

# Are Close Elections Random?\*

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## Abstract

Elections with small margins of victory represent an important form of democratic competition and, increasingly, an opportunity for causal inference. When scholars use close elections for examining competition or for causal inference, they impose assumptions about the politics of close contests: campaigns are unable to systematically determine the outcome. This paper calls into question this model and introduces a new model that accounts for strategic campaign behavior. We draw upon the intuition that elections that are expected to be close attract greater campaign efforts before the election and invite legal challenges and fraud after the election. Our theoretical models predict systematic differences between winners and losers in extremely close elections. We test our predictions using all House elections from 1880-2008, finding that structurally advantaged candidates are more likely to win close elections. But the structural advantages that predict winners shift over time: from 1880 to the 1960's, candidates from strong parties are systematically more likely to win close contests, but the advantage dissipates in more recent contests. After the 1940's, incumbent candidates are much more likely to win close elections. Our findings suggest a new research agenda on the systematic determination of close contests.

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Competitive majoritarian elections comprise perhaps the defining feature of democratic republics. The question of whether these elections are truly competitive has become a central criterion in the assessment of democracy. Robert Dahl described a fundamental of democracy as free, fair and competitive elections on a regular schedule (Dahl, 1970). In this calculus, not even the world's mature democracies can take for granted the prevalence of electoral competition. Analysts both qualitative (Bensel, 2004) and quantitative (Gasiorowski, 1996; Vanhanen, 2000; Przeworski et al., 2000) have expanded upon this insight. The idea is simple and compelling; if those who hold power have little chance of becoming unseated, whether through elections or other means, then the political system tends toward autocracy in fact, whatever its formal institutions may suggest.

In spite of electoral competition's centrality to democracy, formally democratic systems often fail to exhibit a marked degree of genuine competition. The existence of competitive elections depends not merely upon institutions such as universal adult suffrage, open candidate qualification, reduced barriers to entry, and free press and speech protections, but also on how elections unfold behaviorally. In the United States, scholars have puzzled over the disappearance of "marginal elections" (Fiorina, 1977; Mayhew, 1974), or close contests in which each candidate or party would have plausible incentives to show responsiveness to voter preferences and concerns. The vast literature on the "incumbency advantage" in American congressional elections is, in part, a reflection on this reduced electoral competition (Ansolabehere, Snyder and Stewart, 2000). Some critics have gone so far as to suggest that the lack of electoral competition makes the concept of democracy problematic itself. Elections for political office may not, in and of themselves, suffice for representative government; indeed, elections without genuine competition may create fictions of popular sovereignty (McCormick, 2001).

In this paper we revisit the matter of close elections both theoretically and empirically. We ask whether elections that are close in votes are necessarily close in the probability of who wins. This question is important for at least two reasons. First, representation in many political systems occurs not through the votes themselves, but through the actions of the individual seated. This is especially so where a single individual is seated after vote aggregation, as in "winner-takes-all" single non-transferable vote (SNTV) systems like that of the United States or Great Britain. If closeness in margins does not translate into closeness in victory probabilities, then the ideal of democratic

representation is not being met. Second, social scientists have begun to exploit the properties of marginal elections for purposes of causal inference (Thistlethwaite and Campbell, 1960; Lee, 2008). These scholars have essentially treated the winners and losers of marginal elections as randomly assigned to “election winner” (treatment) and “election loser” (control) groups. As the margin gets close, in other words, the winner of the election is determined as if it were the result of a fair coin toss. Using this strategy, scholars have shown theoretically that only very simple and easy-to-satisfy assumptions are needed to identify causal effects of interest (Hahn, Todd and van der Klaauw, 2001; Lee, 2008). Causal inference designs from marginal elections have been employed to demonstrate incumbency advantage (Lee, 2008), policy responsiveness (Lee, Moretti and Butler, 2004), rents from office holding (Eggers and Hainmueller, 2009), spillover effects in elections (Hainmueller and Kern, 2008), and the effect of mayors on budgetary decisions (Gerber and Hopkins, 2011).

Our theoretical models and empirical results suggest that close elections favor certain candidates with structural advantages. We develop, and then formalize, the intuition that elections that are expected to be close attract greater campaign efforts before the election and invite legal challenges and fraud after the election. Our theoretical models predict systematic differences between winners and losers in extremely close elections. Empirically, we test our predictions using all House elections from 1880-2008, finding that structurally advantaged candidates are more likely to win close elections. A critical finding from our analyses is that *structural advantages in close elections have shifted in their mechanism and their size over time*. From 1880 to the 1960’s, candidates from strong parties were systematically more likely to win close contests, but this advantage has dissipated in more recent contests. After the 1940’s, as Caughey and Sekhon (2010) show, incumbent candidates are much more likely to win close elections. Hence the non-randomness of close elections can occur for different reasons, and these reasons can shift historically. Our findings suggest a new research agenda on the systematic determination of close contests, especially into the mechanisms of structural advantage and how they vary in strength over time and space.

## 1 Close Elections: Introduction and Motivation

When scholars point to marginal elections for purposes of normative concerns of democracy or for causal inference they implicitly or explicitly adopt a particular model of the politics: the closest

elections are assumed free of systematic manipulation. In this paper we consider properties of marginal elections that cast some doubt on this portrait and suggest a different model of how the closest elections are decided. We draw upon a basic intuition of strategic electoral politics: in single non-transferable vote systems where the “winner takes all” – i.e. the value from votes garnered in a close but losing effort is zero – the effort and advantages to be deployed by a candidate or party will be much more effective in a close election than in a rout. In other words, close elections are those where differences of campaign resources, structural advantages, and even fraud should most show themselves.

