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**Redistricting California:  
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**Abstract**

For the first time in California history, a carefully vetted commission of citizens has overseen the delicate task of redrawing the state's political boundaries. By analyzing the maps produced by the commission and comparing these plans to the redistricting overseen by the legislature a decade earlier, we show that the new process has produced important improvements in terms of both the criteria voters said they cared about and the representational implications of interest to academics and political observers. In many respects, however, the magnitude of these gains has fallen short of what many political reformers may have hoped for. Perhaps the most important lesson from the 2011 round of redistricting is that a fair process, no matter how nonpartisan and participatory, cannot avoid the reality that any redistricting scheme produces both political winners and losers.

**Keywords:** redistricting, redistricting reform, California politics, political polarization

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# Redistricting California: An Evaluation of the Citizens Commission Final Plans

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## Introduction

California's recently completed redistricting has been a sharp break with the past, both in style and substance. For the first time in state history, the decision about the location of district lines has been made by a commission of citizens from outside of government, rather than elected officials or court-appointed special masters, in a process that has been significantly more participatory and transparent than in the past.<sup>1</sup> This new commission has not wanted for critics. Many observers, including members of the Republican Party and some minority groups, have loudly complained about the process and the commission that has overseen it. Indeed, Republicans have sought to overturn the congressional and state Senate maps in court, and have submitted signatures for a referendum to overturn the state Senate maps and throw that process to the courts as well.

In this paper, we help place these criticisms in historical context and offer a range of important information about the maps the commission produced. We discuss the political forces that led to the creation of the Citizens Redistricting Commission (CRC) and show how the process overseen by the new commission has differed from redistricting of the past four decades. We then evaluate the newly adopted plans, both on the specific criteria the CRC was mandated to consider and on the political implications the CRC was required to ignore. On most of the mandated criteria—such as maximizing compactness and avoiding city and county splits—the commission's plans represent an improvement over the maps drawn by the legislature in 2001. The maps are also somewhat more likely than the current plans to produce competitive races and to elect Democrats to office, though the latter effect is only notable for the congressional plan. In short, although the plans are far from perfect on any single dimension, they look like the sort of result one could expect given the mandates and constraints faced by the commission.

## **California's Redistricting Wars and the Creation of the Citizens Commission**

The creation of California's Citizens Redistricting Commission through the passage of Proposition 11 in November of 2008 represented an important shift in the redistricting battles that have been waged between the state's two largest political parties for decades (see Kousser 1997, 1998; Quinn 1981). Although it is common to say that the commission has taken redistricting power away from legislators, California's redistricting process has not historically been the exclusive purview of the legislature. Instead, the process has involved a series of actors who have used the courts and direct democracy to influence the outcome, making each redistricting a protracted battle with significant input from actors outside the elected branches of government.

The courts have played a direct role in drawing lines in almost half the California redistricting battles since the U.S. Supreme Court's one-person, one-vote decisions began the modern era of redistricting in the 1960s. In both 1971 and 1991, vetoes of Democratic redistricting plans by Republican governors handed the matter to the state Supreme Court, which appointed "Special Masters" to craft the new boundaries. These masters then created plans that, as demonstrated by both qualitative and quantitative analysis, were more favorable for the party of the governor who had appointed a majority of state Supreme Court justices (Kousser 1997, 2006).

Even when members of one party have controlled both the legislature and the governorship in California, they have not exerted unchecked power over how to draw the lines. In the early 1980s, the Democrats controlled all levers of government but saw their redistricting plan defeated by a set of referendums—one each for the congressional, state Senate, and state Assembly lines—placed on the ballot by Republicans. Republicans then allied with good government reformers on a follow-on proposition to establish a redistricting commission. When this measure lost, Democratic legislators rushed to redraw the lines, passing a compromise plan before lame duck Democratic Gov. Jerry Brown had left office and his Republican successor George Deukmejian could be sworn in. The plan was generous enough to Republicans to garner a two-thirds vote in each house, allowing it to go into effect swiftly and avoid another referendum challenge (Kousser 1997). Those lines stayed in place for the remainder of the decade,<sup>2</sup> but a clear lesson from the episode was that direct democracy—whether real or threatened—would constrain the districts legislators could draw.

This contentious history—and the successful referendums in particular—provided the backdrop as California prepared for the 2001 round of redistricting. The Democrats agreed to a bipartisan gerrymander that protected incumbents from both parties with safe districts that minimized partisan turnover, and they cemented the deal with a bipartisan two-thirds majority that exempted the plans from any refer-

endum challenges. The resulting plans angered many outside the legislature. Some minority group leaders argued the maps missed an opportunity to increase representation for historically excluded groups (Ingram 2001b). Political reformers and newspaper columnists considered the plans a corrupt bargain drafted behind closed doors that put the interests of elected officials ahead of the voters they were supposed to represent. Some political observers also argued that, by creating safe political seats in which one party controlled an overwhelming majority of the votes, the maps exacerbated the partisanship and polarization that had created perennial delays in the adoption of the state budget (see, e.g., Skelton 2009; although see McCarty, Poole, and Rosenthal 2009, and McGhee 2008 for evidence to the contrary).

This popular displeasure with the 2001 maps provided fuel for the campaign behind Proposition 11. As with previous failed reform initiatives, Proposition 11 was funded primarily by Republican interests—nonetheless, its advocates made a concerted effort to broaden their coalition. They attracted endorsements from several high-profile Democrats, and attempted to incorporate concerns from minority voting rights groups. These efforts paid off on Election Day 2008, when Proposition 11 squeaked through by the barest of margins. A follow-on measure, Proposition 20, then passed in November 2010, extending the commission's authority to congressional lines as well.

### **The Citizens Redistricting Commission**

Propositions 11 and 20 created a 14-member Citizens Redistricting Commission to oversee the process. CRC members were chosen through a complicated process designed to purge the applicant pool of any connection with the elected officials whose districts would be redrawn. The commission also included representation from every major ethnic group, and the law mandated five Democratic, five Republican, and four decline-to-state or third-party commissioners for partisan balance. The rules laid out in Proposition 11 required at least some members from each partisan delegation to approve the final maps, ensuring that the commission would either act in a bipartisan manner or deadlock trying. In the event of a deadlock, the new law required the state Supreme Court to appoint a panel of special masters to draw the districts as in the 1970 and 1990 redistricting cycles. Thus, there was no scenario under the new system for the legislature to be directly involved in crafting the maps.

Proposition 11 also added new language to the state constitution listing specific criteria, in order of importance, that the CRC was to use to craft new political districts. In many ways, these criteria represented a backlash against perceived abuses of the 2001 process, including districts that split cities and created jagged edges and long protrusions that, to outside observers, appeared to serve few purposes

other than creating constituencies that advanced the political interests of elected incumbents.<sup>3</sup>

Table 1 below lists the formal redistricting criteria adopted by voters as part of Proposition 11. Aside from the equal population, district contiguity, and Voting Rights Act requirements already explicitly or implicitly a part of California law, the measure added several other constraints that had historically been less central to debates about redistricting in California. First, Proposition 11 explicitly required the commission to protect the “geographic integrity” of cities, counties, neighborhoods, and other very broadly defined “communities of interest,” cautioning line-drawers against splitting communities into multiple districts.<sup>4</sup> Second, the new language mandated that districts be drawn to maximize geographic compactness—although only to the extent that this did not conflict with other higher criteria—to avoid the creation of sprawling and irregularly shaped districts. Despite the existence of many different measures used to assess compactness in the context of redistricting (see, e.g., Niemi et al. 1990), the law left it to the commission to define and measure the concept. Finally, the new law adopted the principle of “nesting,” calling for the incorporation of two state Assembly districts within a single Senate district.

Although all six criteria included in Proposition 11 draw on widely accepted redistricting considerations, there are inherent tensions between them. Maximizing either geographic compactness or nesting often hurts minority representation, and nesting can split city and county boundaries as well (Barabas and Jerit 2004; Cain and Mac Donald 2007). Yet aside from ranking the criteria in order of importance, Proposition 11 provided little guidance on how to resolve these conflicts, leaving the difficult task of reconciling them to the commission.

Equally important are the criteria specifically excluded from the measure, such as increasing political competition. Although establishing boundaries for the purpose of creating close elections was not one of the goals included in Proposition 11—indeed, the language of Proposition 11 actually prohibited the maps from being drawn “for the purpose of favoring or discriminating against an incumbent”—the promise of political competition was one of the central arguments made by the measure’s proponents. The growing geographic segregation of California’s electorate has made it more difficult to draw such districts by accident (Cain, Mac Donald, and Hui 2008), and the Voting Rights Act requirements help ensure that a certain number of uncompetitive districts have to be created. Once again, the commission faced a difficult balancing act: reconciling voter expectations that redistricting reform would lead to dramatically more competitive elections with the actual criteria and constraints written into the measure that made drawing such districts more difficult.

**Table 1. Official California Redistricting Criteria**

<b>Priority</b>	<b>Criteria</b>
1	Districts shall have reasonably equal population.
2	Districts shall comply with federal Voting Rights Act.
3	Districts shall be geographically contiguous.
4	To the extent possible, geographic integrity of any city, county, city and county, neighborhood, or community of interest shall be respected.
5	To the extent possible, districts shall be drawn to encourage geographical compactness.
6	To the extent possible, Senate districts shall be comprised of two whole, complete, and adjacent Assembly districts, and each Board of Equalization district shall be comprised of 10 whole, complete, and adjacent Senate districts.

Source: California State Constitution Article XXI, Section 2

### **Evaluating the Commission Plans: Mandated Criteria**

In this section, we assess how well the CRC's maps adhere to the formal redistricting criteria adopted by voters. The inherent tensions among these criteria make it extremely difficult to determine whether the maps drawn by the commission represent the "best" possible set of plans that could have been created. However, by comparing the commission's work to the maps drawn by the legislature a decade earlier, we can quantify the extent to which the new district boundaries represent an improvement on the 2001 plans.

