Report on Computer Simulations of Florida Congressional Districting Plans

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Jowei Chen is Assistant Professor of Political Science at the University of Michigan and a research associate at the Stanford Spatial Social Science Lab. He received his PhD in political science from Stanford University. He has published several papers on political geography and districting in top political science journals including *The American Journal of Political Science* and *The American Political Science Review*. He has substantial expertise in the use of computer algorithms and geographic information systems (GIS) to study questions related to political and economic geography and districting. He is co-author, with Jonathan Rodden, of a paper on political geography, redistricting and gerrymandering that is forthcoming in the next edition of the *Quarterly Journal of Political Science*. This paper focuses in considerable detail on the political geography of Florida and the requirements of the Florida Constitution.

Jonathan Rodden is Professor of Political Science at Stanford University, Senior Fellow at the Hoover Institution, and the founder and director of the Stanford Spatial Social Science Lab. He has published books as well as papers on political and economic geography in a variety of journals including *Proceedings of the National Academy of Science, The Journal of Economic Perspectives, The Virginia Law Review, The American Journal of Political Science, The British*
Journal of Political Science, The Annual Review of Political Science, and The Journal of Politics. He has expertise in the use of geographic information systems to analyze districting and the translation of votes to seats in countries around the world. He is currently writing a book on the relationship between residential patterns and electoral bias in the United States as well as other former British colonies that make use of winner-take-all electoral districts based on geography.

In conducting our joint research on residential patterns and electoral bias, we have developed some computer simulation techniques that allow us to produce a large number of alternative districting plans from the building blocks of precincts or census blocks in a state. As required by the Florida Constitution, our simulation procedure ignores partisanship and forms districts based purely on geographic contiguity and compactness.

The attorneys for the plaintiffs in this case have asked us to use our simulations to produce a non-partisan baseline against which to compare the Congressional districting plan submitted by the Florida Legislature. The goal of this report is not only to assess the nature and extent of electoral bias built into the Legislature’s plan, but to contrast it with a baseline level of bias that would emerge from a non-partisan districting process that meets all of the requirements of the Florida Constitution.

Using our simulated districting plans as a baseline, we are able to show that the pro-Republican bias demonstrated by the Legislature’s plan falls outside the range of partisan bias that could be expected from the non-partisan districting process called for in the Florida Constitution. Our simulations show that the number of Republican seats created by the Legislature’s plan is an extreme statistical outlier. We are able to show that relative to a non-partisan baseline, the Legislature’s plan packs Democrats into overwhelmingly Democratic
districts, and increases the number of Republicans in pivotal districts so that they form
majorities. This analysis provides strong evidence that districts were drawn with intent to favor
the Republican Party.

We begin with an explanation of the logic of our simulation approach, followed by an
overview of our technique. Next, we present the results of our basic simulations, and
demonstrate that the Republican plan is clearly more favorable to Republicans than the non-
partisan baseline. The next section examines several permutations in which we make different
assumptions about the requirements of the Florida Constitution pertaining to race and the
preservation of county boundaries, and the final section summarizes our findings.

Why conduct districting simulations?

Article III, Section 20 of the Florida Constitution requires that “No apportionment plan or
district shall be drawn with the intent to favor or disfavor a political party or an incumbent…”
Once a districting plan has been drawn, however, academics and judges face a difficult challenge
in assessing the intent of its authors, especially regarding partisan bias. Whenever political
representation is based on winner-take-all districts, asymmetries between votes and seats can
emerge merely because one party’s supporters are more clustered in space than those of the other
party. When this happens, the party with a more concentrated support base achieves a smaller
seat share because it racks up large numbers of “surplus” votes in the districts it wins, while
falling just short of the winning threshold in many of the districts it loses. This can happen quite
naturally in modern societies due to such factors as housing and labor markets, transportation
infrastructure, and residential sorting by income, race, and lifestyle.
In a forthcoming academic paper, we document that Florida has in the past been a good example of this phenomenon.\(^1\) In recent elections, support for Democrats has been highly concentrated in Florida’s large urban areas including Miami, Tampa-St. Petersburg, and Jacksonville, as well as in smaller agglomerations spread out along 19\(^{th}\) century rail routes, some of which have colleges or universities: e.g. Gainesville, Tallahassee, Ocala, and Fort Myers. Meanwhile, Republicans are more evenly spread throughout the suburbs, exurbs, and rural areas of Florida. Given this geographic distribution, we found that even completely non-partisan redistricting efforts that assiduously suppress all information about partisanship or race might end up producing maps that are advantageous to Republicans. Building on a long tradition in the study of political geography in Britain and its former colonies, we refer to this phenomenon as “unintentional” gerrymandering.