If close elections are systematically determined at the margin, then mere attention to the margin of victory in an election will constitute insufficient information for whether the election was in fact a competitive contest. If certain candidates have powerful structural advantages in close elections, then the near-randomness of these contests – and their utility for causal inference – must be called into question. So too might the conclusions of regression discontinuity designs be revisited. If, for instance, it is shown that the winners of close elections are more likely than the losers to go onto richer earnings (Eggers and Hainmueller, 2009; Snyder and Querubin, 2008), one might ask whether the effect is due to winning office, or whether some property of the candidate that correlates with winning elections (e.g. power over election officers) is the same property that leads to higher post-career earnings. The idea that winning marginal elections reflects resource advantages may also help explain why winners are reelected at higher rates in subsequent contests (Lee, 2008). Candidates better able to exploit their party’s structural advantages may also be better able to exploit the tools of incumbency once they arrive in Washington.

At one level, our findings constitute a negative result for the use of close elections as a source of natural experiments in US Congressional elections. Yet our theoretical expectations and empirical results also contribute to a new line of inquiry into the determinants of close elections in different contexts. A recent study by Fraga and Hersh (2010) demonstrates that close electoral environments are sufficiently distinct from non-close contests that mechanisms operating in elections in general may not apply in close contests. Our study builds on this notion that close elections are a distinct phenomenon, and to understand the outcomes of such elections, it is necessary to understand their political and institutional contexts.

Our theoretical intuition is built upon the American case, where partisan control over election administration and partisan strength in a district exercise influence over results in the closest elections. But the conditions that determine this influence vary across states and countries: different institutions imply a differential ability to manipulate who wins the closest elections. We view a productive new line of inquiry that examines the determinants of the closest elections. This can take the form of a comparison within the United States, analyzing how different institutional features predict imbalances in close elections within a state, or changes in structural advantages over time. These studies could also take a cross-national form, analyzing how electoral institutions contribute to the determination of the closest elections.

To formalize our hypotheses about close elections, we begin with two models of electoral “manipulation”, one model of campaigning before Election Day, one model of legal challenges and fraud after. Our first model makes the intuitive prediction that campaign expenditures will depend upon the predicted margin of the race. The model formalizes the intuition that equilibrium campaigning decreases as the expected margin of a race increases. For marginal elections, then, any asymmetries in campaign resources, skills, structural advantages and other candidate properties will become *magnified*. This implies that there will be systematic differences within narrow bandwidths of the break-even point (or, for statistical analysts, the “discontinuity” provided by close elections). Our second model examines manipulation of electoral results after an election, making the prediction that systematically manipulated elections will give the appearance of the razor-thin differences necessary for valid RDDs. The model demonstrates that candidates with structural advantages are better able to manipulate votes after the election, leading to the prediction that the winners of close elections differ systematically from the losers. In either case – the case of imbalances between winners and losers within the bandwidth of a close margin (model 1), or the case of elections stolen after the votes have been cast (model 2) – the dynamics we describe will likely confound estimates from RDDs.

We test the predictions of our theoretical models and begin an adjudication of these methods using a data set of U.S. House elections from 1880-2008. We aggregate data that are indicative of structural advantages in a district. Specifically, we employ data on the party controlling the Governor’s office at the time of the election, the party controlling the election administration, such

as the Secretary of State’s office, and partisan control of the State House and State Senate. Our analyses indicate that candidates with structural advantages in a district hold a systematic advantage in extremely close elections. In some instances, these candidates are over *ten percentage points* more likely to win the election. This is indicative of the systematic determination of extremely close elections. This builds upon observations about who wins close contests first made in Snyder (2005), while also offering a theoretical logic for the systematic determination of close elections.

The imbalances we demonstrate correspond to conventional wisdom about the evolving power dynamics in U.S. election campaigns. Before World War II, we show that candidates from strong parties are much more likely to win close elections than other candidates. But this power dissipates in the 1960’s, with party-advantaged candidates no more likely to win close elections in the modern political era. This closely approximates the decline in power of political parties often associated with post-World War II politics. Close elections after WWII remain imbalanced and fall towards candidates with structural advantages, but with *different* advantages. Caughey and Sekhon (2010) show that close elections fall disproportionately to incumbent candidates. We show that this imbalance emerges as the power of party declines and strongly correlates with the rise of the incumbency advantage (Mayhew, 1974; Gelman and King, 1990a).

This historical dynamic also helps to explain *why* close elections fall to structurally advantaged candidates, an explanation that tracks closely with shifting power bases in American politics. In the late 19th and early 20th century, voter intimidation and bribery on Election Day and fraud after an election were endemic and closely associated with partisan control of state offices. Using data on contested elections (Jenkins, 2004) and case studies from contested close elections, we show that control over ballot boxes and over the final vote total was a power closely associated with strong parties. But parties weakened, electoral fraud became more difficult, and elections became more candidate-centric. At that point, the ability to deploy campaign resources before an election became increasingly important (Caughey and Sekhon, 2010). Incumbents, lacking strong party support, leveraged their own advantages to deploy campaign resources.

