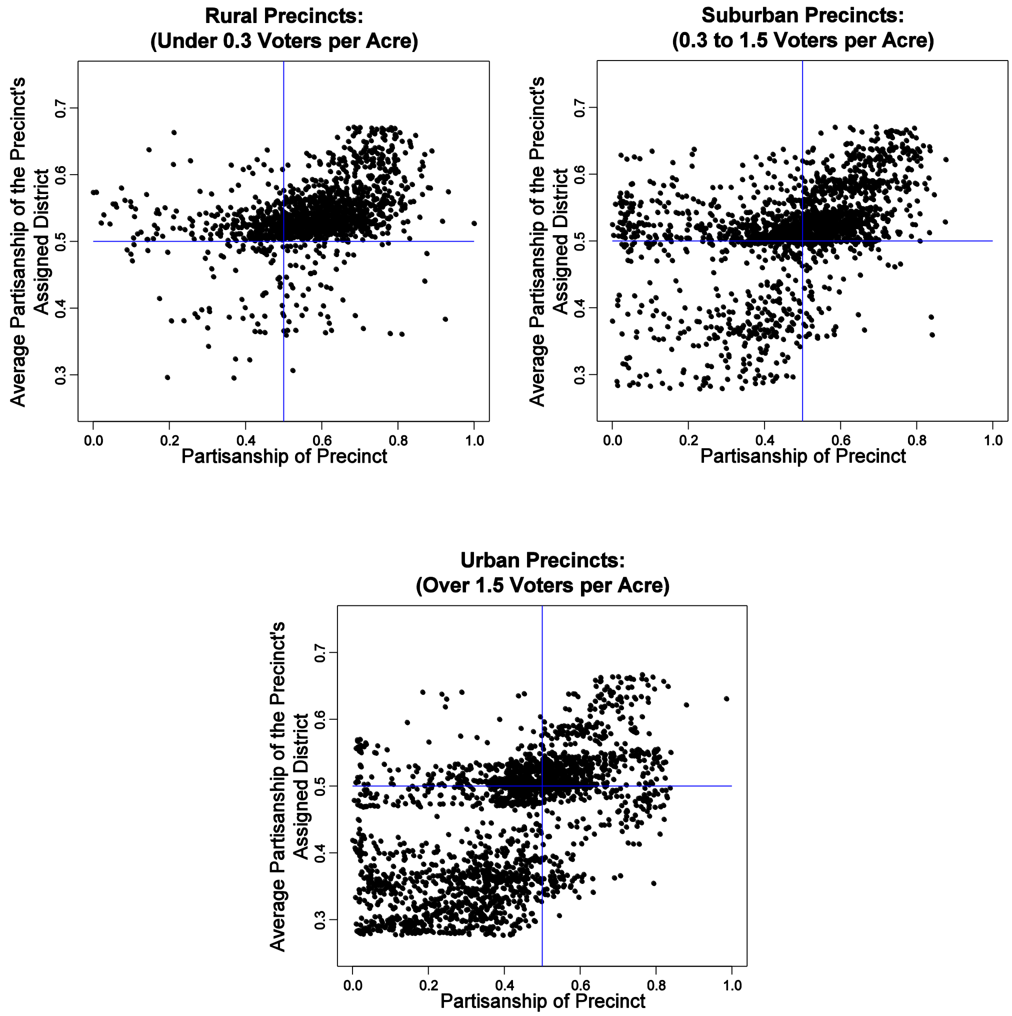


Figure 8: Simulated Electoral Bias and the Urban Concentration of Democrats

