

California's Top-two Primary: A Successful Reform II

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This paper is the second of three concurrent papers, *California's Top-two Primary: A Successful Reform I, II, and III*, but it can be read independently. It is divided into two independent sections.

I. Contrary to claims, it is found that no harm has been wrought by the top-two on the minor parties in California, whether judged by their voter registration; or the risk a minor party runs in not remaining ballot-qualified; or any correlation between a minor party's voter registration and whether it has few or many candidates on the general election ballot; or any fall in the amount of money disbursed by the minor parties' state committees. II. In a race in an incumbent-free Assembly district safe for one or other major party, that ends in a general election between two candidates of that party, the top-two has raised the minimum block of votes sufficient to win the seat, from 20,000 to the range of 60,000 to 80,000, and moved the required block from the primary electorate to the general; and in districts safe for their party the vulnerability of incumbents to being knocked out of office in a primary election has decreased, but the number of incumbents actually losing to same-party challenges has increased, these increased losses now occurring in the general election.

I. MINOR PARTIES UNDER THE TOP-TWO

Is California's top-two primary detrimental to qualified political parties other than the Democratic and the Republican parties, the two that are dominant in California? For convenience, we shall call these two the *major* parties, and the other parties qualified in California the *minor* parties. The minor parties as of 2017 are the American Independent party, the Green party, the Libertarian party, and the Peace & Freedom party [1].

Spokesmen for three of the four the minor parties complain that the top-two primary has harmed the minor parties [2]. In this section we find no evidence that this is in fact so, whether we look at the voter registration of the minor parties (subsection IA); the risk that a minor party will fail to remain ballot qualified (subsection IB); any correlation between the number candidates a minor party has in a general election and changes in its voter registration (subsection IC); or the money the state organizations of the minor parties spend (subsection ID).

A. Registration

Figure 1 shows the history of the voter registration of the minor parties in California. Minor parties have come and gone under the system of partisan primaries [3], the Reform party and the Natural Law party being examples; minor parties have also had gaps in remaining qualified, as (under the system of partisan primaries) both the Reform party and the Peace & Freedom party have had. Change amongst the minor parties is therefore normal; however the advent of the top-two primary has had no discernable effect on the fraction of California's voters who are registered with the minor parties.

The Libertarian party has gained in registration since the advent of the top-two in 2012, continuing a rise that started in 2008; the Peace & Freedom party has gained; the Green party has lost, continuing a fall from its peak of registration in 2002; and the American Independent party has had its voter registration be essentially flat. There is no discernable change in the trends in the voter registration of these parties with advent of the top-two in the elections of 2012. The America Elects party has both come and gone in the era of the top-two primary; but that party became qualified not by voter registration by a petition [4] to nominate a candidate for U.S. President in 2012. The America Elects party never had more than 4000-odd [5] voters actually registered in California.

B. Qualification

None of the minor parties are in any danger of failing to remain ballot-qualified; indeed, their qualification has never been so secure. Figure 2 shows the number of voters registered with the Green, Libertarian, and Peace & Freedom parties over time, and also shows the requirements each has had to meet to remain qualified, requirements which we review.

There has, since at least 1961 [6], been a requirement [7] that to remain ballot-qualified a party must maintain registration equal to at least 1/15th of 1% of the total voter registration in the state. This requirement is shown as the lowest horizontal black line "A" in Figure 2; meeting it has never been a challenge for any of the parties. Again at least since 1961, and up to 2014, a party to remain qualified had in addition either to have a candidate running in the *general* election for a statewide partisan office in the gubernatorial cycle whose vote ex-

ceeded 2% of the *general* election vote for that office; or to maintain a registration exceeding 1% of the *total vote cast in the preceding gubernatorial election* [8]. If in a gubernatorial election year a party met the first of these tests, the point in Figure 2 indicating their voter registration is shown as an enlarged solid circle; if a party failed, as an enlarged hollow circle. The Peace & Freedom party failed twice, in 1998 and in 2002 (in 2002 it in fact ran no statewide candidates at all). To meet the second test, a party had to have registration above the stepped black line “B”; the Peace & Freedom party met this test shortly after the 2002 general election and so again became ballot qualified.

In 2014, in response to the establishment of the top-two primary, the legislature passed Assembly Bill 2351 [9]. To remain qualified, a party now had to have candidates running in the *primary* election for a statewide partisan office in the gubernatorial cycle whose combined vote exceeded 2% of the *primary* election vote for that office; or to maintain a registration exceeding 0.33% of the *total registration of the state* [10]. If a party met the first of these revised tests for the performance of its statewide candidates in an election in 2014, the point indicating that party’s voter registration is again indicated in Figure 2 by a large solid circle; all minor parties did. In addition, none had any trouble staying above the new threshold for their voter registration, shown on and past 2014 as the solid line “C”. Had the legislature *not* included in AB 2351 a repeal of the threshold “B” to remain qualified, the threshold effective for the elections of 2014 would have been what is shown by the horizontal dotted black line “D”; the Peace & Freedom party would (barely) have qualified by its registration remaining over this threshold, but it would have remained qualified anyway at least through the November elections of 2018 because of the number of votes acquired by its statewide candidates running in the primary of 2014.

The same plot as Figure 2 is shown for the American Independent party in Figure 3. There is some controversy [11] concerning how many voters registered with the American Independent party not because they support that party’s platform or candidates, but because voters in filling out their form thought registering as “American Independent” meant they were registering as decline-to-state or no-party-preference voters (that is, as voters “independent” of any party). We do not need to resolve that controversy here to conclude that the party is in no danger of failing to remain qualified for the California ballot.

C. Correlation between candidates run and voter registration

The natural expectation may be that it is harmful to the voter registration of a minor party to have candidates only on the primary election ballot in legislative races, and not to have candidates for those races on the general election ballot. This expectation is not however

supported by any correlation between a minor party having candidates in the general election and a minor party’s voter registration.

That there would be *no* such correlation seems at first sight to be impossible. After all, a party with zero voter registration must run no candidates, and a party with a registration as high as e.g. the Republican party will surely run candidates in most legislative races; therefore as voter registration rises, the number of candidates run must also rise? Not necessarily; that argument shows only that between a registration of 0% and about 25%, the number of candidates run as a function of registration must rise *somewhere*; whether there is a rise in the *specific range* of 0.5% and 3%, where the minor parties have all had their registration since 1990 (or for the Green party, since its qualification in 1992), is not determined. Empirically, there proves to be no rise in that range; and therefore in that range it remains an empirical question whether there is any correlation, either. There proves to be none.

Figure 4 shows, in solid points with solid connections, the voter registration of the minor parties qualified in California in 2016 as a percentage of the total registration of the state (left-hand scale). In hollow points with dashed connections, it shows the percentage of the 100 legislative seats (80 Assembly, 20 state Senate) up for election every two years, for which the party had a candidate on the general election ballot (right-hand scale). There is almost no observable correlation between the number of the general elections a minor party contested and the growth or decay of its voter registration.

The American Independent party has climbed in registration while running hardly any candidates at all [11]. The Libertarian party ran many candidates in partisan elections from 1998 through 2006, contesting over 2/3 of the legislative seats in 2002; there is hardly an upwards blip in its voter registration correlated with this ballot activity, particularly when compared to the bump in the Green party registration over the same interval during which the Green party ran, by comparison, almost no candidates for the legislature. The Peace & Freedom party lost little registration between 1998 and 2002, despite both not being qualified and fielding almost no candidates.

The time of transition from partisan to top-two elections [3] is shown in Figure 4 by the vertical dotted line. Under the top-two, very few minor party candidates for the legislature have made it onto the general election ballot; but the registration of the minor parties is not falling. And while no minor-party candidate has ever won a legislative or U.S. House seat in a California regular election under the top-two, the same was true under the system of partisan primaries [12] as well. As shown [13] in Table I, the most recent regular election in which a candidate belonging to any party other than the Republican or the Democratic party won office in California was over a century ago, in 1916. None of the minor parties ever so elected in California still even exist.

We shall see in *III*, Section V, that across the 50 states in 2014, no more than 60% of the legislative races were contested by both the Republican and the Democratic party. That percentage has been less than 70% as far back as 2002, the earliest year the relevant study [14] has considered, for all the 46 states that have legislative elections in even-numbered years.

Of those 46 states, 43 have a system of partisan primaries. For a major party to get on the general election ballot under a system of partisan primaries, all that is needed is to have one candidate of that party primary file (a modest fee may also have to be paid). Were it a valuable party-building exercise to have a candidate on the general election ballot in a district in which one's party lags greatly in voter registration, one would expect each major party to run candidates in every legislative race. Manifestly, they do not.

TABLE I. The most recent elections to state and federal offices in California in which a candidate belonging to a party other than the Republican or the Democratic party won office.

Office	Party	Elected
Governor	Progressive ^a	1914
Lt. Governor	Progressive	1914
Attorney General	American ^b	1856
Secretary of State	American	1856
Treasurer	Progressive	1856
Controllor	American	1856
U.S. Senate	Anti-Monopoly ^c	1874
Insurance Commissioner	–none–	>1990 ^d
Superintendent of Public Instruction	–none–	>1918 ^e
Board of Equalization	–none–	>1878 ^f
Assembly	Progressive (1), and Prohibition ^g (1).	1916
state Senate	Progressive (8 members)	1916
U.S. House	Progressive (1), and Prohibition (1).	1916

^a The Progressive party split under the leadership of former President Theodore Roosevelt from the Republican party.

^b The American Party, named the Native American Party before 1855, represented what was commonly known as the “Know Nothing” movement, and is unrelated to the American Independent Party, which is a qualified political party in California.

^c The Anti-Monopoly Party belonged to a group generally labeled as progressive. It became a (short-lived) national party in 1884, joining the Greenback party in nominating Benjamin F. Butler for President of the United States.

^d The first election to the then-new office of Insurance Commissioner was in 1990.

^e The office of Superintendent of Public Instruction appeared in 1851. It has been legally nonpartisan since the elections of 1918.

^f The office of Board of Equalization dates to 1878.

^g The Prohibition Party was founded in 1869, its defining feature being opposition to the sale or consumption of alcoholic beverages.

We note that the major parties have even a greater incentive to build some support in a district in which the party lags greatly in voter registration than do the minor parties. Minor parties have no realistic chance of winning an election for a statewide office, but the major parties do; and to win a statewide office a new vote in a district where the major party lags greatly in support is as valuable as a new vote in a district where the party leads. Nonetheless the major parties don't make the effort.

In short, a claim that having candidates on the general election ballot, in a district where a party trails badly in registration, builds party strength, has to account both for there being no evidence for that in the voting registration of the minor parties in California, and for why the Republican and the Democratic parties have not appeared together in more than 70% of legislative races across the country since (at least) 2002.

D. Money spent by the minor parties

If the top-two primary were intrinsically bad for the minor parties, one would expect to see that all the minor parties' state party organizations had spent more money during the elections of 2002 through 2010 under the (assumed favorable) system of partisan primaries than during the elections of 2012 through 2016 under the (assumed unfavorable) top-two primary. But the reverse is true, as is shown in Figure 5, which plots the sum the state organizations of each minor party disbursed each calendar year from 2001 through 2017.

The Libertarian party and the Peace & Freedom disbursed literally nothing (less than \$500) through the whole partisan-primary era, stepping up to still less than \$10,000 apiece in the last partisan-primary election in 2010. (Curiously, the state Libertarian party spent essentially nothing to support its candidates throughout the partisan elections of 2000, 2002, and 2004, for which, as shown in Figure 4, a Libertarian candidate was on the general election ballot in over half the state legislative races.) The Green party's disbursements fell from a high of a bit over \$120,000 in 2010 down to \$30,000 in 2010. The American Independent party disbursed \$17,000 in 2006, but its disbursements fell to \$3000 in 2010.

None of these trends is a picture of health under the system of partisan primaries. To set the general scale, the state Republican party [15] disbursed at least \$22.1 million in 2010, and the state Democratic party [16] disbursed at least \$32.9 million. All the minor party state organizations combined spent \$22,000 in the elections of 2010; the major parties combined spent 2500 times as much.

The disbursement trends for the minor parties after the implementation of the top-two in 2012 are mixed. The American Independent party still spends almost nothing; the Peace & Freedom party disbursements are flat or slightly downward; the Green party has continued its

slide, down to \$14,000 in 2016; but the Libertarian party has come modestly to life, with disbursements rising from a few hundred dollars in 2012 to \$60,000 in 2017. There is no pattern of the minor parties spending less under the top-two than they did in the last years of the partisan primary. Indeed, the total money spent by all four minor parties, shown by the brown dashed line, has not quite doubled [17] since the elections of 2012.

II. WHERE TURNOUT IS APPLIED

A. General Considerations

The top-two has changed the electorate, primary or general, that eliminates some candidates. In districts where one party is dominant, and where under a system of partisan primaries the decision about who would win the district would be decided in the primary, now under the top-two that decision is made in the general election, where the number of ballots cast in the race [18] is much higher. As shown in Figure 6, the ratio of the number of ballots cast in the race in the general election, to the number of ballots cast in the race in the primary, has for the elections of 2012, 2014, and 2016 ranged for the Assembly between 1.72 and 2.24; for the state Senate, between 1.77 and 2.24; and for the U.S. House, between 1.65 and 2.96. Over all the Assembly, Senate, and U.S. House races in 2012, 2014, and 2016 that had same-party general elections, there were 1.25 million votes cast in those races in the general elections, and 0.65 million votes cast in those races in the primary elections, for a state ratio of 1.90. Therefore in those races in districts safe for one or other major party, participation in the only contest that mattered essentially doubled.

Striking though those figures are, they actually understate the impact of the top-two in those 80 races. In Assembly districts dominated by one party, the top-two has trebled or quadrupled the number of votes a candidate must get to win office, from roughly 20,000, to the range of 60,000 to 80,000, and forced those votes to be from among the general electorate, not the primary voters of the dominant party. The top-two has raised also the threshold number of votes for a challenger of an incumbent's party to eliminate the incumbent in the primary, but has set a new, low threshold for that challenger to force a same-party general election. Most tellingly, the top-two has revealed that the system of partisan primaries had been eliminating in the primary the candidate of a dominant party who would actually have won a head-to-head, general-election matchup 25% of the time.

We support these claims by examining Assembly elections under the partisan primary from 2002 to 2010, and under the top-two from 2012 to 2016, dividing them in any given year into three classes. Class 1 consists of the open seats: all the seats where no incumbent was running. Because of California's term limits, every district

in 2002 through 2016 had to offer an open seat in a regular election at least once every 6 years [19]. Class 2 consists of the ordinary re-election seats: all the seats where an incumbent was running, won the general election, and where that incumbent was challenged in the party primary by no other candidate of the incumbent's party. Class 3 is a catch-all, consisting of all the seats belonging neither to Class 1 nor Class 2. Class 3 contains, among other possibilities, the seats where an incumbent ran in the primary but for whatever reason failed to win the ensuing general election; or where an incumbent was re-elected, but had faced opposition in the primary, token or severe, from a candidate of the incumbent's party.

Most Assembly seats, of whatever class, are safe seats for one or other major political party, meaning that in practice one major party is so dominant that any candidate of that party, facing in a general election any candidate or candidates of any other party or parties, will win. The reader may apply whatever criteria the reader wishes to define a safe seat; for the purposes of discussion, we will define it as a seat where one major party leads the other major party in voter registration by more than 5% of the voters registered in the district [20].