Before proceeding, we offer two qualifications. First, our analyses do not by themselves form the basis for any sort of general critique of elections and competitive democracy. More research would be needed to follow upon the inquiries here, yet the idea that close elections may be less

stochastic than commonly presumed opens both normative and positive questions, to which we return in our conclusions. Second, our analyses do *not* suggest that regression discontinuity designs are *necessarily* invalid. In cases where the distribution of election outcomes does not satisfy the properties we attribute theoretically and empirically to marginal elections, RDD may stand as a robust design for causal inference. One interpretation of our findings is that analysts simply need to take into account these structural advantages by matching on partisan advantages in their statistical estimations. However, we believe our paper offers a first answer to the more generally interesting question: who wins close elections and what does this reveal about political power in America?

## 2 Marginal Elections and Randomness

Normative analysts of elections, scholars studying “marginal seats,” and scholars who examine close elections for the sake of causal inference all rely upon a basic intuition – as the margin separating winner from loser in a two-candidate race gets smaller, the election becomes more “competitive” and its outcome more probabilistic. The smaller margin not only denotes greater electoral competition, but often embeds notions of “fairness” and “fair chances.” At the limit, it is claimed, observers will witness near-randomness of the eventual outcome as the margin approaches zero.

### 2.1 Regression Discontinuity Designs

The idea that close elections embed a random component that pushes a winner “over the top” is made as a useful statistical assumption. But underlying this statistical assumption are several assumptions about the *politics* of close elections. We begin our analysis of close elections by recounting the model of close elections used explicitly (and implicitly) in regression discontinuity designs (RDD), for two reasons. First, the RDD assumptions now comprise the dominant model used when exploiting close elections. Second, the statistical assumptions in the RDD model have clear empirical implications, which will provide useful insights in comparison to our alternative model of how competition occurs in close elections. While some of the following discussion is therefore focused upon the explicit model of close elections in RDD analyses, we will make the connection explicit to implications of non-random close elections for normative and quantitative

studies of elections.

The use of regression discontinuity for causal inference requires assumptions about how competition occurs in elections. In a world of two candidates and one office, a competitive race is one that both candidates have a shot at winning. Taken to the extreme, this assumption about competition presumes that as the race gets close to equal vote shares, the outcome is determined as if a fair coin were tossed. This randomness recreates experimental conditions: the background characteristics of candidates, parties, and districts that normally confound analyses are orthogonal to holding office. This enables a study of a wide-range of consequences from winning office-rents, subsequent election advantages, a portfolio of policy choices, and policy outcomes—that are otherwise deeply confounded.

When employing RDD for causal inference, scholars are primarily interested in comparing two counterfactual states of the world (Hahn, Todd and van der Klaauw, 2001). For a running example in this section, we describe an RD design for measuring the *party incumbency advantage* or the effect of incumbency status on electoral support (for example, Erikson 1971 ; Gelman and King 1990 $b$ ). For purely expositional purposes, we follow Lee's (2008) example and consider the effect of incumbency on support for Democrats in Congressional districts. When measuring the incumbency advantage, scholars compare the percent of the vote for Democrats in district  $i$  under “treatment”  $Z_i(1)$ , with a Democrat incumbent in district  $i$ , and the percent of the vote for Democrats in district  $i$  under control  $Z_i(0)$ , or without a Democrat incumbent in the district. The fundamental problem of causal inference ensures that for each district  $i$  we observe only response under treatment or response under control (Holland, 1986),  $Z_i = D_i Z_i(1) - (1 - D_i) Z_i(0)$ , where  $D_i$  is equal to 1 if the Democrat candidate wins the election and 0 otherwise. Given the impossibility of identifying individual level treatment effects, the goal of many causal studies is to identify the *Average Treatment Effect* (ATE), or the average response to treatment for a population of Congressional districts,  $\text{ATE} = \mathbb{E}[Z(1) - Z(0)]$ .<sup>1</sup>

In general, the systematic selection that plagues observational data will make identifying the ATE difficult, if not impossible. The insight of the regression discontinuity design is that identification of a *local* average treatment effect is possible, even from observational data that are otherwise

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<sup>1</sup>Throughout this section, we will suppose that the expectation is over the relevant districts.

deeply confounded. RDDs focus on identification of a treatment effect at a covariate level that constitutes a threshold for treatment assignment: below the threshold level of the covariate the subjects are assigned to control, above the threshold they are assigned to treatment. In electoral studies that employ RDDs, it is common to focus on vote share in the previous election,  $x$ , and attempt to identify the causal effect of incumbency *at the discontinuity*, or at the level of voter support that determines the election winner,  $x = \frac{1}{2}$ . We will denote the causal effect at the threshold of  $\frac{1}{2}$  of vote share by,  $\text{ATE}_{1/2} = E[Z(1) - Z(0)|x = 1/2]$  or the average difference between electoral support for Democrats in districts with a Democrat incumbent, less the electoral support for Democrats in districts without a Democrat incumbent, given that the vote share in the previous election was  $x = 1/2$ .