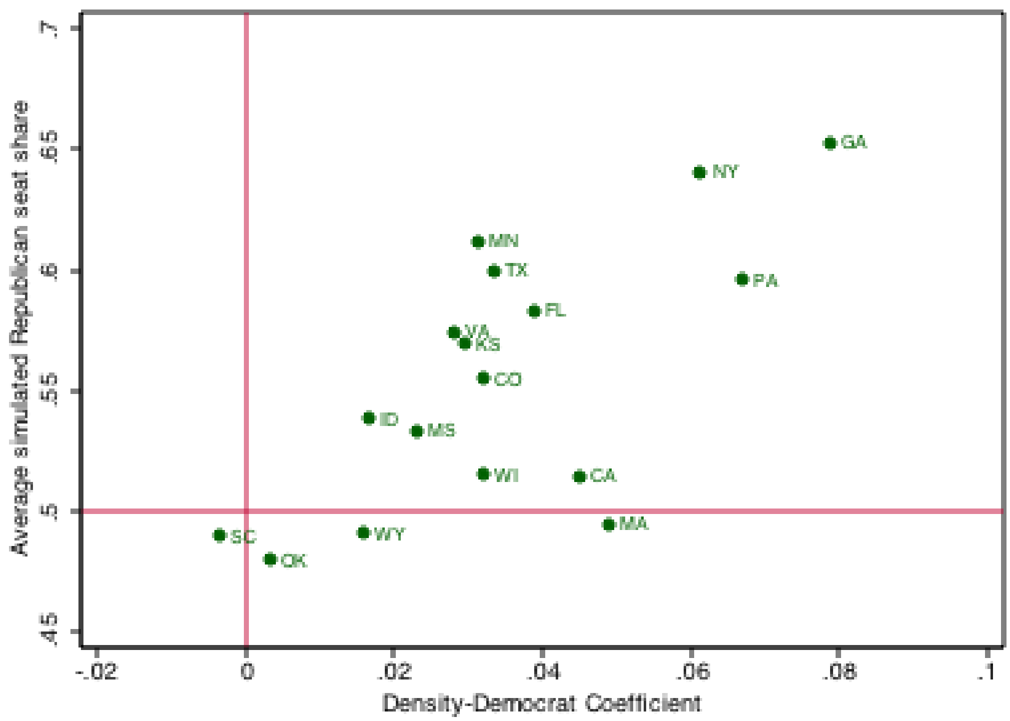
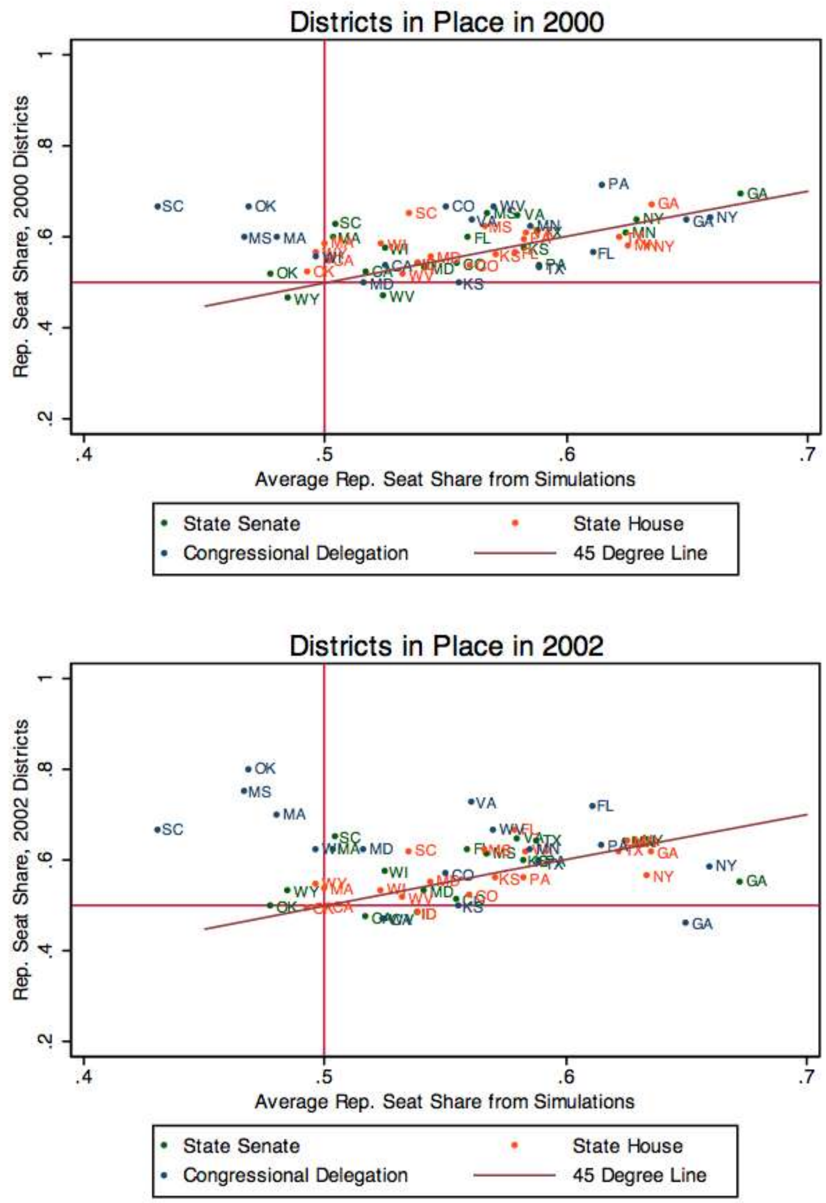
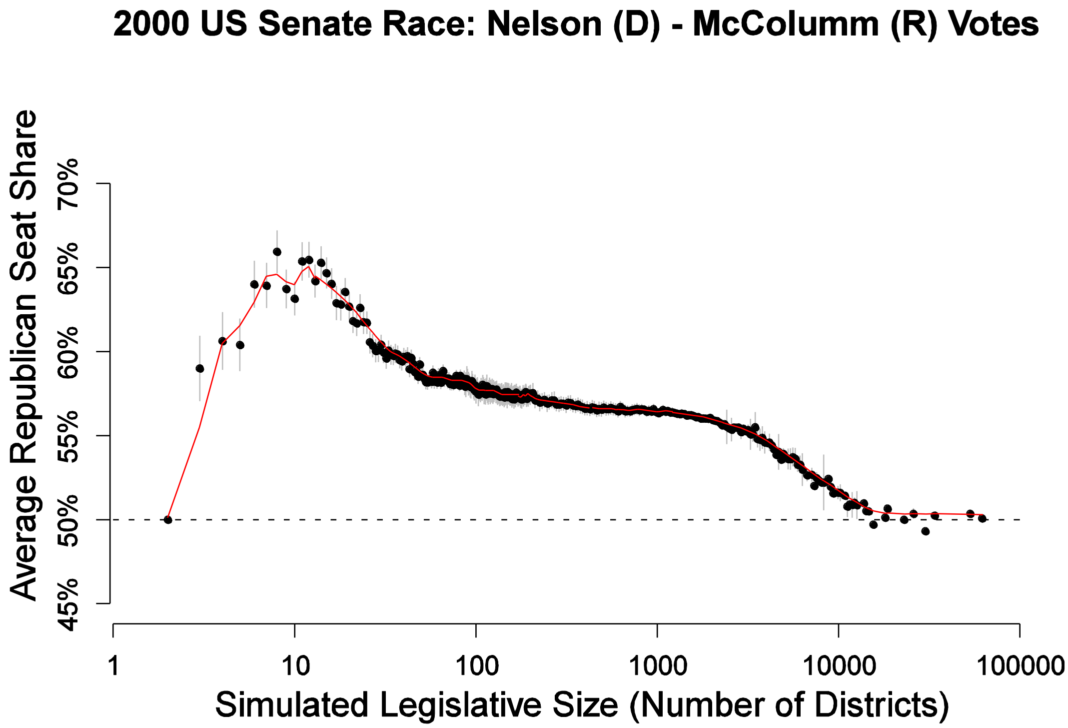