We also contrast the final maps adopted by the commission with the draft boundaries released in June 2011. This comparison is important for two reasons. First, the June maps generally attracted significant praise from political observers, including some notable Republicans.<sup>5</sup> This reception contrasted sharply with the polarized partisan response to the final maps adopted in August, which were almost universally assailed by Republican leaders and strategists, as well as some minority rights advocates. By identifying the differences between the June and August maps, we can assess whether criticisms of the latter were motivated by legitimate concern over the redistricting criteria put into place by Proposition 11 rather than narrow partisan interests that may have emerged as the political implications of the new maps became clear. Second, by tracking changes made to the June maps, we can identify the tradeoffs made by the commission in response to public input.



## Minority Representation

Proposition 11 differed from earlier redistricting reform initiatives in the extent to which the measure sought to reassure advocates of minority rights that their interests would be respected (Kogan and Kousser 2011). One such reassurance was language calling for compliance with the federal Voting Rights Act. In *Thornburg v. Gingles* (1986), the Supreme Court interpreted Section 2 of the law to require the creation of majority-minority districts when minority populations are sufficiently large and geographically concentrated and when there is evidence of “racially polarized” voting. Even where the *Gingles* preconditions may not be satisfied, other parts of Proposition 11 that task the commission with preserving the geographic integrity of local “communities of interest” provide additional protections, since minority groups undoubtedly represent populations that share “common social and economic interests” (California Constitution, Article XXI, § 2, subdivision (d)(4)).

To gauge the implications of the various redistricting schemes for minority representation, we calculated the proportion of each district’s citizen voting-age population (CVAP) that is Asian, black, and Latino, the three groups identified by the CRC as potentially worthy of VRA protections under the *Gingles* criteria (Citizens Redistricting Commission 2001, 20). We focus on CVAP because this number best captures the universe of eligible—rather than actual or registered—voters in each district.<sup>6</sup> For 2011, we rely on census block-level CVAP figures from the Statewide Database; for 2001, we use district-level measures calculated using a special tabulation from the 2000 census data. Although our discussion focuses on point estimates, it is important to recognize that the CVAP figures are inexact because they are constructed, at least in part, from survey data. Unfortunately, due to a variety of methodological challenges discussed at length by McCue (2011; see, in particular, pp. 16-17), it is not possible to construct confidence intervals or margins of error that adequately capture this uncertainty. These data limitations should be kept in mind when interpreting the results below.

Table 2 lists the estimated number of majority-minority districts drawn under each set of redistricting plans. Overall, the 2011 maps adopted by the commission resulted in the creation of eight new majority Latino districts, with most of the gains coming from the Assembly plan. One notable detail is that the bulk of the gains appeared only in the final commission plans, with the draft maps released in June 2011 creating just one net increase in majority Latino districts, a fact that helps explain the initial criticism offered by some civil and voting rights groups after the release of the June maps. The jump in the number of majority Latino districts between June and August suggests that the gains for Latinos were produced primarily through a deliberate effort on the part of the commission to increase representation for this group, rather than as a result of natural growth in the relative size of the La-



**Table 2. Number of Majority-Minority Districts (by CVAP)**

	<b>2001 Plan</b>	<b>2011 Draft Plan</b>	<b>2011 Final Plan</b>
<b>Assembly</b>			
Black	0	0	0
Latino	8	10	14
Asian	0	0	1
<b>Senate</b>			
Black	0	0	0
Latino	4	4	5
Asian	0	0	0
<b>Congress</b>			
Black	0	0	0
Latino	6	5	7
Asian	0	0	0

tino population in California between 2000 and 2010. In addition, the commission created one new majority-Asian district in the San Gabriel Valley—an area that had been split up among several districts in 2001 in the face of strong opposition from Asian voting rights groups (Ingram 2001a).

Given the sizeable increase in the number of Latino Californians over the past decade—from 32.4 percent of state residents in 2000 to 37.6 percent in the most recent census—it may be surprising that Latinos did not see greater gains in representation, particularly in the state Senate and congressional maps. This puzzle may be explained in part by the smaller share of the Latino population that is eligible to vote compared to whites—due both to lower rates of citizenship and a higher proportion of Latinos falling below the legal voting age (see Arvizu and Garcia 1996 for an overview)—as well as lower turnout rates even among Latinos who are eligible to vote. As a percent of CVAP, the Latino population increased from 22.5 percent in 2000 to 25.6 percent in 2010.<sup>7</sup> Moreover, Latino growth has not been limited to heavily Latino areas, leading in many parts of the state to large Latino gains that still fall short of producing a Latino voting majority (California Department of Finance 2011). Consistent with this idea, the number of districts where Latinos make up 30 to 40 percent of the voter-eligible population has increased even as the number of majority-Latino districts has shown much smaller change (see Figure 1, Panel b). Latino candidates might succeed in these “influence” districts by attracting votes from other minorities or cross-over support among white voters.