Identification of  $\text{ATE}_{1/2}$  from observational data requires two continuity assumptions. Specifically, RDD assumes that  $E[Z(0)|x]$  (the expected support Democrats in districts without an incumbent, given previous vote share  $x$ ) and  $E[Z(1)|x]$  (the expected support for Democrats in districts with an incumbent, given previous vote share  $x$ ) are continuous in  $x$  (Hahn, Todd and van der Klaauw, 2001; Lee, 2008; Imbens and Lemieux, 2008).<sup>2</sup> The continuity assumptions identify the causal effect of interest by overcoming of the fundamental problem of causal inference, but only at the threshold. As we approach 0.5 from either side, the continuity of the functions ensures that  $E[Z(0)|X = 0.5] = \lim_{x \uparrow 0.5} E[Z(0)|X = x]$  and that  $E[Z(1)|X = 0.5] = \lim_{x \downarrow 0.5} E[Z(1)|X = x]$ . And therefore,

$$\begin{aligned} E[Z(1) - Z(0)|X = 0.5] &= \lim_{x \downarrow 0.5} E[Z(1)|X = x] - \lim_{x \uparrow 0.5} E[Z(0)|X = x] \\ &= \text{ATE}_{1/2} \end{aligned}$$

In other words, the continuity assumptions allow us to simultaneously observe  $E[Z(1)|X = 0.5]$  and  $E[Z(0)|X = 0.5]$  and therefore are the key to RDD identifying causal effects of interest.

To understand if close elections satisfy the continuity assumption, in the next section we recast

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<sup>2</sup>This is stronger than actually needed to identify the causal effect of interest, as both Imbens and Lemieux (2008) and Lee (2008) observe. However, the more general assumptions preserve the basic intuition that we motivate here and suffer from similar vulnerabilities. In general, we can restrict the continuity assumption to the discontinuity (Imbens and Lemieux, 2008). Even more generally, we might suppose that we observe vote share  $x$ , but fail to observe some effort level  $W$ . Then, it need only be the case that the cdf of  $x$  conditional on  $w$ ,  $F(x|W)$  is continuously differentiable in  $x$  at  $x = 1/2$ . As we will see all the assumptions rely on the critical assumption that, at the discontinuity, observations are just as likely to be above the threshold as they are to be below the threshold (which is why the continuity assumptions are so critical).

the assumptions in political terms. We argue that they impose strong assumptions about how campaigns are contested and how votes are counted. Together, they require that political actors are unable to systematically determine who wins extremely close elections. In place of this model, we advance a theory of electoral competition that argues that close elections are exactly where we would expect political advantages to manifest.

## 2.2 Why Close Elections Are Unlikely to Be Randomly Determined

As several scholars have observed (e.g, Lee (2008)), the continuity logic essentially implies that political actors are uncertain about the vote total and unable to “sort” around the discontinuity. Before the election, if candidates are quite uncertain about the current vote total, or unable to systematically increase their vote total given their knowledge, then the RD designs are likely to identify causal effects of interest. The more uncertainty that candidates have about the vote total, the more elections where winning will be essentially random.

Our first theoretical model demonstrates that the strategic behavior of campaigns implies that all but the closest elections will be systematically determined. When campaigns know that an election will be close (either through partisan information networks or polls), they invest more resources and effort in those contests. This increased effort magnifies candidates’ structural advantages. As candidates structural advantages or information about elections increase, then the set of elections that are randomly determined narrows (see Fraga and Hersh (2010)). For RDD practitioners, this implies that caution must be exercised when deciding which elections to include in the analysis. While wider bands may provide increased statistical power, they introduce greater bias into the estimates. Indeed, as pre-election polls become increasingly precise, we should expect fewer elections to satisfy the assumptions necessary to determine the election outcome.

But even elections that are decided randomly on Election Day may still be subject to systematic manipulation. Once an initial ballot count is announced in a close race all sides know, with certainty, how many votes they will need to legally challenge or how many ballots they will need to stuff in order to win the election. This enables “stealing” of elections with extremely small margins (In Section 4.2 we provide several documented historical examples of this behavior). Building on this intuition, below, we present a game of post-election manipulation that predicts candidates will use

Table 1: Summary of Assumptions and Potential Issues with RDD Models of Marginal Elections

1) Pre-election: Winning an elections is randomized only in the closest contests, yet researchers must choose a bandwidth. In this bandwidth, there could be systematic differences in candidate's structural advantages, though RDDs identify causal effects of interest.
2) Post-election: After polls close, the closest contests invite systematic fraud and legal challenges. If one party is able to systematically determine the outcome of these contests, then RDDs no longer identify causal effects in the limit.

their resources to systematically secure office. The manipulation will result in candidates doing just enough to “steal” an election from their opponent—creating the impression of marginal elections that are actually systematically determined.

If candidates are able to systematically affect election results, then RDDs no longer identify  $\text{ATE}_{1/2}$ . Methodologically, sorting represents a type of selection, breaking the protocol of an experiment. More technically, sorting creates a discontinuity in  $E[Z(1)|X = x]$  and  $E[Z(0)|X = x]$  functions.<sup>3</sup> The result is that  $E[Z(0)|X = 1/2]$  no longer provides a valid estimate of the counterfactual losing response for candidates that just happen to win. This creates the potential for bias in an unknown direction and of unknown size.

In the following sections we provide a theoretical logic how both problems discussed here can manifest in Congressional election data and provide empirical evidence that they do.