In the next two subsections we examine the rules for primary and general elections under partisan primaries and under the top-two, to work out for seats in Class 1 the threshold number of votes a candidate had to get to win the seat; and then for seats in Class 2, the threshold number a challenger of the same party as the incumbent would have to have gotten to win the seat. Then in sections IIB and IIC we examine how all this theory worked out in practice by examining each of the 80 Assembly elections for the five partisan-primary elections of 2002 through 2010, and for the three top-two primary elections of 2012 through 2016. Then in section IID we examine the elections in which incumbents were challenged from their party and defeated. Last in Section IIE we summarize the results not only for Assembly seats, but state Senate and U.S. House seats.

1. Thresholds for seats in Class One

Consider how few votes are necessary for a candidate to win a safe seat in Class 1, if that incumbent-free seat happens to be safe for the candidate's party.

Under the system of partisan primaries, the only election that matters is the party primary of the dominant party; winning the ensuing general election will be automatic. To win the seat, therefore, a candidate of the dominant party had only to get one more primary vote than the candidate who trailed him by taking second in the primary.

Under the system of top-two primaries finding the minimum number of votes is more complicated. If the primary produced a general election contest between a candidate of the dominant party and a candidate of another party (or of no party), the answer is the same as under a

partisan primary: the minimum number of primary votes is one more than that acquired by whichever candidate of the dominant party trailed in the primary [21]. If, however, the primary produced a general election between two candidates of the dominant party, the answer is different. To win the seat, a candidate first has to reach the general election, for which it is necessary to get at least as many votes as the candidate, of whichever party or of no party, who took third in the top-two primary overall; and then it is also necessary to win the general election itself, the outcome of which between two candidates of the dominant party can no longer be predicted from the mere fact that that their common party is dominant in the district in question. Winning that general election requires a candidate to get over half the number of votes cast in the general election.

2. Thresholds for seats in Class Two

Consider next the safe seats in Class 2, where an incumbent was re-elected with no opposition from within his own party. We ask, had there been a challenger from the incumbent's party, how many votes, and in which elections, would the challenger have had to get to be elected to the Assembly?

This question is impossible to answer without making some assumption about how the entry of such a challenger into the primary election list would have affected who else ran, how the turnout for the primary and general elections would have changed, and how votes would have been reapportioned between the candidates who ran. To make some kind of analysis possible, we will make the simple assumption that for a challenger to get a primary vote, he must take it from the incumbent. More specifically, we shall assume:

The candidates in the primary other than the challenger would not have changed; the turnout for the primary would not have changed; and all the primary votes given to candidates who are not the incumbent nor the challenger (necessarily not of the dominant party) would not have changed.

This assumption constructs a system where the consequences of inserting a challenger can be computed exactly, and therefore makes it easy to spot broad trends within the top-two system that would, in our view, remain if the assumption were made more complicated.

Under the system of partisan primaries, in a safe seat all that matters to a challenger is beating the incumbent in the dominant party's primary; winning the ensuing general election is automatic. Given our assumption, the number of votes a challenger would need in the primary is half the number of votes the incumbent actually got in the primary.

Under the system of top-two primaries, two different things can happen, with different thresholds: the challenger can get enough votes in the primary that the incumbent never makes it to the general election, an elec-

tion that in a safe seat the challenger would then win automatically; or the challenger could get enough votes to force a same-party general election against the incumbent, an election which the challenger would then have to win.

To knock out the incumbent in the primary, it is under the top-two necessary but no longer sufficient for the challenger to take away half the incumbent's vote; the threshold for such a knock-out under the top-two system is therefore always greater than or equal to the same threshold under the system of partisan primaries. Often the challenger has to take away more votes than half, in order to push the incumbent's vote to below that of another candidate who ran in the primary.

Pushing the incumbent's vote that low is legally impossible if another such candidate never existed; if the incumbent was the only candidate in the original primary, he could not be prevented from running in the general election even if a challenger took away all of the incumbent's votes but one. Under our assumption, had there been another candidate or candidates other than the incumbent in the race, then to knock the incumbent out it would be necessary to lower the incumbent's vote below that of whichever candidate took second in the original primary, if that candidate got fewer votes than the incumbent; otherwise it is necessary to lower the incumbent's vote below that of whichever candidate took third.

Under our assumption, then, the challenger under the top-two can knock out the incumbent in the primary only if the challenger received *at least* half the incumbent's total. In contrast, for a challenger to force a same-party general election is possible (again under our assumption) only if whichever candidate took second received *at most* half the incumbent's total. For races where that was the case, such a general election would result whenever the challenger could take from the incumbent enough votes for the challenger to beat whomever ran second in the original primary, a number which will always be less than half the vote received by the incumbent in the primary, and often much less. For example, if the incumbent ran alone in the primary, to force a same-party general election all a challenger would have to receive was a single primary vote.

Forcing a such a general election against the incumbent doesn't guarantee victory for the challenger, of course; the would-be challenger would in also have to get a number of votes in the general election equal to at least to half the number cast.

B. Data for Class One Seats: Incumbent-free

For the Class 1 (incumbent-free) seats, and for the partisan primary elections of 2002 through 2008, the number of votes won by the candidate who took second in the primary of the party that won the seat is shown in Figure 7. A block of about 20,000 primary votes was sufficient to

win the primary, and therefore to win any of the safe seats. Figure 8 shows such a block remained sufficient through 2010, the last of the elections with partisan primaries; and shows it also remained sufficient under the top-two elections in 2012 through 2016 for those elections where the general election occurred between two candidates of different parties. The block would also have been sufficient for those elections that in fact ended in general elections between candidates of the same party, if we imagine those elections re-run under a partisan primary, and if the actual votes recorded for each candidate under the top-two are imagined not to change.

Under the actual top-two, however, in 2012, 2014, and 2016, there occurred in incumbent-free Assembly races respectively 13, 8, and 7 general elections between Assembly candidates of the same party (see Figure 8), and to win these seats a candidate had to muster in his general election a much larger block of votes, in the range of 60,000 to 80,000 or so; a smaller block being required only in districts where the primary election turnout is itself below average. Unlike the block in the primary, this larger block could include voters registered with parties other than a district's dominant party; significant numbers of voters with no party preference; and also those voters of the dominant party who had voted in the party primary for candidates of that party who did not make it to the general election. Thus if one faction of the dominant party ran one candidate, and another ran two or three, the second faction (perhaps the majority of the party) would have a chance to unify around its one representative on the general election ballot.

It should not be surprising, then, that the general election leader could prove to be different from the primary election leader. Figure 8 shows that in 2012, 2014, and 2016, the candidate of the dominant party who trailed in the primary election won the general election in respectively 4, 3, and 3 of the same-party Assembly races, respectively; that is, just over a third (10/28, or 35.7%) of the time.

The conclusion we draw is that partisan primaries had been eliminating in the primary election for state Assembly the candidate whom the district in the general election would in fact have chosen in a head-to-head matchup between candidates of the dominant party, had that matchup been available, a third of the time.

Plainly a faction of the dominant party that commands in a safe Assembly seat a loyal block of 20,000-odd primary voters, but no more, or even considerably less, has a very good chance of their candidate leading a multiple-candidate partisan primary, and so winning the seat; but under the top-two, that candidate now has a good chance of losing the ensuing same-party general election, if another candidate of the dominant party, one who better represents the electorate within the district as a whole, can get more than half of the much-larger, and more diverse, general election vote.

C. Data for Class Two Seats: Incumbents unchallenged from within their party

For the Class 2 seats, in districts where an incumbent ran unopposed in the primary by any candidate of his party, Figure 9 plots for the partisan-primary elections of 2002 through 2008 the number of votes a challenger of the incumbent's party would have had to have taken from the incumbent to knock the incumbent out. The same plot continues for the elections of 2010 in the first panel of Figure 10. For the top-two elections of 2012 through 2016, the threshold for the challenger to knock out the incumbent in the primary is plotted as a solid circle. The threshold as it would have been had the partisan primary system been in place instead, and had none of the votes given to each candidate changed, is plotted as a cross. As expected, the first threshold is higher than the second, often insuperably higher: under the top-two it is much harder for a challenger of an incumbent's party to knock out an incumbent in the primary.

Also for the Class 2 seats, where an incumbent ran unopposed in the primary by any candidate of his party, a challenger of the incumbent's party can under the top-two think of winning a seat by forcing a same-party general election which the challenger could then win.

We examine such districts in Figure 11. For the races where a same-party general election would be possible under our assumption, the threshold for a challenger to force a same-party general election is plotted as a diamond; the threshold for knocking an incumbent out had the election been conducted under system of partisan primaries, and had none of the votes given to each candidate changed, is shown, as in Figures 9 and 10, as a cross. The former threshold is always lower than the latter; indeed in many races forcing a same-party general election would be automatic: all a challenger would have to do to force one is merely file for the primary election against any incumbent otherwise unopposed.

To win the ensuing general election would require the challenger to get at least as many votes as is plotted as the solid circles in Figure 11. This number is much larger than the number required to knock the incumbent out in the primary would have been under a partisan primary; and the votes must be mustered in the in the general, and not the primary, election: not solely among the party activists, then, exclusively; but among all the diverse general election voters in the district.

The conclusion we draw is that the ability of a block of voters of the incumbent's party who vote in the primary elections, and whose numbers do not increase in a general election, to knock out an incumbent, or to threaten to, has been decreased under the top-two; while the ability of a challenger to force a same-party general election with the incumbent has been introduced, with a low threshold; and in such a same-party election, it is the candidate who can appeal to a general election voter, in large numbers, who will win. In brief, incumbents seeking re-election have to worry about the primary election voter less, and

the general election voter more. What effect this change has had on how incumbents behave in the legislature is difficult to quantify but we believe it to be real.

D. Data for Class Three Seats: Incumbents opposed from within their party

For the Class 3 seats, where an incumbent was opposed in the primary by a candidate of the incumbent's party, Figure 12 plots for the partisan-primary elections of 2002 through 2008 the number of votes by which the incumbent led the leading challenger of his party in the primary.

Under the system of partisan primaries, any challenge to an incumbent member of the Assembly from within his party was rare—there were but 3 races in 2002, but 1 in 2004, then 5 in 2006, and 5 again in 2008. Only one race led to the incumbent being knocked out. The pattern under partisan primaries continues in the first panel of Figure 13; in 2010 where there were again but 5 such races, in none of which the incumbent was knocked out.

Starting under the top-two primaries, there has been an increase in the number of such Assembly challenges—there were 16 in 2012, and 10 in 2014, and 13 in 2016. Not all these challenges were serious ones, but some were: in ensuing same-party general elections, two incumbents lost in 2012, one in 2014, and two in 2016. Figure 13 shows that all five defeats occurred in districts where the dominant party had an advantage over the other major party of at least 30% of the voters registered in the district, so there was no prospect of the other major party unseating an incumbent. In four out of the five defeats the candidate who beat the incumbent in the general election trailed in the primary, and so would have been eliminated in a partisan primary, had there been one, and the incumbent would have been re-elected.

The conclusion we draw is that the promise of the top-two to render elected officials more accountable to the general election voter, especially in safe seats where their replacement by a person of a different party is otherwise virtually impossible, is being borne out.

We acknowledge, however, another possibility. As indicated in the timeline in *I*, Figure 1, not only did the top-two come into force for the elections of 2012, so did a change in the term limits for members of the Assembly. A member elected for the first time before 2012 was allowed to serve 3 consecutive terms (6 years total) in the Assembly [*I*, ref. 23]; but a member elected in or after 2012 was allowed to serve 6 consecutive terms (12 years total) in the Assembly [*I*, ref. 24]. It is possible that there were so few same-party challenges to Assembly incumbents in the elections of 2002 through 2010 because a race to unseat an incumbent could only elect a challenger two years earlier than if the challenger postponed running until the incumbent was termed out and the seat was open; and that most challengers and their backers were prepared to wait those two years. After 2012, however, a challenger

might have to wait not 2 but 10 years for the incumbent to be termed out, and possibly challengers and their backers simply would not wait so long.

The same change in term limits complicates the use of Figures 7 through 13 in guessing what will happen in the Assembly elections of 2018 and beyond. No member of the Assembly in early 2018 would be termed out of the Assembly before the elections of 2028, so the number of open Assembly seats will likely be reduced; indeed absent an Assembly member leaving office or choosing to not to run for re-election, there will be no open Assembly seats at all until 2024. Whether incumbents will face more challenges by members of their own party when for years there are few open seats available, anywhere, in which to run will have to be seen.

E. Comparison of same-party contests under the top-two and under the partisan primary

We summarize the results for same-party challenges to incumbents for races for the state Assembly, and extend this analysis to consider same-party challenges in races for the state Senate and the U.S. House, in Table II. The same data appears in more detail in *III*, Tables I, II, and III.

Over the three election years from 2012 through 2016, and for races in California for the Assembly, state Senate, and U.S. House combined, the top-two primary produced 80 same-party general elections, 60 D vs. D and 20 R vs. R. Of the 80 races, 20 (or 25%) were won by the candidate who had trailed in the primary. The races fielded 39 incumbents, 10 of whom (more than 25%) lost. We may contrast this with the results of the previous five election years from 2002 through 2010, when over the Assembly, state Senate, and U.S. House but 3 incumbents total were defeated by members of their own party (the three races where an incumbent was defeated are shown in Table III); and of course no candidate who trailed in the party primary got to make a case before the general electorate and prevail.

Under partisan primaries an average of 0.6 incumbents per year lost in primaries, while under the top-two, an average of 3.3 incumbents per year lost in same-party general elections, a factor of 5.6 more. Under partisan primaries, 2 of the 3 incumbents who lost a same-party primary in any election from 2002 through 2010, lost in 2002; and under the top-two, 6 of the 10 incumbents who lost a same-party general election lost in 2012. If we examine the elections that do not immediately follow a redrawing, an average of 0.25 incumbents per year lost a same-party primary under the system of partisan primaries, and an average of 2.0 lost a same-party general election under the top-two, a factor of 8.0 more. So the increase in the number of incumbents who lose in same-party challenges under the top-two, compared to under partisan primaries, increases, if we examine those elections in which the district maps do not change. We conclude that the apparent increased vulnerability under the top-two for an incumbent in a seat safe for his party

to lose to a same-party challenger is not explained by the implementation of new district maps in 2012.

Appendix A: Fuller discussion of figures

1. Figure 1

There is no point plotted for the Green party for the election of 1990 because the Green party had not yet become a qualified political party in California. The points for the Libertarian party and the Peace & Freedom party are, by accident, nearly coincident for the years 1990 through 1996. The America Elects party qualified by filing of petitions to nominate a candidate for U.S. President, not by registering voters, which is why it qualified for 2014 and 2016 with so small a fraction of California’s registered voters. Data for the registration of the various political parties from 1990 to 2016 are taken from the website of the California Secretary of State [22].

The colors used for the four minor parties still qualified in California as of 2016 have been chosen to be as consistent as possible with the party’s choice or history [23].

