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Do Voters or Politicians Choose the Outcomes of Elections? Evidence from High-Stakes U.S. State Legislative Elections

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Abstract

We study whether political parties exert precise control over the outcomes of legislative elections. We test for discontinuities in two outcomes that, in the absence of precise control, should be smooth at the threshold that determines control of the legislature: the identity of the party that previously held a majority, and the probability density of the election outcome. We apply these tests to high-stakes state elections that determine which party controls Congressional redistricting. We find overwhelming evidence of precise control, suggesting the majority party can—through legal means—ensure it retains just enough seats to stay in power. (JEL Codes: D72,D73,J11)

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1 Introduction

Precise control, sometimes called “precise sorting” or “complete manipulation,” arises when an agent has both a means and an incentive to guarantee that some continuous outcome falls on one side of an arbitrary cutoff. A teacher might choose to grade leniently enough to ensure a student’s test score lands just above the cutoff for a passing grade. A worker might choose to work few enough hours to ensure her income falls just below the cutoff for a housing subsidy. Many studies test for precise control at such cutoffs to better understand how agents make choices.¹

Our study differs in but one key respect: the outcome we study is the outcome of an election. It is easy to imagine that a political party might want to ensure it wins enough seats to hold a majority. But in the absence of poll rigging, the outcome of an election is not considered the choice of politicians. They can influence the outcome by fielding better candidates or buying more ads. But the final outcome, chosen by the electorate, is often assumed to be uncertain. Such uncertainty should make it impossible for the majority party ensure it wins the precise number of seats needed to retain control. Though it surely has the incentive, it is typically assumed to lack the means.

This paper presents evidence to the contrary. We show that political parties can exert remarkably precise control over the outcomes of elections even in a democracy as mature as the United States. We study not the outcomes of individual races, which may have little import for policy, but the aggregate outcome that determines which party controls the lower house of a state legislature. We show that when the stakes are sufficiently high the party that holds a majority before the election can, with exceptional precision, choose a set of unfavorable outcomes and drastically reduce their likelihood. These are precisely the outcomes that lie below the 50 percent threshold. Though the majority party may lose seats, it loses just few enough not to lose control of the legislature. We do not claim it rigs the election. Rather we argue that by changing the intensity and tactics of its electioneering it can influence the outcome with a comparable degree of precision.

We subject election outcomes to two tests for precise control of a continuous variable, both adapted from the literature on regression discontinuities. The first, adapted from McCrary (2008), tests for a discontinuity in the probability density of the percentage of seats won by the party that held a majority before the election. If

¹ See Section 1.1 for a partial review of this literature.

this party cannot exert precise control, the density should be smooth at the cutoff where the party loses its majority. A party that holds a majority of 50 seats, for example, should be almost equally likely to lose 50 seats as 49 seats. If it is far more likely to lose 49 seats, that is evidence of precise control. The second test is based on the idea that in the absence of precise control, any pre-determined outcome—in our case, the probability that Democrats previously held a majority—should be smooth around the cutoff where Democrats win a majority. This test is akin to asking if Democrats are far more likely to have previously held a majority in states where they win 51 percent versus 49 percent of the seats. Neither test will reject as long as there is meaningful uncertainty about the election outcome, and this uncertainty has a smooth distribution. A rejection suggests the majority party has sufficiently warped the distribution to introduce a discontinuity, which appears at precisely the point that would cause it to lose its majority.

Could such a discontinuity be a natural feature of elections rather than the result of conscious effort by the majority party? We answer this question by identifying a set of elections in which parties make it their overriding goal to maximize their probability of winning at least a bare majority of seats. In a typical “low-stakes” election the party aims to maximize the number of seats it wins because a bare majority may, if party discipline is imperfect, be insufficient to pass substantive legislation. But there are some purely partisan decisions on which party discipline is almost perfect, implying a bare majority will suffice. If the decision is critical to the party’s future, the party should switch its objective to maximizing the probability it wins even a bare majority in the crucial election. It is in these elections that the party should choose to exert precise control. If the probability density of election outcomes is naturally discontinuous our tests should reject in every election. But if they reject only in high-stakes elections it suggests precise control is no accident but a strategic choice.

By a quirk of American political institutions one such critical, purely partisan decision arises every ten years: Congressional redistricting. By law each state must redraw the boundaries of its Congressional districts after each census. These boundaries determine how many left- or right-leaning voters a candidate will face. The party that controls redistricting can potentially redraw boundaries to favor its own candidates, reaping a windfall in Congress. In most states the redistricting plan is passed as regular legislation by the state legislature. The party that controls any chamber of the legislature—in particular, the lower house—has at least a veto over

any redistricting plan.²

It is the state assembly election just prior to decennial redistricting that determines which party controls redistricting. The outcome of these elections is a priority not only for state legislators but the national political parties, which raise and channel vast sums of campaign contributions. Moreover, the purely partisan nature of the decision—whether the plan should favor Democrats or Republicans—makes a party-line vote more likely, raising the salience of the 50 percent threshold.

We find strong evidence of precise control in high-stakes elections. There is a clear discontinuity in the probability density of election outcomes. A narrow victory for the majority party is almost 4 times as likely as a narrow defeat. The probability that Democrats held a majority in the previous election jumps by 44 percent at the cutoff. These discontinuities suggest the majority party is able to ensure with great precision that it remains on the proper side of the cutoff. These large and statistically significant discontinuities appear only in high-stakes elections. In low-stakes elections that do not determine control of redistricting, there is no evidence of a discontinuity. We then show that precise control is not the same as a party-level “incumbency advantage,” which would imply that holding a bare majority before the election helps win a (potentially larger) majority in future elections. We find no evidence of such an advantage.

Puzzling though these results may seem, they actually follow directly from how the incentives of the majority party change in a high-stakes election. The most obvious change is that the outcome of the election is more important to national party committees and outside donors, implying the parties should spend more money on the outcome. But the more crucial change is that unlike in a low-stakes election, where parties aim to maximize the number of seats they win, in a high-stakes election they maximize the probability of winning a majority. Political scientists have noted that under some circumstances a political party will switch its aim from “seat maximization” to “majority-seeking” (Makse, 2014).

As shown by Snyder (1989), these objectives are best met through different strategies. To see why, consider a simple example. Suppose the legislature has 3 seats, which the majority party may contest with either of two strategies. It can spread its resources equally across all three, winning each with 80 percent probability; or it can concentrate on two of the three seats, winning those with certainty while losing the

²Many states also attempt at this time to redraw the boundaries of state legislative districts, possibly raising even further the stakes for retaining control.

third with certainty. If its objective is to maximize the number of seats won it will spread its resources evenly, which in expectation yields 2.4 seats versus 2. But if its objective is to maximize the probability of holding a majority it will concentrate its resources, retaining control with probability 100 percent versus 90 percent.

When adapted to our context, the model of Snyder (1989) implies the party with more incumbents—the majority party—has a massive advantage in using these strategies. When a party with many more incumbents switches to a majority-seeking strategy it drastically reduces the chance of losing its majority. Since the party is switching away from a seat maximizing strategy, it gives up the chance to win many more seats in return for retaining its majority.

This framework neatly reconciles all of our main results while making additional predictions about how parties act to produce this outcome. As predicted, we find that compared to low-stakes elections, in high-stakes elections the majority party is less likely to win large numbers of seats. In some cases it actually loses seats, yet is disproportionately likely to limit its losses to be just small enough not to lose its majority. Since the key to a majority-seeking strategy is to reinforce the strength of incumbents, we expect (and find) a decrease in the rate at which incumbent state legislators choose not to seek re-election during closely contested high-stakes elections. We also find a massive increase during high-stakes elections in the total campaign contributions flowing to state legislative elections, suggesting parties place far more importance on the outcome. Finally, we find that Democrats in particular ramp up the funds channeled from their party committees to incumbents in states where they hold a majority, especially when that majority is narrow. Even among incumbents they concentrate far more resources on some races than others, consistent with the aim of maximizing the probability of retaining a majority.

Our key contribution is to show that the majority party in a U.S. state election can, through legal but costly means, hang onto precisely the number of seats it needs to retain its majority. To our knowledge the closest work is that of Folke et al. (2011), who find some evidence that prior to civil service reform the majority party in U.S. states was able to exert precise control using patronage and machine politics. What makes our result surprising is that we study elections after civil service reform ruled out such brazen corruption. The majority party cannot resort to machine politics, but through entirely legal means achieves a similar result. It is able to convert targeted campaign spending and the individual popularity of its incumbent legislators into a tool that makes a precise set of outcomes discontinuously unlikely. It gives

up any chance of making big gains in return for ensuring any potential losses are just small enough to preserve its majority. Perhaps most striking is that this discontinuity in the distribution of outcomes appears only in those elections where parties need it the most, suggesting its presence is their choice. Though it is ultimately voters who decide an election, political parties can influence their collective decision with scientific precision.

1.1 Related Literature

This paper most directly contributes to the literature on how politicians use legal or illegal means to retain elected office. This literature has found that incumbents will increase spending in election years (Nordhaus, 1975; Drazen and Eslava, 2010); allocate jobs, public goods or popular reforms to swing districts (Folke et al., 2011; Bardhan and Mookherjee, 2010; Baskaran et al., 2015; Nagavarapu and Sekhri, 2014); exploit the control of one level of government to increase the odds of winning at another (Curto-Grau et al., 2011); or alter the electoral system to marginalize opposition (Trebbi et al., 2008).

But other work has shown that such tactics may fail or even backfire in mature democracies or in the presence of independent institutions (Peltzman, 1992; Akhmedov and Zhuravskaya, 2004; Brender and Drazen, 2008; Matsusaka, 2009; Durante and Knight, 2012; Fujiwara and Wantchekon, 2013). Our work suggests these may simply be the wrong tactics for a mature democracy. By exploiting campaign financing and the overwhelming electoral advantage of incumbent candidates, the ruling party can maintain its majority.

Methodologically our paper is most similar to the recent literature in political science on whether outcomes of close elections are as good as random. Using an approach similar to ours, several papers have found evidence of sorting in close races for the U.S. House (Snyder, 2005; Caughey and Sekhon, 2011; Grimmer et al., 2012). But other work has disputed their conclusions or shown that they are not a general feature of close races in other contexts (Eggers et al., 2015; de la Cuesta and Imai, 2016). Our work is distinct in two ways. First, the papers cited largely focus on the methodological question of whether the regression discontinuity approach first used by Lee et al. (2004) is valid. They are less concerned with the broader question of how political parties can exert precise control over outcomes. Their focus on methodology is in part because of the second distinction: they focus on the outco-

mes of individual *races* between candidates rather than the aggregate outcomes of *elections*. The outcome of one race may have little impact on the composition of the legislature. By contrast, we test whether the incumbent party can edge out victory to remain in control of the legislature.

Substantively our paper is related to the literature in political science on the electoral tactics of political parties. Most relevant is the work of Makse (2014) who shows that parties are more likely to switch to defensive (or “majority-seeking”) behavior when redistricting becomes imminent. Jacobson (1985), Gierzynski (1992), Herrnson (1989), Clucas (1992), Thompson et al. (1994), and Stonecash (1988) likewise explore what circumstances cause parties to pursue defensive tactics. Our work suggests such tactics are so effective that outcomes short of winning a majority are made discontinuously unlikely.

Our paper also builds on the vast literature on precise control and sorting. This literature has found that households adjust their actions to barely meet the criteria for social programs (Dillender, 2016; Camacho and Conover, 2011; Manoli and Weber, 2014; Persson, 2014) or health insurance (Einav et al., 2015, 2016). A similar literature in public finance studies how households and firms bunch at kinks and notches induced by tax policy (Kleven and Best, 2016; Kopczuk and Munroe, 2015; DeFusco and Paciorek, forthcoming; Saez, 2010; Kleven and Waseem, 2013). Other work studies bunching caused by policies governing the environment (Ito, 2014; Ito and Saltee, 2014), business (Garicano et al., 2013; Harasztosi et al., 2015; Le Barbanchon, 2016), or education (Diamond and Persson, 2016). In all of these cases the outcome being manipulated is one clearly under the control of the agent. Our study differs in that our outcome, the seats won in an election, is one generally not thought possible to manipulate.

Finally, our work extends the vast empirical literature on partisan redistricting in the U.S. (for example, Gelman and King, 1990, 1994a,b; Engstrom, 2006; Glazer et al., 1987; McCarty et al., 2009; Chen and Rodden, 2013; Chen, 2016; Brunell and Grofman, 2005; Hetherington et al., 2003; Grainger, 2010; Ansolabehere and Snyder Jr, 2012; Carson et al., 2007; McCarty et al., 2009; Lo, 2013).³ The literature remains divided on whether partisan redistricting has any meaningful effect on outcomes. Our results suggest that, at least in the eyes of national political parties, it is vital to deny

³There is a related but distinct literature on incumbent redistricting. Abramowitz et al. (2006), Friedman and Holden (2009), and Carson et al. (2014) study whether politicians redraw districts not to favor one party but to favor incumbents of all parties.

the opposing side control of redistricting.

2 Testing for Precise Control by the Majority Party

Though our tests for precise control are adapted from the literature on regression discontinuity designs and bunching, they take on a new interpretation when the outcome of interest is the outcome of an election. This section gives the interpretation first through intuition and then through a simple model.

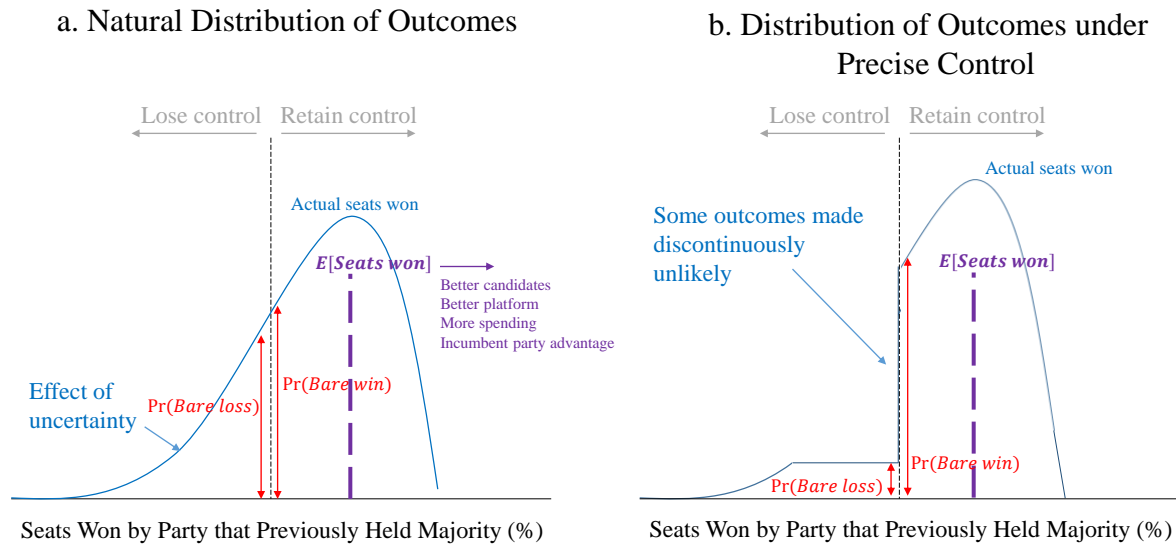
2.1 Interpreting the Tests: Intuition

The outcome of an election depends in part on the efforts of politicians. The majority party can improve its expected seat total by backing better candidates, crafting a better platform, or spending more funds. But as long as there is uncertainty in the outcome, the actual number of seats won will follow some distribution. Figure 1.a shows an example of such a distribution. There is no reason to expect the random component of the outcome to respect the arbitrary cutoff that determines whether the majority party retains control of the legislature. As long as the uncertainty is “smooth” (the probability density is continuous), the probability that the majority party wins slightly less than half the seats should be roughly equal to the probability it wins slightly more than half. More spending or better candidates may shift this distribution, but it should remain smooth at the cutoff.

What would it mean if, as in Figure 1.b, the distribution of outcomes is not smooth at the cutoff? A smooth distribution of outcomes is implied by a smooth distribution in the uncertainty. A lack of smoothness implies either a lack of uncertainty or that the majority party has introduced a discontinuity in the distribution of uncertainty at precisely the point that would cause it to lose its majority. The majority party has selected the precise set of outcomes just below the cutoff and either ruled them out entirely for some fraction of elections, or lowered the probability for all elections.⁴ If we reject smoothness at the cutoff, it implies that the majority party is somehow able to ensure the number of seats won is just high enough to retain control. That is the intuition behind the Density Test.

⁴These two scenarios are observationally indistinguishable—the model of Section 2.2 illustrates the first scenario.

Figure 1
Intuition of the Density Test



Though simple in theory, the Density Test requires an estimate of the probability density of the percentage of seats won by the majority party. We also consider an alternative approach that can be implemented as a simple linear regression. This approach tests for a systematic difference between states where Democrats manage a narrow victory versus those where they suffer a narrow defeat. If these states differ on some pre-determined characteristic—in particular, whether the Democrats won a majority in the previous election—it suggests states are being “sorted” across the threshold based on the identity of the majority party.

To see why, consider observing the percentage of seats won in the lower house by Democrats in an unknown state in an unknown year. Given only this information, how would the optimal prediction of whether the Democrats held a majority before the election vary with their returns? Clearly the probability would increase with their returns. A state that elected many Democrats this election probably did so in the previous election, making it more likely they held a majority.