### 3 Structural Advantages and American Elections

Politicians do not participate in elections only as candidates; they also have a hand in managing nearly every decision of the electoral process, from deciding the boundaries of electoral jurisdictions to the system of voter registration, from the format of the ballot to the mobilization of supporters, to counting and validation of election returns. Moreover, some politicians, namely those associated with the dominant political party in their respective states and districts, play a far greater role in the process than their competitors.

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<sup>3</sup>In the more general proof in Lee (2008) we can think of the discontinuity occurring in the measure on the unobserved (effort) variable  $W$ . If  $g(w)$  is continuous, then each observation is just as likely to be in the treated arm or the control arm at the discontinuity. If there is a discontinuity, however, some observations are systematically more likely to be in treatment than control. This breaks the weighted average conditions in Lee's (2008) Proposition 2b and 3b.

Dominant parties, particularly parties with strong machines in the late 19th and early 20th century, may have a very good sense of how close a given election is going to be ahead of time. These parties may understand the pulse of the voters and the landscape of the district. If the election does not look close, they need not waste their resources. If it looks very close, they may employ massive resources to put themselves over the 50% mark. Immediately after Election Day, but before the results are certified, parties know with certainty the number of votes necessary to win an election. Dominant parties, particularly in localities that afford greater partisan control over electoral administration, are able to use their influence on legal proceedings, the ability to certify electoral results, or even their opportunity to commit fraud to tip electoral results. Of course, we expect this influence to be greatest in historical periods when parties are their strongest and checks against corruption to be weakest.

### 3.1 A Model of Pre-election Campaigning

The idea that the expected margin of an election can draw greater effort from its contestants and their allies can be usefully formalized. The formalization not only ratifies the intuition but also draws attention to the underlying variables that matter most in examining these elections. There are, of course, many models of elections – such as spatial models of vote choice – but the essential properties of the models we seek are not those that examine voter choice or aggregation, nor the production of information (as in models of negative advertising). Instead, we seek simple but generalizable models that describe campaign dynamics, both before and after an election.

To that end, we build upon Erikson and Palfrey (2000) and consider a model of two candidates who observe a pre-election poll. In response to this information, the candidates (and/or the parties) spend costly resources in an attempt to increase their vote shares. These attempts meet with stochastic success, a random component still partially determining the outcome of the election. Under equilibrium campaigning in this model, resources are directed into districts that pre-election polls reveal to be competitive. This magnifies structural advantages and subsequently causes systematic differences between winners and losers within narrow bandwidths around the discontinuity. In our supplemental appendix we generalize this model using a differential game and demonstrate that our same predictions hold in this much more general model.

We suppose that there are two candidates, 1 and 2, who are competing in an election. Our game proceeds in two stages. First, information is revealed to candidates about the current vote share in the election  $x_0$ . In modern campaigns, this information is likely to arise from polling. In earlier campaigns, this information emerges from the parties' precinct organizations, which were able to provide accurate accounts of voters' intentions (Bensel, 2004) After observing this information the candidates make a decision about how much to invest in the campaign. Let  $c_1$  denote the resources for candidate 1 and  $c_2$  denote the resources for candidate 2. After the candidates make their investment decision, the final vote share is revealed, with the vote share for candidate 1 given by

$$x_1 = \gamma_1 c_1 - \gamma_2 c_2 + w \quad (3.1)$$

where  $\gamma_1$  and  $\gamma_2$  represent a multiplier on the campaign's investments and  $w$  is a draw from a  $\text{Normal}(x_0, \sigma_0^2)$ . The vote share for candidate 2 is given by  $x_2 = 1 - x_1$ .  $\gamma_1$  and  $\gamma_2$  capture one manifestation of candidates' institutional capacity during an election: the return on effort exerted in the district.

Candidates' utilities are a combination of the cost of the campaign and their probability of obtaining the returns from office. Let  $k_1$  and  $k_2$  be multipliers that capture how efficiently candidates are able to invest their money during an election. Then, the candidates' utility functions are given by,

$$\begin{aligned} U_{\text{cand1}}(c_1, c_2) &= \text{Prob}(x_1 \geq 0.5) - k_1 \exp(c_1) \\ U_{\text{cand2}}(c_1, c_2) &= \text{Prob}(x_2 \geq 0.5) - k_2 \exp(c_2) \end{aligned}$$

Proposition 1 in the appendix proves that there is a pure strategy symmetric Nash equilibrium. Using this equilibrium, we use simulations to perform comparative statistics. First, we show that an equilibrium response from both candidates is to invest more in closer elections.<sup>4</sup> For both simulations, we will analyze an election where Candidate 1 has a resource advantage over Candidate 2,  $\gamma_1 > \gamma_2$ . Our first simulation demonstrates that, in the equilibrium, candidates invest more