Figure 1. Minority CVAP by District: (a) Black Representation

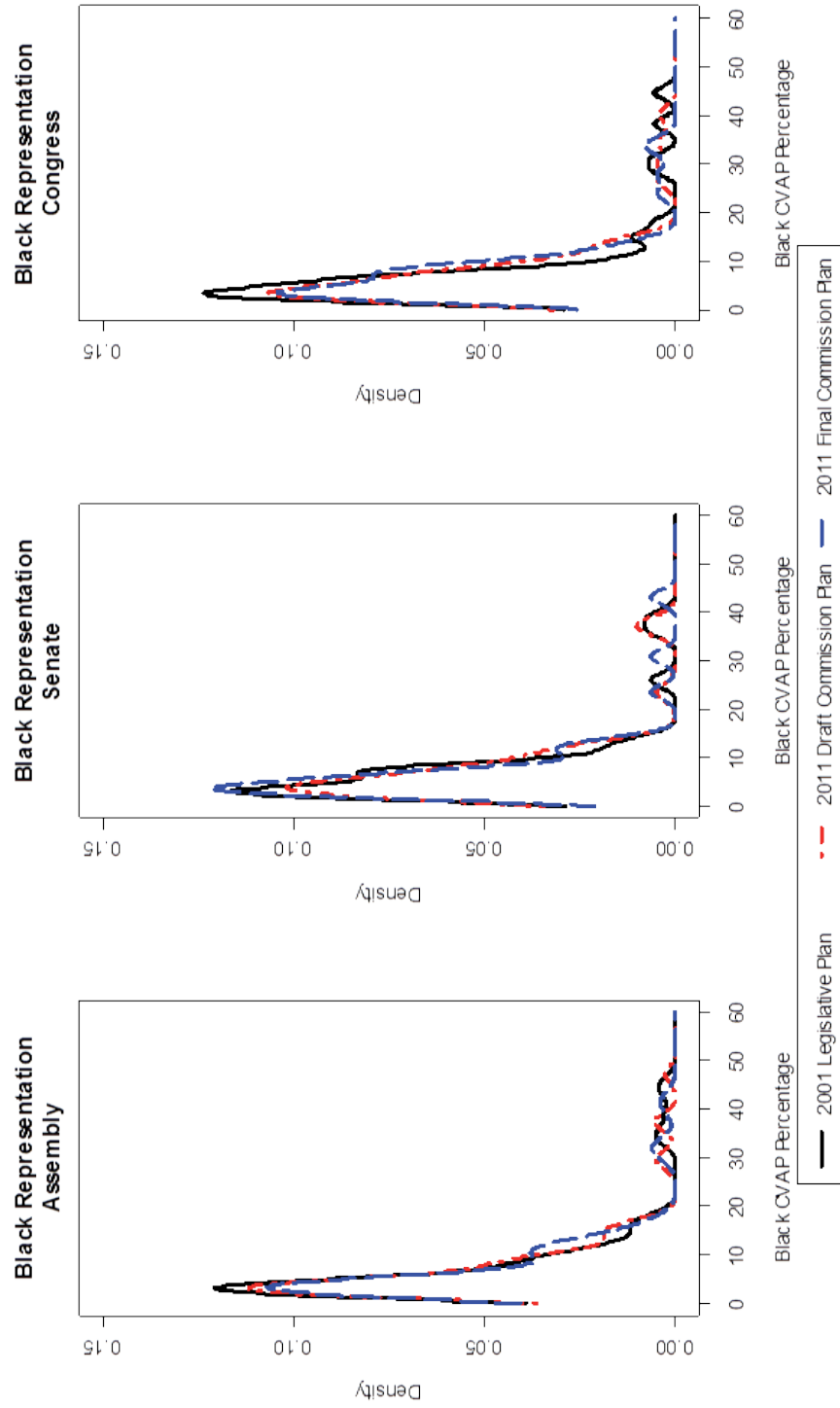


Figure 1. Minority CVAP by District: (b) Latino Representation

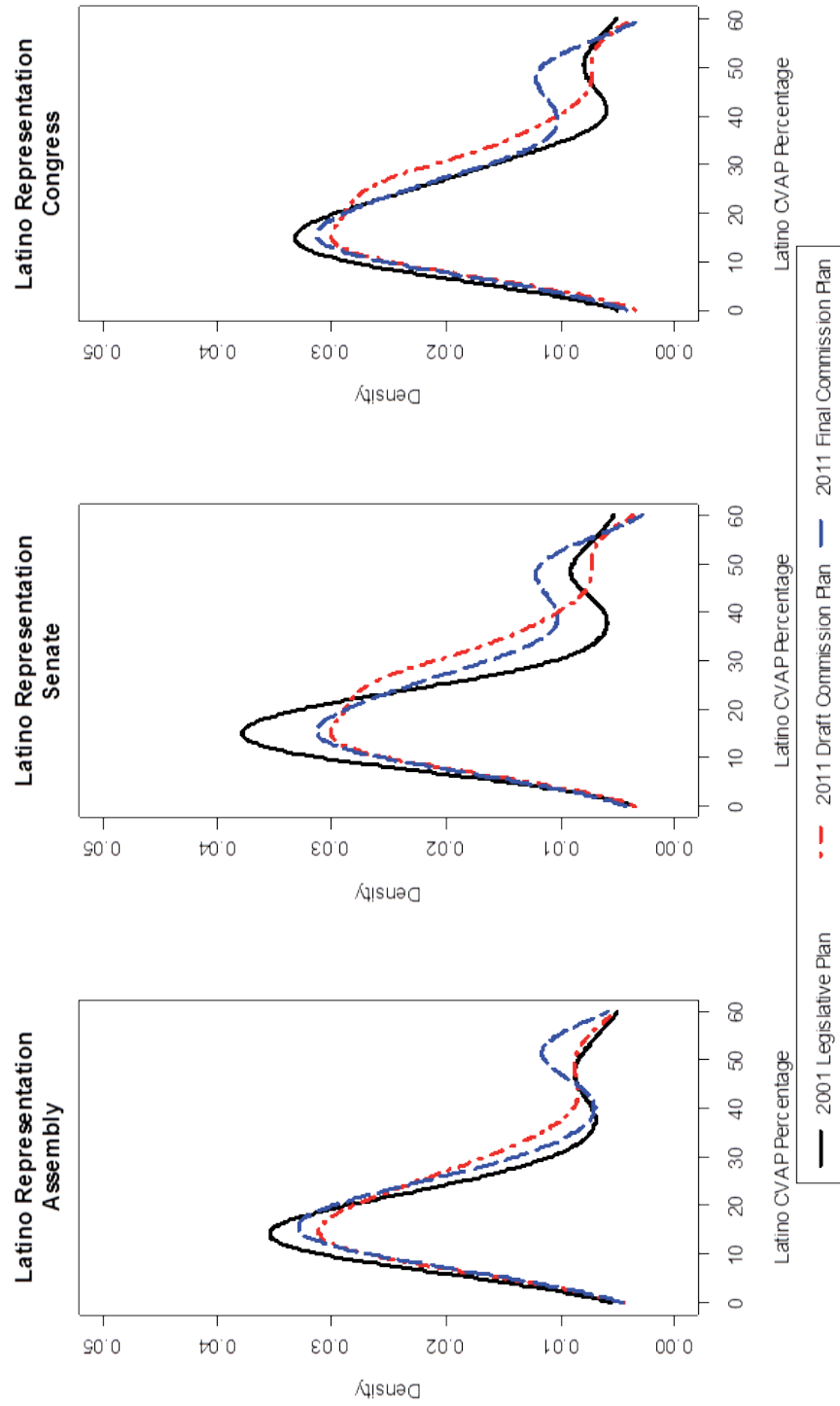
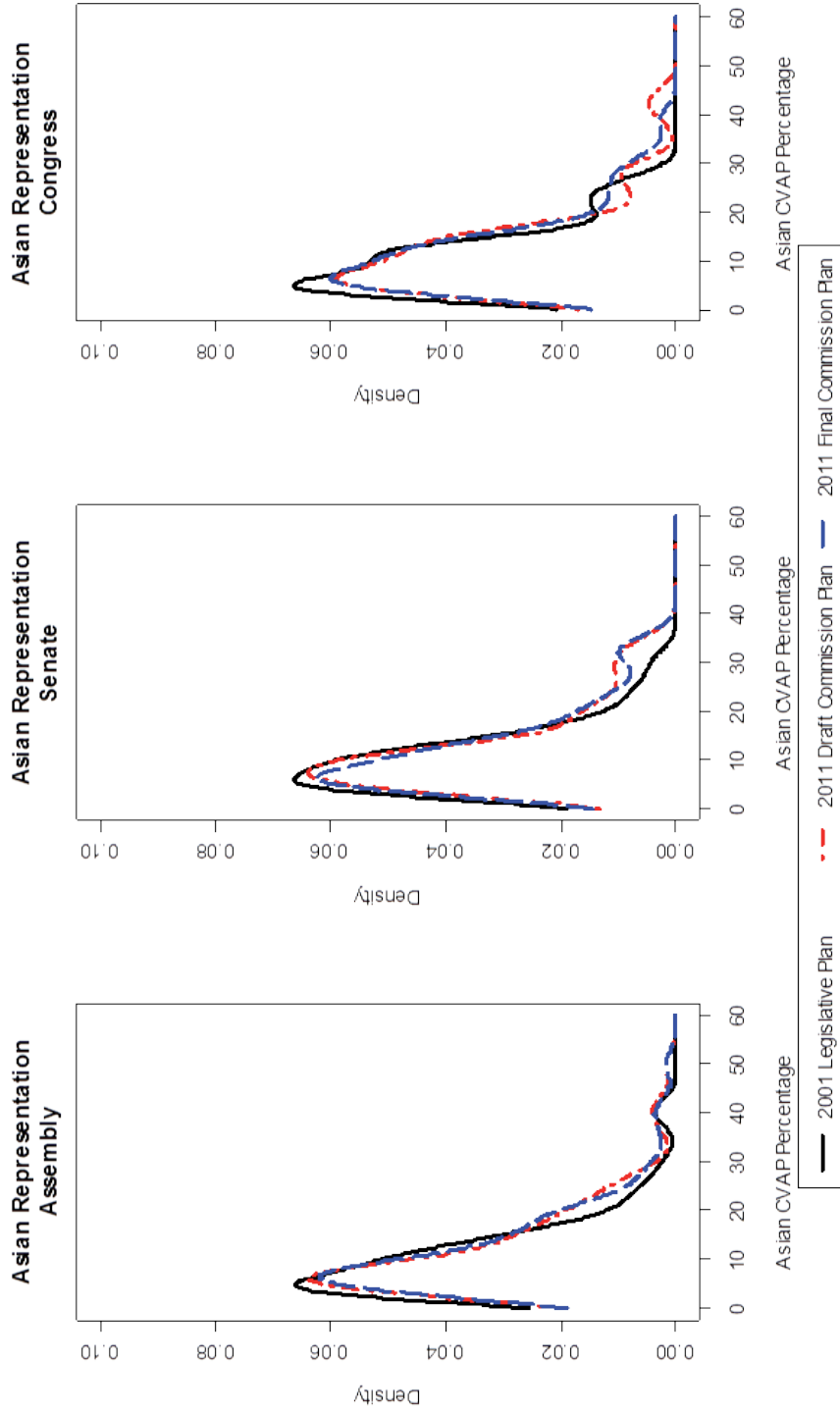


Figure 1. Minority CVAP by District: (c) Asian Representation



Note: The Y-axis in these and other figures presented below display the “probability density”—or roughly the proportion of districts in the data corresponding to each value on the X-axis. The density does not correspond to any absolute measure (such as number of voters) because, by construction, the total area under each density curve must add up to one. As a result, the actual value of on the Y-axis will depend on the units used for the X-axis. However, it is useful to compare such density curves because they provide an intuitive visual representation of the full distribution, which is often more informative than a comparison of district means or medians.

### City, County, and Community Splits

In addition to recognizing the representational aspirations of minority groups, Proposition 11 also directed the CRC to minimize division of cities, counties, neighborhoods, and other “communities of interest.” Indeed, one of the reasons the commission held dozens of hearings across the state was to solicit input from local residents to help commissioners identify such communities. As an empirical matter, it is difficult for outside observers to identify the geographic boundaries of established communities of interest, and this task is made even more challenging by the rather vague and open-ended definition for the term added to the constitution by Proposition 20. Although legal scholars have proposed geospatial methods for identifying communities of interest by comparing the “homogeneity” of districts on various socioeconomic dimensions (Stephanopoulos 2012), this method is not designed for making comparisons among redistricting plans over time. Due in large part to such measurement and definitional challenges, we do not attempt to evaluate the plans on this dimension. Our focus instead is on two types of *political* communities with clearly identifiable geographical boundaries: incorporated cities and counties. For each type of geography, we calculated how many jurisdictions were left intact as part of the redistricting process—that is, the proportion of communities that were drawn into a single political district.

In Table 3, we report the percentage of intact incorporated cities produced by each set of plans. This calculation focuses only on communities small enough to fit into a single district and thus excludes major cities that would have been split under *any* redistricting plan.<sup>8</sup> The table also tallies up the total number of community splits, including geographies too large to fit in a legislative district. Table 4 presents a similar analysis for county splits, except instead of percentages, this table reports the raw counts of intact counties.<sup>9</sup>

The tables suggest that the 2011 commission plans represented a modest improvement on the 2001 legislative redistricting in preserving the integrity of existing communities. Despite criticism from one political observer that the commission’s work “whacks and hacks cities and counties for no apparent reason” (Quinn 2011b), between 91 and 96 percent of all incorporated cities were kept intact under the 2011 plans. For both the Assembly and Senate maps, the number of intact cities increased slightly compared to 2001, although the 2011 congressional plan actually increased the number of city splits compared to the maps adopted by the legislature a decade earlier. The primary difference between the two sets of maps is what happened to split cities. Compared to a decade earlier, more of these divided cities were contained in only two districts in 2011, thus reducing the overall number of city splits. If we expand the analysis to include unincorporated census-designated places, which are well-defined areas with clear community character, the improve-

**Table 3. Comparison of City Splits**

Plan Type	2001 Plan		2011 Draft Plan		2011 Final Plan	
	No. of Community Splits	% Intact <sup>a</sup>	No. of Community Splits	% Intact <sup>a</sup>	No. of Community Splits	% Intact <sup>a</sup>
Assembly	97	98%	62	92%	62	92%
Senate	41	96%	37	94%	33	96%
Congress	53	94%	73	88%	59	91%

Note: We use a list of incorporated cities available from Census GIS shapefiles. The number of incorporated cities increased from 452 in 2000 to 459 in 2010.