But the prediction should not change *discontinuously* when their winnings surpass 50 percent. If the Democrats held a majority before the election, they should not be far more likely to eke out a bare win (say, 50 out of 99 seats) versus a bare loss (49 out of 99 seats). The same is true if the Democrats did not hold a majority before

the election. Sheer chance should make a bare win and a bare loss almost equally likely. If BW and BL denote a bare win or bare loss, and D the event that Democrats previously held a majority, then Bayes' Law implies

$$\begin{aligned} Pr(D|BW) &= \frac{Pr(BW|D)Pr(D)}{Pr(BW|D)Pr(D) + Pr(BW|D^c)Pr(D^c)} \\ Pr(D|BL) &= \frac{Pr(BL|D)Pr(D)}{Pr(BL|D)Pr(D) + Pr(BL|D^c)Pr(D^c)} \end{aligned}$$

In the absence of precise control, $Pr(BW|D) \approx Pr(BL|D)$ and $Pr(BW|D^c) \approx Pr(BL|D^c)$. Then these two expressions are approximately equal, implying the optimal prediction should not change discontinuously when the Democrats' margin crosses zero. If the optimal prediction does change discontinuously it implies the Democrats are far more likely to barely win when they are the majority party, and to barely lose when they are the minority party.

2.2 Interpreting the Tests: Formal Model

The two parties contest a unit measure of elections identified by the state i and election-year t . The outcome of interest is the number of seats won by Democrats as a percentage of the total relative to the 50 percent cutoff. In the absence of precise control they win

$$X_{i,t}^* = \alpha(2M_{i,t-1} - 1) + v_{i,t} \quad (1)$$

where $M_{i,t-1}$ is a dummy for whether the Democrats held a majority before the election and v_i is a mean zero shock to the outcome. Assume $v_{i,t}$ is independent of $M_{i,t-1}$ and distributed according to the cumulative distribution function F , which is everywhere twice-continuously differentiable. The term $\alpha > 0$ gives the expected seats (relative to the 50 percent cutoff) of the party that holds a majority before the election.

For simplicity this model assumes away many features of an actual election. But one could allow the outcome to vary with demographics or the state of the economy, allow the advantage of the majority party to vary continuously with the number of incumbents, and allow the parties to influence the outcome through their choice of platform or through electioneering. For example, one could add a function $h(\mathbf{Z}_{it})$ to (1), where \mathbf{Z}_{it} is a vector containing all these factors. As long as \mathbf{Z}_{it} does not contain any function of $v_{i,t}$ —that is, no one is able to perfectly foresee and condition actions

on the realized value of $v_{i,t}$ —the results that follow will hold.⁵

Suppose the majority party can exert precise control over the outcomes of a fraction of elections κ . Let C^D and C^R be the set of elections controlled by Democrats and Republicans. Let $m(\cdot)$ denote a measure defined over sets of elections. Then C^D and C^R satisfy

$$m(C^D) = m(C^R) = \kappa$$

and

$$\{i \in C^D \mid M_i = 0\} = \{i \in C^R \mid M_i = 1\} = \emptyset$$

When the majority party controls the outcome of election i it wins $u_{i,t}^C$ seats, which has a uniform distribution over half-open interval $[0, \nu)$ for a small number $0 < \nu < 1$.⁶ Then the realized outcome is

$$X_{i,t} = \begin{cases} u_{i,t}^C & \text{if } i \in C^D \\ -u_{i,t}^C & \text{if } i \in C^R \\ X_{i,t}^* & \text{otherwise} \end{cases}$$

Then the following lemma holds:

Lemma 1 *If $\kappa = 0$ then $X_{i,t}$ has an absolutely continuous conditional distribution function $G(X_{i,t} \mid M_{i,t-1})$. The conditional density $g(X_{i,t} \mid M_{i,t-1})$ is continuous at $X_{i,t} = 0$. Finally,*

$$\lim_{x \rightarrow 0} \left\{ \mathbb{E}[M_{i,t-1} \mid X_{i,t} = x] - \mathbb{E}[M_{i,t-1} \mid X_{i,t} = -x] \right\} = 0 \quad (2)$$

Proof: If $\kappa = 0$ then $G(X_{i,t} \mid M_{i,t-1}) = G(X_{i,t}^* \mid M_{i,t-1}) = F[X_{i,t}^* - \alpha(2M_{i,t-1} - 1)]$ which is twice-continuously differentiable. Then the other results follow from Proposition 2 from Lee (2008). \square

Equation 2 states that, in the limit, the optimal prediction of whether the Democrats were the majority party before the election is similar on either side of the

⁵McCrary (2008) notes the difference between “partial” and “complete” manipulation, where complete manipulation implies the running variable is completely controlled by the agent. The agent can only exert precise control in the case of complete manipulation. If the majority party has perfect foresight it can condition its choices on the realized value of $v_{i,t}$, which puts the running variable under its complete control. But as long as there is any noise in its prediction of $v_{i,t}$, some part of the running variable is outside its control.

⁶We assume a uniform distribution only for concreteness. As long as the density of $u_{i,t}^C$ (call it ϕ) has support at 0 and $\phi(0) > \phi(-\nu)$ for arbitrarily small ν , the result holds.

threshold. To be precise, it should not change discontinuously when the Democrats switch from losing to winning the election. This result is akin to the falsification test used to verify a regression discontinuity design. If the design is valid—that is, if there is no precise control of the running variable—no pre-determined outcome should change at the threshold.

To derive a test for precise control, take the contrapositive of Lemma 1.

Test 1 (Sorting Test) *If*

$$\lim_{x \rightarrow 0} \left\{ \mathbb{E}[M_{i,t-1} \mid X_{i,t} = x] - \mathbb{E}[M_{i,t-1} \mid X_{i,t} = -x] \right\} \neq 0 \quad (3)$$

then the majority party can exert precise control over a strictly positive fraction $\kappa > 0$ of elections.

Though this test is standard in the literature on the regression discontinuity design, the model clarifies what it means to reject the null when the running variable is the outcome of an election. Rejection does not imply that the majority party merely has an “incumbent party advantage” in winning elections, which is true as long as $\alpha > 0$ regardless of whether $\kappa > 0$. Rather a rejection implies that the majority party has discontinuously reduced the probability of an unfavorable outcome.⁷ As noted in the introduction, it implies the majority party can exert precise control over the outcome.

Lemma 1 implies another test based only on the density function of a suitable transformation of X_{it} . Define

$$\tilde{X}_{i,t} = \begin{cases} X_{i,t} & \text{if } M_{i,t-1} = 1 \\ -X_{i,t} & \text{if } M_{i,t-1} = 0 \end{cases}$$

which gives the seats won by whichever party held a majority before the election. Lemma 1 implies that in the absence of precise control $\tilde{X}_{i,t}$ has a probability density $h(\tilde{X}_{i,t})$ that is continuous at 0. The contrapositive of this statement is

Test 2 (Density Test) *If $h(\tilde{X}_{i,t})$ is discontinuous at $\tilde{X}_{i,t} = 0$ then the majority party can exert precise control over a strictly positive fraction $\kappa > 0$ of elections.*

⁷In this model we assume the probability falls discontinuously to zero for the set of elections that are controlled. We could instead assume the probability of $u_{i,t}^C < 0$ is positive but strictly less than the probability $u_{i,t}^C = 0$. In our dataset these two scenarios would be observationally equivalent.

This test is based on the usual check for a discontinuity in the density of the running variable (McCrary, 2008). The key, as noted first in Caughey and Sekhon (2011), is that even in the presence of precise control there may not be a discontinuity in the density of the original running variable $X_{i,t}$. That is because Lemma 1 deals only with the *conditional* density $g(X_{i,t} \mid M_{i,t-1})$. But since the definition of $\tilde{X}_{i,t}$ is itself is conditioned on $M_{i,t-1}$, precise control would create a discontinuity in its *unconditional* density $h(\tilde{X}_{i,t})$.

3 Research Design

3.1 High-Stakes Elections

The tests proposed in Section 2 assume that under normal circumstances—when parties are not trying to exert precise control—the uncertainty in election outcomes has a smooth distribution. If the distribution is generally not smooth a discontinuity may be a natural feature of democracy. The problem is compounded by the fact that in a legislature with a finite number of seats, the running variable—the percentage of seats won by Democrats—is to some extent discrete.⁸ Our solution is to compare the outcome of the tests across elections that differ in the stakes for winning a bare majority. If a discontinuity only appears in elections where the stakes are high, it is likely not natural but the result of conscious effort by political parties. High-stakes elections arise through a natural experiment created by the opportunity to control Congressional redistricting.⁹

Why does the chance to control Congressional redistricting raise the stakes of an election? As noted in the introduction, the boundaries of a district may be drawn to favor one party over another. To see how, suppose there is a state that contains 6 likely Democratic voters and 3 likely Republican voters. These voters must be divided evenly into 3 Congressional districts. In Plan A each district contains 2 Democrats and 1 Republican. In Plan B all 3 Republicans are put into a single district while the 6 Democrats are put into the other two districts. Though the total number of Democratic and Republican voters is held fixed, under Plan A the Democrats win all

⁸Most of the observations in our dataset come from state assemblies with at least 100 seats, suggesting discreteness is unlikely to be a serious problem. Nevertheless our tests using low-stakes elections confirm as much.

⁹In the language of Section 2, testing for an absence of discontinuities in low stakes elections is implicitly a test of whether v is non-degenerate and F is twice continuously differentiable.

three seats while under Plan B the Democrats win only two seats. Clearly Democrats prefer Plan A while Republicans prefer Plan B.

Thanks to the rules of redistricting the plan ultimately adopted depends on which party controls the legislature. Most states pass new redistricting plans as regular legislation. Control of the lower house of the state legislature grants a measure of control—at least a veto—over redistricting.¹⁰ Control switches discontinuously away from Republicans when Democrats win at least 50 percent of seats. Regardless of which party controls the other branches, if Democrats control the lower house they can vote down any unfavorable redistricting plan. As we show in Appendix A.1, there is extraordinary party unity when voting on a redistricting bill. Controlling at least half the seats in the lower house is tantamount to having a veto over any unfavorable plan. That makes it critical to have a majority in the lower house in years when the opportunity to redistrict arrives.

That opportunity arrives every ten years with the decennial census. Aside from making it possible to create districts with equal populations, the census helps the party in power gerrymander on demographics. As shown in Figure 2, the census is completed in years ending in 1.¹¹ Whichever party wins the election to the state legislature just before this year has the opportunity to pass its own redistricting plan.¹²

This accident of timing raises the stakes of these elections. As we show in a companion paper (Jeong and Shenoy, 2017), partisan control of redistricting brings immediate benefits to Congressional candidates of the party in power.¹³ That implies national parties and out-of-state donors will muster far more resources for these

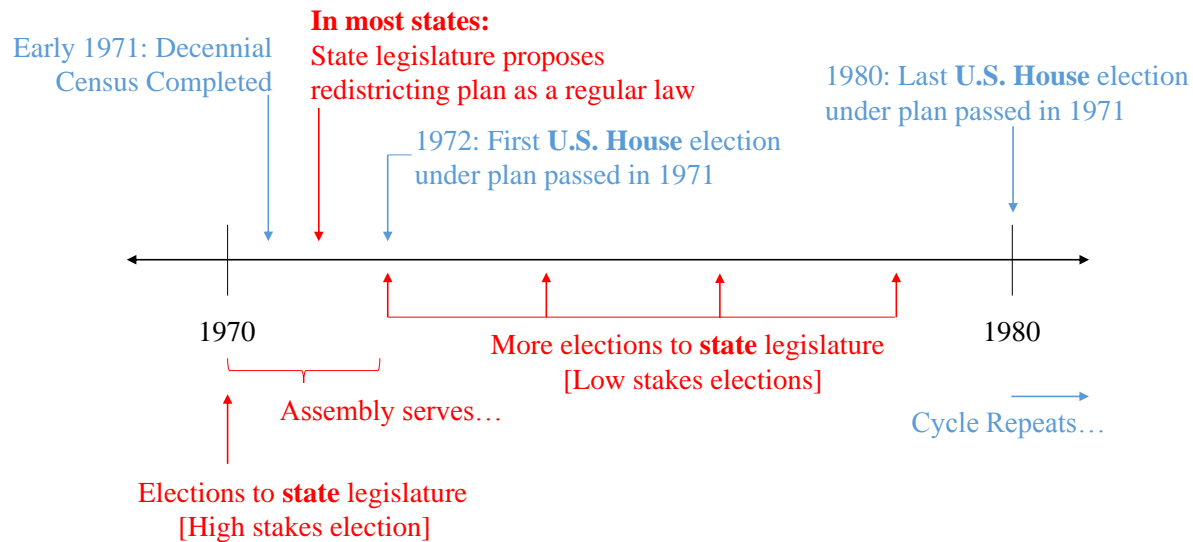
¹⁰We focus on the lower house because most states stagger the terms of members of the upper house (much like the U.S. Senate). Only a fraction of seats are contested in the election before redistricting, making the definition of a high- versus low-stakes election less clear.

¹¹The redistricting bill may not be successfully passed in the year ending in 1 if, for example, the legislature is divided and the bill is particularly contentious. As a result, the date of passage is both unpredictable and endogenous to our outcome of interest. Instead we focus on the opportunity to redistrict, which comes with the completion of the census. It is more likely that this opportunity, which is known and exogenous, is what drives the decisions of parties before the election.

¹²In many states the election is in years ending in 0, but a few states are irregular. We define the most recent election before a year ending in 1 as a high-stakes election.

¹³We show how parties' ability to exert precise control can be used to measure where they aim to capture control of redistricting. We then derive conditions under which a difference-in-discontinuities estimator can net out this selection bias to consistently estimate the causal effect of partisan redistricting. We find that parties capture redistricting in states where they have suffered recent losses, which are then temporarily reversed by redistricting. Opposition candidates are 11 percentage points less likely to win House elections just after redistricting. These results are consistent with the hypothesis that redistricting enables a form of political capture, where parties use redistricting to temporarily retain control in places where they are at risk of losing it.

Figure 2
Redistricting Cycle



Note: The figure shows the redistricting cycle for a typical state (i.e. a state with lower house elections in even years).

elections. Statements from national party officials show that they are well aware of the stakes:

“It’s pretty clear that we’re well ahead of them [the Republicans],” said Michael Sargeant, executive director of the Democratic Legislative Campaign Committee (DLCC). He notes the party has been building an infrastructure to handle this redistricting effort for more than six years. (D’Aprile, The Hill, 2010)

Aside from increasing the prominence of the election, the chance to control redistricting also may change the party objectives. As we describe in greater detail in Section 6.1, it is unwise for a party to seek a bare majority if its aim is to pass substantive legislation.¹⁴ But on an issue whose sole aim is to improve the electoral prospects of one party at the expense of another, defections are unlikely. As noted earlier, there is extraordinary party unity when legislators vote on a redistricting bill (see Appendix A.1).

¹⁴A recent and very prominent example comes from the U.S. Senate. Despite holding a slim majority, Republicans in the Senate were unable to repeal the individual mandate of the Affordable Care Act because 3 of their 52 senators defected.

3.2 Implementing the Tests

Define the seats held by Democrats as a percentage relative to the 50 percent threshold:

$$X_{i,t} = \frac{[Democrats\ elected]_{i,t} - \frac{1}{2}[Total\ Assembly\ Members]_{i,t}}{[Total\ Assembly\ Members]_{i,t}} \times 100\% \quad (4)$$

If there is an uneven number of seats in the assembly we round $\frac{1}{2}[Total\ Assembly\ Members]_{i,t}$ up to the next integer. This ensures $X_{i,t} = 0$ is the fewest number of seats Democrats can win without becoming the minority.¹⁵

To apply the Sorting Test we estimate a regression discontinuity using a local linear regression with a rectangular kernel, as proposed in Lee and Lemieux (2010). As we discuss in Appendix A.2, different methods for choosing an “optimal bandwidth” disagree on the optimum. Since our aim is mainly to test for robust evidence of precise control, we use as our baseline a bandwidth of 18, which lies between the optima of the different methods, and show that the main results are similar at any reasonable bandwidth. As in Section 2.2, let $M_{i,t}$ be a dummy for whether the seats won by Democrats $X_{i,t}$ is greater than or equal to 0. The estimating equation is

$$M_{i,t-1} = \gamma_0 + \gamma_1 X_{i,t} + \gamma_2 X_{i,t} M_{i,t} + \beta M_{i,t} + [Error]_{i,t} \quad (5)$$

which we estimate separately for high-stakes and low-stakes elections. The coefficient $\hat{\beta}$ gives the estimated difference between the right and left limit of $\mathbb{E}[M_{i,t-1} | X_{i,t} = x]$. We cluster the standard errors by state-redistricting cycle. If we reject the null $\hat{\beta} = 0$ it is evidence that the majority party can exert precise control over the outcome.

We apply the Density Test (Test 2) by running a standard McCrary Test (2008) on $\tilde{X}_{i,t}$, the seats won by whichever party held a majority before the election. To make the interpretation of $\tilde{X}_{i,t}$ as clear as possible we discard cases in which independent legislators (neither Democrats nor Republicans) win seats in either the current or the previous election. Restricting the sample ensures the share of seats won by the minority is just 1 minus the share won by the majority.¹⁶ We define

¹⁵In states where there is an even number of seats, a value of zero implies neither party is either the majority or the minority party. Democrats effectively have a veto over redistricting. For example, after the 2000 election left Washington with a perfectly divided house the two parties elected co-speakers and assigned each committee co-chairs from the two parties.

¹⁶The results are qualitatively unchanged if we do not drop observations with independent legislators.

$$\tilde{X}_{i,t} = \begin{cases} \frac{[Democrats\ elected]_{i,t} - \frac{1}{2}[Total\ Assembly\ Members]_{i,t}}{[Total\ Assembly\ Members]_{i,t}} \times 100\% & \text{if } M_{i,t-1} = 1 \\ \frac{[Republicans\ elected]_{i,t} - \frac{1}{2}[Total\ Assembly\ Members]_{i,t}}{[Total\ Assembly\ Members]_{i,t}} \times 100\% & \text{if } M_{i,t-1} = 0 \end{cases} \quad (6)$$

where again $\frac{1}{2}[Total\ Assembly\ Members]_{i,t}$ is rounded up to the next integer. Then $\tilde{X}_{i,t} = 0$ implies the majority party has won the smallest number of seats possible without becoming a minority. We follow McCrary's suggestion of choosing a bin size by inspection and testing the results for robustness. In the main text we use a bin size of 1 and the default bandwidth (roughly 10), and show in Appendix A.2 that the results are robust to different bin sizes and bandwidths.