TABLE II. Breakdown of the same-party general elections for the Assembly, state Senate, and U.S. House by election year for 2012, 2014, and 2016. Presented left to right are the numbers of Democrat vs. Democrat and Republican vs. Republican elections, and the total number of same-party general elections. Of that total number of same party general elections, shown next are the number of those where the victor had trailed his opponent in the primary; the number of incumbents who ran; and the number of those incumbents who lost. At the bottom are the totals over the three houses and years.

year	#D vs. D	#R vs. R	#primary trailer won	#Inc. ran	#Inc. lost
Assembly					
2012	11 +	7 =	18	6	5
2014	8 +	4 =	12	4	4
2016	11 +	4 =	15	4	8
Total:	30 +	15 =	45	14	17
State Senate					
2012	2 +	0 =	2	0	0
2014	5 +	1 =	6	1	3
2016	5 +	0 =	5	1	1
Total:	12 +	1 =	13	2	4
U.S. House					
2012	6 +	2 =	8	2	8
2014	5 +	2 =	7	1	5
2016	7 +	0 =	7	1	5
Total:	18 +	4 =	22	4	18
All:	60 +	20 =	80	20	39

2. Figure 2

Data for the registration of the three parties are taken from the references for I, Figure 2. These data are extended through February 10, 2017 by the odd-year report of registration [24]. Data for the total registration of the state of California, from which the lowest line “A”, representing 1/15th of 1% of registration, is derived, are from the same source. Data for the total number of votes cast in the general election in gubernatorial election years are taken from the California Secretary of State [25].

One can try to attribute the slight bulge in the registration of the Libertarian party, from 1998 to 2006, to that party having run candidates in general elections in many legislative districts, reaching a peak of over two-thirds of legislative districts in the elections of 2000. The bulge in the registration of the Green party from 2000 to 2008 is, however, much larger, while the fraction of legislative races in which the Green party ran candidates in general elections was negligible by comparison; also the Libertarian party saw from 2008 through 2016 a second increase that was larger than this slight bulge, and that second increase occurred when the fraction of legislative general elections in which their candidates appeared was falling steeply, reaching zero in 2012. There is very little evidence that minor party registration rises merely because a candidate of such a party appears on the general election ballot for Assembly, state Senate, or the U.S. House.

The Peace & Freedom party regained its status as a qualified political party on March 14, 2003 [26].

3. Figure 3

Data for the registration of the are from the references for Figure 2.

4. Figure 4

Data for the registration of the political parties are from the references for Figure 1. Data for participation in Assembly and Senate general elections by candidates affiliated with the political parties is taken from the website of the California Secretary of State [27].

TABLE III. The three races for the elections of 2002 through 2010 where under the system of partisan primaries an incumbent lost to a challenger of the incumbent’s own party by being defeated in the party primary.

year	district	party	primary winner	defeated incumbent
2002	AD36	R	Sharon Runner	<i>Phil Wyman</i>
2002	CD18	D	Dennis A. Cardoza	<i>Gary A. Condit</i>
2008	SD 3	D	Mark Leno	<i>Carole Migden</i>

5. Figure 5

Figures for the money disbursed for the four minor parties in a calendar year are taken from each party committee's [28] electronically-filed, Fair Political Practices Commission Form 460, available through Cal-access [29]. The state Libertarian party has an additional committee [30], whose disbursements have been included except for most of a \$26,200 total charge for radio airtime [31] on 6/2/2010 [32], that part being paid for by a net \$25,000 contribution (over June 2 and June 3, 2010) from the Libertarian National Party [33], and spent to oppose the passage of Proposition 14 (the top-two primary) [34]. I have chosen not to include this \$25,000 transfer in calculating the solid point for the Libertarian party in 2010 because I view it as essentially an activity of the national, not the state, Libertarian party. If the reader wishes to include this activity, the resulting point is shown as an isolated open orange circle, which happens to be almost coincident with the solid green point for the Green party in 2010.

The other three minor parties do not have such secondary committees or, if they do, their activity is not sufficient to trigger a requirement to file financial reports with the FPPC.

The Peace & Freedom party in 2010 also made an unusual disbursement of \$5000 on 5/17/2010 to oppose Proposition 14 [35]. I have chosen not to include this disbursement either; if the reader wishes to include it, the resulting point is shown as an isolated purple circle. The FPPC Form 460's for neither the Green party nor the American Independent party disclose expenditures in 2010 regarding Proposition 14, so there are no isolated points plotted for those parties.

Political parties with negligible expenditures need not file reports; the years in which a party filed no reports are shown without solid circles plotted. That an FPPC report is required [36] to be filed with the FPPC when a committee's disbursements influencing the action of voters exceeds \$500 was established by the passage of Proposition 9, the *Political Reform Act*, in 1974. The threshold was raised [37] to \$2000, effective January 1, 2016, by the passage of Assembly Bill 594 in 2015. These two thresholds make up the red stepped line at the bottom of the figure. In years in which a party committee did not file electronically an FPPC Form 460 the disbursements are taken to be zero, though it is possible that such a form was filed with paper only and is therefore simply not available at Cal-access.

6. Figure 6

Data are from the references used for Figure 7.

7. Figure 7

The references for all the figures 6 through 13 apply here.

Data are from the website of the California Secretary of State. The candidates, incumbency status of candidates, and vote totals for the primary elections for Assembly in the years 2002 through 2016, are from the *Vote Summaries* for the office of member of the state Assembly for the respective primary election [38]. The candidates and vote totals in the corresponding general elections are from the *Vote Summaries* for the office of member of the state Assembly for the respective general election [39]. The voter registration in each Assembly district is from the *15 Day Report Of Registration* by Assembly district, issued 15 days before the regular November general election in each election year [40].

8. Figure 8

Data are from the references used for Figure 7.

9. Figure 9

Data are from the references used for Figure 7.

10. Figure 10

The generally higher number of votes required in 2016 compared to 2014 or 2012 is explained by the statewide turnout being markedly higher in the primary of 2016; see I, Figure 1.

Data are from the references used for Figure 7.

11. Figure 11

Data are from the references used for Figure 7.

12. Figure 12

The symbols for district 68 in 2006 are the same as, and lie atop of, the symbols for district 38; the location of the center of the symbols for district 68 is indicated by the small black dot.

Data are from the references used for Figure 7.

13. Figure 13

The symbols for district 3 in 2012 are the same as, and lie atop of, the symbols for district 33; the location

of the center of the symbols for district 3 is indicated by the small black dot.

In 2012 the incumbent in district 50 was but barely the top vote-getter in the top-two primary but then went

on to lose the same-party general election. In 2016, the incumbent in district 39 was a distinct second in the top-two primary, and lost the ensuing same-party election.

Data are from the references used for Figure 7.

[1] The correct name is the “Peace and Freedom” party. We shall refer to it as the “Peace & Freedom” party, to avoid confusion in sentences like, “The Peace and Freedom and Green parties participated”.

[2] See for example *Top Two Elections and their Effects on the Smaller Parties - A joint statement from the Green Party, Libertarian Party and Peace and Freedom Party*, available on the website of the Green Party of California at <https://www.cagreens.org/resolution/top-two-elections-and-their-effects-smaller-parties>. This listing begins,

“In view of the devastating affect the Top Two system is having on California’s smaller parties, the following joint statement was sent to all 120 members of the California state legislature.”

As of July 5, 2018, the website of the American Independent party nowhere mentions the top-two. See <http://www.aipca.org>.

[3] The “blanket” primary, in force for the elections of 1998 and 2000, is effectively a partisan primary for the present purpose, in that each minor party was guaranteed a slot on the general election ballot.

[4] America Elects became a qualified political party by petition on December 19, 2011. See the website of the California Secretary of State, specifically *American Elect Party Qualifies for California Ballot*, <http://www.sos.ca.gov/administration/news-releases-and-advisories/2011-news-releases-and-advisories/db11-064>.

[5] The party is recorded as having 3030 registered voters on the May 21, 2012 report of registration, rising to 3922 registered voters on the October 22, 2014 report of registration; the party became no longer qualified, and was no longer seeking qualification, by the date of the next report of registration on February 10, 2015, on which no figures for the party are recorded. See the *Report of Registration as of [appropriate date]: Registration by County*, available on the website of the California Secretary of State at <http://www.sos.ca.gov/elections/voter-registration/voter-registration-statistics>.

[6] The threshold to meet this requirement has had its present value at least as far back as September 15 of 1961. The threshold is presently in Elections Code Section 5101, as a result of an extensive renumbering and reordering of the Elections Code in 1994 (See Statutes of 1994, chapter 920); before that the threshold was in in Elections Code Section 6530(d). The relevant language in that section remained unchanged since being set by a previous rewrite of the Elections Code in the 1961 Regular Session that became effective on September 15, 1961. The relevant part of that rewrite read,

“Whenever the registration of any party which qualified in the previous direct primary election falls below 1/15th of 1 per cent of the total state registration, that party

shall not be qualified to participate in that primary election but shall be deemed to have been abandoned by the voters, since the expense of printing ballots and holding a primary election would be an unjustifiable expense and burden to the State for so small a group. The Secretary of State shall immediately remove the name of the party from any list, notice, or other publication containing the names of the parties qualified to participate in the primary election.”

See for example *1961-1976 Cumulative Supplement: Completely Supplementing Both Volumes of the Elections Code Since Issuance Through the End of the 1985 Regular and Extra Sessions of the 1975-75 Legislature. Deering’s Election Code annotated of the State of California, &&1 to End [1976]*. Available at the Stanford University Crown Library as call number LAW KFC30.5D4E44 1961.

The work of 1961 was itself a renumbering and a reordering; I know that on January 1, 1955, the threshold existed in Elections Code Section 2540 but was different (1/10th of 1%, not 1/15th). In that code section the following appears:

“Except that whenever the registration of any party which qualified in the previous direct primary election falls below one-tenth of 1 percent of the total state registration, that party shall not be qualified to participate in the primary election but shall be deemed to have been abandoned by the voters, since the expense of printing ballots and holding a primary election would be an unjustifiable expense and burden to the State for so small a group. The Secretary of State shall immediately remove the name of such party from any list, notice, ballot, or other publication containing the names of the parties qualified to participate in the primary election.”

When the shift from 1/10th to 1/15th occurred, and whether the threshold existed earlier, I have not determined. The threshold was duplicated in Elections Code Section 5153, the section current as of 2017, by the passage of AB 1413.

[7] California Election Code Section 5101. See for example the FindLaw website, specifically <http://codes.findlaw.com/ca/elections-code/elec-sect-5101.html>.

“Whenever the registration of any party that qualified in the previous direct primary election falls below one-fifteenth of 1 percent of the total state registration, that party shall not be qualified to participate in the primary election but shall be deemed to have been abandoned by the voters. The Secretary of State shall immediately remove the name of the party from any list, notice, ballot, or other publication containing the names of the parties qualified to participate in the primary election”.

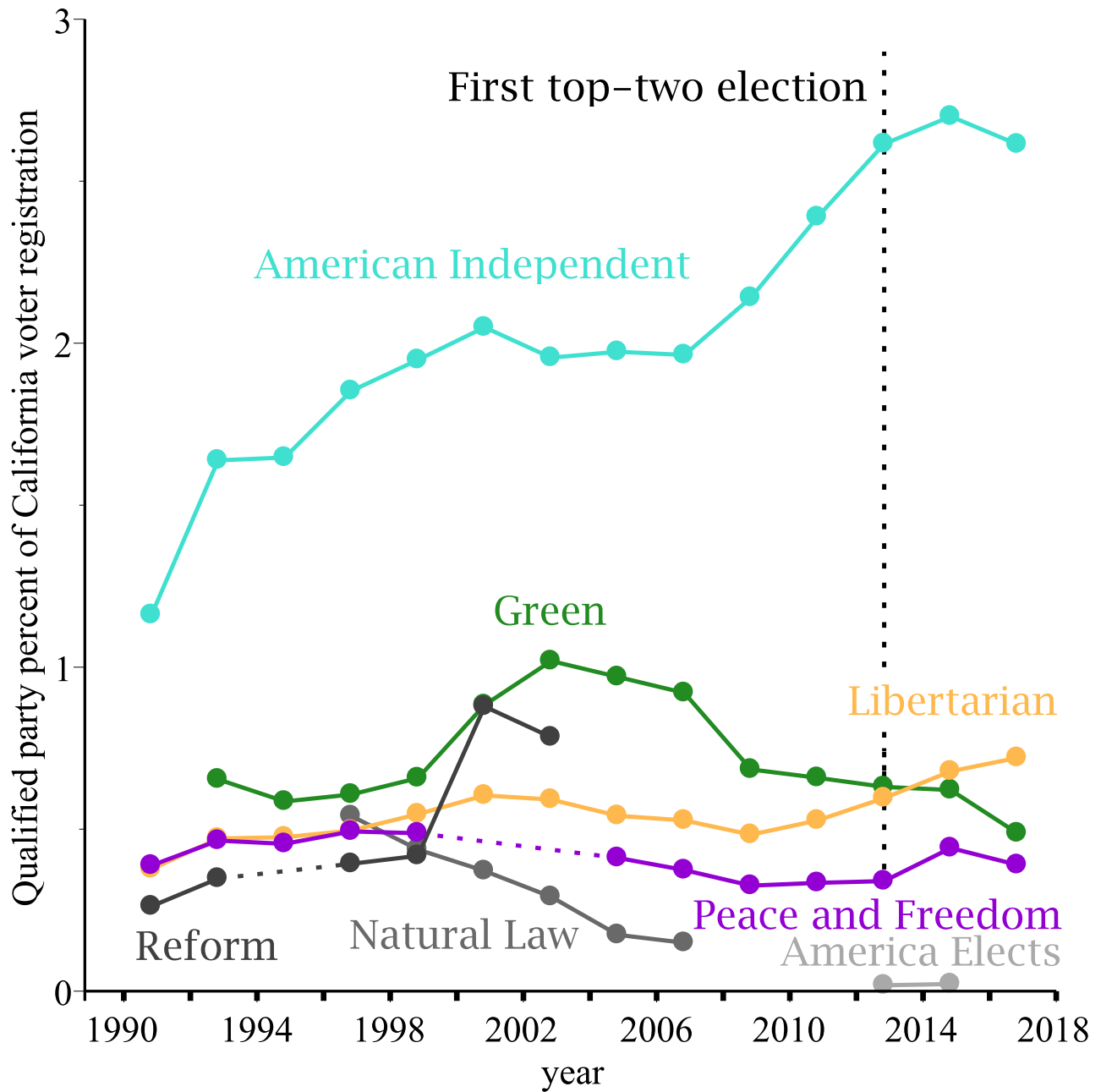


FIG. 1. Plot of the percent of all registered voters in California registered with all the qualified political parties, except the Democratic and Republican parties, in California for the election years 1990 to 2016. Large solid points indicate the voter registration just before a general election in a year for which the party was qualified for the ballot. The three parties no longer qualified in California as of 2016 are shown in tones of grey; the four that are, in color. Two parties (the Reform party in 1994 and the Peace & Freedom party in 2000 and 2002) had intervals when they fell out of qualification and but then recovered; these intervals are indicated by dotted lines. The time of the first general election under the top-two system is shown as a vertical black dotted line. For a fuller discussion of this figure see Appendix A 1.