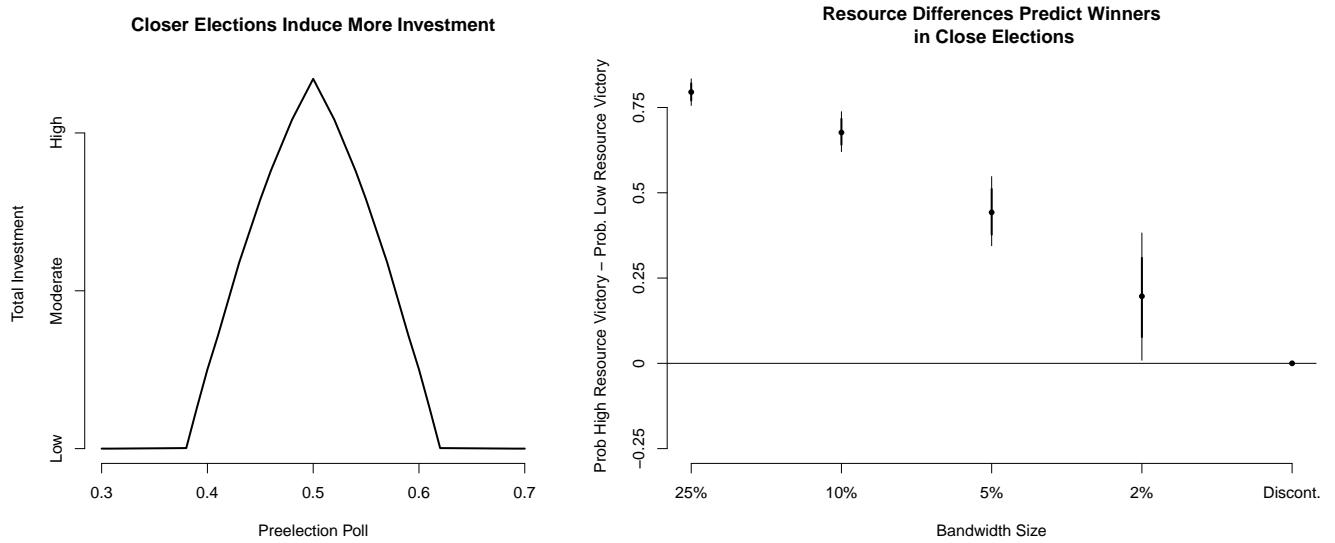
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<sup>4</sup> A formal comparative static will likely reveal that the amount invested in any one election is non-decreasing, because some elections an equilibrium response is to not campaign.

in close elections. The left-hand plot in Figure 1 shows that closer preelection polls induce more investment from candidates. To demonstrate this, we varied the preelection poll from 0.5—indicative of a very close election—to 0.7 and 0.3—indicative of an uncompetitive election.

As Figure 1 illustrates, the closer election induces more investment from both candidates. The result of this increased investment is systematic differences in who wins elections. The right-hand plot in Figure 1 shows that equilibrium strategies predict that candidates with resource advantages will be systematically more likely to win close elections, even within very small bandwidths. This figure varies the size of the bandwidth along the horizontal axis, from wider (25% bandwidth) to more narrow (using the predictions from a polynomial regression model at the discontinuity). The vertical axis presents the average difference in resources between candidates who win and those that lose.

Figure 1: Close Elections Induce Greater Campaigning




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This figure demonstrates two predictions from the simple campaigning model. The left-hand plot shows that the game predicts more resources invested in close elections. The right-hand plot presents the prediction of systematic differences in winners and losers in even close elections.

The right-hand plot in Figure 1 shows that our model predicts systematic differences exist between winners and losers, even in very close elections. Even in elections decided by less than 2 percentage points, we expect that those with greater resources will be systematically more likely to win. This has two important implications. First, this implies that marginal elections may mask candidates' structural advantages, rendering these elections less competitive than they appear. Second, RDD estimates that rely upon wide bandwidths will provide poor estimates of  $ATE_{1/2}$ . Because of the randomization after the candidates invest their resources, the model predicts that the resources will be balanced at 0.5, which is demonstrated with the zero estimate at the far right. As the information available to candidates before an election increases, or as structural advantages of a candidate increase, the region where election outcome is randomized shrinks.

This model predicts, therefore, that systematic differences will exist between winners and losers even within narrow regions around a discontinuity, even though there is no difference (on average) at 0.5. Our next model provides a theoretical prediction of what can happen in elections just near the 0.5 threshold.

### 3.2 A Model of Post-Election Challenges

Our model of campaigning predicts that candidates with a structural advantage in a district are systematically more likely to win close elections, even within very narrow bandwidths. But the model does predict that the closest elections are decided at random. The randomness inherent in each model predicts that the estimate at the discontinuity will be an unbiased estimate of the treatment effect, so long as there are sufficient observations to estimate the effect exactly at the threshold for winning the elections. The important substantive implication is that partisan differences may swing narrow elections, but the closest elections are determined without systematic manipulation. The key statistical implication is that commonly used bandwidths are unable to identify the desired treatment effect. In principle, however, enough data could be collected to identify the desired causal effect if sufficiently narrow bandwidths are employed.

Campaigns represent only one method candidates and parties can employ to affect vote totals. After an election, they are able to employ legal and illegal means to alter the official tally. This manipulation represents a type of sorting, a violation of the assumptions necessary for RDD to

identify valid causal effects. In extremely close elections, both parties will file legal complaints, demand recounts, challenge ballots and use their resources to obtain a desired certified vote total. And as we see in Section 4.2 below, parties and candidates are able to use more nefarious methods to obtain their desired results. We show evidence that parties can stuff ballot boxes, use the votes of citizens long deceased, or simply manufacture votes to systematically alter the outcome of the close election.

To formalize this intuition about post-election manipulation, we model a sequence of “legal” challenges and show that candidates with a resource advantage are able to systematically claim elections using legal challenges that their opponent would have won in the absence of such challenges. We use legal challenges to avoid appropriating fraudulent motivations or deeds to party officials. But certainly, our model is intended to include both legal and illegal methods of post-election vote manipulation.