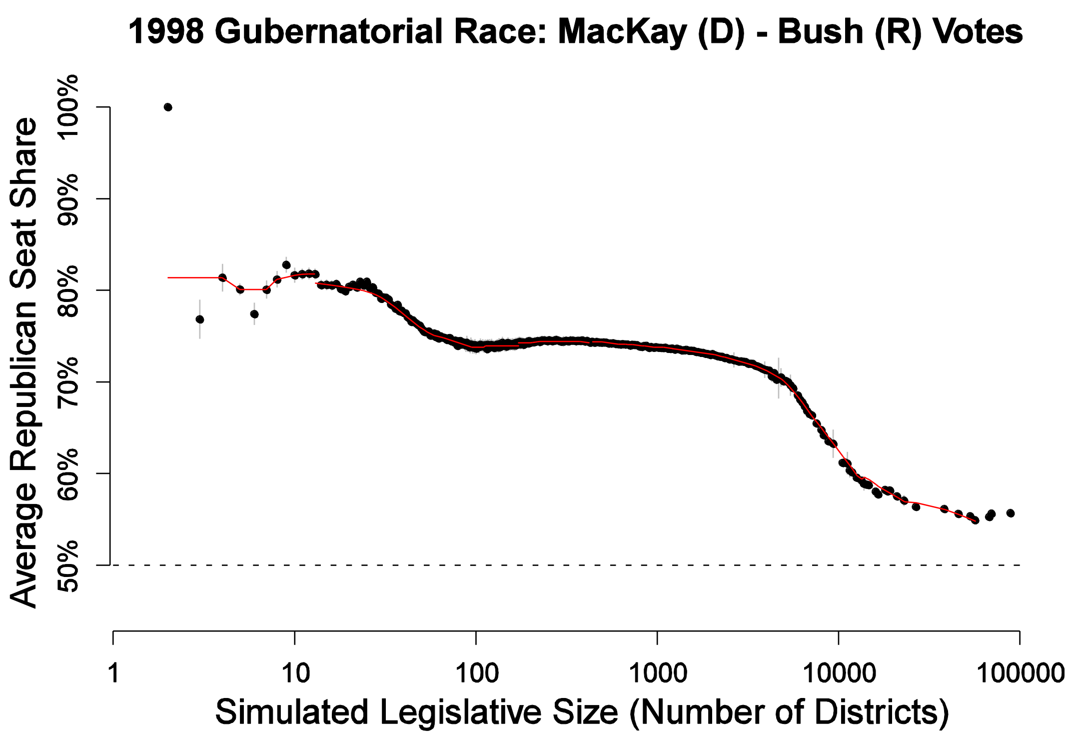
Figure 9: Electoral Bias in Simulated vs. Observed Districting Plans