4 Data

We apply the tests for precise control to data compiled by Klarner (2013b) on the number of Democrats, Republicans, and independents elected to the lower house of the state legislature. In the early part of the past century, many state legislatures left district lines unchanged to avoid making incumbents face new voters. Only after the Supreme Court ruled in *Baker v. Carr* 369 (1962) and *Wesberry v. Sanders* 376 (1964) that their failure to redistrict was unconstitutional did states that were apportioned more than one Congressional district start redistricting regularly.

We restrict our attention to elections after 1962, the year of *Baker v. Carr* 369 (1962), which yields elections leading up to the 1970, 1980, 1990, 2000, and 2010 redistricting cycles. We also have elections through 2015, which add to our set of low stakes elections. Not all states allow their Congressional districts to be drawn by the state legislature. The exceptions are generally independent or appointed commissions. There is some ambiguity about how to handle cases where states adopt a commission. In our main sample we discard all elections after a state adopts a commission (as per Levitt, 2016).¹⁷ In Online Appendix A.4 we show that the results do not change when we handle these states differently. We also discard states that have only a single House representative, as these states have a single district comprising the entire state.¹⁸ Maine presents an unusual case because unlike other states it has

¹⁷Hawaii adopted a commission in 1968, Washington in 1982, Idaho in 1994, New Jersey in 1995, Arizona in 2000, and California in 2012.

¹⁸Alaska, Delaware, Vermont, and Wyoming are excluded. North Dakota is excluded after the 1972

Table 1
Descriptive Statistics

	Low-Stakes Elections	High-Stakes Elections
Democrats win	0.66	0.63
Democrats held prior majority	0.66	0.69
Seats Won by Democrats*	7.69	7.66
Democrats Remain Majority	0.88	0.88
Democrats Remain Minority	0.77	0.90
Incumbent Re-Election Rate**	0.94	0.93
Total Receipts**	36564	36951
Party Committee Contributions***	4785	5531
Presidential Election	0.48	0.34
Elections	796	201
State-Redistricting-Cycles	242	201

*As a percentage of the total seats in the assembly, relative to the 50 percent threshold

**Based on elections from 1967 to 2010

***Based on elections after 1990 (mostly from 2000–2012), excluding odd-year election states

Note: Each cell gives the mean among either low- or high-stakes elections in the sample. “Democrats win” refers to their winning at least 50% of seats in the current election, while “Democrats held prior majority” refers to their having done so in the previous election. The margin is defined as the percentage of seats held by Democrats beyond the minimum number needed to give them at least 50% of the seats. “Democrats Remain Majority” is the fraction of elections in which Democrats win the current election conditional on having won the previous election. “Democrats Remain Minority” is the fraction in which they lose the current election conditional on having lost the previous election.

occasionally redistricted in years ending in 3 rather than 1. In our main sample we treat it like the other states, but show in Online Appendix A.4 that the main results do not change under any of several different assumptions. Finally we exclude Nebraska, which has a non-partisan legislature, from our entire analysis.

We draw on data for campaign finances and career paths for state legislators from Bonica (2013). These data are available for state legislators in an expanding number of states starting in 1990 through 2012.¹⁹ We compute the incumbent exit rate of state legislators using a dataset of state legislative races compiled from Klarner et al. (2013) and Klarner (2013a), which are available from 1967 to 2010.

Table 1 reports several summary statistics. At first glance low- and high-stakes elections seem similar in many respects. As our later results show, the aggregate

reapportionment, Montana after the 1991 reapportionment, and South Dakota after the 1981 reapportionment.

¹⁹There is some ambiguity about how states that hold their elections in odd years are assigned to federal election cycles in the data. That creates a risk that funds meant for a high-stakes election are erroneously assigned to a low-stakes election and vice-versa. In the sample used in the main text we exclude these odd-year states from the campaign finance data. We show in Online Appendix A.4 that including them does not much change the results.

statistics mask how parties change their tactics when a low-stakes versus a high-stakes election is expected to be close. But even the sample means show a few key differences that foreshadow our later results. First, conditional on Democrats being in the minority, the probability that they remain so rises from 77 percent in low-stakes elections to 90 percent in high stakes elections. Second, although average total campaign receipts to lower house legislators are broadly similar, contributions from party committees rise by roughly 16 percent in high-stakes elections. Party committees, which might be expected to give more strategically than regular donors, are increasing their involvement in these critical elections.

The last row of the table shows what fraction of high- and low-stakes elections coincide with presidential elections. One might worry that high-stakes elections are all presidential elections, and that the results have little to do with control of redistricting. In fact neither low nor high-stakes elections are dominated by presidential elections, and in our sample high-stakes elections are slightly less likely to be presidential elections.²⁰

Finally, the incumbent re-election rate, though similar across high- and low-stakes elections, is crucial to understanding how a majority party exerts precise control. The average incumbent re-election rate (conditional on the incumbent seeking re-election) is over 93 percent. This number, comparable to what Friedman and Holden (2009) find for U.S. House races, is extraordinary. It suggests the majority party has an enormous advantage in contesting elections if it simply convinces its incumbents to seek re-election.

5 Main Results: Can Parties Exert Precise Control?

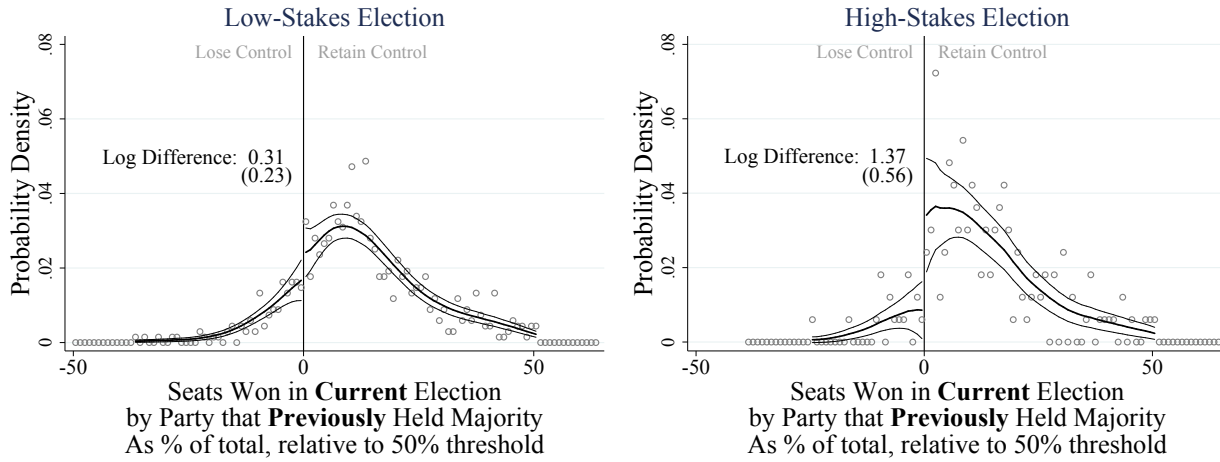
5.1 Tests for Precise Control

We apply the Density Test (Test 2), which tests for a discontinuity in the probability density of the percentage of seats won by the party that held a majority before the election. The left-hand panel of Figure 3 shows that in low-stakes elections there is a small and statistically insignificant difference in the density of outcomes around the

²⁰In unreported regressions we find that the distinction between presidential and midterm elections is not what drives the results (results available upon request). The fraction of low- and high-stakes presidential elections are less than 0.5 because some states have assembly elections in odd years. The fraction is especially low for high-stakes elections by sheer chance; our first set of high-stakes elections lies roughly within 1969-1970, and our last set lies within 2009-2010.

Figure 3

Density Test: The Majority Party is Far More Likely to Barely Win than Barely Lose a High-Stakes Election



Note: The figure gives the estimates and the visual representation of the density test. The test is implemented using the procedure of McCrary (2008), which tests for a significant difference at the cutoff in the log of the density.

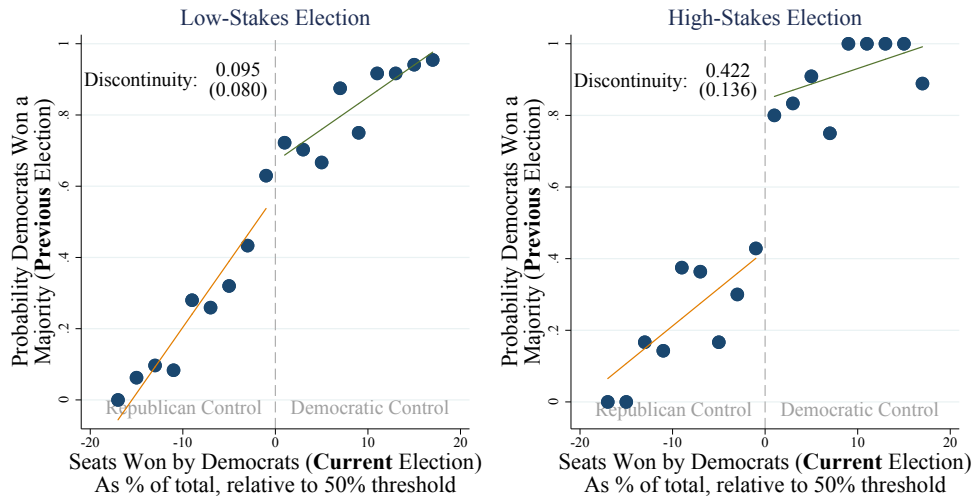
cutoff. But as shown in the right-hand panel of Figure 3, a large and statistically significant discontinuity appears in high-stakes elections. The point estimates imply that a narrow win for the majority party is nearly 4 times as likely as a narrow defeat. As noted in Section 3.2, the estimates of any density test may depend on bandwidth and bin size. We show in Appendix A.2 that across different combinations of bandwidth and bin size the results are robust.

For confirmation of the result we turn to the Sorting Test (Test 1), which is depicted in Figure 4. We split the running variable—the percentage of seats won by Democrats in the lower house—into bins with a width of 2 percentage points. For each bin we plot the fraction of elections in which Democrats were the majority party before the election. This fraction can be interpreted as the probability, conditional on the outcome of the current election, that the democrats were the majority party before the election. We estimate Equation 5 and plot the predicted values, which appear as lines on either side of the cutoff (at zero). We report the regression discontinuity estimate (β in Equation 5) and its standard error.

In low-stakes elections we are unable to reject the null of no precise control. As expected, the conditional probability that Democrats won a majority in the previous election is increasing in the percentage of seats won in the current election.

Figure 4

Sorting Test: The Majority Party is Able to Precisely
Sort onto the Winning Side of the Cutoff



Note: The figure depicts our estimates of Equation 5. Standard errors are clustered by state-redistricting cycle. Bin size is 2 percentage points.

States that elect more Democrats in the current election probably elected more in the previous election, making it more likely the Democrats held a majority in the lower house. But there is no statistically significant discontinuity at the cutoff, meaning the probability is similar in elections just barely won and lost by Democrats. By contrast we find strong evidence of precise control in high-stakes elections. The conditional probability jumps by 42 percentage points at the cutoff, suggesting the majority party is able to sort itself onto the more favorable side of the discontinuity with remarkable precision.

Table 2 reports the estimates from the baseline specification and several robustness checks. Columns 1 and 2 give the same baseline estimates shown in Figure 4. The other columns show the results of robustness checks. One possible concern with these estimates is that the presence of independent legislators (those unaffiliated with either major party) muddies the partisan narrative of Section 3. Columns 3 and 4 show that dropping elections in which independents either win seats or held seats before the election makes little difference in the estimates.

Next we redo our estimates excluding the so-called pre-clearance states. These states are required to submit changes to their voting rules for pre-clearance to the

Table 2
Sorting Test: Main Results and Robustness

	Baseline		No Ind. Leg.		Drop VRA States		Republican Seats	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Low-Stakes	High-Stakes	Low-Stakes	High-Stakes	Low-Stakes	High-Stakes	Low-Stakes	High-Stakes
Discontinuity	0.095 (0.080)	0.422*** (0.136)	0.119 (0.084)	0.540*** (0.136)	0.072 (0.086)	0.419*** (0.145)	-0.106 (0.085)	-0.391*** (0.136)
Observations	535	138	466	119	468	121	528	136
Clusters	178	138	163	119	154	121	176	136
Control Mean	0.48	0.35	0.46	0.27	0.48	0.31	0.71	0.88
Test: Low=High		0.06		0.02		0.06		0.09

Note: Outcome is a dummy for whether Democrats held a majority before the election (to be precise, whether they won a majority of seats in the previous election). “Baseline” is the same specification used to construct Figure 4. “No Ind. Legislators” drops elections in which independent legislators are elected in either the current or previous election. “Drop VRA States” drops states that require pre-clearance from the Justice Department for any change in election law. “Republican Margin” defines the running variable as the Republican rather than Democratic margin. The last row gives the p-value of test for the equality of the estimates for low- and high-stakes elections. The test is based on a single regression that jointly estimates both discontinuities.

U.S. Department of Justice (as per Section 5 of the 1965 Voting Rights Act).²¹ Columns 5 and 6 shows that the estimate is not much changed. Columns 7 and 8 report the estimate using as the running variable the percentage of seats won by Republicans rather than Democrats. It is not precisely equal to the negative of the percentage won by Democrats (as there may be independents).²² Nevertheless, the coefficient is essentially the negative of that in the baseline specification. Finally, the last row of the table gives the p-value of a joint test for the equality of the discontinuities estimated for low-stakes and high-stakes elections. In all specifications we reject equality at either the 10 percent or 5 percent level.

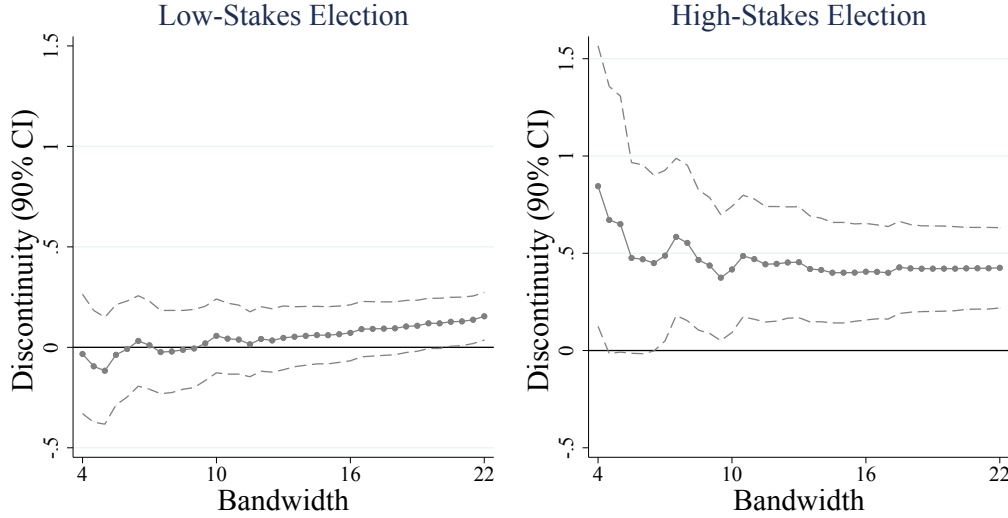
As noted in Section 3.2, bandwidth is always a concern when estimating discontinuities. Figure 5 shows that our results are not driven by the choice of bandwidth. We re-estimate Equation 5 for every bandwidth $h = \{4, 4.5, \dots, 21.5, 22\}$. We plot the regression discontinuity estimate and the 90 percent confidence interval against the bandwidth. The left-hand panel confirms that for any but the widest choice of bandwidth, there is no discontinuity in low-stakes elections. By contrast, there is always a large discontinuity in high-stakes elections, though the estimates grow large and

²¹These are Alabama, Alaska, Arizona, Georgia, Louisiana, Mississippi, South Carolina, Texas, and Virginia.

²²This is why the number of observations is not quite the same as in the baseline specifications. A different running variable implies a different set of elections will fall within the bandwidth of the local linear regression.

Figure 5

Sorting Test: The Results are Robust to the Choice of Bandwidth



Note: Figure plots the estimate and confidence interval for the discontinuity using every bandwidth $h = \{4, 4.5, \dots, 21.5, 22\}$. Standard errors are clustered by state-redistricting cycle.

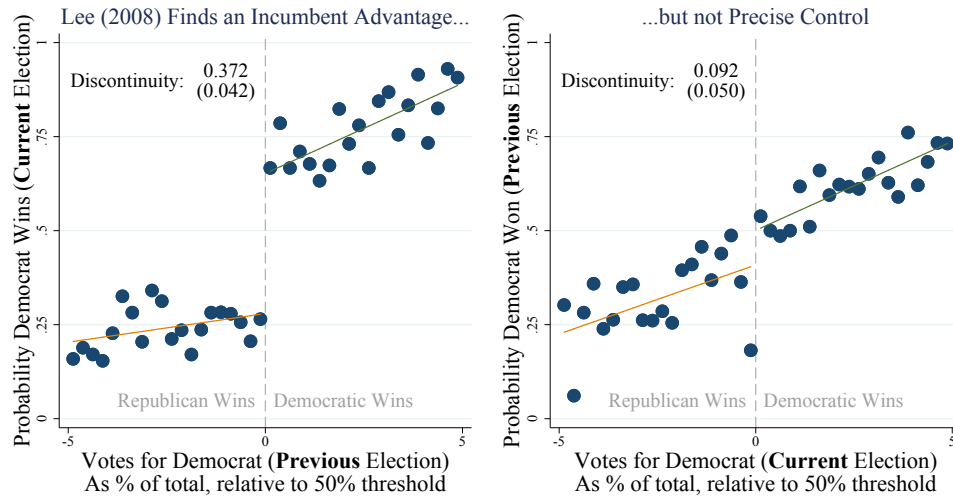
noisy when the bandwidth falls below 10.