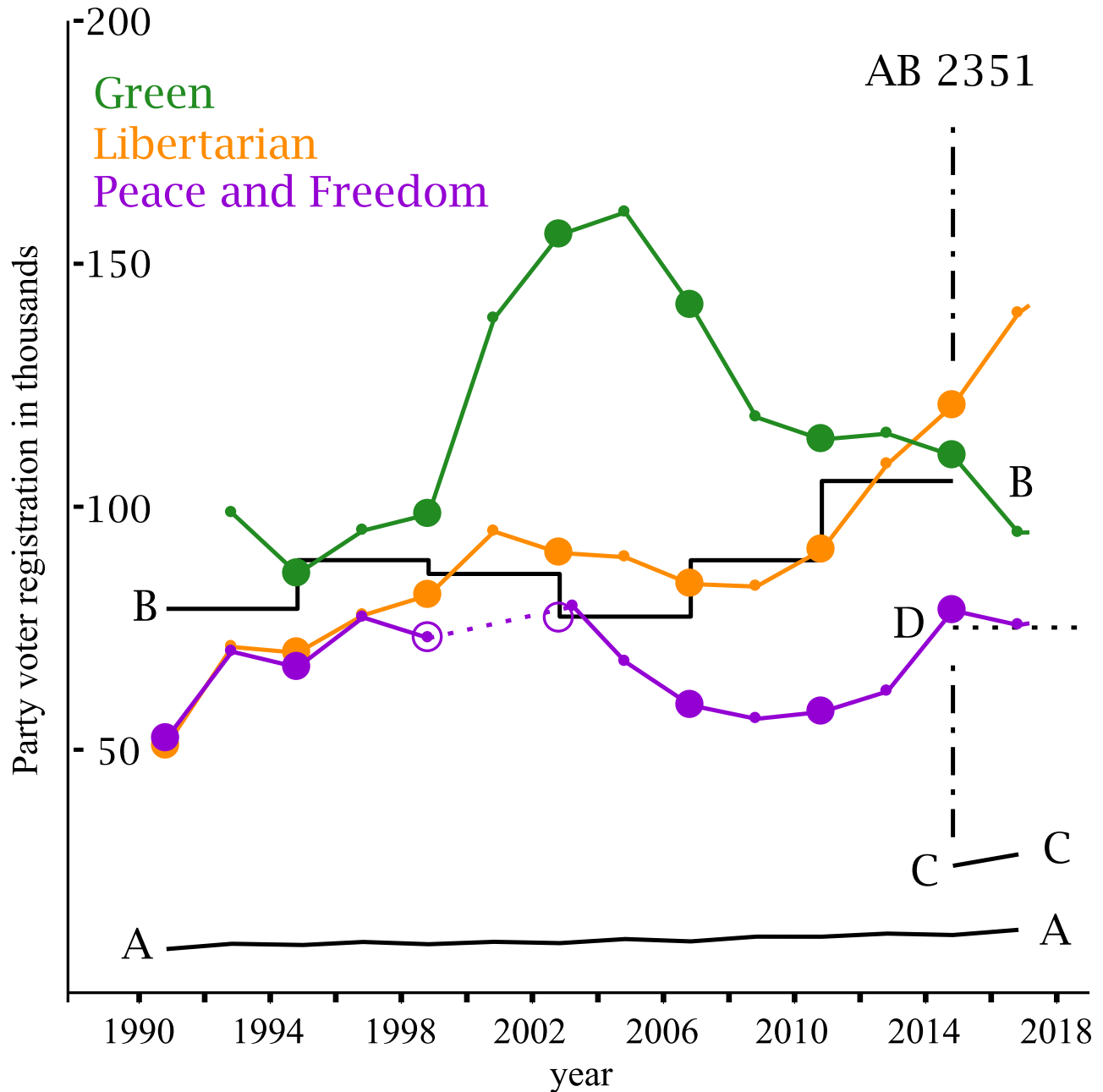


FIG. 2. Plotted is the annual voter registration in California for the Green and Libertarian parties, and for the Peace & Freedom party. The solid circles are the reports 15 days before the November general election in even-numbered years. The interval when the Peace & Freedom party failed to remain a ballot-qualified political party is indicated by the dotted line. Except for that interval, the Peace & Freedom party has been ballot-qualified in California continuously since 1968; the Libertarian party, since 1980; and the Green party, since 1992. Before the passage of AB 2351, for a party to remain qualified a party had to have registration above the lowest black line “A”, and either (a) have party registration above the stepped black line “B” or (b) have one of its statewide candidates receive at least 2% of the general-election vote cast for an office. If a party met this second test, its registration for the November election is shown as a large solid circle; if not, as a large hollow circle. The Peace & Freedom party failed both tests in 1998 and 2002, but become qualified again in early 2003. After the passage of AB 2351, a party’s registration has only to remain above the pair of black lines “A” and “C”, or to have the sum of the votes cast for its candidates in a state race in the primary exceed 2% of the vote for that office in the primary. As is indicated by the large solid circles in 2014, all three parties met this second test. For a fuller discussion of this figure see Appendix A 2.

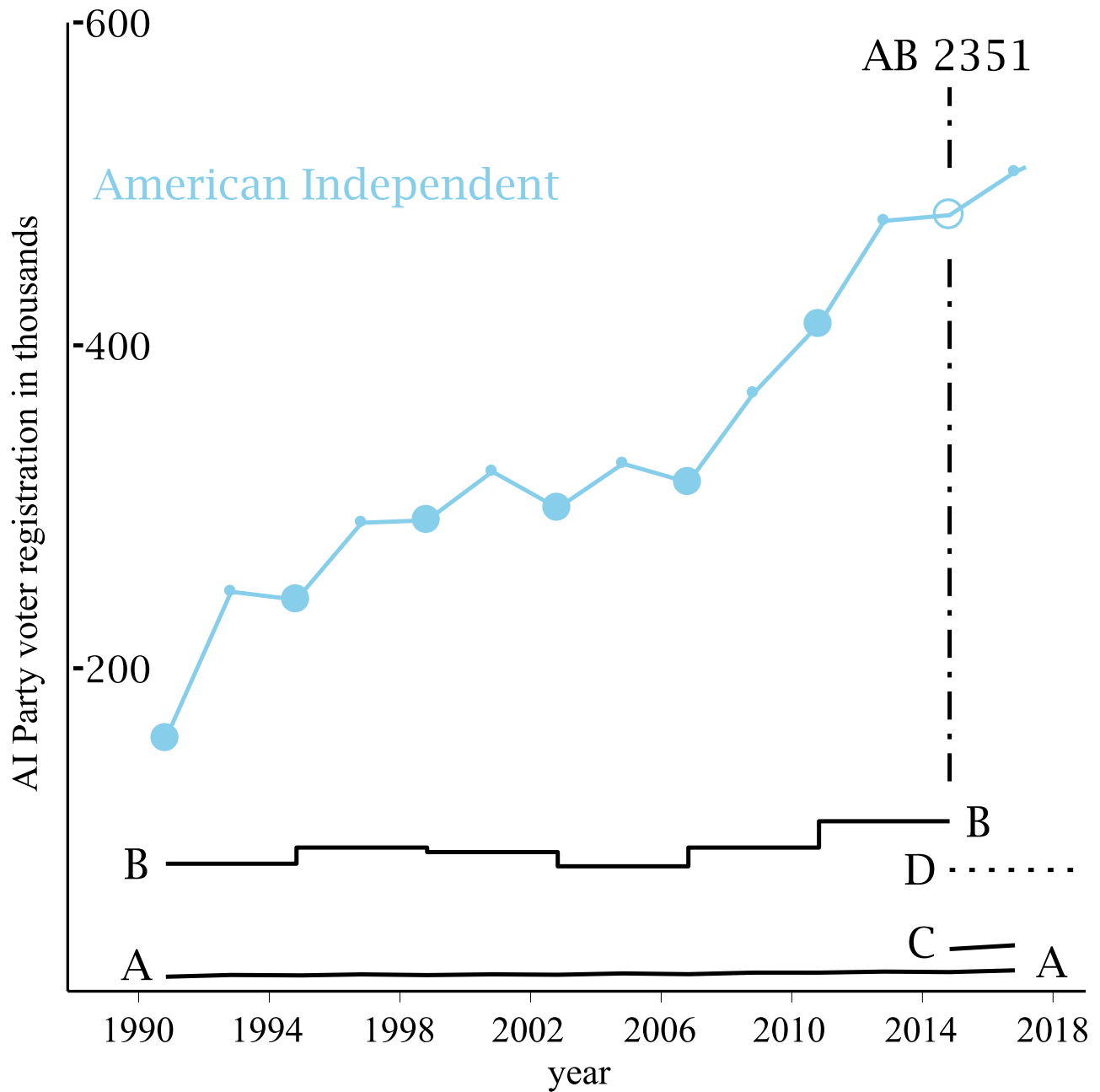


FIG. 3. As for Figure 2, but for the American Independent party; note that the vertical scale here is three times larger than that of Figure 2. The AI party has been qualified in California continuously since 1968. In 2014 the AI party ran no statewide candidates; it easily maintained qualification because of its voter registration. For a fuller discussion of this figure see Appendix A 3.

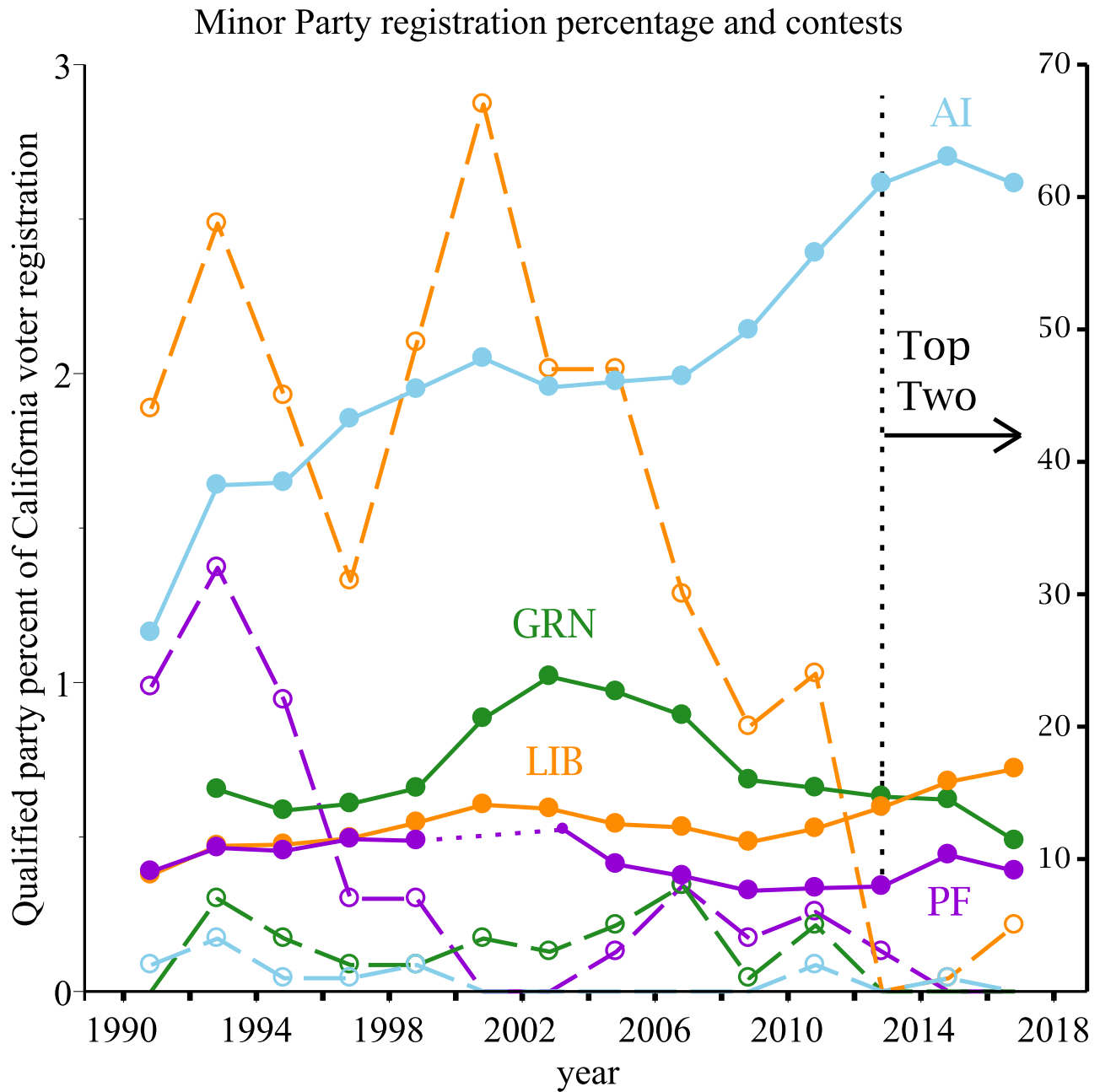


FIG. 4. Plotted in solid points joined by solid lines, and to be read using the left-hand vertical scale, is the percentage of California's registered voters who are registered with the four minor political parties qualified in California in 2016: the American Independent party (in turquoise); the Libertarian party (in gold); the Green party (in green); and the Peace & Freedom party (in purple). Plotted as open points joined by dashed lines, and to be read using the right-hand vertical scale, is the percentage of the 100 seats in the California legislature (80 Assembly, 20 Senate) in which a candidate of a party was on the general election ballot. Elections before the one marked by the vertical dotted lines were conducted using partisan primaries; on and after, using the top-two primary. For a fuller discussion of this figure see Appendix A 4.