It is also quite possible that partisan bias in the transformation of votes to seats can emerge without intent to favor or harm a political party as an outgrowth of efforts to create majority-minority districts. Since African-Americans tend to vote overwhelmingly for Democrats in Florida and elsewhere, it is plausible that efforts to protect the representation of African Americans will tend to create excessively Democratic districts, and hence partisan bias in favor of Republicans.

When tallying partisan registration or votes in statewide races such as those for U.S. President, U.S. Senator, or Governor, it is clear that Florida’s population is roughly evenly divided between Democrats and Republicans. Yet Republicans have been winning consistent majorities in both chambers of the state Legislature as well as the U.S. Congressional delegation over several election cycles.

This observed asymmetry between votes and seats justifiably attracts attention, and strongly suggests that the maps have been drawn to favor Republicans. However, in order to provide more conclusive proof of partisan intent, it is useful to contrast this observed asymmetry with that which would emerge from the truly non-partisan districting process called for by the Florida Constitution. This would negate the claim that the electoral bias associated with plans drawn by Republican legislators was merely a product of Florida’s residential geography or the need to protect the representation of racial minorities.

In order to make stronger inferences about the presence or absence of partisan intent, it is informative to compare a proposed districting plan with a standard that is based squarely on the non-partisan districting process required by the Florida Constitution. Our computer simulations have been created expressly for the purpose of developing such a standard. To our knowledge this is the most practical strategy for generating a reliable baseline against which to compare proposed districting plans. Our approach is to leave aside any data about partisanship or demographic characteristics other than population counts, and allow the computer algorithm to generate a complete and valid districting plan based purely on geographic contiguity and compactness.

After a plan has been created in complete ignorance of partisanship, we can introduce the precinct-level results of recent elections, sum them over the hypothetical districts, and then calculate the number of seats that would be won by Democrats and Republicans under this districting plan. Instead of generating only one such plan, our algorithm allows us to generate thousands of such plans. Each plan combines Florida’s precincts in a different way. Thus we end up with a large distribution of reasonable non-partisan districting plans. For each plan, we
can sum up the precinct-level votes and calculate the number of seats that would have been won by Democrats and Republicans.

We can then do the same for the actual plan proposed by the Legislature. If we examine the share of districts with Republican majorities in each plan, we should expect that if a districting plan is drawn without partisan intent, this number will fall somewhere roughly in the middle of our distribution of valid non-partisan plans. If the plan produced by the Legislature is far in the tail of the distribution, or lies outside the distribution altogether—meaning that it favors one party more than the vast majority or all of the simulated plans—we have a strong indication that the plan was drawn with intent to favor that political party.

The Districting Algorithm

Our intention is to produce a distribution of plans that is consistent with the dictates of the Florida Constitution. This requires not only that we draw districts that are contiguous, compact, and within the proper population bounds, but also that we abide by the Florida Constitution’s prohibitions against diminishing the opportunities of racial minorities to elect the representatives of their choice. The Florida Legislature interpreted this as requiring them to draw three districts with African-American majorities, which they ostensibly achieved by drawing districts 5, 20, and 24. The African-American populations of districts 5 and 24 appear to fall slightly under 50% of the citizen, voting-age population. Nevertheless, we begin by considering these as fixed, and then generate valid districting plans for the rest of the state. In other words, we give the Legislature the benefit of the doubt that all three of these extremely
Democratic districts are required by the Florida Constitution and/or the Voting Rights Act, and could not have been drawn with smaller Democratic majorities.