We analyze a modified version of the game employed in Section 3.1. We remove the random component from the previous game. After an election, both parties know with certainty the number of votes they will need to tilt the election in their favor. Second, we introduce a sequential structure to this game, similar to the sequential structure employed in legislative vote-buying models for analytic tractability (for example, Groseclose and Snyder (1996)).<sup>5</sup>

Suppose that a campaign has occurred and both candidates have observed the vote share  $x_c$ . After observing this electoral result, the game proceeds in three stages. In the first stage of the game, the candidate ahead after the campaign (if  $x_c > 0.5$ , Candidate 1, if  $x_c < 0.5$  Candidate 2) makes a decision about how much to invest in post-election manipulation. In the second stage of the game the other campaign decides on how much to invest in their legal challenges. We will denote both campaigns investment by  $l_1$  and  $l_2$ . The final stage of the game is the realization of election results, which we assume are a consequence of the following process,

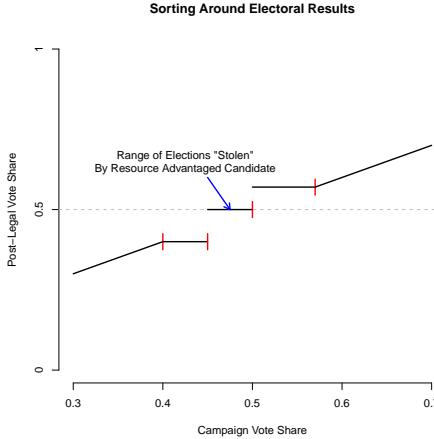
$$x_1 = \eta_1 l_1 - \eta_2 l_2 + x_c$$

where  $\eta_1$  and  $\eta_2$  represent Candidate 1 and 2’s institutional capacity to manipulate post-election

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<sup>5</sup> As with vote buying in legislatures, we introduce the sequential structure to avoid the use of mixed strategies in an equilibrium (Groseclose and Snyder, 1996).

Figure 2: Resource Advantages Allow Candidates to Steal Election




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This figure presents the equilibrium predictions from the simple post-election manipulation game, predicting that candidates can employ their resource advantages to systematically win extremely close elections.

results, respectively. If  $\eta_1 > \eta_2$ , a candidate is more effectively able to manipulate election results. After deciding on the amount to invest, payoffs are realized.

To finish specifying the game, the utility function for the candidates are,

$$U_1(l_1, l_2) = \begin{cases} -k_1 \exp(l_1) & \text{if } x_1 \leq 0.5 \\ 1 - k_1 \exp(l_1) & \text{if } x_1 > 0.5, \end{cases} \quad U_2(l_1, l_2) = \begin{cases} 1 - k_2 \exp(l_1) & \text{if } x_1 \leq 0.5 \\ -k_2 \exp(l_1) & \text{if } x_1 > 0.5, \end{cases}$$

where  $k_1$  and  $k_2$  encode the cost multiplier to both candidates.

Proposition 2 in the Appendix describes a pure-strategy sub-game perfect Nash Equilibrium to this game. It predicts that a candidate with a resource advantage will be able to manipulate election results after the fact, ensuring her final victory even though she was behind on Election Day. In this way the candidate is able to “steal” the election: even though the public voted for Candidate 2 in the campaign, Candidate 1 emerges victorious through post-electoral manipulation. Figure 2 displays this dynamic demonstrating the area of vote stealing. The horizontal axis presents the pre-election vote share, the vertical axis is the vote share after the legal manipulation. The thick line through the plot presents the equilibrium election results, with the vertical red-lines denoting changes in the equilibrium strategy.

Figure 2 shows clearly that the resource advantaged candidate is able to use legal challenges to secure victory in marginal election that originally favored their opponent. This represents *sorting* around the discontinuity. Substantively, this suggests that there will be systematic characteristics that predict the winners of even the closest elections. Statistically, this equilibrium result violates the assumptions necessary for RDD to identify valid causal effects. If candidates' resource advantages help to determine whether they are able to steal marginal elections and subsequently affects their behavior in office, then the continuity assumption is violated. Specifically, candidates who just happen to win an extremely close election will, on average, hold a resource advantage over the candidates that happen to just lose an election. This systematic difference then implies that  $\lim_{x \uparrow 0.5} E[Z(1)|X = x] \neq \lim_{x \downarrow 0.5} E[Z(1)|X = x]$  and that  $\lim_{x \uparrow 0.5} E[Z(0)|X = x] \neq \lim_{x \downarrow 0.5} E[Z(0)|X = x]$ .

## 4 The Systematic Determination of Close Contests

Our theoretical models predict that there will be systematic differences in resources in very close elections and differences at the discontinuity in close elections if sorting occurs. If the differences in resources are correlated with the dependent variable, this will result in RDD failing to identify  $ATE_{1/2}$ . Substantively, this implies that indicators of partisan or candidate strength should systematically predict who wins the narrowest elections. In this section we show that there are systematic differences in who wins very close U.S. House elections and these differences are indicative of the importance of structural advantages.