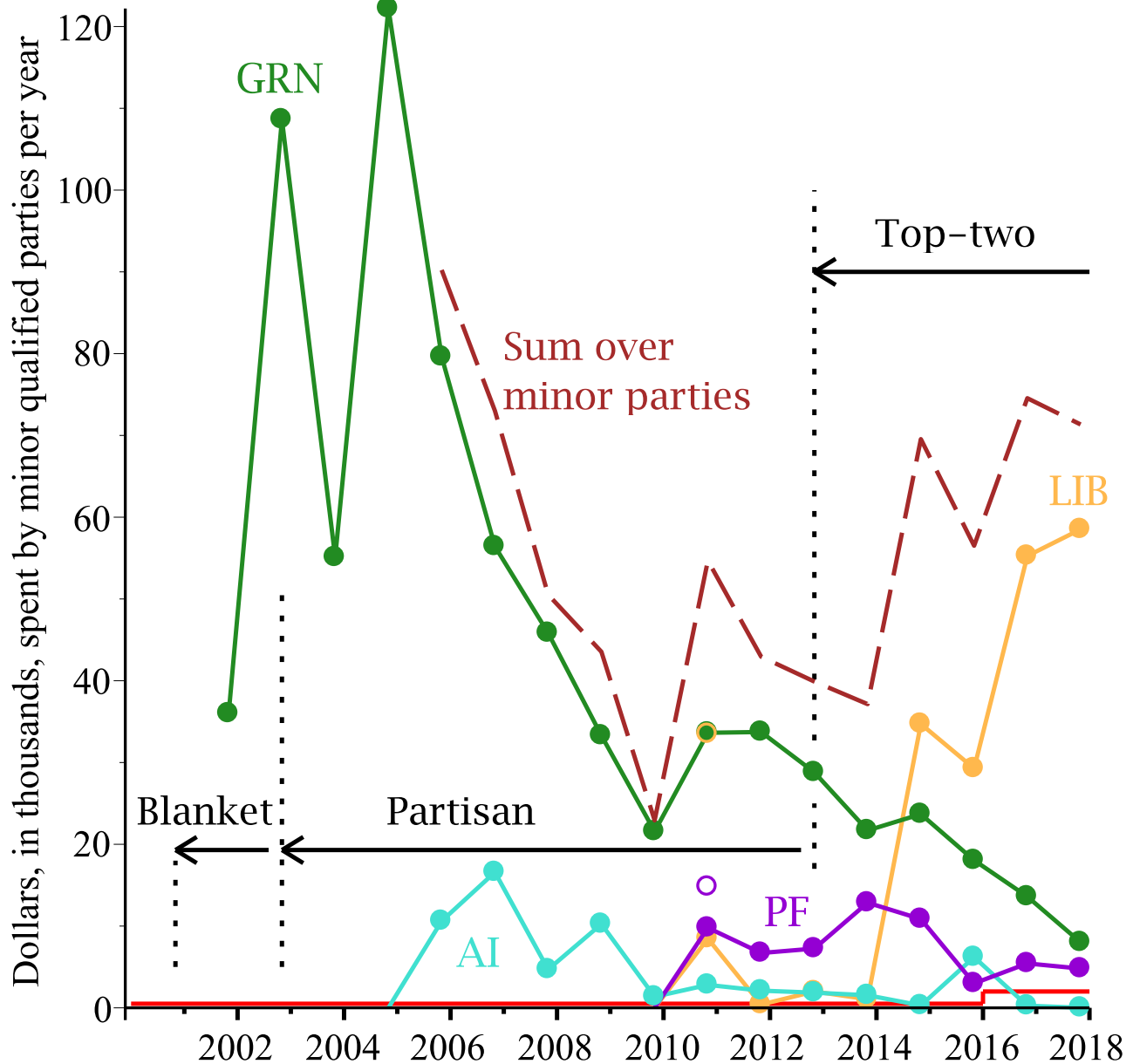


FIG. 5. Plotted is the money in successive calendar years, in thousands of dollars, spent by the political party organizations of the four minor parties qualified in California: for the American Independent party (in turquoise); the Libertarian party (in gold); the Green party (in green); and the Peace & Freedom party (in purple). The points are plotted in November of their calendar year to coincide with the time of general elections. The American Independent party reported no expenditures on its electronic FPPC Form 460 on or before 2005; the Peace & Freedom party, on or before 2009; and the Libertarian party, on or before 2009. The legal threshold requiring a report, \$500 before 2016 and \$2000 after, is indicated by the stepped red line. The years are indicated which had elections conducted using the blanket primary, partisan primaries, or the top-two primary. The open circles in orange and purple show the money spent in 2010 by the Libertarian party and the Peace & Freedom party with their expenditures against the passage of the top-two included. The brown dashed line shows the sum of the monies spent by the four parties. For a fuller discussion of this figure see Appendix A 5.

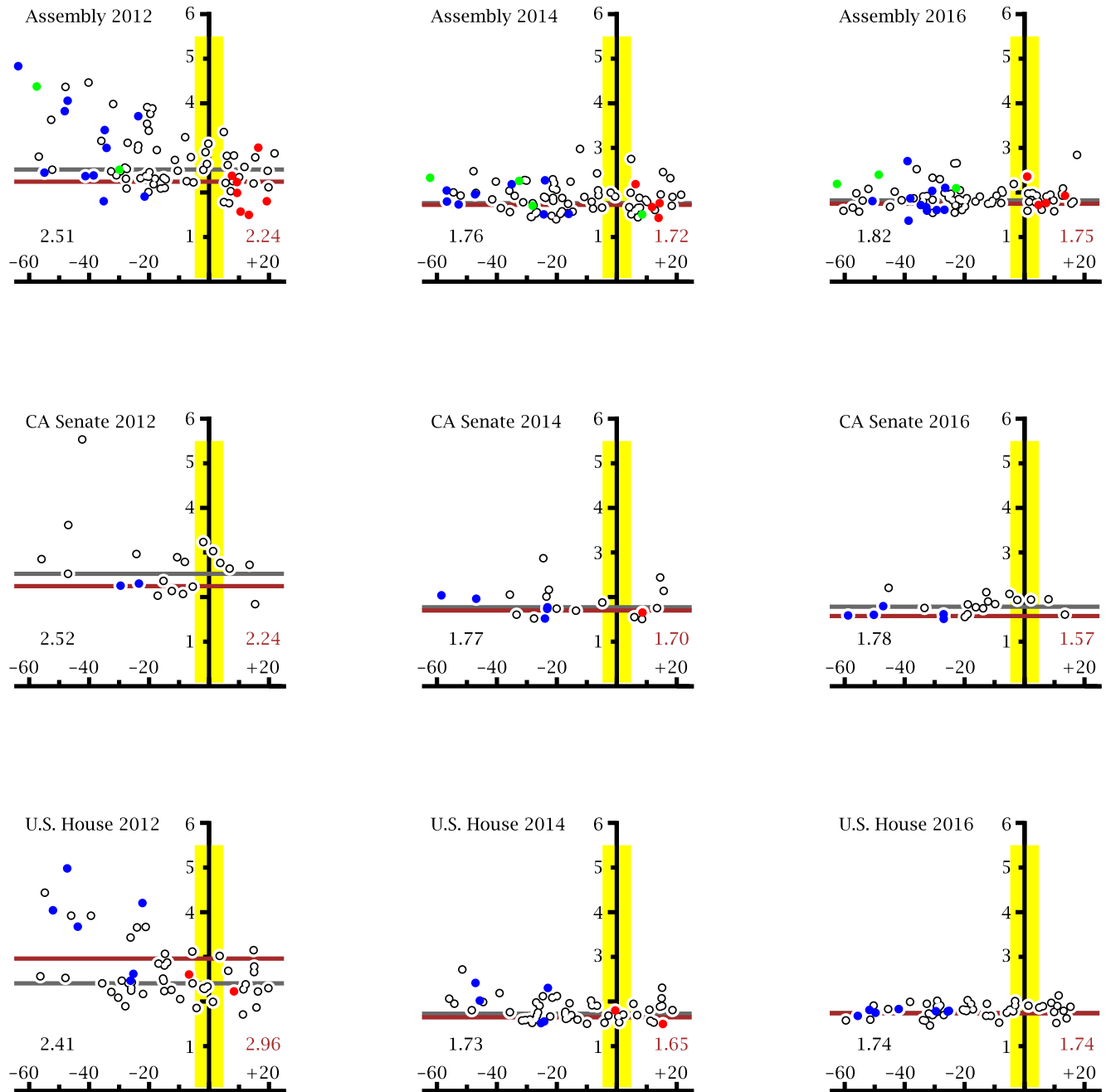


FIG. 6. For all the Assembly, state Senate, and U.S. House regular elections in California in 2012, 2014, and 2016, plots of the ratio of the number of general election votes cast in an election, to the number of primary election votes cast, as a function of the advantage the Republican party had over the Democratic party in voter registration in the district, in percent. Blue points show races where the general election was D vs. D; red, where it was R vs. R; green, where there was one candidate, only, in the general election; and open circles, all the other races (mostly D vs. R). The brown horizontal line shows the districts with same-party general elections the ratio of the total number of votes cast in the general election race in the district, to the total number of votes cast in the primary election race in the district. The grey horizontal line shows the same ratio for districts whose general elections had two candidates not of the same party. The numerical values for each ratio are shown in each figure in brown or grey, respectively. The band in yellow marks the limits of a $\pm 5\%$ advantage in registration that one major party had over the other. For a fuller discussion of this figure see Appendix A 6.

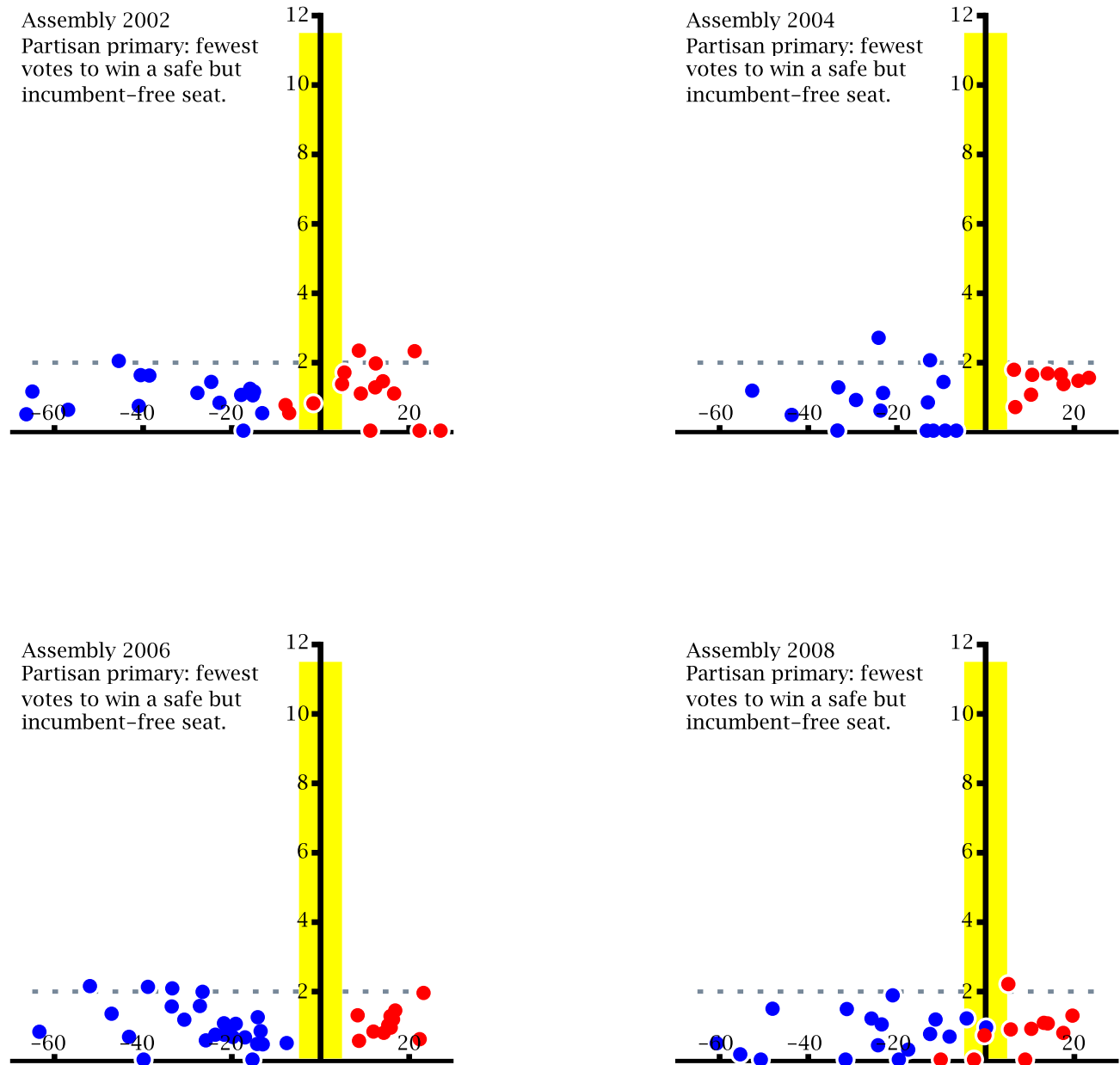


FIG. 7. Consider Assembly elections that were conducted under partisan primaries, and that had no incumbent running. Districts won by Democrats are shown by points in blue; those by Republicans, by points in red. Plotted horizontally is the advantage Republicans had over Democrats in voting registration in November, in percent of all the voters registered in the district. Plotted vertically, in tens of thousands, is the number of votes won by whomever took second in the primary for the party that won the district; this is taken to equal the minimum number of votes a candidate would have to muster to become elected. The band in yellow marks the limits of a $\pm 5\%$ advantage in registration. Districts outside this band are, roughly, the districts safe for one or other major party. For a fuller discussion of this figure see Appendix A 7.

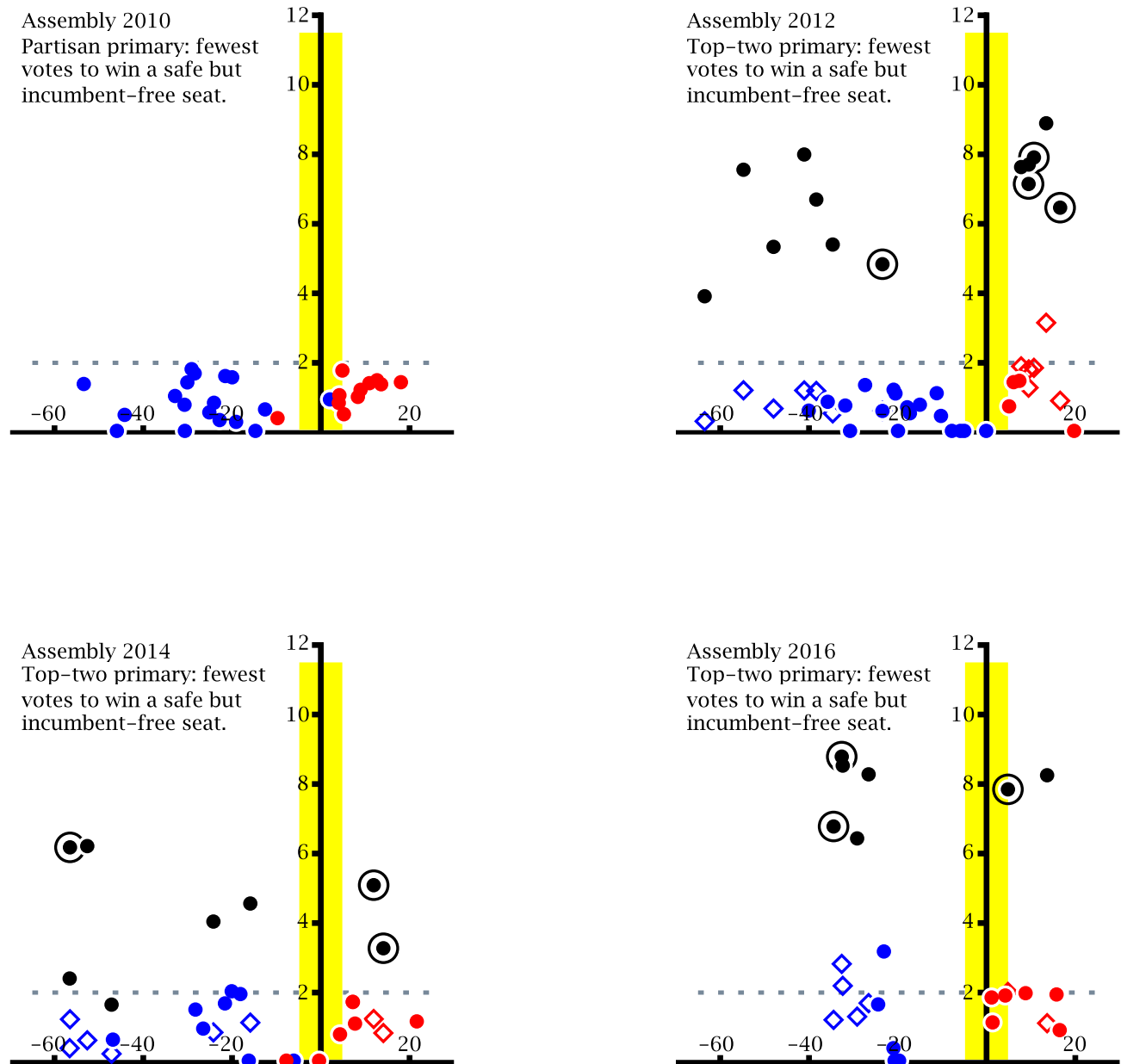


FIG. 8. For 2010, the last year of the partisan primary, a continuation of Figure 7. The elections of 2012, 2014, and 2016 were conducted using the top-two primary; continue to consider the Assembly elections in which no incumbent ran. As in Figure 7, districts won by Democrats are shown by points in blue; those by Republicans, by points in red, and plotted horizontally is the advantage Republicans had over Democrats in voting registration in November, in percent of all the voters registered in the district. In most districts the general election was D vs. R; for these, the point is shown as a solid circle (red or blue), and the vertical coordinate is the number of votes given to the candidate of the district winner's party who trailed in the primary. In these districts, this is taken to be the minimum number of votes required to win the seat. In some districts the general election was between two candidates of the same party; for these, for reference, the same data is plotted as a hollow diamond. Winning the seat under the top-two required winning the ensuing general election; plotted as a solid black point is half the number of votes given to the winner of that general election, taken in these districts to be the minimum number of votes to win the seat. The points where the same-party, general-election winner trailed in the primary are circled in black. As in Figure 7, the horizontal axis is the advantage Republicans had over Democrats in voting registration in the district, as a percentage of all registered voters; the vertical axis is number of votes, in tens of thousands; and the yellow band marks districts where the advantage in registration is within $\pm 5\%$. Districts outside this band are, roughly, the districts safe for one or other major party. For a fuller discussion of this figure see Appendix A 8.