Let us then simulate the remaining 24 districts as follows. We begin with 7,393 precincts and wish to create 24 districts with equal population.

1) To begin the simulation procedure, each of the 7,393 precincts represents a single district. Hence, there are 7,393 districts, each containing only one precinct 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 that is geographically closest, and denote it as district $j$.

4) Merge district $i$ together with district $j$ in order to form a single new district. There are now 7,392 total districts remaining.

Steps 2 through 4 are repeated over and over again until there are 24 districts. At this point in the procedure, these districts are geographically contiguous and reasonably 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 $l$.

Steps 5 through 8 are repeated until each of the 24 districts has a population within 5% of the ideal district population. Florida’s population according to the 2010 census was 18,802,690, so the ideal district population is 696,396.

In order to get a feel for the districting plans produced by this procedure, see the sample maps in Figure 1.² We have repeated this procedure 1000 times, and produced a sample of 1000 complete, valid districting plans.

**Main Results**

An aggregation of the precinct-level 2008 presidential votes to the level of the Congressional districts submitted by the Florida Legislature reveals that John McCain received more votes than Barack Obama in 17 of 27 districts (63 percent). Since John McCain received only 48.6 percent of Florida’s statewide two-party vote (the combined McCain and Obama votes), this indicates a rather striking asymmetry between votes and expected seats. While this fact alone is quite suggestive, a comparison of this pro-Republican bias with that emerging from our non-partisan simulated maps provides more conclusive proof of partisan intent given the Republican advantage that may be built into Florida’s human geography.

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² The figures and table that we refer to are attached at the end of the report.
For each of our 1000 plans, we aggregate the precinct-level votes for Barack Obama and John McCain in the 2008 presidential election to the level of simulated Congressional districts, and calculate the number of seats with a majority in favor of John McCain.

Figure 2 presents the distribution of this quantity across all 1000 plans in the form of a histogram. A sizable majority (approximately 64 percent) of the simulated plans fall in the two bins in the middle of the distribution, where the Republicans win either 14 or 15 of the 27 seats. In other words, when we hold constant the three districts proposed by the Legislature as majority-black districts, most of our non-partisan plans would give the Republicans 52 to 56 percent of the seats.

For present purposes, however, attention must be directed to the bins on the right. Of our 1000 simulated plans, only 9.9 percent created 16 majority-Republican seats, and less than 1 percent generated as many Republican seats (17) as the plan submitted by the Florida Legislature.

Our 1000 simulated Congressional districting plans represent a mere sample drawn from the extremely large number of valid, non-partisan plans that could be drawn. When generating this type of sample, the standard statistical procedure is to generate a confidence interval: a range of values that acts as a good estimate of an unknown population parameter. In our analysis, the unknown parameter is the number of Republican seats associated with a truly non-partisan plan.

We construct a standard 95 percent confidence interval by measuring the middle 95 percent range of districting plans produced by our simulation procedure. Specifically, our analysis concludes with 95 percent certainty that a non-partisan redistricting process produces a districting plan that contains between 12 and 16 districts in which McCain voters outnumber
Obama voters. The plan submitted by the Florida Legislature, which contains 17 such districts, falls outside of this 95 percent confidence interval. Hence, we conclude that the enacted districting plan would be an extreme statistical outlier under a partisan-neutral redistricting process. In other words, if the Legislature had drawn the congressional districting plan without partisan intent, the enacted plan would have been statistically very unlikely to have emerged.

In our view, this is the most convincing possible indication that the plan submitted by the Legislature was drawn with intent to favor the Republicans. If one samples again and again from the feasible set of valid non-partisan plans, one is exceedingly unlikely to come up with a map as biased as the map submitted by the Florida Legislature.