<sup>a</sup>Percent intact calculated only for communities with a small enough population to fit in a single legislative district.

**Table 4. Comparison in County Splits**

Plan Type	2001 Plan		2011 Draft Plan		2011 Final Plan	
	No. of Community Splits	Intact Counties	No. of Community Splits	Intact Counties	No. of Community Splits	Intact Counties
Assembly	99	31	93	31	92	30
Senate	51	33	59	32	54	38
Congress	62	34	69	31	67	33

ment between the 2001 and 2011 maps is somewhat more pronounced.<sup>10</sup> However, aside from the Senate plans, where the 2011 maps increased the number of intact counties, the commission did not notably increase or reduce county splits.

### **Maximizing Geographic Compactness**

Compactness—the spatial “spread” of a district—is a long-established criterion for evaluating political boundaries, and a legally mandated redistricting consideration in many states (Niemi et al.1996). Indeed, sprawling districts are often used by critics to make the case for redistricting reform. In California, for example, proponents of Proposition 11 often pointed to California’s 23<sup>rd</sup> Congressional District drawn by the legislature in 2001. Known as the “Ribbon of Shame,” the costal district stretched nearly 200 miles from Monterey County in the north to Oxnard in the south.

Despite the straightforward intuition for what it means to draw compact districts, consensus on a formal mathematical definition has remained elusive, and scholars have proposed a variety of measures. Niemi et al. (1996) showed that aggregate statistics produced by these measures generally lead to similar conclusions about specific redistricting plans, so the precise measure we choose is not likely to affect our conclusions. We use the measure proposed by Polsby and Popper (1991): It ranges from zero to one, with higher values indicating greater compactness.<sup>11</sup>

To compare the degree of compactness achieved by the 2001 legislative redistricting and the two sets of commission-drawn plans, Table 5 presents the mean district Polsby-Popper score produced by each plan. Figure 2 also plots the distribution of district compactness scores for each set of maps. Overall, the larger Polsby-Popper scores for the CRC-drawn districts provide strong evidence that the commission drew notably more compact boundaries than the legislature. This was the case for both sets of commission plans, although the August maps achieved somewhat greater compactness than the initial draft maps released in June.

### **Nesting Assembly Districts**

The final criterion we evaluate is “nesting”: the process of fitting two Assembly districts within a single Senate district. One impetus for nesting is the belief that doing so makes it easier for voters to correctly identify their elected representatives and accurately apportion credit and blame for policy outcomes. Some research has also shown that nesting can improve legislative productivity in bicameral systems by aligning electoral incentives of lawmakers and thus making it easier to build legislative coalitions across chambers (Chen 2010). In fact, the Special Masters adopted perfectly nested plans in both the 1970s and the 1990s (Special Master 1991, 40). Although nesting of lower house districts was approved by voters as part of Proposition 11, this goal was given the lowest priority among the criteria listed in the constitution.

Table 6 compares the degree of nesting across the commission and legislative plans. For each Senate district, we calculated the percentage of its population that was contained in the two Assembly districts with the largest number of overlapping residents. In a perfectly nested plan, the percentage would be 100—because the two Assembly districts would contain all of the residents of the larger Senate district. The first row of Table 6 reports the average amount of population overlap between each Senate district and its two most nested Assembly districts. The second row reports the average number of Assembly districts covered, at least partially, by each Senate district. A perfectly nested plan would have a value of 2 on this measure, and higher values indicate weaker nesting.



**Table 5. Average Polsby-Popper Compactness Scores**

<b>Plan Type</b>	<b>2001 Plan</b>	<b>Draft 2011 Plan</b>	<b>Final 2011 Plan</b>
Assembly	0.20	0.22	0.22
Senate	0.12	0.17	0.19
Congress	0.13	0.19	0.19

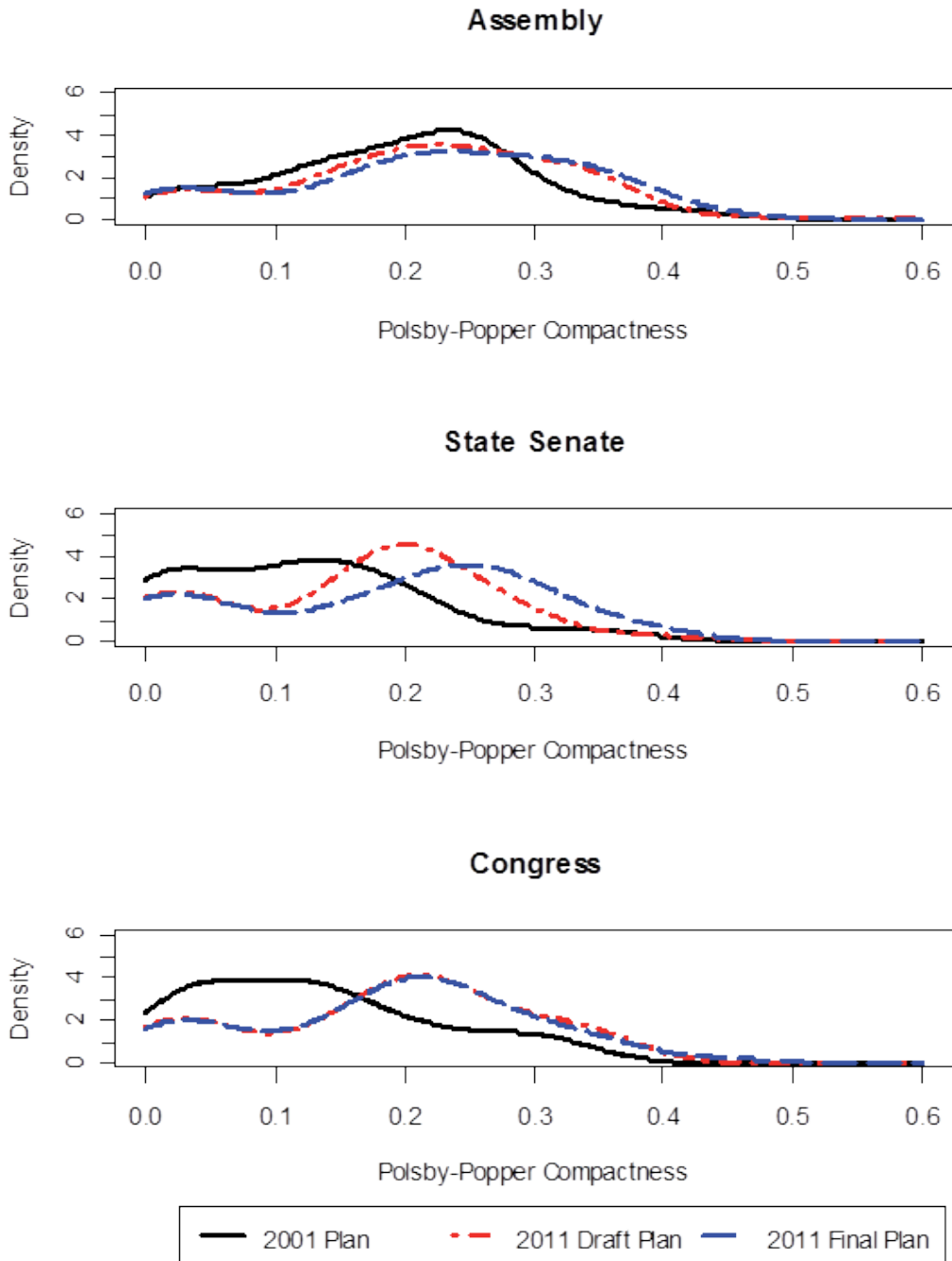
As the table makes clear, the draft plan released in June 2011 achieved the greatest amount of nesting, with nearly perfect population overlap between the districts of the upper and lower houses of the legislature. The amount of nesting was reduced in the final plan adopted by the commission, in large part due to the creation of new majority-minority districts in response to public input and in an effort to reduce the number of community splits in the draft plan (Citizens Redistricting Commission 2011). However, the final commission maps still produced more overlap between the Senate and Assembly districts than the redistricting plan adopted by the legislature in 2001.

### **Summary**

Overall, the results reported here make clear that the final commission maps adopted in August represent a notable improvement over the 2001 legislative redistricting on nearly all of the criteria voters said were important to them when they passed Proposition 11. This is true despite the fact that the commission did not produce lines that fully achieve any of the goals written into the state constitution. Though slightly more communities have been left intact in 2011 than in 2001, a small number of cities are still split into multiple districts under the CRC-approved plan. Likewise, while the new districts are more compact than the old ones, none of them look like perfect rectangles or circles. The fact that the commission did not achieve perfect compliance with *all* of the criteria reveals the inherent tensions between these important considerations — tensions that limit the potential gains from the reform and which few voters likely understood when they voted for the new system.

Equally surprising, however, is that the apparent conflicts between the redistricting criteria were less pronounced than many redistricting scholars may have expected. This is best demonstrated by comparing the draft maps released by the commission in June to the final maps adopted in August. The changes made to the plans in the meantime resulted in improvements on nearly all of the redistricting criteria. Only nesting, the lowest-ranked priority under Proposition 11, declined in the final maps — and this likely occurred because the commissioners worked to

**Figure 2. Comparison of Compactness Across Plans**



**Table 6. “Nesting” of Assembly Districts Inside Senate Districts**

	<b>2001 Plan</b>	<b>2011 Draft Plan</b>	<b>2011 Final Plan</b>
Senate District Population in Two Largest Assembly Districts (Average)	74%	96%	83%
Average Number of Assembly Districts per Senate District	6.35	2.95	4.95

maximize other higher-ranked criteria, as directed by the state constitution. The criteria were in tension with each other, but they were not mutually exclusive.