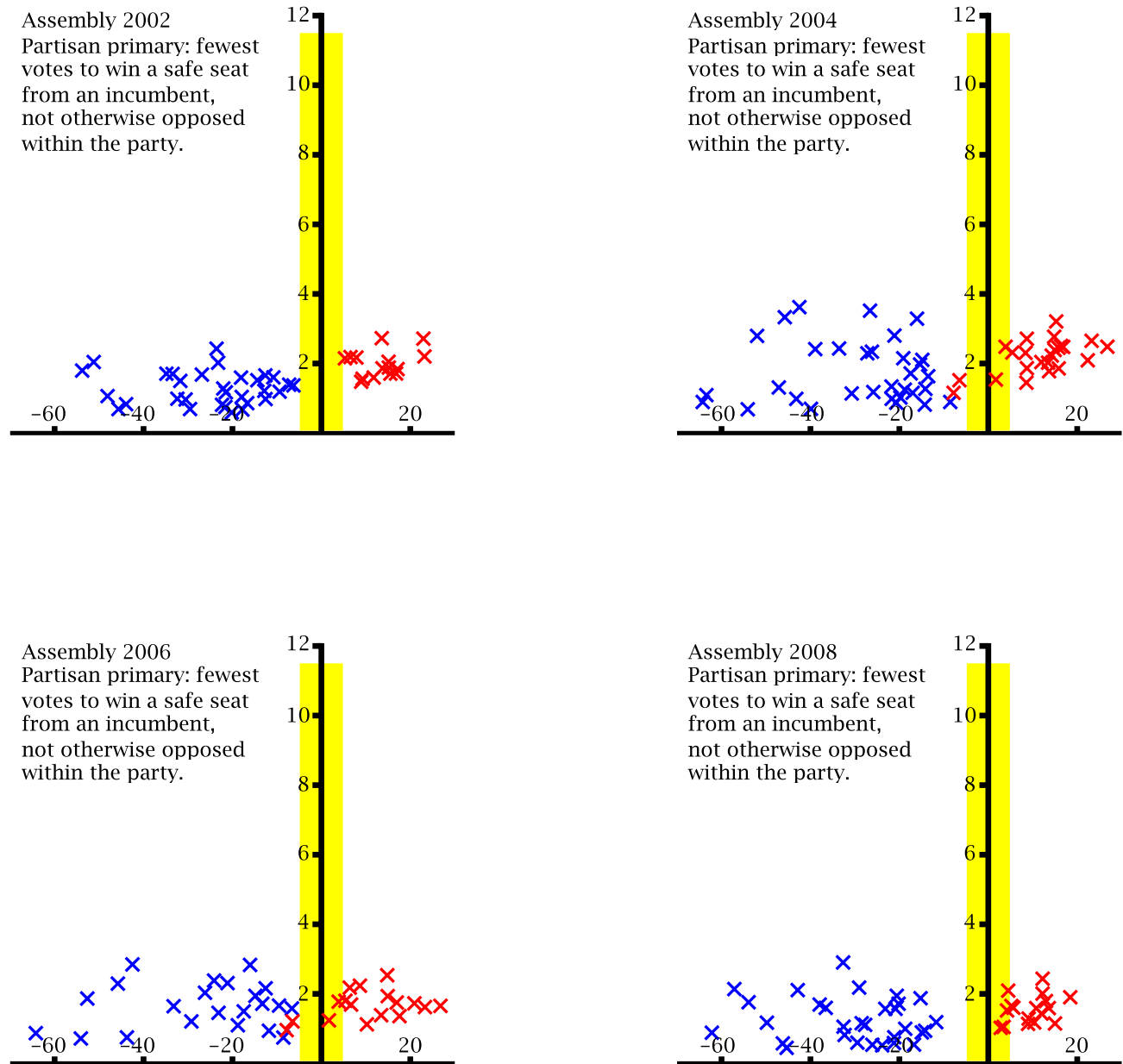


FIG. 9. In years with partisan primaries, and in Assembly elections in which an incumbent won re-election and was unopposed by any other candidate of his party on the primary ballot, the vertical axis is the number of votes, in tens of thousands, that a challenger of the incumbent's party would have had to have taken from the incumbent in the primary to knock the incumbent out of the general election. Districts won by a Democrat are shown by a blue cross; districts won by a Republican, by a red cross. As in Figure 7, the horizontal axis is the advantage Republicans had over Democrats in voting registration in the district, as a percentage of all registered voters; the vertical axis is number of votes, in tens of thousands; and the yellow band marks districts where the advantage in registration is within $\pm 5\%$. For a fuller discussion of this figure see Appendix A 9.

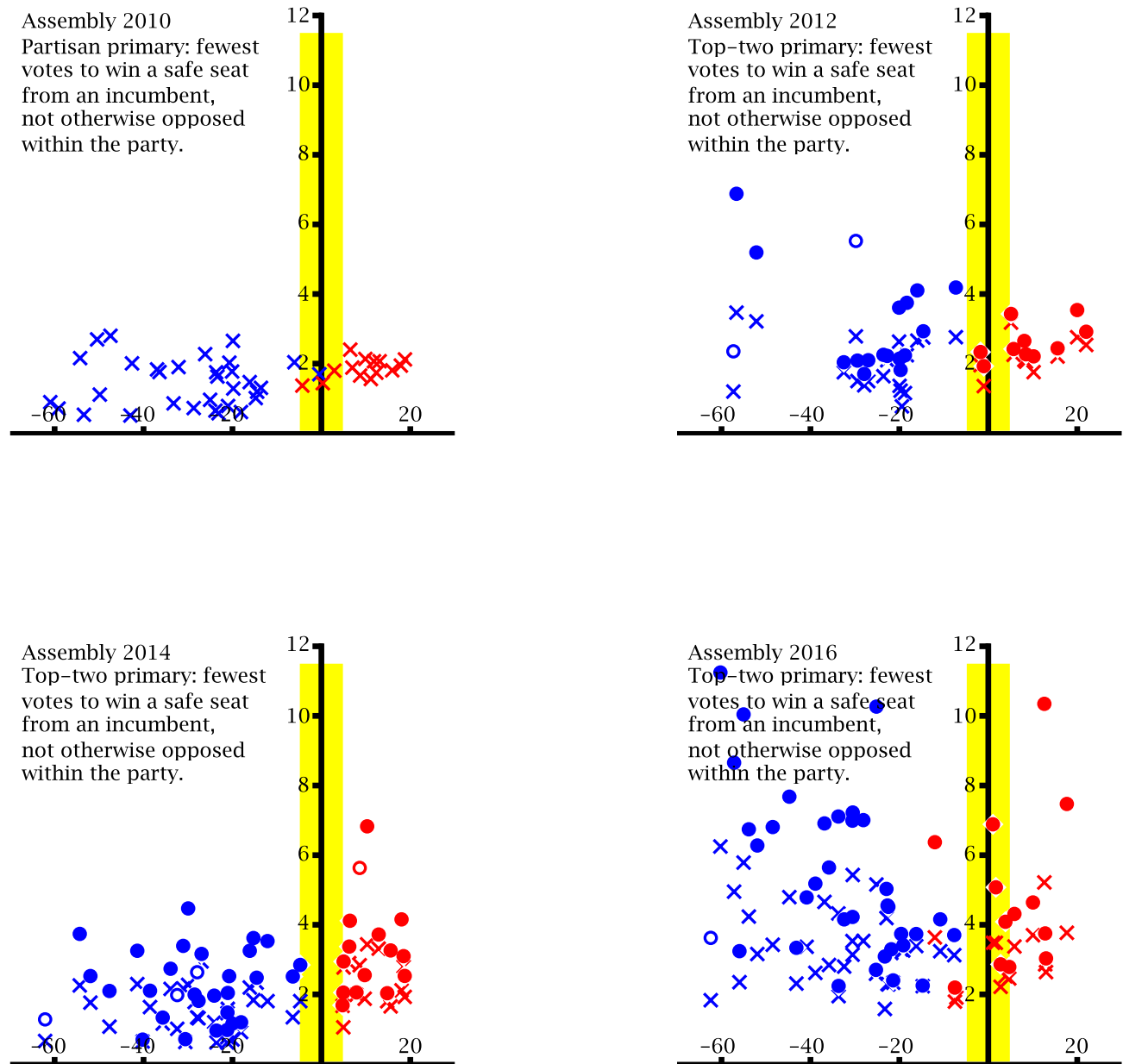


FIG. 10. For 2010, the last year with a partisan primary, a continuation of Figure 9. For 2012 through 2016, which had top-two primaries, the vertical position of the crosses mark, for races where an incumbent ran unopposed on the ballot by any member of his party, the number of votes a same-party challenger would have had to get to knock out the incumbent in the primary, had it been conducted under *partisan* primary rules. Under the *actual* top-two rules, the threshold to knock the incumbent out of the general election is always higher (solid circles). A knockout is sometimes impossible under the top-two, if originally only the incumbent ran; in such races the threshold had, in addition to the challenger, yet another candidate run who got but a handful of primary votes, is shown as an open circle. Points for districts won by Democrats are shown in blue; by Republicans, in red. As in Figure 7, the horizontal axis is the advantage Republicans had over Democrats in voting registration in the district, as a percentage of all registered voters; the vertical axis is number of votes, in tens of thousands; and the yellow band marks districts where the advantage in registration is within $\pm 5\%$. For a fuller discussion of this figure see Appendix A 10.

Top-two primaries:

For Assembly races with an incumbent unopposed on the primary ballot by a candidate of their own party:

Diamond: Primary vote for such a challenger to have forced a same-party general election.

Circle: Subsequent general election vote for the challenger to win the seat.

Cross: Threshold for a same-party challenger to have defeated the incumbent in the primary had it been partisan and not top-two.

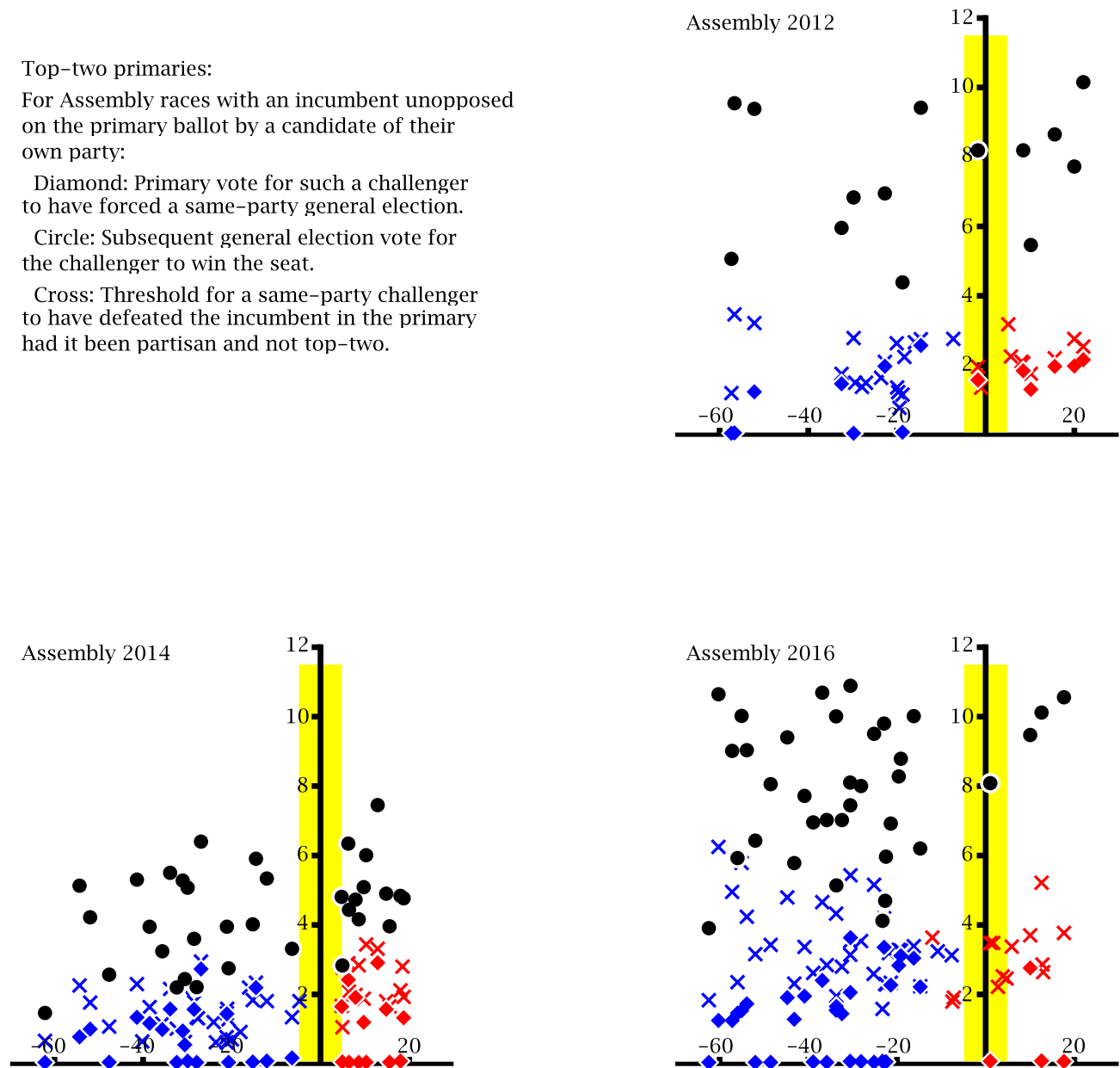


FIG. 11. For top-two, Assembly primaries in 2012 through 2016 in which an incumbent won re-election and was unopposed by any other candidate of his party on the primary ballot, shown as the vertical position of a diamond is minimum number of votes a challenger of the incumbent's party would have had to have taken from the incumbent in the primary to force a same-party general election, for all the districts where the primary vote given to other candidates make such an outcome possible. This is often equal to just 1 vote, if the incumbent was entirely unopposed in the primary. Also for those districts, shown as a round black point is the minimum number of votes a candidate would have to have gotten in the ensuing general election to win it. For comparison, the number of votes a challenger would have had to have taken from the incumbent in the primary to knock the incumbent out of the general election, had the primary been conducted as a partisan primary, is plotted as a cross. Crosses and diamonds are blue for districts won by Democrats, and red for districts won by Republicans. As in Figure 7, the horizontal axis is the advantage Republicans had over Democrats in voting registration in the district, as a percentage of all registered voters; the vertical axis is number of votes, in tens of thousands; and the yellow band marks districts where the advantage in registration is within $\pm 5\%$. For a fuller discussion of this figure see Appendix A 11.