We also report in Appendix A.1 several other tests to verify our interpretation. We show that Test 1 does not reject in elections preceding the decennial census in the years before *Baker v. Carr* 369 (1962) made redistricting mandatory. We show that Test 1 still does not reject in low-stakes elections when they are disaggregated by time, e.g. 1 election prior to high-stakes, 2 elections prior, and so on. We show using rolling regressions that the estimate of (5) in high-stakes elections is reasonably consistent over time (there is some slight evidence it may have grown smaller in recent years). Finally, we show that after disaggregating by whether Republicans versus Democrats are the majority party there is a discontinuity in the conditional density of seats won by Democrats $g(X_{i,t} \mid M_{i,t-1})$.

5.2 Precise Control is Not the Same as an Incumbent Advantage

One immediate but spurious interpretation of our results is that they are explained by a party-level analog to the well-known incumbent advantage. Lee (2008) finds that individual candidates for the U.S. House enjoy a big incumbent advantage when

Figure 6
Comparison to the Results of Lee (2008)



Note: Each dot represents the average outcome within a bin of width 0.25 percentage points.

they seek re-election. The incumbent advantage is the extra votes received by the incumbent because she is familiar to voters or has served them in the past (Ansola-behere et al., 2000). For a political party to enjoy such an advantage, it would have to be that the extra press coverage gleaned by the Speaker or the majority leader of the lower house translates into extra support for her followers.

Even if such an advantage exists, it cannot explain our results because, as noted earlier, there is a difference between the incumbent advantage and precise control of outcomes. An incumbent advantage implies the incumbent gets more votes (or in this case, more seats) simply for being the incumbent. It implies that having won an election in the past (no matter how narrow the margin of victory) helps win elections in the future. It does not imply the incumbent is far more likely to *barely* win than to *barely* lose, which is precise control. They are distinct phenomena; in the model of Section 2.2 there is an incumbent (or majority party) advantage regardless of whether there is precise control. In the presence of uncertainty, the probability the incumbent barely wins or barely loses should be similar even in the presence of a large incumbent advantage.

To make this difference clear, Figure 6 uses data on U.S. House races from Lee et al. (2004) to illustrate the difference between the incumbent advantage (as es-

timated in Lee, 2008) and precise control. The left-hand panel plots the average probability the Democrat wins the current election as a function of the Democrat's vote share (relative to the 50 percent threshold) in the previous election. When the share in the previous election crosses zero the Democrat discontinuously switches to contesting this election as the incumbent.²³ At the threshold, the probability the Democrat wins the current election jumps from 0.25 to 0.65. This is the incumbent advantage.

By contrast, the right-hand panel plots the average probability the Democrat won the *previous* election as a function of the Democrat's vote share in the *current* election. This is the analog to Figure 4, the Sorting Test, applied to individual House races. At the threshold, the Democrat switches from barely losing to barely winning this election. There is nothing like the large discontinuity visible in the left-hand panel. Democrats who barely win are no more likely to be the incumbent than Democrats who barely lose.²⁴ In other words, individual incumbents are not able to sort themselves onto the winning side of the threshold. That is not surprising, as the mechanism proposed in Section 6 makes sense only in the context of an election that determines the number of seats won, not an individual race to determine which candidate wins.

We make the distinction clear in our context by estimating the direct analog of the left-hand panel of Figure 6 in our sample. Using the seats won by Democrats in the *previous* election as the running variable, we test for a discontinuity at the cutoff in the probability Democrats win a majority in the *current* election. Figure 7 shows the estimate for several choices of bandwidth (we decrease the bin size as the bandwidth shrinks to better display the raw data). At no choice of bandwidth is the estimate statistically significant, and it shrinks as the bandwidth narrows. This result stands in stark contrast to Figures 4 and 5, which show a large discontinuity at almost any choice of bandwidth.

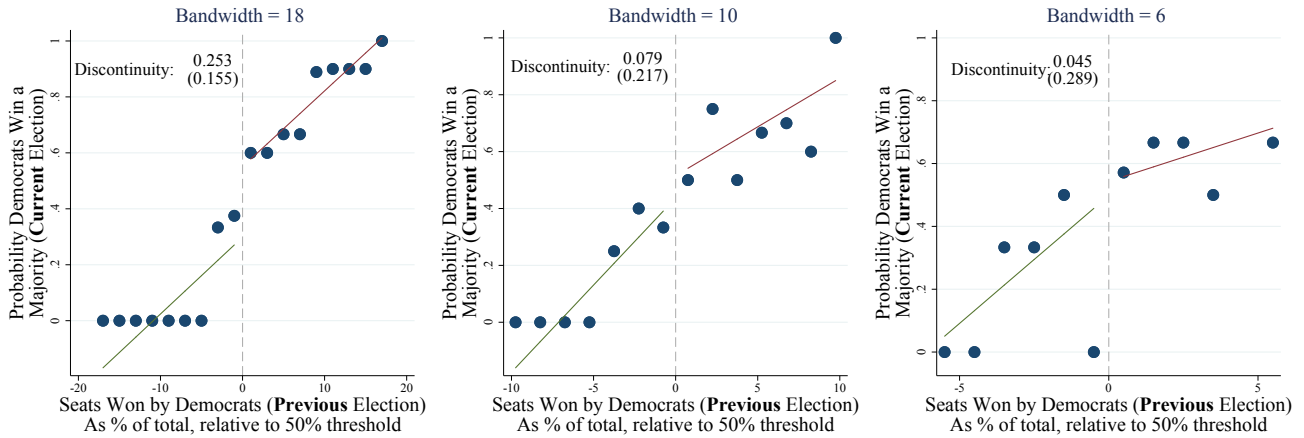
These results imply that holding a bare majority does not help a party win a bare majority (or any majority) in future elections. Aside from showing the distinction between an incumbent party advantage and precise control, this result is suggestive

²³Technically the Democrats become the incumbent party. The candidate is the incumbent assuming she seeks re-election.

²⁴As noted by Caughey and Sekhon (2011), at a very narrow bandwidth one can reject that there is no difference at the cutoff. But Eggers et al. (2015) have shown that this discontinuity is largely driven by a small number of outliers very close to the cutoff. The discontinuity does not survive a standard "doughnut-hole" test.

Figure 7

There is No Evidence of an Incumbent Party Advantage in High-Stakes Elections



Note: These plots are the direct analog of the left-hand panel of Figure 6 when applied to high-stakes elections in our sample. We take the seats won by Democrats in the *previous* election as the running variable and test for a discontinuity at the cutoff in the probability Democrats win the *current* election. Bin sizes are (from left to right): 2, 1.5, 1.

about the mechanism for precise control. Simply having the Speaker's gavel does not suffice. This is another major difference between our results and those of Folke et al. (2011), who find stronger evidence of an incumbent party effect than of precise control. That is not surprising, as in their context the mechanism for both is that control of government gives a party the power of patronage. In the pre-civil service reform elections they study, machine politics is a plausible mechanism for precise control.

That cannot be the mechanism in our post-reform sample. As we discuss in greater detail in Section 6, the key to precise control in our sample is that holding more (ideally many more) seats than the opposition enables the majority party to switch to defensive tactics. It sacrifices the chance of greatly expanding its majority in order to maximize the chance of retaining it. The absence of an incumbent party advantage also suggests why, as we show in Online Appendix A.1, there is no evidence of precise control in the election *before* the high-stakes election. Figure 7 suggests winning a bare majority would be useless in helping subsequently contest the high-stakes election. In fact, the mechanism for precise control proposed in Section 6 implies the optimal strategy is to win as many seats as possible in the election prior to the high-stakes election. The larger its pool of incumbent legislators, the bigger

its advantage in leveraging a majority-seeking strategy in the high-stakes election.

6 Mechanism: How Does the Majority Party Exert Precise Control, and Why Only in High-Stakes Elections?

At first glance the results of Section 5 are hard to reconcile. The party that holds a majority—or rather, the party that has more seats—is somehow able to exert precise control (Section 5.1). But it only chooses to do so in high-stakes elections—there is no evidence of precise control in low-stakes elections (Section 5.1). And even in high-stakes elections there is no evidence that holding a bare majority confers some sort of “incumbent party advantage” in winning seats or winning a majority (Section 5.2).

But as we show, theory—in particular, the model of Snyder (1989)—can reconcile these results. The model makes counter-intuitive predictions about how parties behave in a high-stakes election. We show that the patterns in the data are consistent with these predictions.

6.1 Theoretical Predictions: The Consequences of a Switch to Majority-Seeking Tactics

The first step to understanding our results is to understand how the chance to control Congressional redistricting changes the incentives of political parties. Clearly it increases the prominence of an election—what would otherwise be a state contest now has national implications—but it also raises the benefit of winning even a bare majority. That may seem puzzling, as a majority is all that is needed to pass—or at least block—any law. Why not seek a bare majority in every election?

The key is that on issues of substance, a bare majority in the assembly need not translate to a bare majority for a vital piece of legislation. On tax policy, for example, legislators within a party may differ in their ideology about the size of government. Using measures of ideology from Bonica (2014) we find that in about half of state assembly elections, some elected Democrats were more conservative than at least 5 percent of elected Republicans. Such a Democrat may not side with her party on a

substantive issue, making it unwise for party leadership to aim for retaining a bare majority.

But on a purely partisan issue—whether to enact a redistricting bill favorable to Democrats versus Republicans—party discipline is strong (see Online Appendix A.1). Since defections are less likely, parties may find it worthwhile to maximize their chance of winning even a bare majority. This difference in objectives is the crucial distinction between what we call high-stakes and low-stakes elections.

When parties switch their goal from maximizing the number of seats won to maximizing the chance of holding a majority, both the optimal strategy and the outcome are drastically different. This is the key insight behind Snyder's (1989) model of legislative elections, which predicts much of what we see in the data. When maximizing the number of seats won, parties will direct their resources to districts where they are naturally the weakest (against an enemy incumbent, for example). Using money to compensate for other disadvantages equalizes the marginal return of each dollar, maximizing the average probability of winning any seat.

But when maximizing the probability of holding a majority, parties channel their funds to pivotal districts most likely to put them over the 50 percent threshold. Snyder (1989) shows what this strategy implies in the case where there are three types of districts: those relatively and uniformly safe for one party (which, in our application, would be districts contested by that party's incumbents), those safe for the other party, and those where each party has an equal chance of winning (open districts). For the party that holds a majority before the election, and thus contests the election with more incumbents, the pivotal districts are actually those where its own incumbents are running. The party sends relatively little money to districts where it is challenging an opponent's incumbent. Though an extra dollar would have a bigger impact in these districts, they are unlikely to be part of the party's winning majority. To summarize, the majority party does exactly the opposite of what it would do if it were maximizing the number of seats won.

As a result, choosing this majority-seeking strategy comes at a cost. The party gives up the chance to win large numbers of seats, and may even *lose* seats. The party would have likely used a seat-maximizing strategy in the previous election (because, as noted above, holding a bare majority is usually not useful in passing legislation). Switching to a majority-seeking strategy might cause its majority to shrink, even though the chance it shrinks below 50 percent may be low. The trade-off can be phrased as one of risk versus reward; seat-maximization is a risk-neutral strategy

while majority-seeking is a risk-averse strategy.

The impact of this change in strategy can be stark. Snyder (1989) calculates the relative probability of holding a majority under a functional form assumption that makes the problem tractable. He finds that if the majority party contests a 65-district state with 30 incumbents against 20 opposition incumbents, it can retain its majority with 92 percent probability. The size of the difference in the number of incumbents is crucial. If the majority party contests with a bare majority—say, 30 incumbents versus 29 for the opposition in a 65-district state—it retains its majority with only 56 percent probability. That is little different from the 50-50 chance of winning a majority when both parties are equally matched. Holding a bare majority does not confer any discontinuous “incumbent party advantage.”

This chain of reasoning reconciles precise control in high-stakes elections with the absence of an incumbent party advantage. By switching to a majority-seeking strategy, the majority party can drastically reduce the chance it loses its majority. It only chooses to do so in a high-stakes election because these are the elections in which winning only a bare majority pays off. But it can only effectively pursue these strategies as long as it contests the election with a sizable majority. The model assumes no electoral benefit from simply being the ruling party. As a result there is no discontinuous increase in the chance of winning a majority in a future election when a party wins a bare majority in the current election.

6.2 Patterns in the Data: Evidence of a Switch to Majority-Seeking Tactics

The theory makes predictions beyond the results of Section 5, each of which we now test. The switch in party objectives from seat-maximization (in low-stakes elections) to majority-seeking (in high-stakes elections) implies a change in how parties contest elections. Compared to a low-stakes election, in a high-stakes election the majority party is less likely to win a large number of seats. It may even lose seats, but is far more likely to keep its losses small enough to retain a majority (Section 6.2.1). The majority-seeking strategy rests on reinforcing the strength of incumbent legislators. Therefore in high-stakes elections the parties should maximize their advantage by keeping their incumbents running for re-election (6.2.2). Since the outcome of a high-stakes election is disproportionately important (even to agents outside the state), parties should spend more money on winning them (Section 6.2.3). Finally,

the majority party in particular should direct these funds to its incumbents, and may even concentrate the funds within the set of incumbents to maximize the chance of having a bare majority (6.2.4).

6.2.1 The Majority Party is Less Likely to Make Big Gains but More Likely to Retain its Majority

The model predicts that switching from a seat-maximizing strategy to a majority-seeking strategy reduces the chance that the majority party will make major gains. It retains its majority by either holding steady or even by sustaining losses that are just small enough not to lose the majority.

Figure 8 illustrates this point. It plots the outcome of the election against the manner in which it was achieved. Like Figure 4, it divides all election outcomes into bins based on the number of seats won by Democrats (plotted on the horizontal axis). Aside from widening the bins to make the result more clear, the horizontal axis is exactly the same as Figure 4. The height of each bar gives the fraction of cases where the election outcome arose because the Democrats gained a number of seats greater than or equal to 5 percent of the total seats in the legislature. For example, the bar labeled “[0,5)” in the left-hand panel shows that of all low-stakes elections in which Democrats win a majority of between 0 and 5 percent, a fraction 0.18 were won by increasing their number of seats by at least 5 percentage points (of the total legislature).

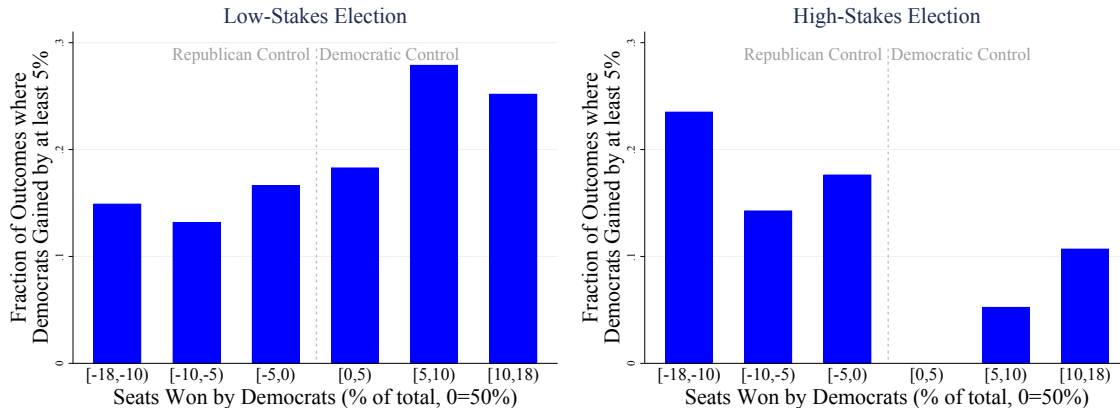
In low-stakes elections there are two clear patterns. First, a sizable fraction of elections where Democrats win a majority arose because Democrats gained many seats. Compared to the elections they lose, the elections they win are if anything more likely to have been won by making big gains. Second, a comparable fraction of elections barely won and barely lost by Democrats arose through big Democratic gains—there is no evidence of a sharp change at the cutoff.

Both patterns are reversed in high-stakes elections. Elections where Democrats win a majority are very unlikely to have been won because Democrats made big gains. In high-stakes elections Democrats win a majority by either losing seats to Republicans (though not enough to lose their majority) or because neither party makes big gains. The most extreme example is the set of elections where Democrats win a slim majority of less than 5 percent of seats, which never arise through Democratic gains. That implies Democrats never win a slim majority by winning a large number

Figure 8

Democrats Do Not Win High-Stakes Elections by Winning Many More Seats

Fraction of Outcomes Achieved through Large Democratic Gains



Note: Conditional on the outcome of the current election—the percentage of seats won by Democrats—we plot the fraction of elections in which they increased their number of seats compared to the previous election by more than 5 percentage points (elections in which $X_{i,t} - X_{i,t-1} > 5$). This figure restricts the sample to cases where no independents won seats, which lets us interpret Democratic gains as Republicans losses.

Test for equality: A test for whether the heights of the [0,5],[5,10],[10,18] bars in high-stakes elections jointly equal those in low-stakes elections rejects with a p-value of 0.000. An analogous test for the [-18,-10],[-10,-5],[-5,0] bars fails to reject with a p-value of 0.874.

of seats that barely flips the chamber from Republican control. By contrast nearly 20 percent of elections barely lost by Democrats arose because Democrats made gains, creating a large discontinuity in the graph. This discontinuity implies that although Democrats do make gains in states where Republicans hold a majority, these gains are rarely large enough to let them take control.

This reasoning suggests the majority party retains control by either holding steady or even suffering some losses. The key prediction of the model is that there should be an asymmetrically low chance that these losses push the party's returns below the cutoff for defeat. In a low-stakes election there should be a roughly equal chance that its losses are just small enough to retain the majority versus barely pushing it into the minority. But in a high-stakes election it will ensure these slightly larger losses are far less likely.