**Evaluating the Commission Plans: Political Effects**

While the law explicitly required the CRC to consider the impact of its maps on geographic and minority representation, it also specifically directed the CRC to *ignore* the partisan and political effects of the plans it drew. All the same, many actors hoped for a particular political outcome: either more competitive seats, more victories for their own party, or both. In fact, the commissioners might have found ways to produce a partisan advantage using some combination of the demographic information available to them and their own knowledge of particular communities or incumbents. Even if the commission pursued its task with strict neutrality, the product of its efforts was certain to produce partisan winners and losers—and a partisan impact that emerges from a neutral process still has real consequences.

In this section we evaluate the plans for two possible political effects: the number of competitive seats, and the share of seats each major party is likely to win under the new maps. Although we show that the plans will likely impact the nature of political competition and the balance of partisan power, these effects are not always as large as some observers have suggested, nor have they necessarily emerged for the reasons that many critics claimed.

**Competitiveness**

Although the CRC was not allowed to consider partisanship, advocates of reform clearly hoped the commission would draw a larger number of competitive seats (Common Cause Education Fund 2005, Johnson, et al. 2005, Kogan and Kousser 2011), and the campaign on behalf of Proposition 11 strongly hinted that its passage would lead to greater competition.<sup>12</sup> Did the commission live up to those expectations? We consider a seat “competitive” if we predicted that it would lead to

elections in which no candidate would win by more than 10 percent. This definition of “marginal” districts is commonly used by scholars of legislative elections, and a 10-point advantage is certainly close enough to keep a representative or legislator concerned about reelection without forcing us to adopt an overly restrictive definition.<sup>13</sup> We use party registration and incumbency to produce our estimates, first by fitting a statistical model that used these two variables to predict the results of previous elections with data from those elections, and then by combining the model coefficients with the relevant data from the new maps to generate predictions under the new lines.<sup>14</sup>

Using our definition, the share of seats predicted to be competitive under the new maps can be found in Table 7, with separate estimates for the 2001 districts, the CRC’s draft plan from June, and the final plan adopted in August. All the commission’s maps are more competitive than the existing maps, with increases ranging from three percentage points (i.e., between one and two additional seats) for the final Assembly plan to 13 points (i.e., between six and seven additional seats) for the final House plan. The draft plan in June offered slightly greater competitive gains in both the Senate (6%, or between two and three seats) and Assembly (6%, or between four and five seats), but not in the House (11%, or between five and six seats), although none of the differences are statistically significant. In fact, while there is at least an 80 percent chance of greater competition in each of the final plans, the competitive gains only clear the 95 percent statistical significance standard for the House.<sup>15</sup>

It is worth noting the large role incumbency plays in these estimates of competition. If all incumbents were suddenly to retire and leave every district open, our model predicts that the new lines by themselves would make between 19 percent (state Senate) and 25 percent (Congress) of the races competitive—higher than the 14 percent to 18 percent competitive when incumbency is factored in. Of course, the same is true of the old lines as well: between 13 percent and 18 percent would have been competitive if all incumbents had retired, far higher than the 5 percent to 11 percent we observed in practice. Thus, district lines are only one of several factors that determine the competitiveness of races.<sup>16</sup>

If we assume no incumbent effects—that is, if we take every district on its face and remove the effect of the “incumbency advantage”—which seats would be the most competitive? Table 8 lists the most competitive districts for each plan, along with the general location in the state, the balance of party registration in each district (i.e., the difference between the Democratic and Republican shares of voter registration), and the probability that its outcome will be competitive by our estimates. Since our methodology explicitly incorporates uncertainty, none of these districts is certain to see a competitive race, but each of them has a competitive outcome in at least half our simulated elections. Because these particular estimates

**Table 7. Predicted Share of Seats with Competitive Outcomes: 2001 Plan vs. CRC Plans**

	<b>2001 Plan</b>	<b>2011 Draft Plan</b>	<b>2011 Final Plan</b>	<b>Significant Difference ? (2001 Plan to 2011 Final Plan)</b>
Senate	11%	17%	15%	No (p=0.20)
Assembly	11%	17%	14%	No (p=0.16)
Congress	5%	16%	18%	Yes (p=0.02)

treat every race as open, they include many districts political analysts would typically omit from a list of this type. But the list gives a sense of which districts could be competitive should they come open, based on hundreds of previous elections results. Indeed, if incumbency is factored back in, the list shrinks from 30 seats to 19, further emphasizing the important role incumbents play in determining the competitiveness of races. Overall, the new maps will produce a modest increase in the number of competitive elections — though perhaps fewer than many reformers hoped for.

**Partisan Balance**

We conducted a similar analysis to gauge the impact of the new districts on the partisan balance of power, as measured by the Democratic share of seats in each legislative house and the California congressional delegation. Predictions of this kind can be sensitive to assumptions about broader partisan tides, especially when several competitive seats are in play: A good year for Democrats might push a number of these seats into the Democratic column, while a good year for Republicans could produce the opposite effect. To address this challenge, we produce two sets of estimates: one based on 2008, which we call a “Good Democratic Year,” and one based on 2010, which we call a “Good Republican Year.”<sup>17</sup> Basing our analysis on those two years also ensures we are working with a relatively stable period for partisan registration. A large registration shift away from Republicans occurred in the 2008 election, leading to a new, more Democratic equilibrium that has persisted to the present day.<sup>18</sup>

State Senate races create special complications that are worth a short discussion. The new even-numbered seats will not be used until the 2014 election cycle, and in the interim, incumbents currently representing even-numbered districts will be allowed to remain in office. If they step down, the resulting special election will be held under the old district lines. To capture this dynamic, we have gener-

**Table 8. Seats most likely to be competitive in CRC Final Plan (no incumbent effects)**

	<b>Location</b>	<b>Registration Balance (%)</b>	<b>Probability of Competitive Race</b>
<b>Senate</b>			
5	San Joaquin	+4D	0.74
21	Palmdale	+4R	0.53
27	Ventura County	+6D	0.64
29	Fullerton	+6R	0.55
31	Riverside	+2D	0.76
34	Huntington Beach	Even	0.75
<b>Assembly</b>			
8	East Sacramento County	+2D	0.79
12	Modesto	+3R	0.50
16	Tri-Valley	+6D	0.60
35	San Luis Obispo	+5R	0.59
36	Palmdale	+4R	0.63
40	Redlands	+2R	0.69
44	Ventura County	+2D	0.81
60	Corona	+4R	0.64
61	Riverside	+7D	0.68
65	Fullerton	+2R	0.78
66	Torrance	+3D	0.73
77	North San Diego	+9R	0.60
<b>Congress</b>			
7	East Sacramento County	+1D	0.66
9	San Joaquin	+9D	0.60
10	Stanislaus	+5D	0.66
21	Kings	+11D	0.62
24	Santa Barbara	+4D	0.64
25	Palmdale	+6R	0.54
26	Ventura County	+6D	0.62
31	San Bernardino	+4D	0.69
36	Coachella Valley	+3R	0.52
39	Fullerton	+9R	0.54
41	Riverside	+5D	0.66
52	San Diego	+3R	0.65

Note: Location copies the description given by Redistricting Partners, a Democratic consulting firm. Party registration balance is the difference between the share of total registered voters who are Republicans and the share who are Democrats. The probability of a competitive race is the share of 1,000 simulated elections where the district's predicted outcome fell between 45 and 55 percent Democratic, based on the statistical model described in Footnote 16. Only districts with probability above 0.5 have been listed here.

ated separate Senate predictions for 2012 and 2014. For 2012, we generate model predictions only for the odd-numbered seats and assume that the rest will continue to be held by the party that currently controls them. We then generate estimates for 2014 based on all 40 seats, which assumes that our model predictions for those odd-numbered seats represent the best guess as to party control moving forward. We split the seats in the same way for our predictions using the old maps, to make the numbers as comparable as possible.<sup>19</sup>

Table 9 summarizes the results of our analysis, including predicted Democratic seat share for the existing and new maps, as well as the probability of Democrats claiming a two-thirds majority under each plan.<sup>20</sup> (Because the estimates from the June draft plan were virtually identical, for the sake of space we have reported only a comparison of the final CRC map and the existing 2001 map.) Perhaps the most interesting result is that our model predicts a strong Democratic performance in the legislature under the existing maps put in place in 2001—far stronger, in fact, than the Democrats have actually achieved.<sup>21</sup> Under the 2001 maps, a good Democratic year in 2012 would give Democrats better than even odds ( $p=0.60$ ) of claiming a two-thirds majority in the Senate, and only a good Republican year predicts a seat share (63%) close to what Democrats currently hold. Likewise, the existing Assembly districts already seem to give the Democrats good odds ( $p=0.53$ ) of claiming a two-thirds majority, at least in a good year for their party.

Nonetheless, the final CRC map still improves the odds of a two-thirds majority for the Democrats in 2012. The increase is modest for the Assembly (0.53 to 0.66), but much larger for the Senate (0.60 to 0.94). Taken together, if 2012 turns out to be a good Democratic year, we predict a six in ten chance that Democrats will win two-thirds in both chambers under the new maps, compared to a one in three chance under the old.

The results are much different for 2014 (recall that estimates for this year incorporate model predictions for all seats). Under the 2001 maps, the odds of a Democratic two-thirds in the Senate are a little higher in 2014 than in 2012, while under the new maps the odds are actually a little lower. In fact, when the Senate plan is considered as a whole in this way (rather than as odd and even districts separately), the maximum chances of a Democratic supermajority in the Senate are, if anything, marginally smaller under the new map than the old one (0.79 vs. 0.89), while the maximum chance of a supermajority in both chambers is about the same (0.52 vs. 0.47). Thus, the potential Democratic gains are less a function of the district lines themselves and are more closely related to the numbering of the Senate districts, which “front-loads” seats in 2012 where the Democrats can expect to do better.