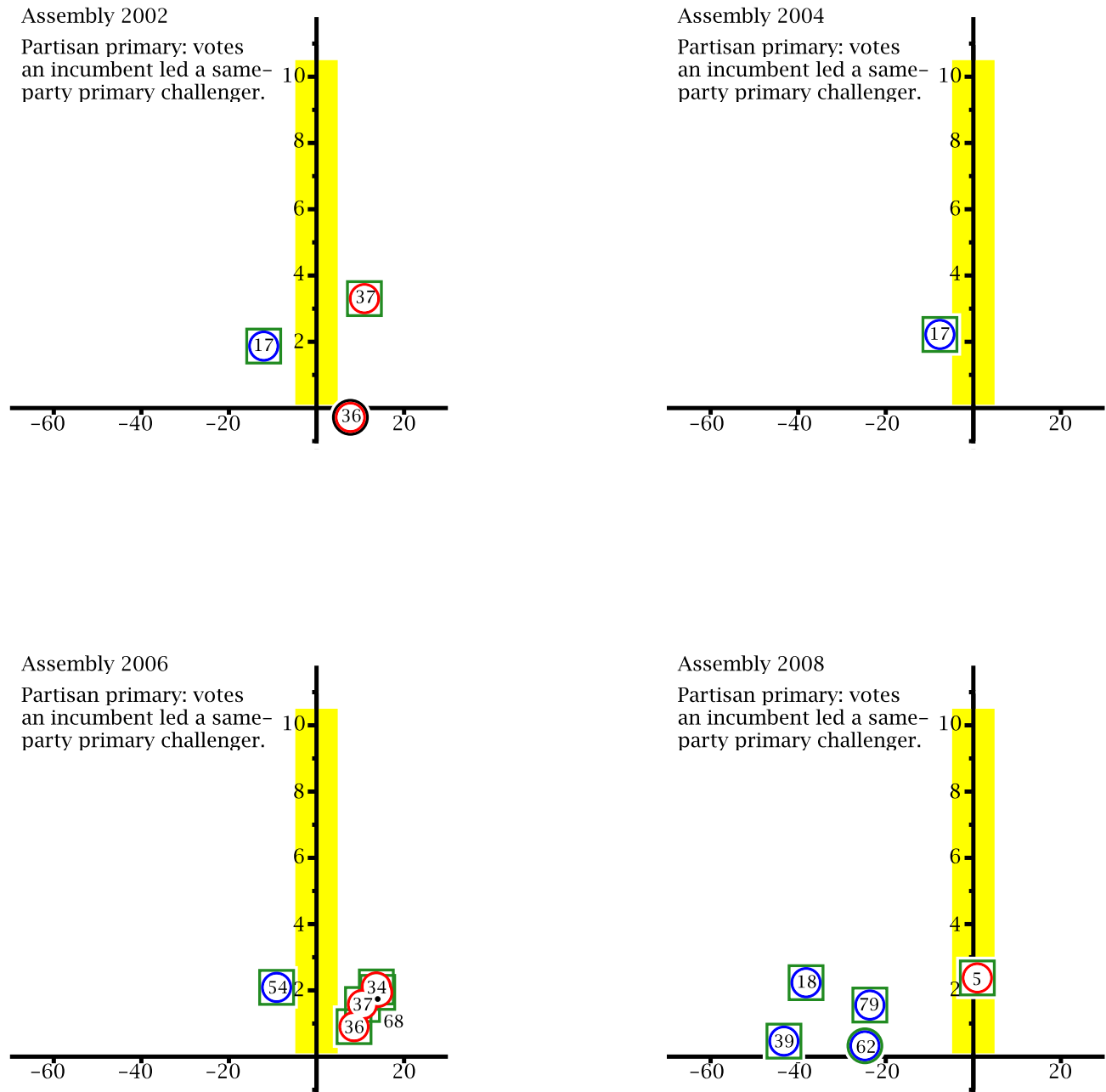


FIG. 12. For Assembly elections run by partisan primaries, and for races where there was an incumbent running who was opposed by any other candidate of his party on the primary ballot, plotted vertically is the number of votes by which the incumbent led the challenger in the primary. The number of the district appears in a circle which is red or blue as the incumbent was Republican or Democrat. A race where an incumbent lost in the primary is further circled in black; a race where the incumbent won the primary and faced no opposition on the general election ballot is further circled in green. Races where the incumbent faced opposition in the general election are enclosed in a square: green if the incumbent won the general election, black if the incumbent lost. As in Figure 7, the horizontal axis is the advantage Republicans had over Democrats in voting registration in the district, as a percentage of all registered voters; the vertical axis is number of votes, in tens of thousands; and the yellow band marks districts where the advantage in registration is within $\pm 5\%$. For a fuller discussion of this figure see Appendix A 12.

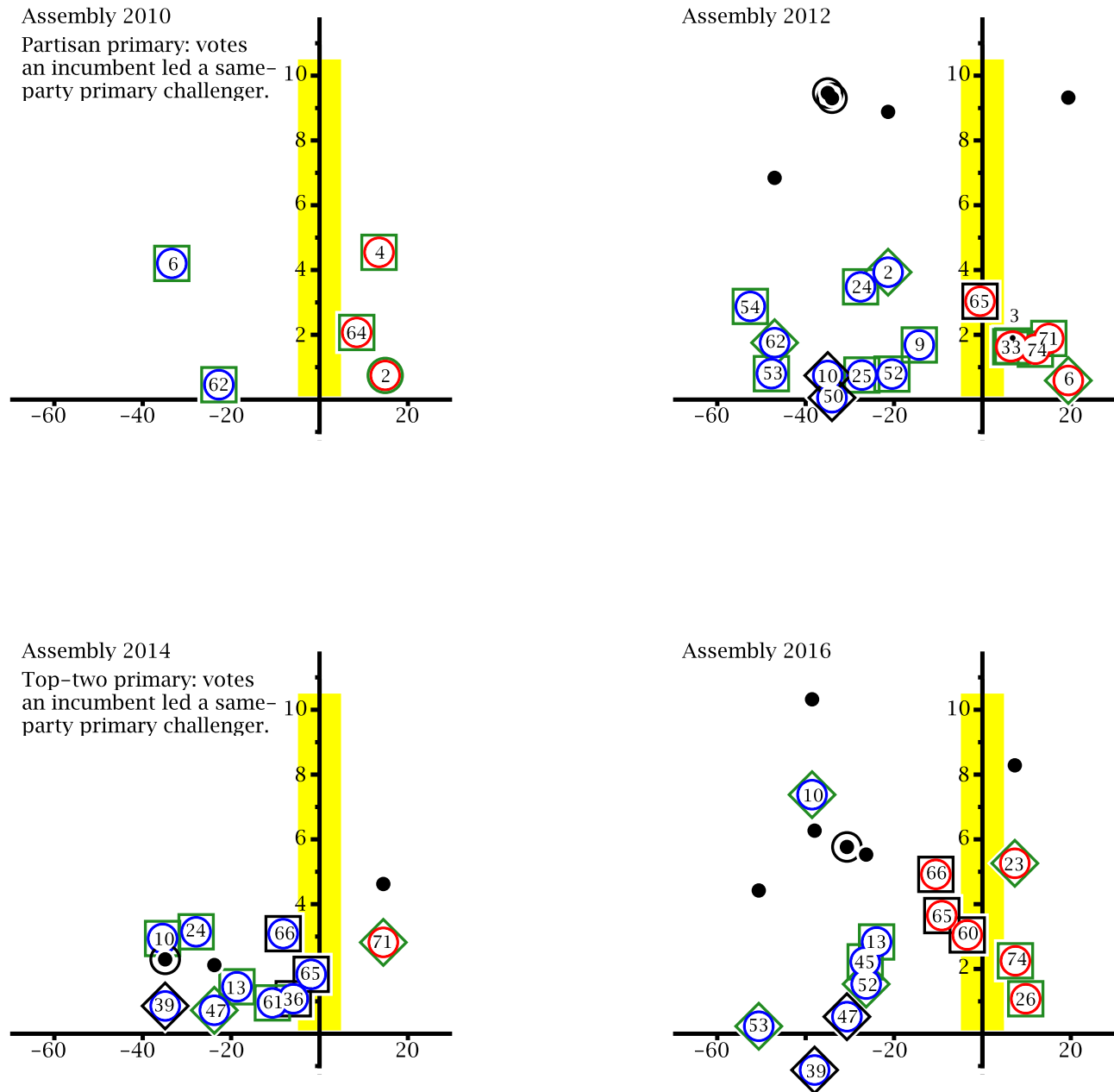


FIG. 13. For the partisan election of 2010, a continuation of Figure 12. For the top-two elections of 2012 through 2016, a race where an incumbent was challenged on the primary by a candidate of the incumbent's party, we have the new possibility that the primary can result in a same-party general election. Such races are indicated by being surrounded by a diamond: green if the incumbent won, black if the incumbent lost. For such top-two races the minimum number of votes required to win the general election is plotted as a black circular solid point; if the candidate who won the general election had trailed in the primary, that point is circled in black. The description that appears in the figure for 2014 applies to the figures for 2012 and 2016 as well, but is suppressed to avoid obscuring the data. As in Figure 7, the horizontal axis is the advantage Republicans had over Democrats in voting registration in the district, as a percentage of all registered voters; the vertical axis is number of votes, in tens of thousands; and the yellow band marks districts where the advantage in registration is within $\pm 5\%$. For a fuller discussion of this figure see Appendix A 13.

- [8] The relevant part of the California Elections Code appears at least as far back as 1961 in (as then numbered) Section 6430, subsections (a) and (c):

“Qualified parties. A party is qualified to participate in any primary election:

(a) If at the last preceding gubernatorial election there was polled for any one of its candidates who was the candidate of that party only for any office voted on throughout the State, at least 2 per cent of the entire vote of the state; or . . .

(b) . . .

(c) If on or before the 135th day before any primary election, it appears to the Secretary of State, as a result of examining and totaling the statement of voters and their political affiliations transmitted to him by the county clerks, that voters equal in number to at least 1 per cent of the entire vote of the State at the last preceding gubernatorial election have declared their intention to affiliate with that party or . . .”

See for example *1961-1976 Cumulative Supplement: Completely Supplementing Both Volumes of the Elections Code Since Issuance Through the End of the 1985 Regular and Extra Sessions of the 1975-75 Legislature. Deering’s Election Code annotated of the State of California &&1 to End [1976]*. Available at the Stanford University Crown Library as call number LAW KFC30.5D4E44 1961.

- [9] In a complex maneuver, this bill contained different sets of changes to the election code, the set to become law depending on whether a related bill (Senate Bill 1043) was chaptered. In the event, that bill was not passed. The two sets were in any event consistent as to the amendments to code sections 5100(a) and (b) of interest in the present work. Those amendments became effective January 1, 2015.

- [10] Elections Code Section 5100 was amended to read

“5100. A party is qualified to participate in a primary election under any of the following conditions:

(a) (1) At the last preceding gubernatorial primary election, the sum of the votes cast for all of the candidates for an office voted on throughout the state who disclosed a preference for that party on the ballot was at least 2 percent of the entire vote of the state for that office.

(2) Notwithstanding paragraph (1), a party may inform the Secretary of State that it declines to have the votes cast for any candidate who has disclosed that party as his or her party preference on the ballot counted toward the 2-percent qualification threshold. If the party wishes to have votes for any candidate not counted in support of its qualification under paragraph (1), the party shall notify the secretary in writing of that candidate’s name by the seventh day prior to the gubernatorial primary election.

(b) On or before the 135th day before a primary election, it appears to the Secretary of State, as a result of examining and totaling the statement of voters and their declared political preference transmitted to him or her by the county elections officials, that voters equal in number to at least 0.33 percent of the total number of voters

registered on the 154th day before the primary election have declared their preference for that party.

(c) On or before the 135th day before a primary election, there is filed with the Secretary of State a petition signed by voters, equal in number to at least 10 percent of the entire vote of the state at the last preceding gubernatorial election, declaring that they represent a proposed party, the name of which shall be stated in the petition, which proposed party those voters desire to have participate in that primary election. This petition shall be circulated, signed, and verified, and the signatures of the voters on it shall be certified to and transmitted to the Secretary of State by the county elections officials substantially as provided for initiative petitions. Each page of the petition shall bear a caption in 18-point boldface type, which caption shall be the name of the proposed party followed by the words Petition to participate in the primary election”.

See the text of AB 2351 at the leginfo website of the California Assembly and Senate, specifically at http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140AB2351&search_keywords=5100.

This code section was subsequently amended by the passage of SB 837 in 2016, the changes taking effect January 1, 2017; but neither in time nor in substance do the changes affect the work of this paper.

- [11] For the controversy concerning how many voters register with the American Independent party thinking they are registering with no party preference, see for example the article by John Meyers, *California voters are joining this party by mistake, but lawmakers aren’t doing anything about it*, the Los Angeles Times, March 30, 2018, available at <http://www.latimes.com/politics/a-pol-ca-road-map-american-independent-party-20180330-story.html>, and the earlier story by John Meyers, Christine Mai-Duc, and Ben Welsh, *Are you an independent voter? You aren’t if you checked this box*, the Los Angeles Times, April 17, 2016, available at <http://static.latimes.com/american-independent-party-california-voters/>.
- [12] Green party candidate Audie Bock was elected on March 30, 1999 in Assembly District 16 in a special, not regular, election, apparently becoming the first (and last) third-party candidate to serve in the California Assembly since 1914. See *Victory by California Assembly Candidate is First for Greens*, Bill Staggs, New York Times, April 4, 1999, available at <https://www.nytimes.com/1999/04/04/us/victory-by-california-assembly-candidate-is-first-for-greens.html>. Ms. Bock ran for re-election in 2000, but as an independent, not a Green, and was defeated; no Green candidate filed for the ballot in her district. See the website of the California Secretary of State, *Complete Statement of the Vote [for the 2000 primary]*, p. xvii and p. xxvi, available at <http://elections.cdn.sos.ca.gov/sov/2000-primary/sov-complete.pdf>.
- [13] Data in the table are from Wikipedia, *Political party strength in California*. See https://en.wikipedia.org/wiki/Political_party_strength_in_California. The descriptions of the various political parties are adapted from the Wikipedia descriptions to which that page links.