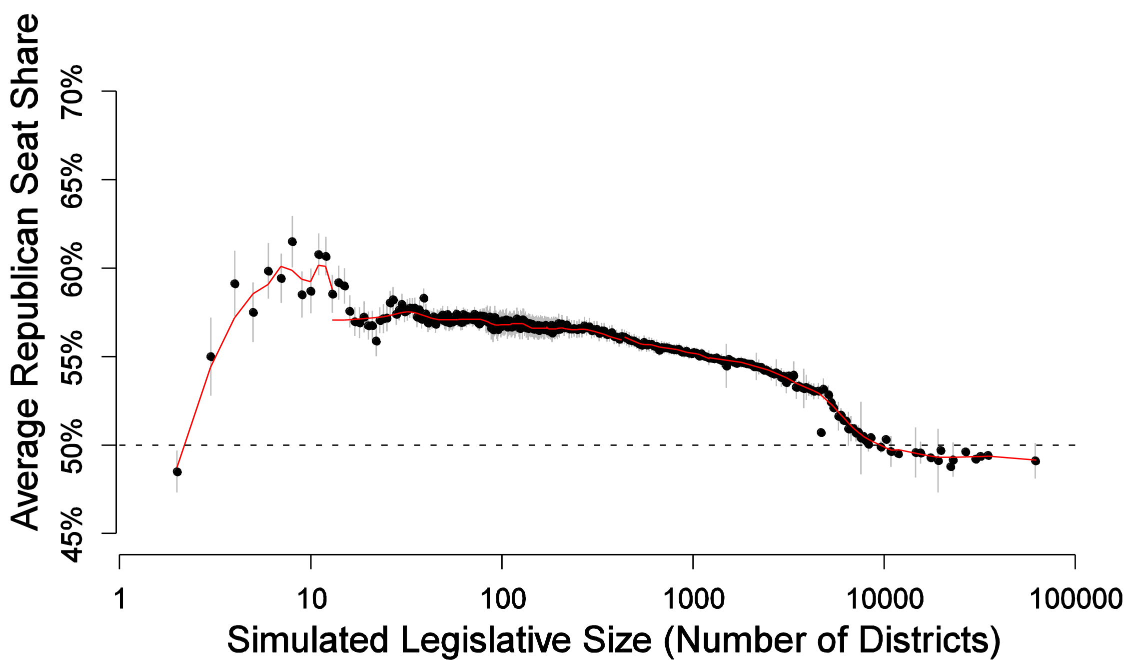
The horizontal axis plots estimates of the share of seats in the legislature that would have Republican majorities from districting simulations under the hypothetical scenario of a tied statewide 2000 presidential vote. Also using 2000 presidential results, the vertical axis plots the percent of seats that would be won by Republicans after applying the uniform swing to votes aggregated to the level of actual districting plans. Each measure is displayed separately for the U.S. Congressional delegation, and the state upper and lower chambers.

Appendix A: Districting Simulations using Alternative Election Results





1994 Gubernatorial Race: Chiles (D) - Bush (R) Votes



1992 Presidential Race: Clinton (D) - Bush (R) Votes