We look for evidence of this asymmetry by calculating the change in the seats won by Democrats compared to the election prior to the high-stakes election. It is essentially the seats gained by the Democrats. Figure 9 plots the histogram of the change within states where Democrats initially held the majority. The left-hand

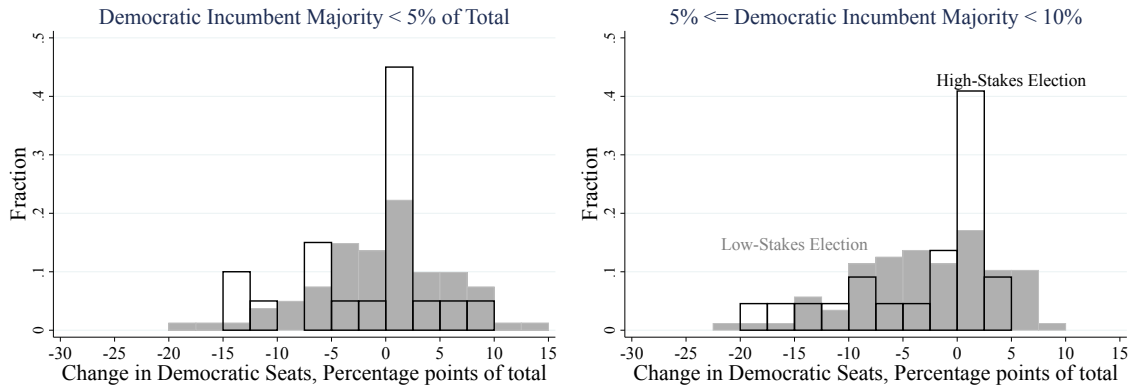
panel restricts the sample to states where the Democrats contest the high-stakes election with an incumbent majority of less than 5 percent (meaning they won between 50 percent and 55 percent of the seats in the previous election). The right-hand panel restricts to elections where their majority is between 5 and 10 percent. The gray histogram shows the fraction of observations among low-stakes elections, while the black outline shows high-stakes elections.

The left-hand panel shows that although the modal low-stakes election features either no change or a slight (less than 2.5 percent) gain for the Democrats, there is a similar probability mass at nearby outcomes. There is a reasonable chance they will lose seats equal to between 0 and 5 percent of total seats, possibly costing them control of the legislature. But there is also a reasonable chance they will gain seats equal to between 2.5 and 10 percent of the legislature. By contrast, about half of high-stakes elections feature little or no change. The chance of losing a small (0-5 percent) number of seats is very small. But compared to low-stakes elections, they are also unlikely to win many seats (which was exactly the pattern noted above in Figure 8).

The right-hand panel is even more striking. As when they contest with a narrower majority, Democrats are most likely in high-stakes elections to see little or no change. But now the probability of a small loss (less than 2.5 percent of seats) is somewhat higher. Though the sample is admittedly small, this pattern is consistent with the theory that parties lose just few enough seats not to lose control. With an incumbent majority of 5 to 10 percent of seats, Democrats can afford to lose a few seats without losing control. But their chances of slightly larger losses that might put them just below the 50 percent cutoff remain low, as do the chances of substantial gains. The majority party is able to precisely limit its losses to ensure it remains in the majority.

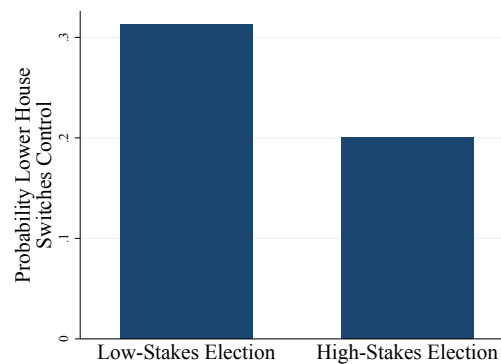
The consequences of this precision are visible in Figure 10, which shows the probability that the lower house switches hands between elections. We define a switch as any event where the Democrats win a majority in this election but not the previous election, or vice-versa. The probability of a switch falls from over 30 percent in low-stakes elections to less than 20 percent in high-stakes elections. Despite losing seats the majority party is much less likely to lose control.

Figure 9
Democrats Hold Just Enough Seats to Retain Control



Note: We plot histograms of the percentage point change in the seats won by Democrats from the previous election to the current election ($X_{i,t} - X_{i,t-1}$), conditional on the size of their incumbent majority (the seats won in the previous election $X_{i,t-1}$). We restrict attention to observations that lie within the bandwidth used for Figure 4 to keep the histogram legible. The left-hand figure shows the histogram conditional on Democrats holding a majority of less than 5 percent of the assembly. The right-hand figure shows cases where their majority is slightly larger (5 to 10 percent).

Figure 10
The Lower House is Less Likely to Change Hands in a High-Stakes Election



Note: We define a switch as any case where either the Democrats won a majority in this election but not the previous election, or vice-versa.

6.2.2 Incumbents Are Less Likely to Retire in a High-Stakes Election

According to the theory, the strategy that achieves precise control relies heavily on having many incumbent legislators. A majority-seeking party should thus take special care to ensure these incumbents run for re-election. On average about 22 percent of lower house incumbents do not seek re-election. In part that is because many politicians see the lower house of the state assembly as a stepping stone to higher office. Among lower house members who won office in 2002, roughly 15 percent sought higher office over the next 10 years. Nearly 80 percent of them ran for the upper house of the state legislature, and over 10 percent ran for the U.S. House. Can such legislators be convinced to delay their ambitions for two more years?

Additional funding for state legislators may be enough to convince incumbents to run for re-election. An incumbent who knows she need not spend as much effort fund-raising may be more willing to seek re-election. We show in Section 6.2.3 that total campaign receipts to state assembly candidates spike in closely-contested high-stakes elections. Alternatively, an incumbent may decide that her ambitions are best served by staying in office. If her plan is to run for the U.S. House, she may believe her run would be more successful after her party draws favorable Congressional boundaries.²⁵ Alternatively, state and national political parties may pressure incumbents to delay seeking higher office. If running for higher office is easier with the support of the party, it may hold considerable leverage over an ambitious legislator.

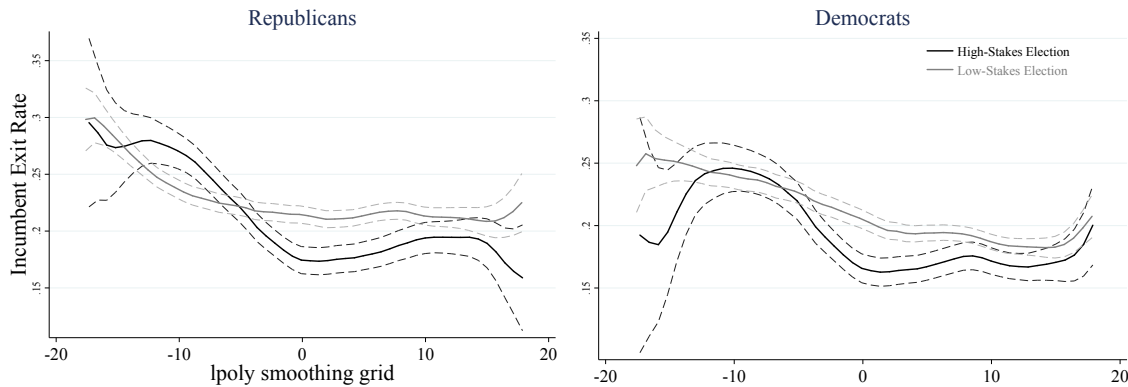
Whatever the cause, we find a decrease in the incumbent exit rate in high-stakes elections, especially in those expected to be close. Define the percentage of Democratic incumbents as the percentage of seats won by Democrats in the previous election relative to the 50 percent threshold ($X_{i,t-1}$ in the notation of Section 3). When this percentage is close to zero, both parties contest with a similar number of incumbent legislators. These are cases where the outcome of the election may be particularly uncertain and thus heavily contested.

Figure 11 plots a moving local linear regression of the exit rate of incumbents against the percentage of Democratic incumbents.²⁶ The rate of incumbent exit is lowest in high-stakes elections where neither party has a big advantage in the number of incumbents. Among Republicans the exit rate not only falls but falls almost

²⁵For example, The Economist (2002) reports that after the 2000 Census the chairman of North Carolina's redistricting commission stood for office in a Congressional district he himself created.

²⁶See Online Appendix A.1 for a slightly more rigorous check.

Figure 11
The Incumbent Exit Rate Falls in High-Stakes Elections



Note: We plot a moving local linear regression of the incumbent exit rate against the number of Democratic incumbents as a percentage of the total—to be precise, the percentage of seats won by Democrats in the previous election. The dashed lines give 90 percent confidence intervals.

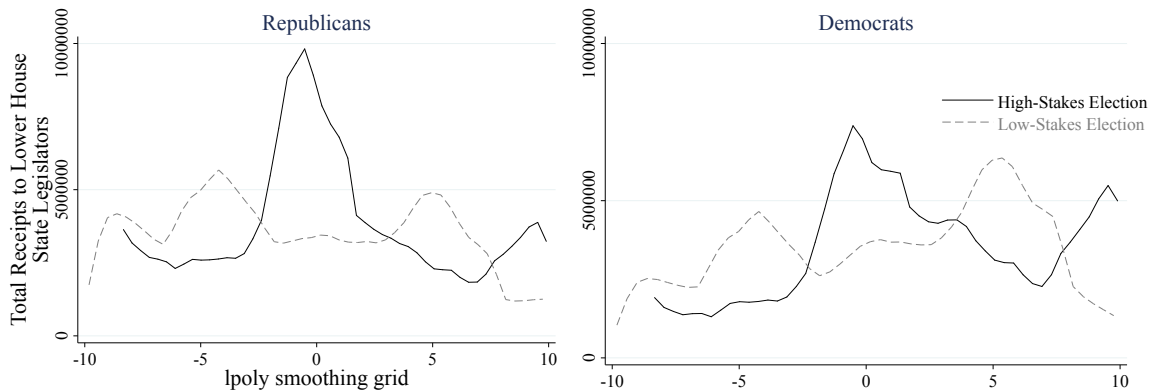
one-for-one as their majority diminishes. This pattern suggests the number of legislators who choose to retire before a high-stakes election in part depends on the number of seats their party can afford to lose.

6.2.3 Parties Spend More to Win High-Stakes Elections

Most any model of electoral competition predicts that when the returns from winning increase, candidates and parties will spend more to win. Gerber (2004) and Gerber et al. (2011) report that randomized campaign mailings and television ads, two of the most common uses for campaign spending, can have substantial effects on vote totals. A basic test of the hypothesis is to confirm that when an election is very competitive and its outcome has high stakes, parties spend more in the hopes of winning.

Figure 12 plots a moving local linear regression of the total campaign contributions (by state) received by candidates for the lower house of the state assembly. In high-stakes elections there is a spike in the total contributions to candidates in states where neither party has a large majority of incumbents. There is no similar spike in low-stakes elections. The spike is especially pronounced among Republicans. In states where they enter the high-stakes elections with a small majority of incum-

Figure 12
Campaign Contributions to Lower House
Candidates Rise in High-Stakes Elections



Note: We plot a moving local linear regression of total state-level campaign receipts for lower house members against the number of Democratic incumbents as a percentage of the total—to be precise, the percentage of seats won by Democrats in the previous election.

bents, their receipts among all candidates in the state spikes at roughly 10 million (in 1983 dollars). In low-stakes elections their receipts are only 3.5 million dollars.

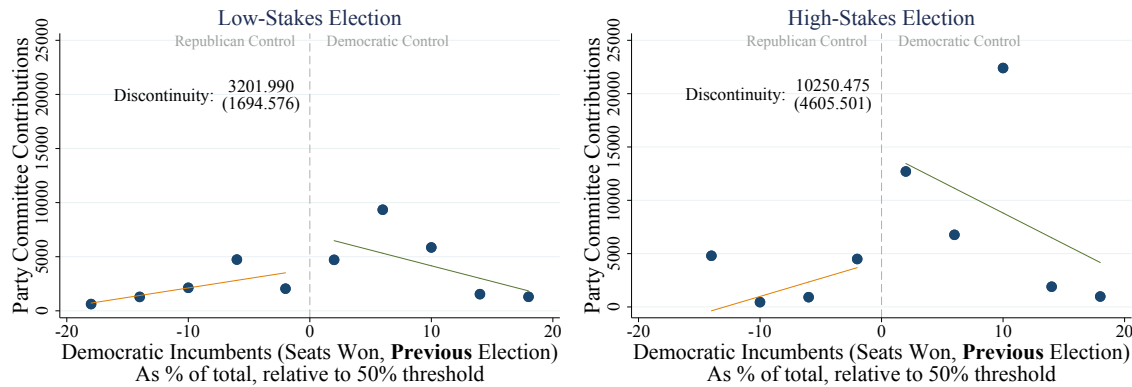
6.2.4 When in the Majority, Democrats Direct Funds to Incumbents

The most interesting theoretical predictions, however, are about how parties change the targeting of their campaign spending. As explained in Section 6.1, when the majority party aims to maximize its chances of retaining a majority it should redirect funds to support incumbents. These seats are more likely to be in the set of districts that put the party over the 50% cutoff.

That is exactly what Democrats at least seem to do. Figure 13 plots the average contributions to Democratic incumbents from party committees as a function of the number of incumbents.²⁷ It suggests these contributions are higher in high-stakes elections in states where Democrats already hold a majority. There is even some evidence that contributions are discontinuously higher, though this result should be treated with caution (recall that the sample of elections for which we have cam-

²⁷We focus in this section on the party committees because they are most likely to distribute campaign funds strategically. As noted in Section 3.1, the Democratic Legislative Campaign Committee had been preparing for 6 years to hold control during the 2010/2011 redistricting.

Figure 13
 Democrats Channel Funds to Incumbents
 in States Where they Hold a Majority



Note: Outcome is contributions to Democratic incumbents from Democratic party committees. Standard errors are clustered by state-redistricting cycle.

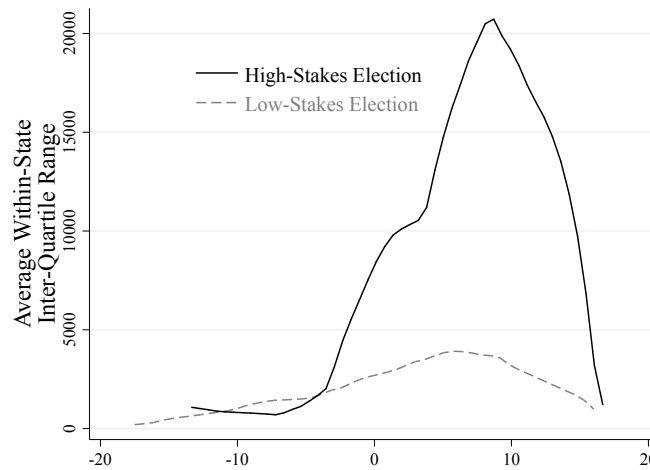
paign finance data is small). Regardless of whether there is an actual discontinuity (which the model does not require), the figure suggests Democrats are more likely to focus on protecting incumbents in states where they hold a majority—exactly as predicted.

Equally striking is that they do not protect all incumbents equally, but concentrate their resources on protecting a few. We compute the within-state inter-quartile range in contributions from Democratic party committees to their incumbents. Figure 14 plots the local average of the inter-quartile range against the number of Democratic incumbents. The figure suggests that Democrats choose some of their incumbents to defend at all costs while leaving others to fend for themselves. Given that we also find they often lose seats in high-stakes elections (see Section 6.2.1), this result suggests they concentrate on protecting only as many incumbents as are needed to retain their majority. If their objective is only to retain control of the legislature, it is optimal to pursue such a purely defensive strategy.

We find that Republicans take a different approach to defending their majority. They take the fight to the enemy, channeling funds to challengers in states controlled by Democrats. This asymmetry in strategies is not discussed in Snyder (1989), who restricts the discussion to symmetric strategy equilibria. The difference between the parties' responses may be an asymmetric equilibrium of the model. It may also arise

Figure 14

The Inter-Quartile Range in Contributions to Democratic Incumbents
Rises in High-Stakes Elections where they Hold a Majority



Note: Outcome is the within-state inter-quartile range of contributions to Democratic incumbents from Democratic party committees.

because Snyder's model considers a single election in isolation, while in reality the parties must contest elections across many states simultaneously. The Republican approach forces the Democrats' coordinating committees to pull funds from Democratic challengers in Republican-controlled states. Republicans can precisely retain control by simply keeping their incumbents running for re-election (as Figure 11 suggests they do). They may rely on the overwhelming advantages of incumbency do the rest. Why Republicans are able to pursue this strategy while Democrats do not is beyond the scope of any formal model we are aware of, though it may relate to the difference in the funding structure of the two parties.²⁸

6.3 Alternative Explanation: Abuse of Power

Is it possible that the mechanism for our results is not a change in tactics but that the majority party somehow abuses its power to ensure it barely wins the election? Though not inconceivable, this interpretation seems inconsistent with the results of Section 5.2. Although the official powers of holding a majority—the speakership

²⁸Jacobson (1985) writes that Republicans have a higher “organization capacity.” Aside from being able to raise more money the Republicans also have “a more centralized and strategically efficient resource distribution system” that ensures challengers get the money they need.

and control of legislative committees—kick in with even a bare majority, there is no evidence that holding a bare majority helps win elections.

The interpretation also seems unlikely when each potential abuse is considered in turn. The most blatant abuse would be to rig the polls. Though possible in theory, most studies in the U.S. have found little evidence of voter fraud (see, for example, Levitt, 2007; Caughey and Sekhon, 2011). Moreover, it is not clear why control of the lower house of the state legislature would allow influence over the tallying of votes, which is done by local officials of both parties in each precinct.

Another possibility is that control of patronage allows the use of machine politics, as found by Folke et al. (2011) in the years before U.S. states adopted civil service reforms. But by the time of our first high-stakes election nearly all states had adopted such reforms.²⁹ Meanwhile the Hatch Act amendment, which extended the Hatch Act's civil service protections to many state and local employees, was adopted in 1940.