When it comes to the U.S. House, we predict more substantial gains for Democrats under the new plan, with as many as four additional seats (7%) in a good Democratic year. Even a bad year for Democrats will likely net them the same share



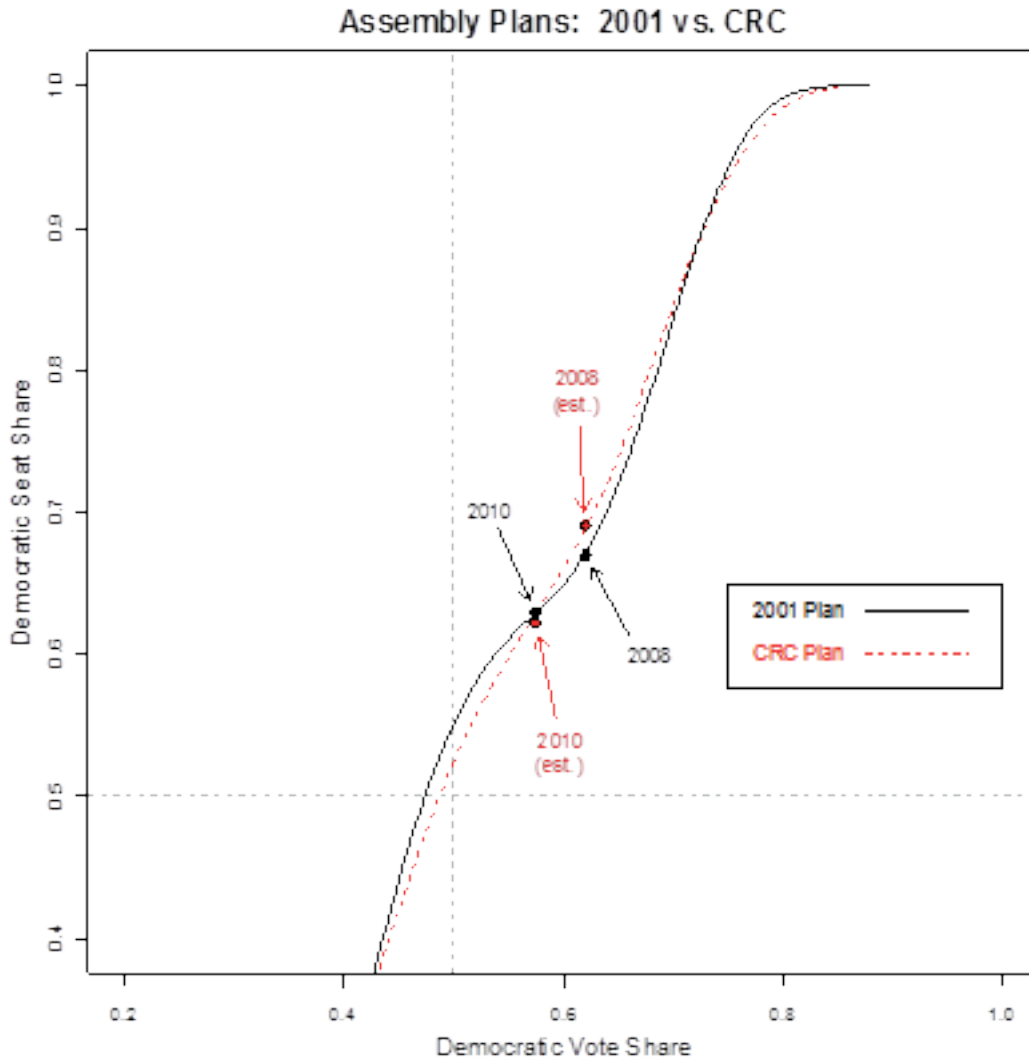
**Table 9. Predicted Democratic Seat Share: 2001 Plan vs. Final 2011 Plan**

	Predicted Seat Share			Prob. Democratic 2/3	
	2001 Plan	2011 Plan	Significant Difference?	2001 Plan	2011 Plan
<b>Senate: 2012</b>					
Good Democratic Year	67%	70%	No (p=0.30)	0.60	0.94
Good Republican Year	63	66	No (p=0.32)	0.04	0.43
<b>Senate: 2014</b>					
Good Democratic Year	69	69	No (p=0.56)	0.89	0.79
Good Republican Year	66	63	No (p=0.32)	0.35	0.11
<b>Assembly</b>					
Good Democratic Year	67	68	No (p=0.52)	0.53	0.66
Good Republican Year	63	62	No (p=0.43)	0.00	0.01
<b>Congress</b>					
Good Democratic Year	65	72	No (p=0.14)	--	--
Good Republican Year	63	63	No (p=0.53)	--	--

Note: “Good Democratic Year” estimates are based on an OLS regression on 2008 election data; “Good Republican Year” estimates are based from the same model using 2010 election data. Model coefficients are available from the authors upon request. Significance estimates indicate the proportion of simulations where the difference between the old and new districts held the opposite sign from the reported average difference.

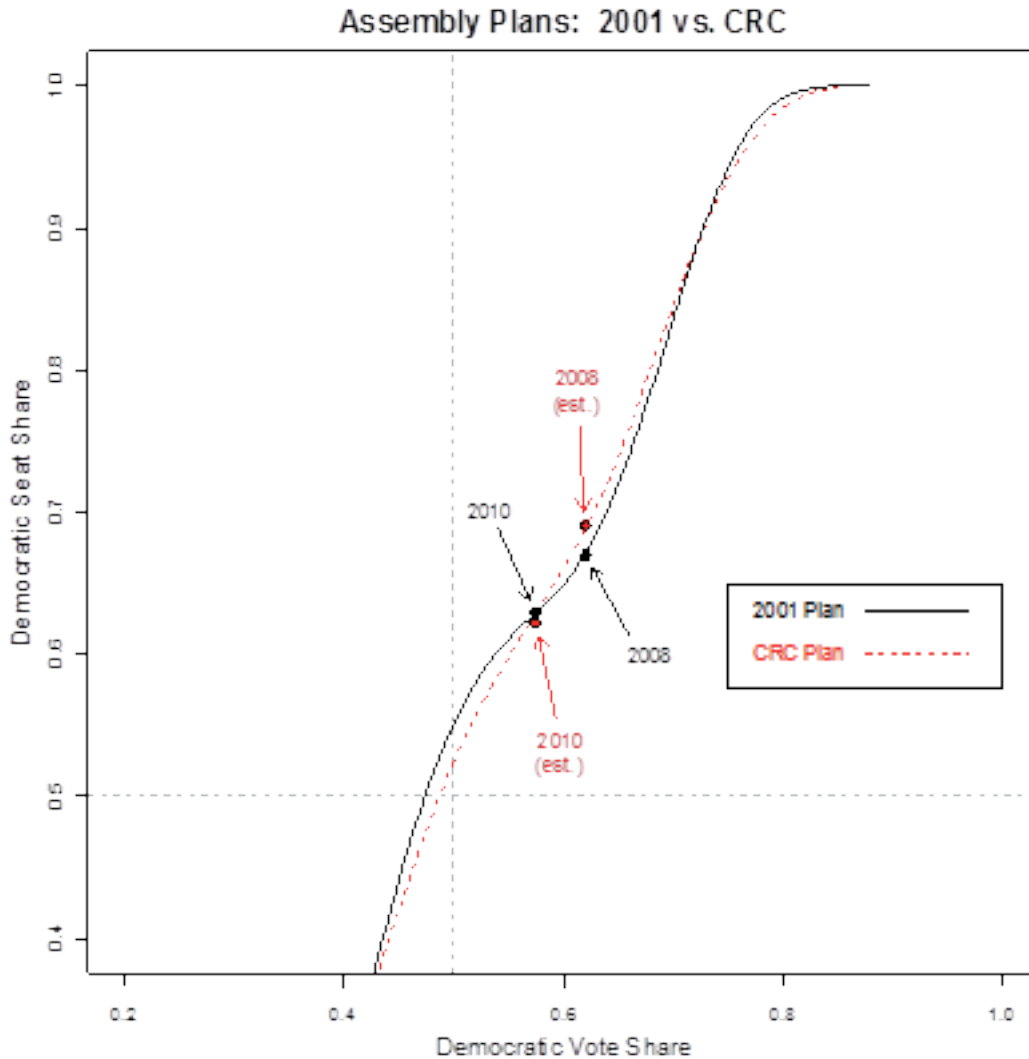
of seats they currently hold. In contrast to the Assembly and Senate plans, Republicans have performed about as expected by our model in recent elections, with the predictions using the 2001 seats closely matching what actually occurred.<sup>22</sup> Thus, it seems fair to attribute any estimated gains to the redistricting plan itself. Nonetheless, the uncertainty inherent to competitive seats places even this large seat gain within the margin of error, because slight vote share deviations in competitive districts can alter the predicted seat share dramatically.<sup>23</sup>

Figure 3. Seats-votes curves: existing maps vs. final CRC maps



Why does the congressional plan produce so many more seats for the Democrats than either the Assembly or the Senate plans? Figure 3 offers some explanation by tracing out the seats-votes curves for the both the old districts and the new ones. A seats-votes curve displays the relationship between the average share of votes received by a party in each district and the seats won as a result across a broad range of potential election outcomes (Niemi and Fett 1986). The curves therefore allow us to identify the partisan seat share we should expect for any average vote share in that plan.<sup>24</sup> The black lines in Figure 3 identify the curve for the 2011 plan