- [14] The Thomas Jefferson Program in Public Policy at the College of William and Mary, *A Report on Partisan Competition in State Legislative Elections, 2014: Two-Party Contests Hit Lowest Point in Past 7 Cycles*, John J. McGlennon, Jacob Derr, and Jakob Deel, https://www.wm.edu/as/publicpolicy/documents/stateleg_report.pdf.
- [15] *California Republican Party*, committee #810163, reports on line 11 of page 3 of Form 460, statement date 12/19/2010 through 1/1/2011, total expenditures over the 2010 calendar year of \$22.14 million. See Cal-access at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1557760&amendid=1>.
- [16] *California Democratic Party*, committee #741666, reports on line 11 of page 3 of Form 460, statement date 12/19/2010 through 12/31/2010, total expenditures over the 2010 calendar year of \$32.85 million. See Cal-access at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1567174&amendid=2>.
- [17] The controversy [11] over the voter registration of the American Independent party does not affect this calculation, since the amount spent by the American Independent party contributes negligibly to the total.
- [18] Some voters who cast a ballot will leave that part of the ballot for a specific race blank. There is therefore a distinction between the number of voters who live in a district and cast some sort of ballot, and the number of voters who live in district and who voted for a candidate in a race in that district. In this section we are counting the latter.
- [19] If a district had had a vacancy filled by a special election, there might be no open seat in a regular election, the incumbent in the regular election following the special being the candidate who won the special. We do not account for this possibility.
- [20] Voter registration is not destiny. In the elections of 2016 at least three Assembly districts, AD 16, AD 36, and AD 40, where the advantage the Democratic party had in voter registration exceeded 5%, were won by Republicans. We do not claim that any seat where the major parties' registration is within 5% is competitive, or that every seat outside 5% is safe; just that almost all the competitive seats are within that band, and almost all the safe seats are without.
- [21] It is possible for the minimum number of votes so computed to be too low. While it is certainly necessary that the leader beat by one vote in the primary the nearest rival of his own party, that may not suffice; the leader might be eliminated by two other candidates in the primary who were not of the leader's party. The number so computed is certainly too low in for example Congressional District 31 in 2012; see the discussion in *III*, section IV B and in *III*, Table XI. The number of races where the number computed is too low is however too few to affect our conclusions.
- [22] For 1990, from the *November 6, 1990 General Election Statement of Vote, Voter Registration Statistics By County October 9, 1990*. <http://elections.cdn.sos.ca.gov/sov/1990-general/voter-registration-statistics.pdf>.
- For 1992, from the *November 3, 1992 General Election Statement of Vote, Voter Registration Statistics By County October 5, 1992*. <http://elections.cdn.sos.ca.gov/sov/1992-general/voter-registration-statistics.pdf>.
- For 1994, from the *November 8, 1994, General Election Statement of Vote, Voter Registration Statistics by Party, by County*, <http://elections.cdn.sos.ca.gov/sov/1994-general/voter-registration-statistic.pdf>.
- For 1996, from the *Report of Registration by County as of the Close of Registration, October 7, 1996*, <http://elections.cdn.sos.ca.gov/sov/1996-general/ror.pdf>.
- For 1998, from the *Report of Registration, as of October 5, 1998: Registration by County*, <http://elections.cdn.sos.ca.gov/sov/1998-general/regbycounty.pdf>.
- For 2000, from the *Report of Registration as of October 10, 2000: Registration by County*, <http://elections.cdn.sos.ca.gov/sov/2000-general/reg.pdf>.
- For 2002, from the *Report of Registration as of October 21, 2002: Registration By County* <http://elections.cdn.sos.ca.gov/sov/2002-general/reg.pdf>.
- For 2004, from the *Report of Registration as of October 18, 2004: Registration By County* http://elections.cdn.sos.ca.gov/sov/2004-general/sov_pref.pg5_6_ror.pdf.
- For 2006, from the *VOTER REGISTRATION STATISTICS BY COUNTY AS OF OCTOBER 23, 2006: REPORT OF REGISTRATION*, <http://elections.cdn.sos.ca.gov/sov/2006-general/reg.pdf>.
- For 2008, from the *Report of Registration as of October 20, 2008: Registration by County*, <http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-presgen-08/county.pdf>.
- For 2010, from the *Report of Registration as of October 18, 2010: Registration By County*, <http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-gen-10/county.pdf>.
- For 2012, from the *Report of Registration as of October 22, 2012: Registration by County*, <http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-general-12/county1.pdf>.
- For 2014, from the *Report of Registration as of October 20, 2014: Registration by County*, <http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-general-2014/county.pdf>.
- For 2016, from the *Report of Registration as of October 24, 2016: Registration by County*, <http://elections.cdn.sos.ca.gov/or/ror-pages/15day-gen-16/county.pdf>.
- [23] The use of red for the Republican party and blue for the Democratic party became a common identification for the parties after the lengthy coverage of the Bush vs. Gore presidential race in 2000, though, historically the assignment of the colors was reversed. See Philip Bump, *Red vs. Blue: A history of how we use political colors*, The Washington Post, November 8, 2016, available at https://www.washingtonpost.com/news/the-fix/wp/2016/11/08/red-vs-blue-a-brief-history-of-how-we-use-political-colors/?noredirect=on&utm_term=.6963012a592c.
- Green is naturally the color for the Green party. The particular green employed here is a close match to that employed on the website of the California Green Party at <https://www.cagreens.org/>.

Thus far, there is universal agreement about which color should represent each party. About colors for the other minor parties there is chaos. My choices:

The American Independent party has not to my knowledge adopted a color, but it has used turquoise (a light blue, with a tinge of light green) as the base color of its official flag since the flag's adoption on August 30, 1970. See *History of the American Independent Party*, on the website of the American Independent Party of California, available at <http://www.aipca.org/history.html>.

The Libertarian Party, in California or nationally, has not adopted a color, and several distinct colors have been used by it; the most common appear to be yellow or gold. See *Libertarian Color*, by Lpedia, a Collaborative History of the Libertarian Party, available at <https://lpedia.org/Libertarian.Color>. To make ink stand out better on a white page, I have chosen a gold that has a tinge of light orange.

The Peace & Freedom party, "California's socialist and feminist political party," according to the party website at <http://www.peaceandfreedom.org/home/>, has its roots in the suffragette movement in England, whose members chose as characteristic colors purple, white, and green; in America, the movement's colors were purple, white, and gold. Green being taken by the Green party, I have represented the party by the color purple, the particular hue being chosen to be close to images of Peace & Freedom party T-shirts, banners, and so on.

Ballotopedia's guide to its authors is to have yellow for the Libertarian party, a choice with which I agree; but I disagree with the guide's choice to have purple for the American Independent party, and a dark pink for the Peace & Freedom party, choices which I believe distort the history of both parties. Ballotopedia's conventions may be found at https://ballotpedia.org/Writing:Political_party_colors.

- [24] See the website of the California Secretary of State, *Report of Registration as of February 10, 2017: Registration by County*, <http://elections.cdn.sos.ca.gov/ror/ror-pages/ror-odd-year-2017/county.pdf>.
- [25] *HISTORICAL VOTER REGISTRATION AND PARTICIPATION IN STATEWIDE GENERAL ELECTIONS 1910-2016*, <http://elections.cdn.sos.ca.gov/sov/2016-general/sov/04-historical-voter-reg-participation.pdf>.
- [26] See the website of the California Secretary of State, *Secretary Shelley Releases Latest Report of Registration: Announces Re-Qualification of Peace and Freedom Party*, dated March 14, 2003. See http://admin.cdn.sos.ca.gov/press-releases/prior/2003/03_013.pdf.
- [27] See the website of the California Secretary of State, specifically

For the elections of 1990, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/1990-general/assemblymember.pdf>. State Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/1990-general/state-senator.pdf>.

For the elections of 1992, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/1992-general/assemblymember.pdf>. State Senate: *State Sena-*

tor <http://elections.cdn.sos.ca.gov/sov/1992-general/state-senator.pdf>.

For the elections of 1994, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/1994-general/assemblymember.pdf>. Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/1994-general/state-senator.pdf>.

For the elections of 1996, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/1996-general/assemblymember.pdf>. Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/1996-general/state-senator.pdf>.

For the elections of 1998, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/1998-general/sov38-48.pdf>. Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/1998-general/sov35-37.pdf>.

For the elections of 2000, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/2000-general/assemblymember.pdf>. State Senator: *State Senator* <http://elections.cdn.sos.ca.gov/sov/2000-general/state-senator.pdf>.

For the elections of 2002, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/2002-general/state-assemblymember.pdf>. State Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/2002-general/state-senator.pdf>.

For the elections of 2004, Assembly: *Member of the State Assembly* http://elections.cdn.sos.ca.gov/sov/2004-general/formatted_st_AD_all.pdf. State Senator: *State Senator* http://elections.cdn.sos.ca.gov/sov/2004-general/formatted_st_sen_all_detail.pdf.

For the elections of 2006, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/2006-general/assemblymember.pdf>. State Senator: *Member of the State Senate* http://elections.cdn.sos.ca.gov/sov/2006-general/senate_amended.pdf.

For the elections of 2008, Assembly: *State Assemblymember* http://elections.cdn.sos.ca.gov/sov/2008-general/40_56_state_assemblymember.pdf. State Senate: *State Senator* http://elections.cdn.sos.ca.gov/sov/2008-general/35_39_state_senators.pdf.

For the elections of 2010, Assembly: *State Assemblymember* <http://elections.cdn.sos.ca.gov/sov/2010-general/73-state-assemblymember.pdf>. State Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/2010-general/69-state-senator.pdf>.

For the elections of 2012, Assembly: *State Assemblymember* <http://elections.cdn.sos.ca.gov/sov/2012-general/14-state-assembly-1-80.pdf>. State Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/2012-general/13-state-senators.pdf>.

For the elections of 2014, Assembly: *Member of the State Assembly* <http://elections.cdn.sos.ca.gov/sov/2014-general/pdf/64-state-assemblymember.pdf>. State Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/2014-general/pdf/58-state-senator.pdf>.

For the elections of 2016, Assembly: *State Assemblymember* <http://elections.cdn.sos.ca.gov/sov/2016-general/sov/45-state-assembly-formatted.pdf>. State Senate: *State Senator* <http://elections.cdn.sos.ca.gov/sov/2016-general/sov/40-state-senators-formatted.pdf>.

- [28] For the American Independent party, the committee *American Independent Party, State Central Committee, #74237*.

For the Green party, the committee *Green Party of California, #921909*.

For the Libertarian party, the committee *Libertarian Party of California, #1367692*, and the additional committee *Libertarian Party of California Candidate Support Committee, #1292062*.

For the Peace & Freedom party, the committee *Peace & Freedom Party State Central Committee, #744181*.

- [29] See the website of the California Secretary of State at <http://cal-access.sos.ca.gov>.

- [30] *Libertarian Party of California Candidate Support Committee, #1292062*.

- [31] See Schedule E, page 15, of California Form 460 for the *Libertarian Party of California Candidate Support Committee, #1292062*, for the period 1/1/2010 to 6/30/2010, available at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1521704&amenid=0>.

- [32] See Schedule D, page 14, of California Form 460 for the *Libertarian Party of California Candidate Support Committee, #1292062*, for the period 1/1/2010 to 6/30/2010, available at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1521704&amenid=0>.

- [33] See Schedule A, page 9, of California Form 460 for the *Libertarian Party of California Candidate Support Committee, #1292062*, for the period 1/1/2010 to 6/30/2010, available at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1521704&amenid=0>.

- [34] See Schedule D, page 14, of California Form 460 for the *Libertarian Party of California Candidate Support Committee, #1292062*, for the period 1/1/2010 to 6/30/2010, available at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1521704&amenid=0>.

- [35] See Schedule D, page 11, of California Form 460 for the Peace and Freedom Party State Central Committee, #744181, for the period 1/1/2010 to 5/22/2010, available at <http://cal-access.sos.ca.gov/PDFGen/pdfgen.prg?filingid=1491334&amendid=0>.

- [36] The relevant section of the Government Code read,

“§2013. “Committee” means any person or combination of persons who directly or indirectly receives contributions or makes expenditures or contributions for the purpose of influencing or attempting to influence the action of the voters for or against the nomination or election of one or more candidates, or the passage or defeat of any measure, including any committee or subcommittee of a political party, whether national, state, or local, if

(a) Contributions received total five hundred dollars (\$500) or more in a calendar year;

(b) Expenditures and contributions made, other than contributions described in subsection (c), total five hundred dollars (\$500) or more in a calendar year; or

(c) Contributions of cash, checks and other cash equivalents paid directly to candidates and committees total five thousand dollars (\$5000) or more in a calendar year. Persons or combinations of persons who are covered by this subsection but not by subsections (a) or (b) are deemed to be committees only for purposes of Chapter 4 of this title”.

- [37] The relevant section of the Government code as of the time this paper was written is

“§2013. “Committee” means any person or combination of persons who directly or indirectly does any of the following:

(a) Receives contributions totaling two thousand dollars (\$2,000) or more in a calendar year.

(b) Makes independent expenditures totaling one thousand dollars (\$1,000) or more in a calendar year; or

(c) Makes contributions totaling ten thousand dollars (\$10,000) or more in a calendar year to or at the behest of candidates or committees.

A person or combination of persons that becomes a committee shall retain its status as a committee until such time as that status is terminated pursuant to Section 84214”.

- [38] Primary election data are from the website of the California Secretary of State for Assembly races in the successive regular elections from 2002 to 2016.

<http://elections.cdn.sos.ca.gov/sov/2002-primary/state-assembly.pdf>.

<http://elections.cdn.sos.ca.gov/sov/2004-primary/assembly.pdf>.

http://elections.cdn.sos.ca.gov/sov/2006-primary/sov-detail_primary_assembly.pdf.

<http://elections.cdn.sos.ca.gov/sov/2008-statewide-direct-primary/stassem08primary.pdf>.

<http://elections.cdn.sos.ca.gov/sov/2010-primary/pdf/101-118-ad.pdf>.

<http://elections.cdn.sos.ca.gov/sov/2012-primary/pdf/102-state-assembly1-80formatted.pdf>.

<http://elections.cdn.sos.ca.gov/sov/2014-primary/pdf/84-state-assemblymember.pdf>.

<http://elections.cdn.sos.ca.gov/sov/2016-primary/110-state-assembly-formatted.pdf>.

- [39] General election data are from the website of the California Secretary of State for Assembly races in the successive regular elections from 2002 to 2016.

<http://elections.cdn.sos.ca.gov/sov/2002-general/state-assembly.pdf>.

http://elections.cdn.sos.ca.gov/sov/2004-general/formatted_st_AD_all.pdf.

<http://www.sos.ca.gov/elections/prior-elections/statewide-election-results/general-election-november-7-2006/>.

http://elections.cdn.sos.ca.gov/sov/2008-general/40_56_state_assembly.pdf.

<http://elections.cdn.sos.ca.gov/sov/2010-general/73-state-assembly.pdf>.

<http://www.sos.ca.gov/elections/prior-elections/statewide-election-results/general-election-november-6-2012/>.

<http://elections.cdn.sos.ca.gov/sov/2014-general/pdf/64-state-assemblymember.pdf>.

<http://elections.cdn.sos.ca.gov/sov/2016-general/sov/45-state-assembly-formatted.pdf>.

[40] Voter registration data in the Assembly districts just be-

fore the November regular general election, by successive election from 2002 to 2016, are from the website of the California Secretary of State. For the general elections from 2002 to 2010 see footnote [I, ref. 101]; for those from 2012 to 2016 see

<http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-general-12/assembly1.pdf>.

<http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-general-2014/assembly.pdf>.

<http://elections.cdn.sos.ca.gov/ror/ror-pages/15day-gen-16/assembly.pdf>.

A.M.D.G.