A third possibility is that control of the lower house gives a party some special means to precisely predict the outcome of any particular race, which allows the party to divert resources to that race. It is hard to imagine what source of information is available to the assembly's majority party that is not available to the public. Finally, we show in Appendix A.1 that precise control does not arise because the majority party is more likely to have controlled redistricting in the previous cycle.

7 Conclusion

Though it is ultimately voters who decide elections, our results suggest the majority party has enough influence over their decisions to achieve precise control over the outcome. It manages this not through fraud but by targeting campaign spending to reinforce the near-certain re-election of its incumbents. This shift in tactics may reduce the number of seats it can expect to win, but drastically decreases the probability of the precise set of outcomes in which it loses its majority.

It may seem that the ability to exert precise control is not relevant for policy. In the past, parties could not rely on passing substantive legislation with only a bare

²⁹Of the states that are ever close to the threshold (within 5 percentage points), only Minnesota and Montana during the high-stakes election of 1970 had not yet adopted reforms. Dropping these two observations makes little difference to the results. Both states had adopted civil service reforms by the 1980 high-stakes election (see Folke et al., 2011, for details).

majority. But as state parties grow ever more ideologically polarized, party-line votes may become common. Eventually a bare majority may suffice to pass bills on taxes or health care, making precise control increasingly attractive and of immediate relevance to policy.

Given that the means are legal, is there really any cause for concern? Making such a normative judgment is beyond the scope of this study. However, there is a body of work (e.g. Besley et al., 2010; Acemoglu et al., 2014; Bernecker, 2014; De Paola and Scoppa, 2011; Galasso and Nannicini, 2011; Ashworth et al., 2014) that suggests meaningful political competition fosters economic growth. If the means to eliminate competition are lawful, it may suggest the laws should be reconsidered.

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A Empirical Appendix (For Online Publication)

This appendix shows additional figures and tables referenced in the main text.

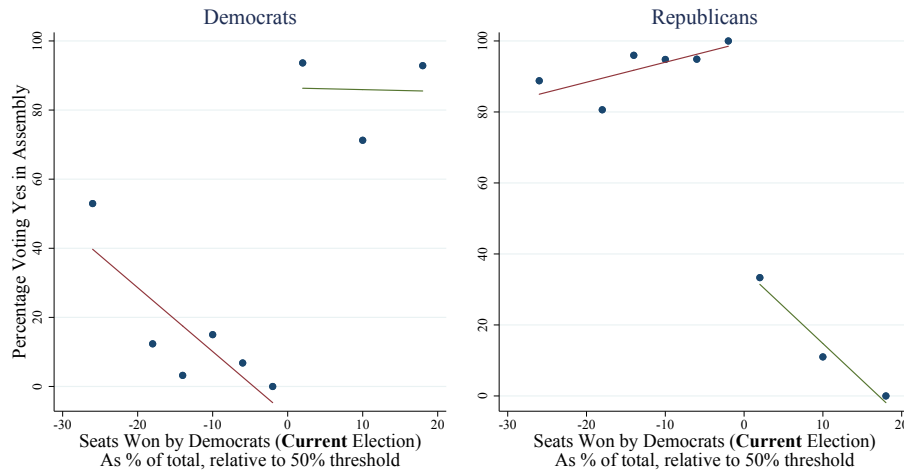
A.1 Additional Tables and Figures Referenced in the Text

A.1.1 Party Unity in Votes on Redistricting Plans

We show using data from the 2011 redistricting cycle that legislators switch discontinuously from opposition to support of the redistricting bill when control of the lower house passes to their party.³⁰ Figure 15 shows the fraction of Democrats and Republicans who support the redistricting bill as a function of the percentage of seats won by Democrats. When it switches from negative to positive the Democrats win con-

³⁰These data were constructed from Vote Smart (2016), which has roll call votes on 51 bills from 21 states for the most recent redistricting cycle. Consistent roll call votes are only available for the 2011 cycle.

Figure 15
Lower House Members Vote
Along Party Lines on Redistricting Bills

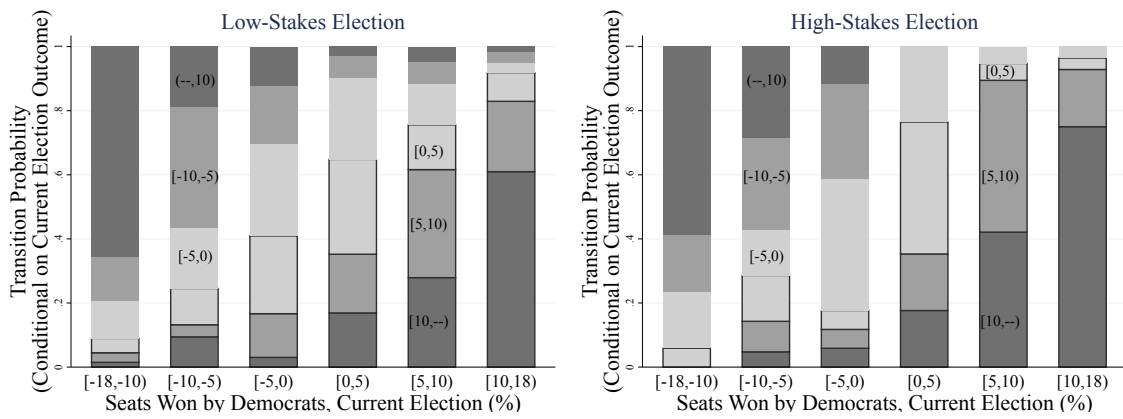


rol of the assembly . At this point they switch from near universal opposition to near universal support for the redistricting bill. The response of the Republicans, though slightly less extreme, is similar. The reversal in support suggests not only that the bill favors the party in power, but that party discipline is almost perfect. That makes it critical to win a majority in the lower house in years when the opportunity to redistrict arrives.

A.1.2 Transition Probabilities

In the main text we show that the majority party loses seats in high-stakes elections but not quite enough to lose its majority. To assess whether this pattern holds across the distribution, consider what fraction of all the elections in which Democrats win a margin of 5 to 10 percent (say) had they in the previous election won an even higher margin. Figure 16 splits the outcomes of the current election (the margin won by Democrats) into bins. Within each bin we subdivide each state by the outcome in the previous election (essentially the incumbent majority). The height of each bar shows what fraction of outcomes in the current election had each of several possible outcomes in the prior election. For example, the left-hand panel shows that of all

Figure 16
Transition Probabilities



Note: Conditional on an election outcome (seats won by Democrats), we compute the fraction of states in which the previous election had any of several outcomes. This is essentially the incoming (outcome-conditional) transition probability. We restrict the sample to cases where independent legislators won no seats in either the current or previous election. This restriction implies a negative number is equivalent to a Republican majority.

the elections in which Democrats won a majority of 5 to 10 percent, in roughly 30 percent they had previously won a majority of at least 10 percent.

The relative height of each bar gives the *incoming* transition probability. By construction, the heights of all bars within a bin add up to 1. Bars with a black outline represent cases where Democrats had previously held a majority, while bars without a black outline represent cases where Republicans held a majority. Darker grays represent a majority with a larger margin, while lighter grays represent a majority with a small margin. To make the interpretation easier, we drop all cases where independents won seats in either the current or previous election, meaning a negative number implies a Republican majority. The stacked heights of the bars with a black outline represent the fraction of cases within a bin where Democrats previously held a majority. They roughly correspond to the heights of the dots in Figure 4 (although the bins in Figure 4 were narrower). In the right-hand panel (high-stakes elections), the sharp increase in the height of the bars with a black outline at the point where the winning margin turns positive matches the result of the Sorting Test.

The most obvious difference between the left-hand panel (low-stakes elections) and the right-hand panel (high-stakes elections) is in the two bins just on either side of the threshold. The fraction of elections in the $[-5, 0)$ bin “with a black outline,” meaning cases where Democrats had previously held a majority, drops from about

0.4 to less than 0.2. Likewise, the fraction of elections in the $[0, 5)$ bin “without a black outline” drops by a similar amount. When a party barely wins an election, it was less likely to have previously been won by the opposing party. This decrease in states won from the opposing party is matched by an increase in the fraction of elections in which there is relatively little change. In the $[-5, 0)$ bin there is a big increase in the fraction in which the previous outcome was also $[-5, 0)$. The $[0, 5)$ bin shows a similar pattern.

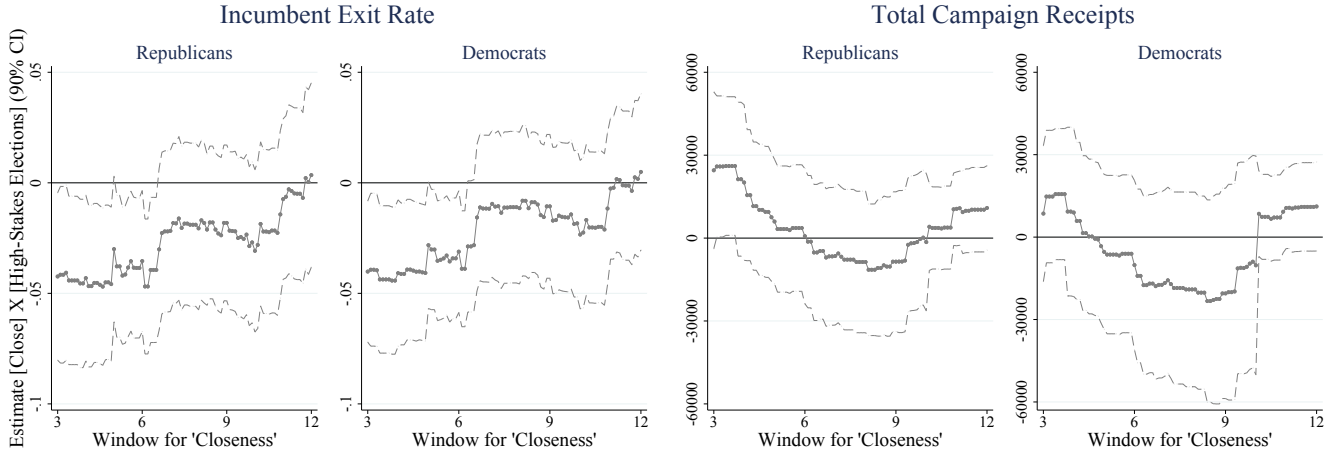
But what is also notable (especially in elections won by Democrats) is that there seems an increase in cases where Democrats had previously held a larger margin. For example, in elections where Democrats won a majority of $[5, 10)$, in low-stakes elections nearly 40 percent are cases where they improved on their performance in the previous election (the four shaded areas labeled $(-, 10)$, $[-10, -5)$, $[-5, 0]$, and $[0, 5)$). In high-stakes elections, this portion falls to barely 10 percent. Meanwhile, the proportion of these elections in which their performance actually declined—those colored the darkest gray with $[10, -)$, representing cases where they won a majority of more than 10 percent in the previous election—increases from about 25 percent to over 40 percent. Taken together, these results confirm that it is not the case that the majority party is necessarily winning more seats in high-stakes elections.

A.1.3 Formal Tests of the Patterns in Sections 6.2.3 and 6.2.2

This appendix presents some slightly more formal evidence of two patterns reported in 6.2. We define a dummy for whether there is a “close” relative number of incumbents, meaning whichever party won more seats in the previous election had narrow win. The current election would then likely be competitive. We regress the incumbent exit rate and total campaign receipts on this dummy for closeness, a dummy for being a high-stakes election, and their interaction. To be precise, for candidate c contesting an election in state i during election year t we estimate

$$\begin{aligned} [Outcome]_{c,i,t} = & \pi_0 + \pi_1 \mathbb{I}(|X_{i,t-1}| < h) + \pi_2 \mathbb{I}(\text{High-Stakes}) \\ & + \omega \mathbb{I}(|X_{i,t-1}| < h) \times \mathbb{I}(\text{High-Stakes}) + [Error]_{c,i,t} \\ & \text{for } h = 12, 11.9, 11.8, \dots, 3 \end{aligned}$$

where \mathbb{I} is the indicator function. The coefficient ω on the interaction measures the extent that parties make greater efforts to win close elections when the stakes are

Figure 17Estimated Interaction Effect: [Close Margin of Incumbency] \times [High-Stakes Election]

Note: For different definitions of what counts as a “close” incumbent majority, we regress the incumbent exit rate and total campaign receipts (at the candidate-level) on a dummy for a close margin, a dummy for being a high-stakes election, and their interaction. We plot the estimated interaction and 90 percent confidence interval against the cutoff for what counts as a close margin. Standard errors are clustered by state-redistricting cycle.

high. We vary the window within which the incumbent majority is defined to be close (h), starting with a wide definition and narrowing it. We re-estimate our specification at each of these definitions. The change in the estimated coefficient as the window narrows shows how much more the parties exert themselves in the most competitive elections.

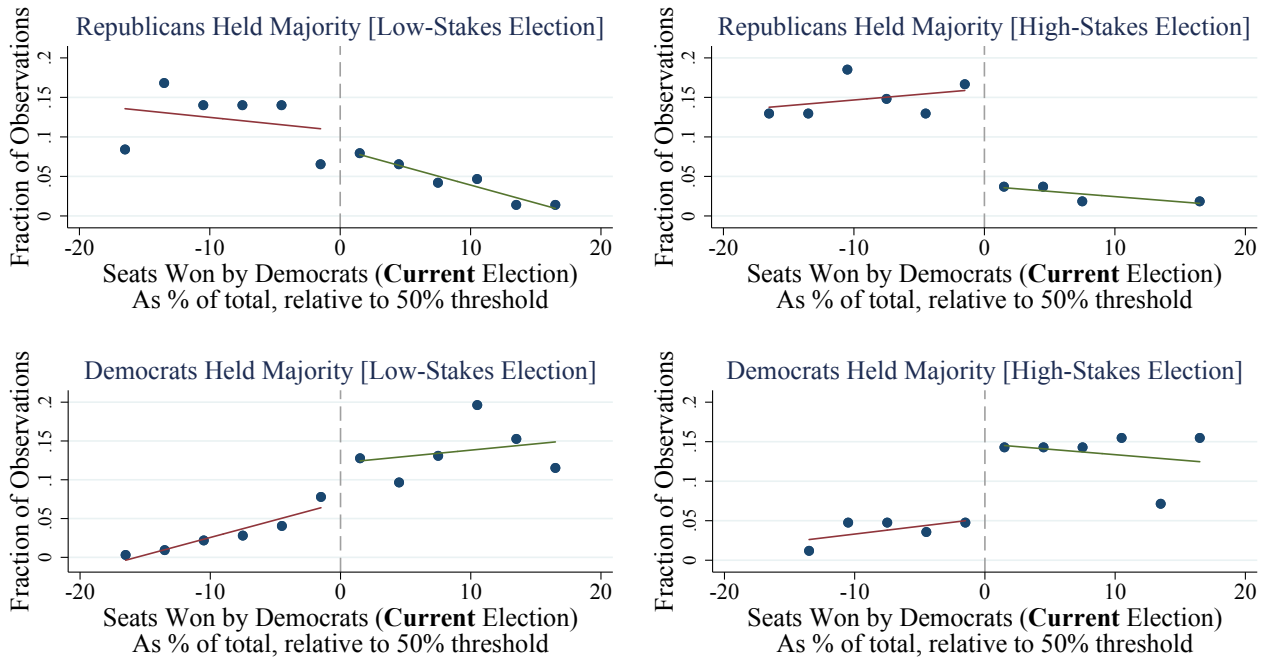
Figure 17 confirms the patterns in Figures 12 and 11. When the election is competitive the incumbent exit rate is especially low and campaign contributions to state assembly members are especially high during high-stakes elections. Though the estimates for campaign finance are somewhat noisy (recall we have campaign finance data for relatively few elections), the pattern is clear.

A.1.4 Additional Tables and Figures Referenced in Section 5

Figure 18 shows that precise control creates a visible discontinuity in the conditional density of the election outcome $g(X_{i,t} \mid M_{i,t-1})$. Each panel shows a histogram for the seats won by Democrats in elections that meet the condition given in the title. Each dot plots the fraction of observations that falls within a 3-percentage point bin.

Figure 18

Conditional on the Party that Held a Majority, there is a Discontinuity
in the Probability Density of High-Stakes Election Outcomes



Note: Each panel shows a histogram for the seat margin of Democrats in elections that meet the condition given in the title. The right-hand panels show the probability mass in each bin for observations in high-stakes elections, while the left-hand panels show low-stakes elections. The top panels show elections in which Republicans previously held a majority, while the bottom panels show elections in which Democrats previously held a majority.

Atop these dots we plot the line of best fit. The left-hand panels show the density for low-stakes elections. Regardless of which party held a majority before the election, there is no large discontinuity in the density. By contrast, the right-hand panels show that there are large discontinuities in high-stakes elections. When Republicans previously held a majority, there is far more mass just to the left of the threshold—that is, far more elections are barely won than barely lost by Republicans. The converse is true when Democrats previously held a majority.

Table 3 applies the Sorting Test to elections in our sample before the *Baker v. Carr* 369 (1962) made it mandatory to redistrict after each census. Since the number of elections is small, we use all states rather than just those that would subsequently form our estimation sample. As before, we restrict to elections just before the decennial census. There is no significant evidence of sorting. Though the coefficient

Table 3
Interpreting Test 1

	Pre-Redistricting	
	(1) $BW = 18$	(2) $BW = 10$
Discontinuity	0.260 (0.195)	0.093 (0.273)
Observations	63	41
Clusters	63	41
Control Mean	0.67	0.67

Table 4
Disaggregating Low-Stakes Elections

	Lead: 0		Lead: 1		Lead: 2		Lead: 3	
	(1) $BW = 18$	(2) $BW = 10$	(3) $BW = 18$	(4) $BW = 10$	(5) $BW = 18$	(6) $BW = 10$	(7) $BW = 18$	(8) $BW = 10$
Discontinuity	0.422*** (0.136)	0.417** (0.195)	0.208 (0.157)	-0.033 (0.226)	0.154 (0.183)	0.409 (0.246)	-0.051 (0.165)	0.239 (0.233)
Observations	138	85	121	57	114	46	111	48
Clusters	138	85	121	57	114	46	111	48
Control Mean	0.35	0.35	0.41	0.50	0.38	0.13	0.63	0.64

seems large at a bandwidth of 18, it shrinks at a smaller bandwidth. We conclude there is little evidence of precise control in the years before redistricting was at stake.