Our analysis also makes it possible to get a clearer sense of how this extreme partisan advantage was created. In general, partisan advantage is achieved by stuffing one’s opponents into excessively homogeneous districts that they win with very large majorities, and spreading one’s supporters as efficiently as possible over the remaining districts so as to win them with smaller but tolerably comfortable majorities. This is typically referred to as “packing” and “cracking.” As explained above, Florida’s residential geography produces this effect to some extent even without gerrymandering. Our simulations, however, allow us to examine whether the plan submitted by the Legislature has gone further than what would be expected from a non-partisan plan.

To do so, we can take each simulated plan and arrange the districts from the most Democratic to the most Republican. We can then do the same for the Legislature’s plan, and ask whether it produces Democratic districts that are more “packed” with Democrats than the baseline obtained from the simulations. Moreover, we can ask whether Republican votes are
more evenly distributed across the remaining districts so as to produce more victories in the pivotal districts than would be expected based on our sample of non-partisan plans.

Figure 3 presents this analysis. The districts are arrayed from left to right from the most Democratic district to the most Republican district. The red X markers indicate the McCain vote share of each district in the Legislature’s plan, and the corresponding district number is indicated on the horizontal axis below. We also rank each district within each of our 1000 plans from the most Democratic to the most Republican, representing each district generated by each simulation with a small grey dot, ordering each district within each simulation from the most Democratic to the most Republican.

Recall that the three most Democratic districts on the far left are the heavily African-American districts that we left untouched, so there are no simulation results corresponding to the first three red X markers. These are, of course, overwhelmingly Democratic districts. As we move to the right, the red X markers and the clusters of grey dots become separated, and we see striking evidence of an extremely effective effort to create Republican partisan advantage. In the next four districts, Democrats are far more packed in the Legislature’s plan than in the entire range of plans produced by the simulations (The red X markers are well below the clusters of gray dots).

The partisanship of the 8th most Democratic district (number 22) is roughly in line with the simulations, but after that, we see an abrupt switch. Once we get to the middle of the distribution, into the class of districts that are conceivably winnable by Republicans, the red X markers are either completely beyond or at the very high end of the range of the simulations, indicating that the Legislature’s plan produces a sizable advantage for Republicans in the pivotal districts. The 9th and 10th most Democratic districts would be comfortable Democratic victories.
in the simulations, but in the Legislature’s plan they are much closer to 50 percent.\textsuperscript{3} In the next three districts, the Legislature’s plan produces narrow Republican majorities while the simulations, on average, produce narrow Democratic majorities. Overall, in the middle of the distribution—where districts are most evenly divided between Democrats and Republicans and partisan legislative majorities are won or lost—the red X markers are above the vast majority of the gray dots, indicating that the Legislature’s plan is clearly and consistently more favorable to the Republicans than the non-partisan baseline.

To summarize, our analysis reveals that relative to a non-partisan baseline, the districting plan submitted by the Legislature effectively takes Republicans from solidly Democratic districts and places them in pivotal districts, transforming them from Democratic majorities or toss-ups into Republican majorities.

\textbf{Additional Analysis}

\textit{African-American Representation:}

Thus far our analysis has given the maximum benefit of the doubt to the Legislature by assuming that districts 5, 20, and 24 were 1) African American majority districts required by the Florida Constitution and 2) drawn without partisan intent. Both assumptions are dubious. First, Districts 5 and 20 may not in fact have African-American majorities among voting-age citizen population. Second, it is possible that the extremely large Democratic majorities in these districts reflect efforts to achieve partisan advantage under the cloak of non-retrogression.

Thus it is useful to generate a set of alternative baseline plans that do not rely on these generous assumptions. We proceed by progressively dropping our protections for the

\textsuperscript{3} In 2012, the Republicans in fact won District 13 and lost 18 by a razor-thin margin.
Republicans’ proposed districts, thus throwing more of the precincts into our non-partisan simulation procedure. First, we conduct 1000 simulations that only preserve the majority-black District 24 along with District 5. Second, we conduct 1000 simulations that only preserve Districts 24 and 20. Third, we conduct 1000 simulations that only preserve District 24.