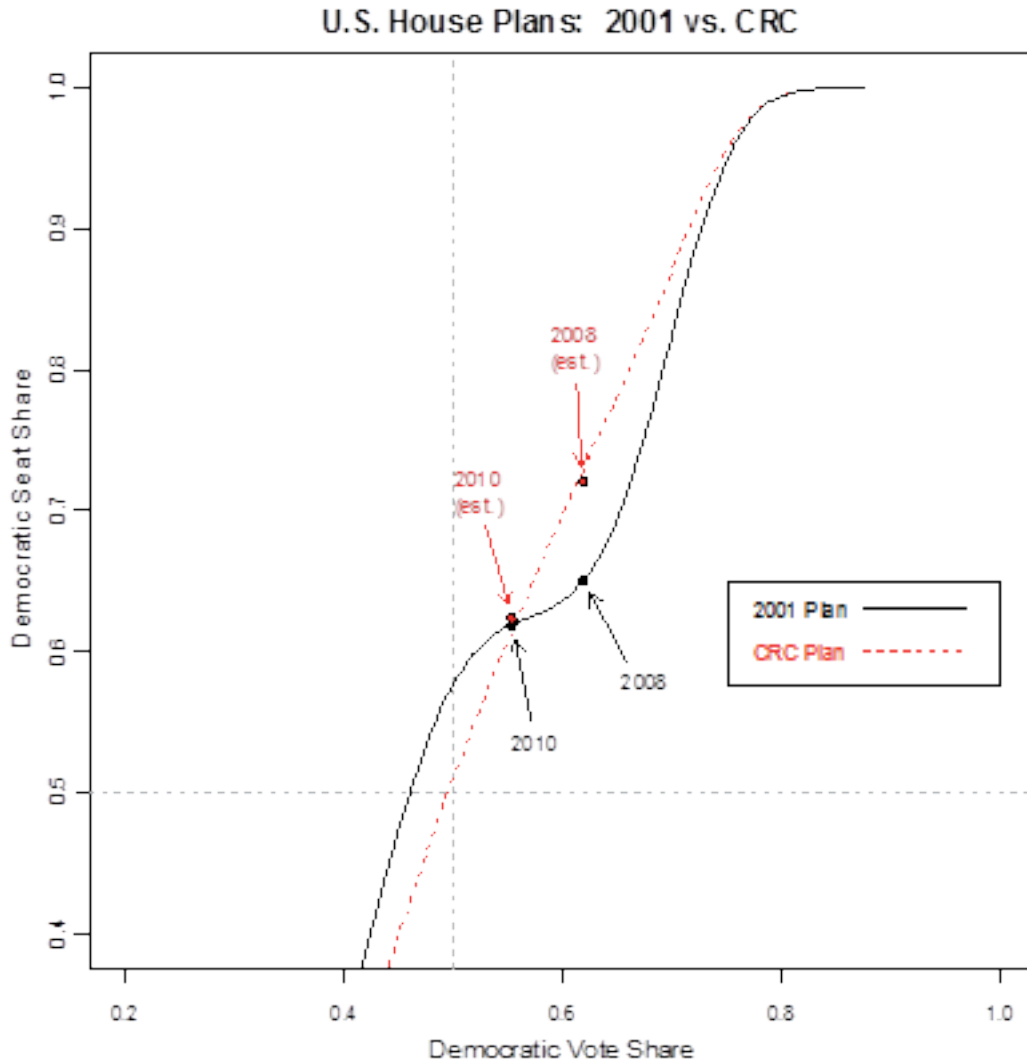
Figure 3. cont.



in each case, while the dotted red lines identify the curve for the final CRC plan. We also label the 2008 and 2010 outcomes on each graph for reference.

Each of the 2001 plans has a distinctive bowing in its seats-votes curve between a vote share of about 55 and 65 percent Democratic—exactly the range where elections in California tend to occur. This bowing is a graphical representation of the lack of competitive seats, because at the point where the curve bows, a shift in vote share (on the horizontal axis) produces a smaller change in seat share (on the vertical axis). By contrast, all three CRC plans come close to eliminating the bowing,

Figure 3. cont.



leaving a straight line where additional votes translate into new seats at a much faster pace. In the Assembly and Senate plans, the original bowing was modest so the consequences of straightening it are less pronounced. But the bowing was quite severe in the 2001 congressional plan. Given the range of vote shares across which elections in California have historically occurred, this has limited the gains the Democrats might have achieved under a more competitive map. The predicted seat shares for 2008 make this clear: The same vote share produces a much higher seat

share for the Democrats under the new map than under the old one, because the new map allows the additional Democratic support to translate into greater seat gains.

These results do not necessarily suggest that the CRC maps avoid any and all attempts at gerrymandering. But they do show that the new plans all resemble each other in the seat share that is predicted for similar shares of the vote, so the differences in partisan gains for Democrats between the new plans have at least as much to do with the 2001 plans to which they are compared as with the lines the commission has drawn. Indeed, given the strongly uncompetitive nature of the 2001 congressional plan, it seems unlikely that it is possible to draw *any* plan that increases competition among congressional seats without also advantaging the Democrats.

## Summary

Our analysis of political effects points to several conclusions. First, as many observers had hoped, the districts are somewhat more competitive than the districts drawn by the legislature in 2001. Apart from the congressional plan, however, the gains in competition are fairly modest. Indeed, for the Senate and Assembly, the level of competition predicted by our model is higher for the 2001 districts than actually occurred. This suggests that factors besides either incumbency or the district lines have conspired to keep competition low in recent years and may continue to do so moving forward.

Second, the partisan change we predict for the new plans is generally modest, and where it is larger, the new lines are not necessarily responsible. Based on party registration and incumbency, Republicans have been outperforming expectations in the current set of districts, especially in the Senate, where the Democrats probably ought to have claimed a two thirds majority already. This fact is visible without any statistical model. Under the 2001 Senate map, every Democrat represents a safe seat, while three Republican senators either represent Democratic-leaning districts or won their last election by a small margin (Sen. Blakeslee in District 15, Sen. Cannella in District 12, and Sen. Strickland in District 19). Had two of these three races turned out differently, the Democrats would already have a two-thirds majority. The handwriting for Republicans has been on the wall for several years.

Because the map in place before the redistricting already predicted better Democratic performance than actually occurred, only a small fraction of the partisan effects are properly attributed to the new lines drawn by the commission. In the Senate, improved Democratic performance is a product of district numbers more than any other cause. It is conceivable that Democrats could claim more than two-thirds of the seats in 2012 but lose the super-majority in 2014, based largely on the districts at stake in each year. Of course, one might accuse the commission of deliberately producing this result. We offer no opinion on this idea, except to note

that the commission adopted a systematic method of numbering Senate districts (Citizens Redistricting Commission 2011, 25), so any argument about the numbering would presumably need to take issue with that process itself.<sup>25</sup>

We find the largest partisan effects in the House map, where the Democrats may pick up four or more seats. These gains stem from the old congressional plan as much as the new one. The 2001 congressional plan was the least competitive of the three considered here. Such low levels of competition ensured that a strong Democratic performance would not lead to gains in seat share. By contrast, the new congressional plan is the most competitive of the three, so a good year for Democrats will probably allow them to pick up the seats they did not win before. Yet because these gains come from competitive seats, they could easily be lost again in a countervailing partisan tide. Greater competition brings opportunity, but also risk.

The implications of these results depend greatly on one's primary concern. If the question is whether the new maps are better for the Democrats, the answer is clearly yes. But the gains for Democrats are either uncertain, because they depend on competitive seats, or conditional, because they depend on the esoterica of Senate seat numbering. Moreover, there is nothing about the new lines that guarantees a good Democratic performance. If past Republican overperformance is due to systematic factors we have not accounted for in our model (e.g., strong candidates or fundraising), Republicans might continue to perform well and hold at least one-third of the seats into the foreseeable future.<sup>26</sup>

## **Discussion**

There is little doubt that the maps produced by the CRC, and the process through which these plans came about, represented an important improvement on the legislature-led redistricting of 2001. The new district boundaries kept more communities together and created more compact districts while at the same time increasing opportunities for minority representation. If these maps survive the coming referendum and legal challenges, they have the potential to modestly increase competition in California elections and the responsiveness of the legislative branch to changing voter preferences.

These are important accomplishments, and many supporters of Propositions 11 and 20 will rightly point to them as Californians and political observers elsewhere evaluate our state's innovative approach to redistricting. Yet any political reformer who believed that simply giving the job of drawing districts to regular citizens and attempting to take politics out of the process would produce maximum improvement on every desired dimension will surely be disappointed. As the 2011 experience has showed, many other social and political factors—such as the partisan self-sorting and segregation of the electorate—greatly limit the extent to which the

redistricting process, no matter how fair and nonpartisan, can change the product of redistricting. Maximizing certain criteria, such as keeping communities intact and protecting the voting rights of historically underrepresented groups, makes achieving other goals, such as increasing competitiveness, more difficult. Perhaps most importantly, the experience of the CRC has shown that a nonpartisan, participatory, and transparent process does not eliminate the zero sum nature of electoral competition. The commission's maps have both winners and losers and may result in lasting impacts on the balance of political power. If Californians decide that they like their new system of drawing lines, they will need to jealously guard it in future iterations, because the organized interests who care most about the process will surely learn from this maiden voyage. They will attempt to either steer future commissions in their direction or sabotage the commission's efforts entirely.

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## Notes

<sup>1</sup> California voters first created a redistricting commission in 1926. However, this body was different in important respects from the commission that carried out redistricting in 2010. First, the 1926 commission was made up of public officials — including the lieutenant governor, who was to serve as the chairman. Second, the commission was given power over drawing political boundaries only if the legislature first failed to agree on a plan. The earlier commission never actually oversaw the redistricting process in the state. See Brown (2000) for additional details.