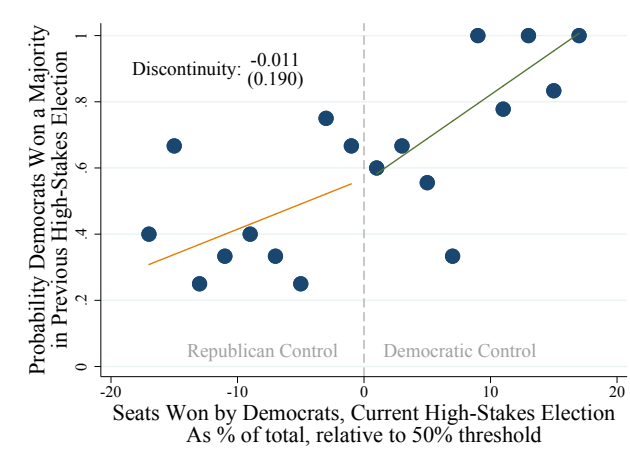
Table 4 applies the Sorting Test after disaggregating low-stakes elections based on their place in the redistricting cycle. We label the n -th election before a high-stakes election “Lead: n .” The first two columns (Lead: 0) are essentially a reproduction of the Main Result from Table 2. The columns labeled “Lead: 1” apply the sorting test to the election before a high-stakes election, and so on. Only in true high-stakes elections is there robust evidence of sorting.

Table 5 applies the Sorting Test to subsets of high-stakes elections taken from rolling windows of time. We take each post-Census year 1971, 1981, \dots , 2011 as the center of the window and restrict the sample to high-stakes elections within 10 years of the center. The purpose of these regressions is to reveal whether precise control is confined to some specific era in history, or if there is a trend in its prevalence. The estimated coefficients are smaller in more recent years than in earlier years. However, the samples are small enough (and the standard errors large enough) that we cannot reject that all coefficients are equal. Moreover, the apparent change in coefficients is

Table 5
Discontinuity Persists Across Time

	(1)	(2)	(3)	(4)	(5)
	1971-1981	1971-1991	1981-2001	1991-2011	2001-2011
Discontinuity	0.587*** (0.218)	0.487*** (0.183)	0.468** (0.187)	0.211 (0.183)	0.319* (0.181)
Observations	50	79	83	88	59
Clusters	50	79	83	88	59
Control Mean	0.11	0.20	0.43	0.63	0.57

Figure 19
Is Precise Control Driven by Prior Redistricting?



Note: This figure is similar to the right-hand panel of Figure 4, but the outcome is a dummy for whether the Democrats won a majority in the previous high-stakes election.

not monotonic, suggesting the apparent decline may be driven by one or two unusual decades. We conclude that there is not much evidence that our estimates vary across time.

A.1.5 The Result is Not Driven by Prior Control of Redistricting

Given that the act of redistricting may affect a party's fortunes, it is possible that the winner of a high-stakes election uses redistricting to ensure it will remain the majority party for years to come. Could this explain our results? Suppose control of prior redistricting were what let a party exert precise control in the current high-stakes election. Then there would be sorting based on whether Democrats or Republicans won the previous high-stakes election. Figure 19 tests this hypothesis by running the

Sorting Test as was done in the right-hand panel of Figure 4, except the outcome is now a dummy for whether Democrats won the previous high-stakes election. There is no evidence of sorting, suggesting prior redistricting cannot explain precise control.

A.2 Bandwidth

A.2.1 Optimal Bandwidth Methods

Standard methods of choosing optimal bandwidth give wildly different suggestions for the optimal bandwidth of Equation 5. The cross-validation method suggested in Ludwig et al. (2007) and Lee and Lemieux (2010) chooses a bandwidth of 22 percentage points or higher. The method of Calonico et al. (2014) suggests bandwidths closer to 10. Finally, the method of Imbens and Kalyanaraman (2011) suggests a bandwidth close to 1 (which contains very few observations). The disagreement may arise because our sample is relatively small. Even the smallest example considered in Imbens and Kalyanaraman (2011) used 500 observations, several times as many as in our sample of high-stakes elections. As noted in the text we opt instead to choose a bandwidth that gives relatively conservative estimates and show that the main results are robust to other choices.

A.2.2 Verifying the Results of Test 2 are not Sensitive to Bandwidth or Bin Size

As noted in the text, the Density Test requires making a nonparametric estimate of the probability density of $\tilde{X}_{i,t}$. Any such estimate requires choosing not only a bandwidth for smoothing but the size of the bins used to form observations of the empirical density. Figures 20 and 21 show that our estimates are robust to many choices of both bandwidth and bin size.

Figure 20

Robustness to Bin Size and Bandwidth: Figure 3

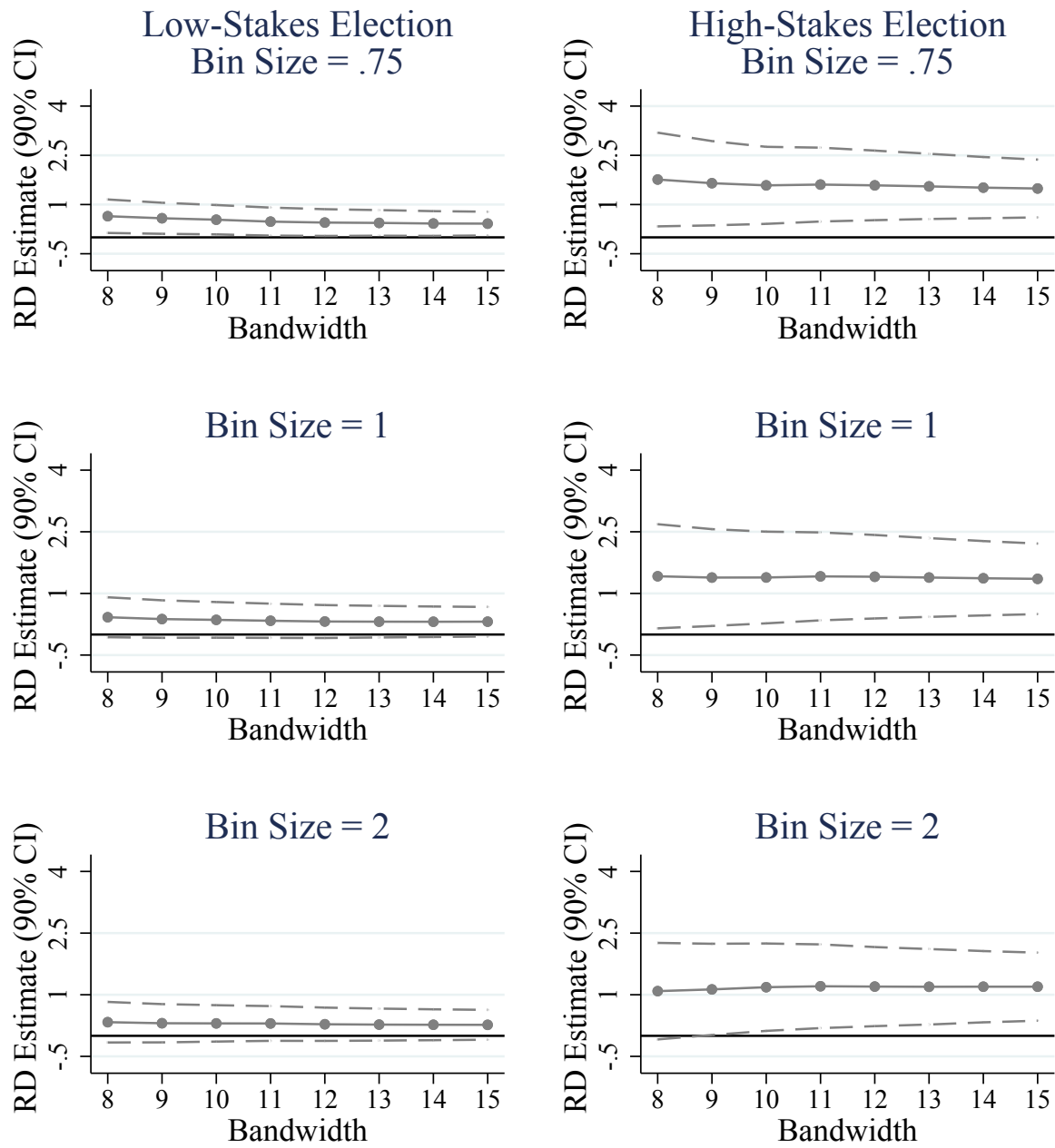


Figure 21
Robustness to Bin Size and Bandwidth: Figure 3

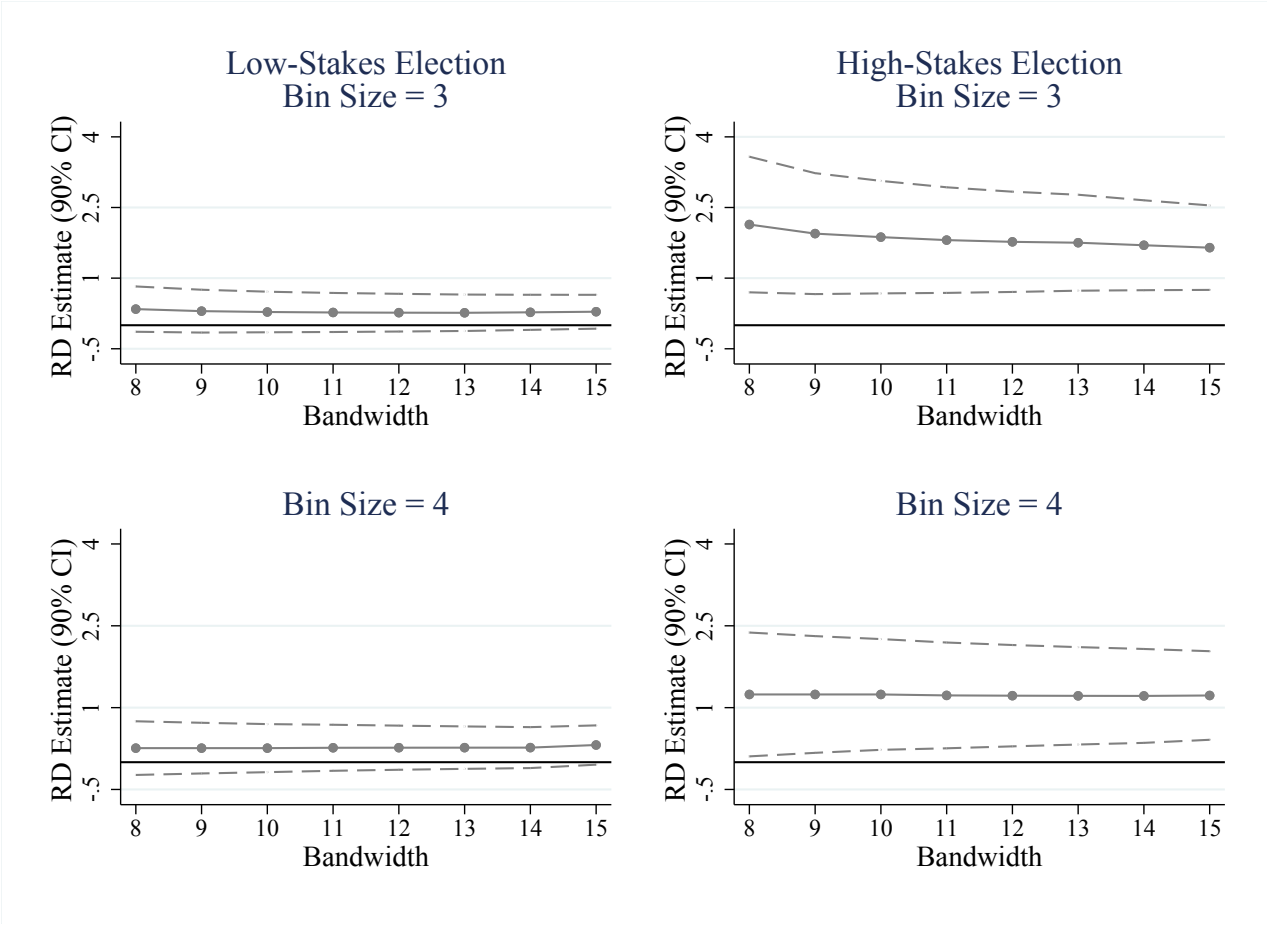
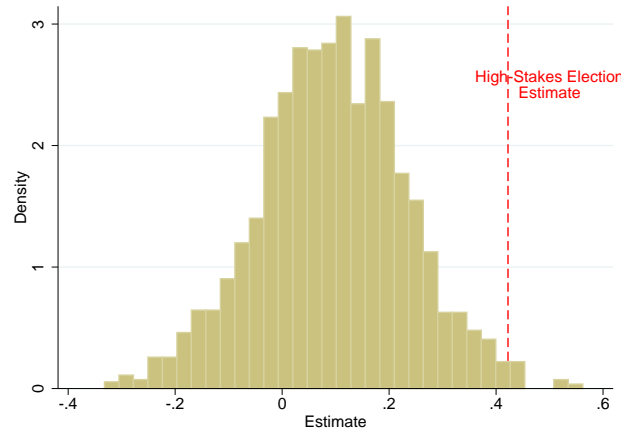


Figure 22

Subsamples of the Low-Stakes Elections Rarely Produce Discontinuities as Large as in the High-Stakes Elections



Note: See text for details.

A.3 Verifying the Results are Not Mechanical because of Small Sample Size

This appendix verifies that the main result—the estimate of Equation 5—is not driven by a small sample size. Finding a larger discontinuity in high-stakes elections might be mechanically more likely because there are fewer of them. To test this hypothesis we test for whether we can produce an equally large discontinuity by discarding some of the low-stakes elections.

To be precise, we start with the dataset of all low-stakes elections. We randomly select a subsample of these elections of the same size as the set of high-stakes elections. We then estimate Equation 5. We repeat this procedure 2000 times. Figure 22 plots the histogram of the 2000 estimates. The dashed line marks the actual estimate from the high-stakes elections. Just 19 of the 2000 estimates are larger than the actual estimate based on the sample of high-stakes elections. Only 7 (0.35 percent) have a larger absolute t-statistic. This exercise suggests it is unlikely that the high-stakes elections are drawn from the same data-generating process as the low-stakes elections.

A.4 Verifying the Results are Robust to the Definition of the Sample

A.4.1 Maine

In this section we confirm that the results of the Density and Sorting tests are unchanged under different assumptions about high-stakes elections in Maine. During the 1981, 1991, and 2001 redistricting cycles Maine passed its redistricting legislation in the years ending in 3. In the front-matter we treat Maine like all other states. Here we consider three alternatives:

1. We assume it was common knowledge that the redistricting would happen in these years rather than the year after the Census. The elections in 1980, 1990, and 2000 are no longer high-stakes elections. Those in 1982, 1992, and 2002 are high-stakes elections.
2. We assume it was NOT common knowledge that the redistricting would happen in these years rather than the year after the Census. Parties would have tried to hold a majority in the year after the Census as well as the year before redistricting actually happened. The elections in 1982, 1992, and 2002 are now high-stakes elections *in addition to those* in 1980, 1990, 2000.
3. We simply drop Maine from the sample.

Figures 23 and 24 show that in all cases the estimates are largely unchanged from what we find in the front-matter.