Using the same format as above, Figure 4 through 9 present the results of these simulations. The histograms look rather similar to those above, but they have shifted subtly to the left. In other words, when we break up Districts 5 and 20 and allow the computer algorithm to draw the districts rather than the Florida Legislature, the average plan becomes less biased. In fact, the simulated plans are only very slightly biased towards the Republicans. The simulations almost never produce 17 Republican seats, and even 16 is a rare outcome. Moreover, by contrasting the red X markers with the corresponding gray dots in the graphs of individual districts, it is possible to see that Democrats are far more packed in the Republican plan than in the simulations.

Finally, we simply conduct simulations of all 27 districts using all 8,441 precincts and setting aside no majority-minority districts. With this process, the simulated plans produce one and often two African-American-majority districts purely because of the number and geographic clustering of African-Americans in the Miami area, but we do nothing to intentionally produce such districts. Given the dispersed African-American population in the Northern part of the state, a majority-black district in the Northern Florida never occurs in our simulations based on contiguity and compactness.

In Figure 10, as one might expect, the distribution has shifted even further to the left, so that the baseline simulations are almost unbiased on average. Compared with this standard, the
Legislature’s map with 17 Republican seats is especially extreme. Not a single one of 1000 simulations produced 17 Republican seats, and a vanishingly small number produced 16.

*Hispanic Representation:*

An additional question is whether our simulations might produce plans that inadvertently underrepresent Hispanic voters relative to the Legislature’s plan. To examine this question, we simply examine in closer detail the simulated plans produced by the algorithm described above in which districts 5, 20, and 24 (the majority- African-American VAP districts) are held as fixed in each simulation.

We produce 1,000 simulated districting plans under this algorithm. For each of these simulated districting plans, we calculate Hispanic population among each of the 27 districts within each of the 1,000 simulated plans. We have plotted these district-level Hispanic vote shares in Figure 12, which aligns the districts within each plan from the most heavily Hispanic to the least Hispanic district. Additionally, Figure 12 also displays the Legislature's enacted plan with red X markers, indicating the Hispanic proportion within each district of the enacted plan. The 1,000 simulated plans' district-level Hispanic proportions are depicted by grey dots.

Figure 12 shows that the simulated plans are not notably distinct from the Legislature’s plan on the dimension of producing majority Hispanic districts. Without any intentional effort, the simulation algorithm almost always systematically produces exactly three majority-Hispanic districts, as does the Legislature’s plan. Hence, these results lay to rest any potential concern that our simulation algorithm fails to produce as many majority-Hispanic districts as the Legislature's plan does.
The Preservation of County Boundaries:

The Florida Constitution requires that “districts shall, where feasible, utilize existing political and geographic boundaries.” A possible concern with the simulated districting plans we have presented thus far is that our algorithm, while it forces districts to be reasonably compact, does not explicitly minimize splits of counties and other political or geographic divisions. The most common empirical technique for evaluating plans along this dimension is to count up the number of intact and split counties in a districting plan: By this measure, as detailed in Table 1, the Legislature's enacted congressional districting plan splits 21 of Florida’s 67 counties, and these 21 counties are split into 61 fragments. Yet in parts of Florida there is a tension—enhanced by the peninsular shape of the state—between the goals of compactness and the preservation of completely intact counties. Often the size, shape, and geographic location of a county means that if it is preserved in its entirety, given the need to stay within population bounds, a human or computer algorithm would be left with choices for adjoining precincts that would all significantly undermine the compactness of the district.

The Florida Constitution does not provide explicit guidance about the relative importance of compactness versus the minimization of split jurisdictions. Nevertheless, herein lies a potential critique of the inferences we draw from our comparison of simulated and actual plans: One might possibly worry that the Legislature’s plan exhibits greater bias than the simulations because the Legislators were more assiduously focused on maintaining the integrity of counties. Perhaps electoral bias emerged as an unintentional byproduct of the desire to preserve the integrity of overwhelmingly Democratic urban counties.