<sup>2</sup> Even after this late-1982 maneuver, California's redistricting wars of the 1980s were not over. Republican assemblyman and winery owner Don Sebastiani funded an initiative to draw new plans in 1983, but the measure was thrown out by the state Supreme Court on the grounds that it violated the state constitution's requirement that redistricting occur once a decade. In the November 1984 election, Gov. Deukmejian pushed another initiative to create an independent commission, which was defeated, as was Proposition 119 in 1990 (Kousser 1997). Moreover, on the same ballot with

Proposition 119 was Proposition 118, a measure to require a two-thirds vote in each chamber of the legislature to pass a redistricting plan, and it too was defeated.

<sup>3</sup> In fact, there are many legitimate reasons, including minority empowerment, for the drawing of irregularly shaped districts.

<sup>4</sup> A different section of the state constitution prior to the passage of Proposition 11 had included nearly identical language protecting the boundaries of cities and counties, though not necessarily of neighborhoods and other “communities of interest.” Proposition 20 added a specific definition of the term to the constitution: “A community of interest is a contiguous population which shares common social and economic interests that should be included within a single district for purposes of its effective and fair representation. Examples of such shared interests are those common to an urban area, a rural area, an industrial area, or an agricultural area, and those common to areas in which the people share similar living standards, use the same transportation facilities, have similar work opportunities, or have access to the same media of communication relevant to the election process” (California Constitution, Article 21, Section 2(d)(4)).

<sup>5</sup> Influential Republican analyst and redistricting expert Tony Quinn praised early visualizations of the maps, commending the commission for listening to community input and concluding that “[t]he maps are balanced in partisan terms” (Quinn 2011a). This is not to suggest that the June plans were universally liked. Some Republican leaders criticized the draft maps soon after they were released (Hoffenblum 2011). Moreover, Quinn himself quickly had a change of heart, writing several weeks later that the maps “have bombed” and arguing that the commission “managed to gerrymander the state even more than the legislature did in 2001” (Quinn 2011b).

<sup>6</sup> In *Romero v. City of Pomona* (1989), the Ninth Circuit Court of Appeals endorsed the use of CVAP to assess compliance with the Voting Rights Act.

<sup>7</sup> These numbers are calculated by the authors using data on citizenship rates from the 2000 Census and the 2010 American Community Survey estimates.

<sup>8</sup> This follows the methodology used by the commission in its final report, except the commission did not count splits that produced areas with zero population; such splits are included in our count.

<sup>9</sup> Despite overall population growth, the number of counties too big to fit in a single legislative district did not change between 2000 and 2010. Thus, the comparison of the raw counts provides a useful metric for the differences between the 2001 legislative redistricting and the 2011 commission plans.

<sup>10</sup> Results available from the authors on request.

<sup>11</sup> The Polsby-Popper score for each political district is equal to the ratio of the area of the district to the area of a circle that has the same perimeter length as the district.

<sup>12</sup> For instance, supporters of Proposition 11 argued in the November 2008 voter information guide that “[t]here is a serious conflict of interest when legislators are allowed to draw their own district boundaries. They divide up neighborhoods and communities to create districts where they are virtually guaranteed reelection. Once elected, these politicians aren’t accountable to voters because they don’t have to earn our votes.” (California Secretary of State 2008, 72) Later in the same guide, supporters also argue, “[Proposition 11] means fair election districts drawn by citizens, not politicians, so we can *hold [the politicians] accountable and throw them out of office if they aren’t doing their jobs.*” (California Secretary of State 2008, 73, emphasis in original.)

<sup>13</sup> One could measure competitive seats in a number of ways. Past efforts have used the number of Democratic and Republican voters (Abramowitz, et al. 2006, McGhee 2011), turnover (i.e., the seats that actually change hands) (Johnson, et al. 2005), or close outcomes (Jacobson 1990). We assume that supporters of greater competition value it for its ability to keep incumbents concerned about public opinion outside their own party base. A seat need not actually change partisan hands

to frighten an incumbent in this way. Likewise, the number of Democratic and Republican voters in a district might be a decent proxy for election results, but it is the results themselves that matter. So while both turnover and party registration are defensible, close outcomes are a more satisfying approach than either one.

<sup>14</sup> We regress the Democratic share of the two-party vote on the Democratic and Republican shares of total registration and separate dummies for Democratic and Republican incumbents. Because we conceptualize competitiveness as a characteristic of each district independent of specific elections, we pool together all the elections from 2002 through 2010 into a single multilevel model, with random intercepts for election years, and then generate predictions for an average year. We also omit uncontested seats for the purposes of estimation but generate predictions for all seats. Thus, our predictions implicitly assume that all districts would be contested under the new maps. For the sake of coding incumbency, we assume that all incumbents will run in their district of primary residence, and that any seat occupied by a termed-out incumbent is open. After running these models, we sample 1,000 vectors of coefficients and errors to generate our estimates of probabilities. All models were run in R. Coefficient and goodness-of-fit estimates from these models are available from the authors upon request.

<sup>15</sup> Our predictions overstate the number of competitive races that actually occurred in the Assembly (11% predicted vs. 8% actual) and Senate (11% predicted vs. 7% actual) while perfectly predicting competitive races in the House (5% each). Nonetheless, there is little reason to think that the predicted changes will be consistently over- or underreported for the new plan. The same model also overpredicted competitive races in the 1990s, but there was no bias in the estimated change in competitiveness from the 1990s to the 2000s. These results are available from the authors upon request.

<sup>16</sup> One might also use the vote for the seven partisan statewide offices in 2010 and for president in 2008 as the basis for a measure of competitiveness—for instance, the districts whose average vote across all those races falls within some range around 50 percent, or the number of districts won by each party at least once. We tend to prefer the regression-based approach because it ties the estimates explicitly to votes. Nonetheless, these measures produce broadly similar estimates of competitive races, with the new Assembly plan always the least competitive and the House and Senate plans the most competitive depending on the measure.

<sup>17</sup> For the Assembly and House, we ran separate OLS models for 2008 and 2010 and generated predictions off each model separately. We omitted uncontested seats and used the same predictors as for the estimates of competition: Democratic and Republican registration, and separate dummies for Democratic and Republican incumbency. Since the Senate offers so little data (a maximum of 20 races per cycle), we ran one regression for both 2008 and 2010 and included a dummy to capture the intercept shift between the two cycles.

<sup>18</sup> There is a common misconception that the national Republican tide of 2010 did not touch California. Although Republican candidates did perform poorly statewide, they gained substantial ground in legislative and congressional races. Controlling for party registration and incumbency and excluding uncontested seats, the average Republican candidate in 2010 earned an additional 4 percent of the vote in the Assembly, 5 percent in the Senate, and 6 percent in the House compared to 2008. Shifts of these magnitudes would qualify as substantial partisan tides in the broader sweep of American history. However, given the lopsided registration advantage for one of the two large parties in most districts, these swings did not produce any extra victories for Republican candidates.

<sup>19</sup> Because both the odd- and even-numbered district estimates are based on the same model for 2014 (i.e., either a “Good Democratic Year” or a “Good Republican Year”) it assumes that both 2012 (when the odd seats are up) and 2014 (when the even seats are up) would be good years for the same party. In reality, a good year for one party is rarely followed by another good year for the

same party. Thus, it is more than likely that the actual 2014 results will fall somewhere between the estimates we present.

<sup>20</sup> The results are similar if we use an average of the vote for statewide offices in 2010 and the presidential vote in 2008 as our measure of the likely outcome, assigning those districts with an average vote share greater than 50% to the Democrats and all others to the Republicans. This approach does not allow us to distinguish between good years for each party, so the specific estimates vary somewhat. However, they all show a modest gain for Democrats in the Assembly and Senate plans and a larger gain in the House plan.

<sup>21</sup> Our regression model predicts vote share, which we then translate into seat share. In an otherwise competitive race, even slight deviations from our model's prediction will produce the wrong winner. The Democratic underperformance is therefore a consequence of better than expected Republican performance in key competitive districts. We cannot say whether this performance is a function of something predictable and systematic that we have not included in our model or simple random chance.

<sup>22</sup> Our model predicts a 65% Democratic seat share in a good Democratic year and a 63% seat share in a good Republican year, compared to the 64% Democrats actually won in both 2008 and 2010.

<sup>23</sup> Consistent with this idea, the predicted seat shares under the old plan are much more precisely estimated than they are under the new plan, while there is no such difference in precision for vote shares.

<sup>24</sup> Specifically, the seats-votes curve graphs the implications of a hypothetical partisan tide moving the vote share in every seat by a uniform amount. For example, if the Democrats received an average of 60 percent of the vote and then suddenly lost five percent in every district, the seats-votes curve would indicate how many seats the Democrats could expect to lose for that five percent, assuming that nothing else about the districts changed.

<sup>25</sup> The commission's process intended to minimize the number of voters moving from an odd to an even numbered district or vice-versa. To our knowledge, neither the 2001 plan drawn by the legislature nor even the 1991 plan drawn the Special Masters followed a similar systematic process. The legislature made no attempt to explain any of its decisions, while the Special Masters simply noted that they "tried to assign the numbers rationally" (Special Masters 1991, 74) and that any errors they made could be corrected by the California Supreme Court (Special Masters 1991, fn 60).

<sup>26</sup> There are two ways that we tested our Senate results to ensure that the real outcome for Republicans was not worse than we estimate. First, it is possible that party registration is not the best gauge of a district's political sensibilities, so we tried estimating our models with each district's 2008 presidential vote and 2010 gubernatorial vote. We obtained these vote results from the web site of Redistricting Partners, a Democratic consulting firm (<http://redistrictingpartners.com/>). Predictions based on these numbers actually suggested better outcomes for Republicans than the analysis using party registration. Second, we allowed for certain key incumbent decisions affecting competitive districts that have been announced or that might soon be announced: Republican Tom Berryhill running in the safe Republican District 8 in 2014 instead of the competitive District 5 in 2012; Republican Sam Blakeslee retiring, leaving solidly Democratic District 17 open; and Juan Vargas running for Congress instead of challenging fellow Democrat Christine Kehoe for District 39. The results were the same.