Figure 23

Density Test: Different Assumptions About Maine

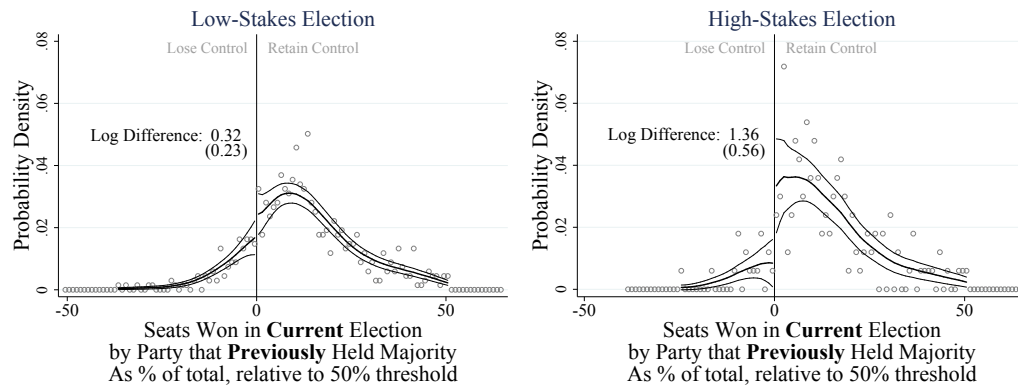
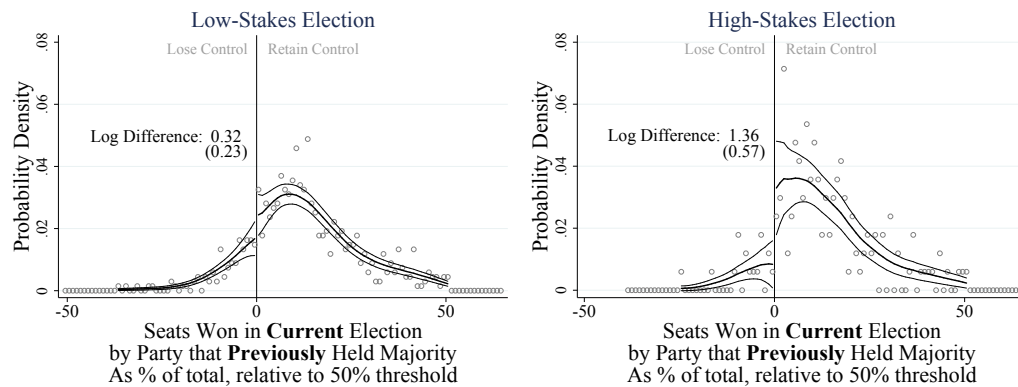
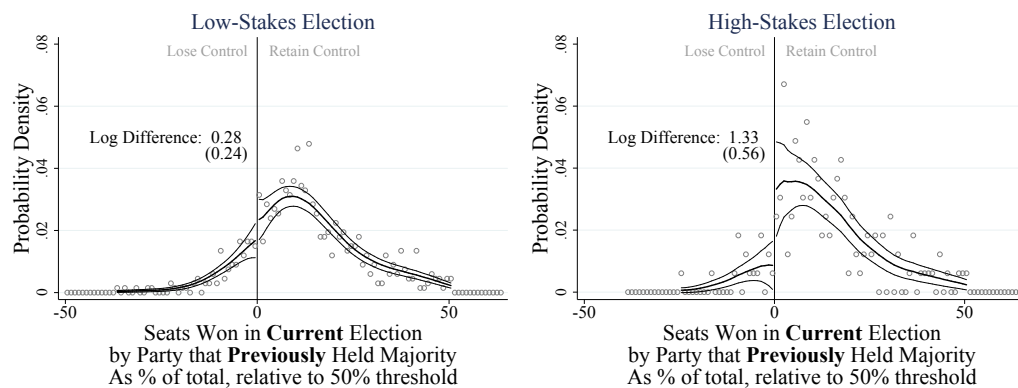
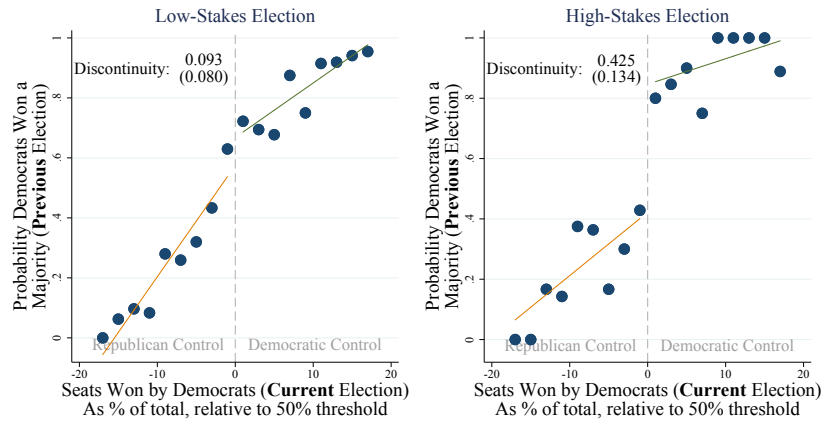
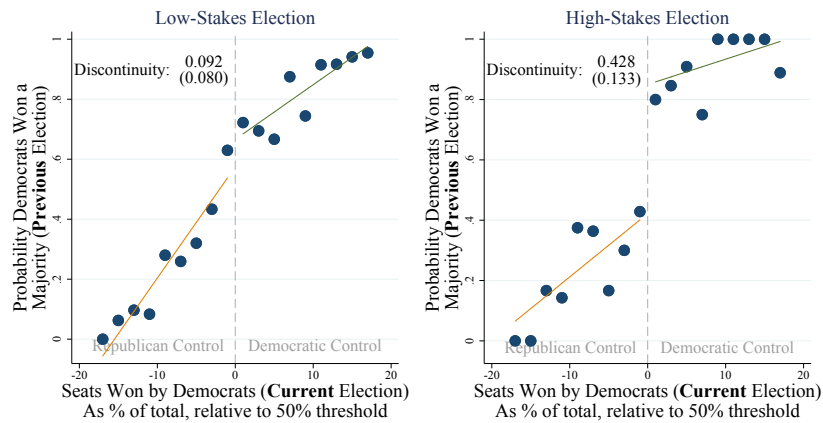
Alternative 1**Alternative 2****Alternative 3***Note:* See text for details.

Figure 24
Sorting Test: Different Assumptions About Maine

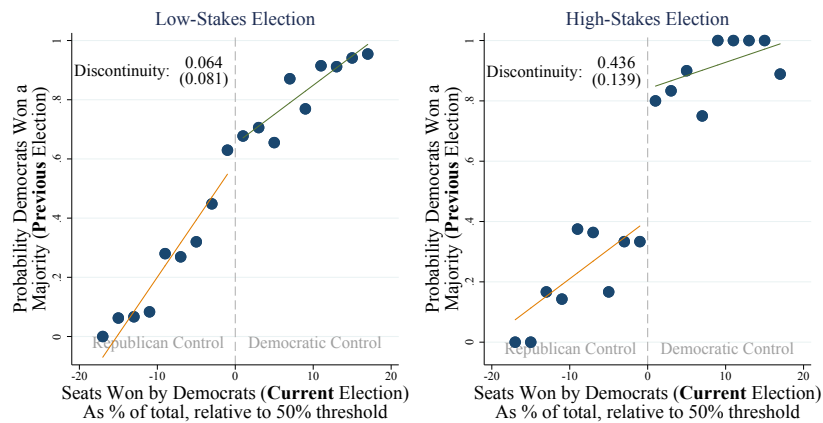
Alternative 1



Alternative 2



Alternative 3



Note: See text for details.

A.4.2 Redistricting Commissions

In this section we confirm that the results of the Density and Sorting tests are unchanged under different ways of handling states that set up independent commissions. We consider two alternatives to how we handle these states in the front-matter:

1. We keep the state in the sample until the first election that would have had high stakes in the absence of the commission. This approach maximizes the number of low-stakes elections.
2. We drop all elections after the commission is established and also all elections within the redistricting cycle during which the commission is established. This ensures high- and low-stakes elections are evenly represented in each redistricting cycle.

Figures 25 and 26 show that in all cases the estimates are largely unchanged from what we find in the front-matter.

Figure 25

Density Test: Different Assumptions About Redistricting Commissions

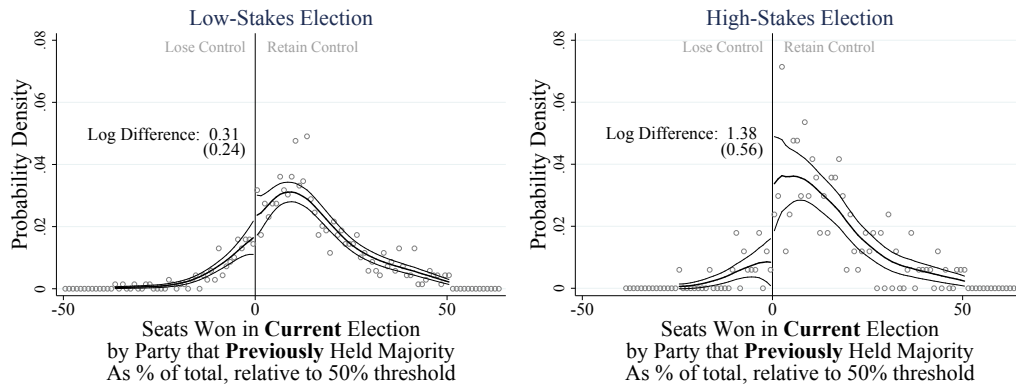
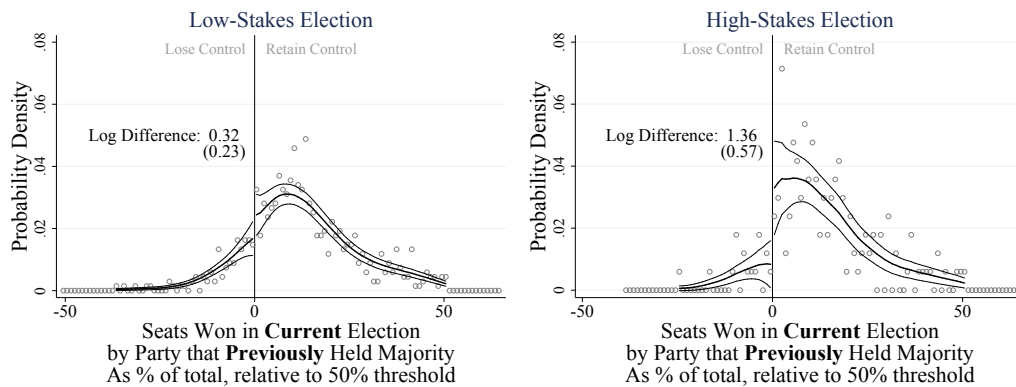
Alternative 1**Alternative 2***Note:* See text for details.

Figure 26

Sorting Test: Different Assumptions About Redistricting Commissions

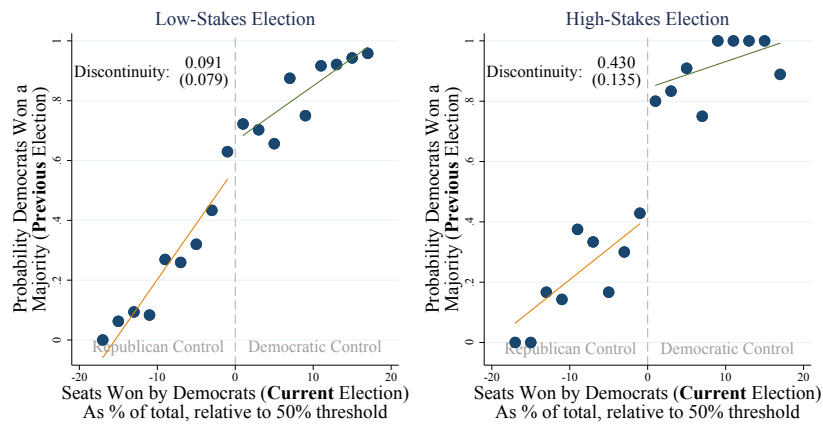
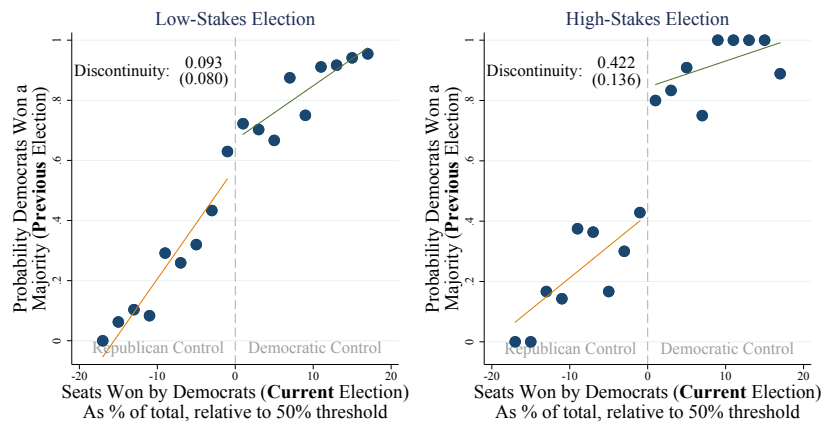
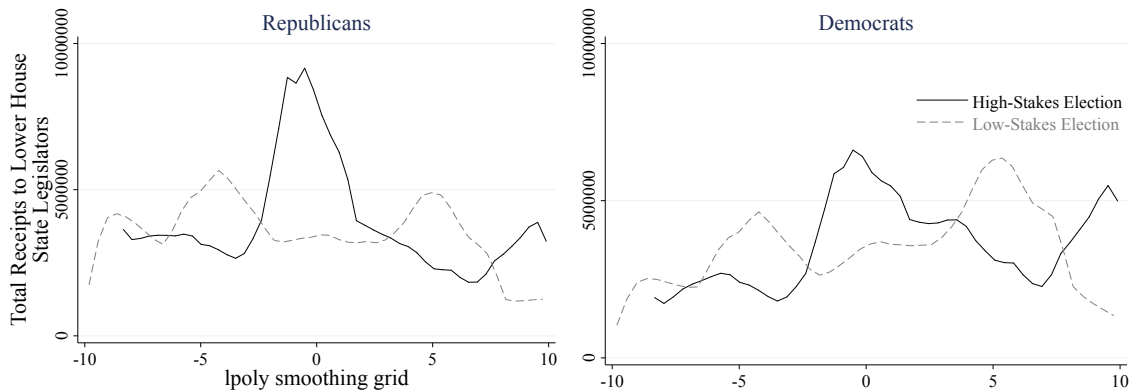
Alternative 1**Alternative 2***Note:* See text for details.

Figure 27
 Campaign Contributions to Lower House
 Candidates Rise in High-Stakes Elections

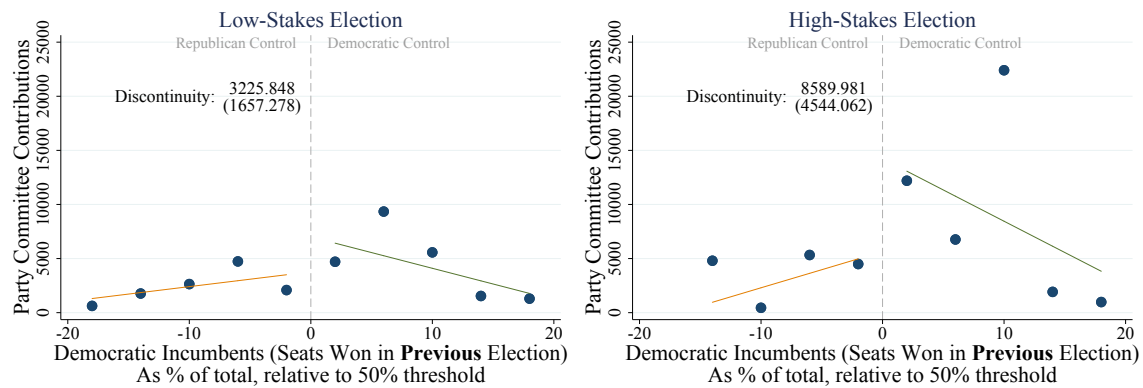


Note: We plot a moving local linear regression of total state-level campaign receipts for lower house members against the number of Democratic incumbents as a percentage of the total—to be precise, the percentage of seats won by Democrats in the previous election.

A.4.3 Odd-Year Elections and Campaign Finance Data

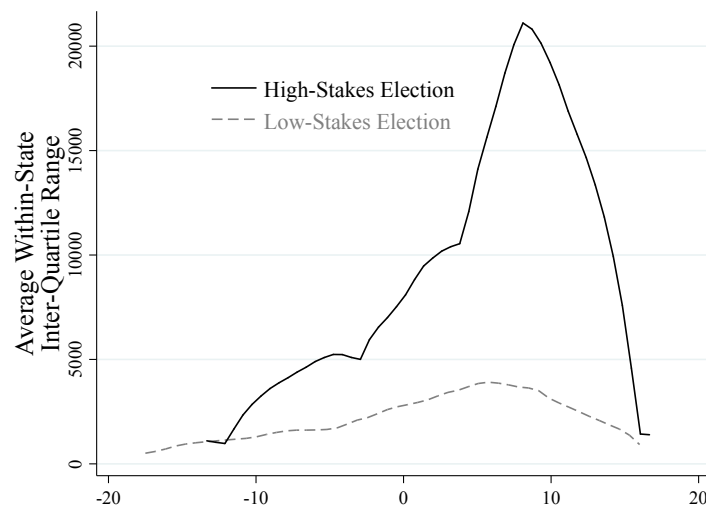
In the main text we exclude states that have elections in odd years from all analysis using the campaign finance data. Given that the campaign finance data span from 1990 to 2012, the states excluded are Louisiana, Mississippi, New Jersey, and Virginia. In Figures 27—30 we confirm that including these states does not substantively change the results.

Figure 28
 Democrats Channel Funds to Incumbents
 in States Where they Hold a Majority



Note: Outcome is contributions to Democratic incumbents from Democratic party committees. Standard errors are clustered by state-redistricting cycle.

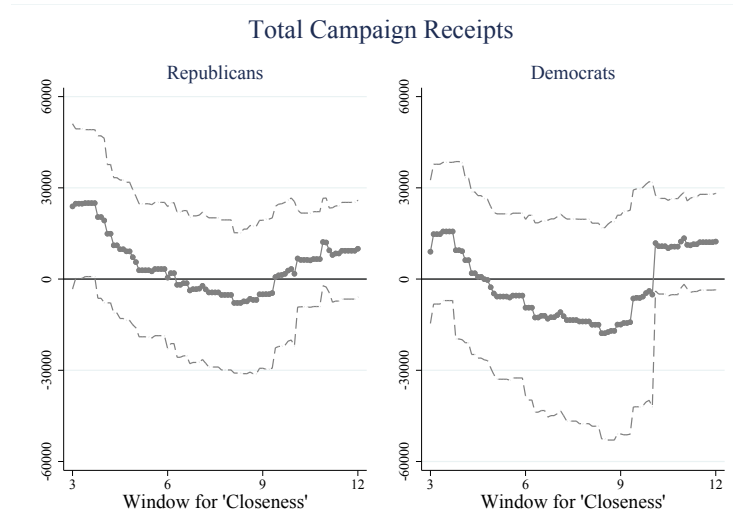
Figure 29
 The Inter-Quartile Range in Contributions to Democratic Incumbents
 Rises in High-Stakes Elections where they Hold a Majority



Note: Outcome is the within-state inter-quartile range of contributions to Democratic incumbents from Democratic party committees.

Figure 30

Estimated Interaction Effect: [Close Margin of Incumbency] \times [High-Stakes Election]



Note: For different definitions of what counts as a “close” incumbent majority, we regress the incumbent exit rate and total campaign receipts (at the candidate-level) on a dummy for a close margin, a dummy for being a high-stakes election, and their interaction. We plot the estimated interaction and 90 percent confidence interval against the cutoff for what counts as a close margin. Standard errors are clustered by state-redistricting cycle.