There is a straightforward way to examine this proposition. We simply tailor our computer algorithm to produce districting plans with exactly the same number of counties split
among multiple congressional districts. Specifically, this modified algorithm continues to prioritize drawing compact, contiguous, and equally-apportioned districts, but these goals are now constrained by the following county-preserving requirement: *The algorithm requires that every simulated districting plan must preserve as wholly intact exactly the same counties that are preserved by the Legislature’s plan.* The Legislature’s enacted plan keeps 46 of Florida counties geographically intact and splits the remaining 21 counties among multiple congressional districts. Table 1 lists these 46 intact counties. Our modified algorithm, then, requires that every simulated districting plan must preserve these same 46 counties intact, with each county lying entirely within a single district. By implementing this requirement, our modified algorithm guarantees that every simulated districting plan will preserve *at least as many county boundaries* as the Legislature’s enacted districting plan preserves.

Using this modified, county-preserving algorithm, we conduct a new set of 5,000 simulations, with 1,000 simulated plans drawn under each of the five approaches to majority-minority district preservation described above. The only difference with these new simulations is that the 46 counties listed in Table 1 are always kept fully intact. Thus, any difference between the distribution of partisan bias produced by our simulations and that of the Legislature’s plan cannot possibly have been produced by a difference in the Legislature’s effort to preserve counties.

Figures 13 through 22 present the results of our analysis using the modified, county-preserving algorithm. We revisit each of the different approaches to majority-minority district preservation employed above. The results are virtually identical, and our conclusions remain substantively the same as before. Even when we preserve all 46 of the counties that were preserved by the Legislature’s plan, we see that the Legislature’s plan demonstrates significantly
more partisan bias than the vast majority of the simulations. Hence, our conclusion is that even after accounting for the Legislature's efforts to respect county boundaries, the Legislature's enacted plan produces a partisan distribution of districts (specifically, 17 districts that favored McCain in November 2008) that is clearly a statistical outlier among the set of simulated plans produced by every one of our five computer districting algorithms.

Specifically, each of our five sets of simulations under this county-preservation approach finds that producing a plan with 17 McCain-favoring districts is extremely rare. In each of our five sets of 1,000 simulations each, such an electorally-biased outcome is achieved less than 1% of the time. Hence, we conclude, with well over the conventional statistical standard of 95% certainty, that the Legislature's enacted congressional districting plan is an extreme statistical outlier in terms of its partisan distribution of districts.

Finally, one might wonder whether our modified, county-preserving simulation algorithm produces a number of county-district fragments similar to the number produced by the Legislature's enacted plan. In the Legislature's plan, among the 21 counties that are split into more than one district, there are a total of 61 county-district fragments (ie, 61 unique county-district combinations). We calculate the number of county-district fragments among our simulated districting plans, and our results are detailed in Figure 23. This Figure illustrates that our simulated plans generally produce a number of county-district fragments that is, on average, close to the 61 fragments produced by the Legislature's enacted plan. These calculations are not surprising, given that our algorithm and the Legislature's plan keep intact the identical set of 46 counties.

Conclusion
The Florida Constitution calls for a non-partisan districting process that is based purely on geographic contiguity, compactness, and equal population. Using computer simulations to generate a large baseline sample of such plans, we demonstrate that the number of Republican-majority seats generated by the Florida Legislature’s plan is exceedingly unlikely to have emerged unless its authors intentionally favored Republicans.

Even if we leave the three majority-minority districts in place and assume that the Legislature did not draw them with partisan advantage in mind, the simulations show that the Congressional plan submitted by the Florida Legislature “packs” and “cracks” Democrats in order create a far more efficient distribution of Republican voters across districts—and hence more Republican seats—than does a baseline sample of valid, non-partisan maps drawn according to the requirements of the Florida Constitution. The geography of Florida and the minority representation requirements do facilitate some pro-Republican bias even in the computer simulations, but the Legislature’s plan goes even further. We have shown that this result was not driven by the Legislature’s need to draw majority-minority districts or protect the integrity of counties. Thus we are left with the conclusion that the Legislature’s plan was drawn with explicit intent to favor the Republican Party.
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Figure 1: Examples of Computer-Simulated Districting Plans

With 3 Majority-Black VAP Districts Held as Fixed (Districts 5, 20, and 24)
Figure 2:

Results from 1,000 Simulations of Florida's Congressional Delegation Plan (27 Districts) With Three Majority-Black VAP Districts (5, 20, and 24)

Frequency Among Simulated Districting Plans (1,000 Total Simulated Plans)

Number of Districts with Over 50% McCain Vote Share (Percent out of 27 Total Congressional Districts in Florida)
Figure 3:

Comparison of Simulated vs. Actual Districts
With Three Majority-Black VAP Districts (5, 20, and 24) Held as Fixed

Legend:
- Enacted Districts
- Simulated Districts

District-Level McCain Vote Share (November 2008)

Black VAP Districts Held Fixed

Districts Aligned from Most Democratic to Most Republican
Figure 4:

Results from 1,000 Simulations of Florida's Congressional Delegation Plan (27 Districts) With Two Majority-Black VAP Districts (5 and 24) Held as Fixed

Frequency Among Simulated Districting Plans
(1,000 Total Simulated Plans)

Number of Districts with Over 50% McCain Vote Share
(Percent out of 27 Total Congressional Districts in Florida)

10 (37%) 11 (40.7%) 12 (44.4%) 13 (48.1%) 14 (51.9%) 15 (55.6%) 16 (59.3%) 17 (63%) 18 (66.7%) 19 (70.4%) 20 (74.1%)
Figure 5:

Comparison of Simulated vs. Actual Districts
With Two Majority-Black VAP Districts (5 and 24) Held as Fixed

Legend:
- Enacted Districts
- Simulated Districts

District-Level McCain Vote Share (November 2008)

Districts Aligned from Most Democratic to Most Republican
Figure 6:

Results from 1,000 Simulations of Florida's Congressional Delegation Plan (27 Districts) With Two Majority-Black VAP Districts (20 and 24) Held as Fixed

Frequency Among Simulated Districting Plans
(1,000 Total Simulated Plans)

0 50 100 150 200 250 300 350 400

Number of Districts with Over 50% McCain Vote Share (Percent out of 27 Total Congressional Districts in Florida)
Figure 7:

Comparison of Simulated vs. Actual Districts
With Two Majority–Black VAP Districts (20 and 24) Held as Fixed

Legend:
- X Enacted Districts
- + Simulated Districts

District-Level McCain Vote Share (November 2008)

Black VAP Districts Held Fixed

Districts Aligned from Most Democratic to Most Republican
Figure 8:

Results from 1,000 Simulations of Florida's Congressional Delegation Plan (27 Districts) With One Majority–Black VRA District (District 24) Held as Fixed

Number of Districts with Over 50% McCain Vote Share (Percent out of 27 Total Congressional Districts in Florida)
Figure 9:

Comparison of Simulated vs. Actual Districts
With One Majority-Black VAP District (District #24) Held as Fixed

Legend:
× Enacted Districts
* Simulated Districts

Districts Aligned from Most Democratic to Most Republican
Figure 10:

Results from 1,000 Simulations of Florida’s Congressional Delegation Plan (27 Districts) With No VRA Districts Held Fixed

Number of Districts with Over 50% McCain Vote Share (Percent out of 27 Total Congressional Districts in Florida)
Figure 11:

Comparison of Simulated vs. Actual Districts
With No Majority–Black VAP Districts Held Fixed

Legend:
- Enacted Districts
- Simulated Districts

District-Level McCain Vote Share (November 2008)

Black VAP Districts Not Held Fixed

Districts Aligned from Most Democratic to Most Republican
Figure 12:

District-Level Hispanic Proportions in Simulated and Actual Districts
With Three Majority-Black VAP Districts (5, 20, and 24) Excluded from Analysis

Legend:
× Enacted Districts
× Simulated Districts

Note: The three enacted majority-black VAP districts (5, 20, and 24) are held as fixed during the simulations and excluded from this figure.
Figure 13:

Results from 1,000 Simulations of Florida’s Congressional Delegation Plan (27 Districts) With 46 Counties Held Intact And Three Majority–Black VAP Districts (5, 20, and 24)

Frequency Among Simulated Districting Plans

Number of Districts with Over 50% McCain Vote Share
(Percent out of 27 Total Congressional Districts in Florida)
Figure 14:

Comparison of Simulated vs. Actual Districts
With 46 Counties Held Intact
And Three Majority-Black VAP Districts (5, 20, and 24) Held as Fixed

Legend:
- Enacted Districts
- Simulated Districts

District-Level McCain Vote Share (November 2008)

Districts Aligned from Most Democratic to Most Republican
Figure 15:

Results from 1,000 Simulations of Florida’s Congressional Delegation Plan (27 Districts) With 46 Counties Held Intact And Two Majority–Black VAP Districts (5 and 24) Held as Fixed

Frequency Among Simulated Districting Plans (1,000 Total Simulated Plans)

Number of Districts with Over 50% McCain Vote Share (Percent out of 27 Total Congressional Districts in Florida)
Figure 16:

Comparison of Simulated vs. Actual Districts
With 46 Counties Held Intact
And Two Majority-Black VAP Districts (5 and 24) Held as Fixed

Legend:
- Enacted Districts
- Simulated Districts

District Level McCain Vote Share (November 2008)

Black VAP Districts Held Fixed
Districts Aligned from Most Democratic to Most Republican
Figure 17:

Results from 1,000 Simulations of
Florida's Congressional Delegation Plan (27 Districts)
With 46 Counties Held Intact
And Two Majority-Black VAP Districts (20 and 24) Held as Fixed

Number of Districts with Over 50% McCain Vote Share
(Percent out of 27 Total Congressional Districts in Florida)
Figure 18:

Comparison of Simulated vs. Actual Districts
With 46 Counties Held Intact
And Two Majority-Black VAP Districts (20 and 24) Held as Fixed

Legend:
- Enacted Districts
- Simulated Districts

District-Level McCain Vote Share (November 2008)

Districts Aligned from Most Democratic to Most Republican
Figure 19:

Results from 1,000 Simulations of Florida's Congressional Delegation Plan (27 Districts) With 46 Counties Held Intact And One Majority-Black VRA District (District 24) Held as Fixed

Frequency Among Simulated Districting Plans (1,000 Total Simulated Plans)

Number of Districts with Over 50% McCain Vote Share (Percent out of 27 Total Congressional Districts in Florida)
Figure 20:

Comparison of Simulated vs. Actual Districts
With 46 Counties Held Intact
And One Majority–Black VAP District (District #24) Held as Fixed

Legend:
- Enacted Districts
- Simulated Districts

District–Level McCain Vote Share (November 2008)

Districts Aligned from Most Democratic to Most Republican
Figure 21:

Results from 1,000 Simulations of Florida’s Congressional Delegation Plan (27 Districts) With 46 Counties Held Intact And No Majority-Black VAP Districts Held Fixed

Frequency Among Simulated Districting Plans (500 Total Simulated Plans)

Number of Districts with Over 50% McCain Vote Share
(Percent out of 27 Total Congressional Districts in Florida)
Figure 22:

Comparison of Simulated vs. Actual Districts
With 46 Counties Held Intact
And No Majority-Black VAP Districts Held Fixed

Legend:
- Enacted Districts
- Simulated Districts

District-Level McCain Vote Share (November 2008)

Black VAP Districts Not Held Fixed

Districts Aligned from Most Democratic to Most Republican
Figure 23:

Number of Fragments Created Among the 21 Split Counties In the Enacted and Simulated Districting Plans

Legend:
- Enacted Districting Plan
- Simulated Districting Plans

Number of County-District Fragments Among the 21 Split Counties