Our empirical analysis requires data on election returns and measures of party control that serve as indicators of a party's structural advantages in a state. We employ a wide ranging data set of House elections from 1880-2008, first introduced in Ansolabehere and Snyder (2002). For these races, we ask if measures of partisan strength in a state predicts the winner of the closest elections and then ask *when* partisan strength correlates with close election outcomes. To measure party strength in a state we employ party control of four key institutions of state government at the time each election was held: the governorship, the election administration, the state lower legislative chamber, and the state upper legislative chamber. An implication of our theoretical model of close elections is that there should be systematic differences in the rate of party agreement between

winners and losers, even in the closest elections.

Using these data, the left-hand plot in Figure 3 demonstrates that winners of extremely close U.S. House elections also tend to hold structural political advantages. Along the horizontal axis is the share of the two-party vote. As we move towards the center, we observe increasingly close elections, until we reach the dashed line which represents the discontinuity, or the 50% of votes necessary to win the election. The vertical axis measures the proportion of candidates from the same party as the Governor. The gray dots create bins of legislators based on their vote share and measure the proportion of candidates with the same party as the Governor within each bin. The black-lines are nonparametric regressions of the proportion of candidates from the same party as their Governor against the two-party vote share.<sup>6</sup> If marginal elections are essentially decided by a coin flip, we would expect the line to the left of 50% and the line to the right to meet exactly at the discontinuity.

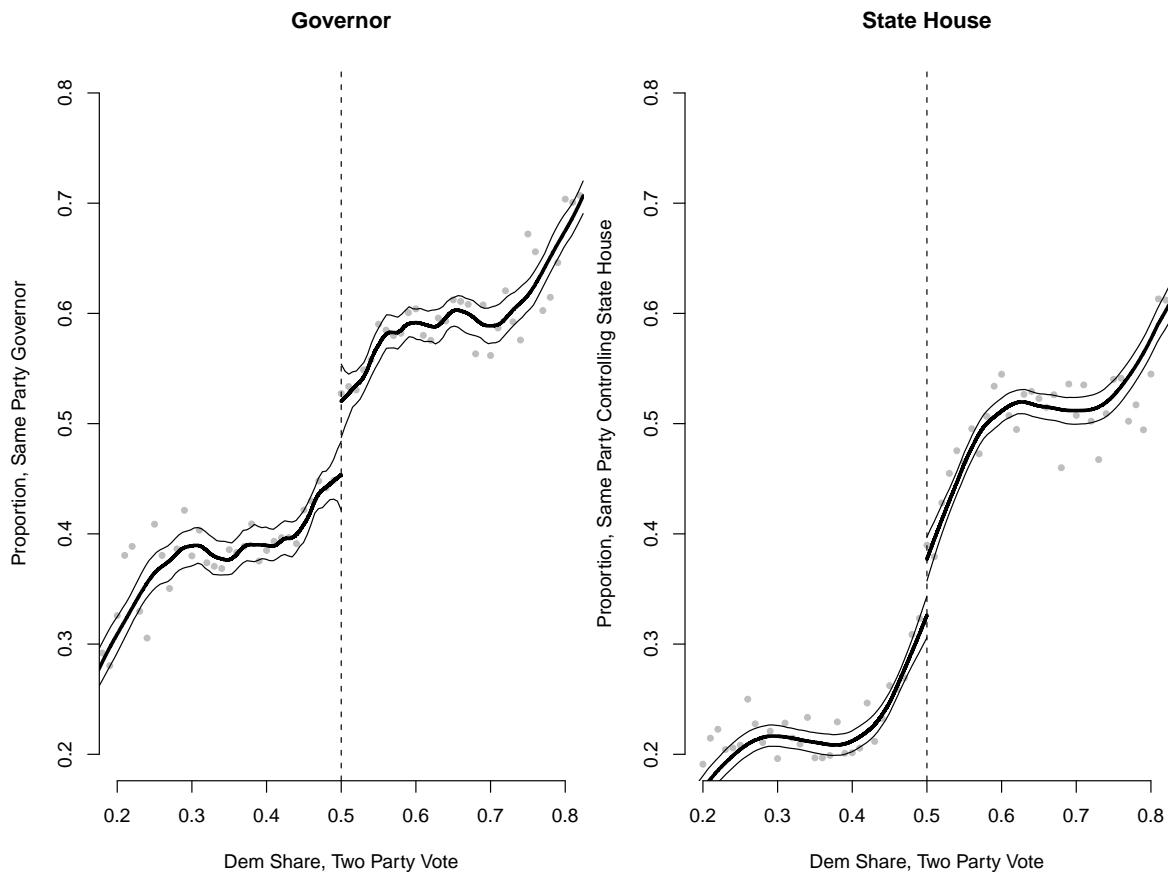
But the large gap between the regression lines demonstrates that structural advantages are correlated with who wins extremely close elections. Candidates who barely won the election are almost 7 percentage points more likely to belong to the same party as the Governor than candidates who barely lost. And the significant gap in the binned estimates of agreement between candidates and governors suggests that this finding will be robust to a wide variety of modeling choices (we demonstrate this below). The right-hand plot in Figure 3 shows that winners were also systematically more likely to belong to the same party as the party controlling the State House. Winners of the closest elections were 5 percentage points more likely to belong to the party controlling the State House than candidates who lost the closest elections.

The differences we observe in Figure 3 are replicated across all four offices representing partisan advantages, across a wide range of different model specifications (Green et al., 2009). Figure 4 summarizes the systematic differences between winners and losers in very close elections. To do this, each plot compares the average party agreement between winners and losers in the U.S. House

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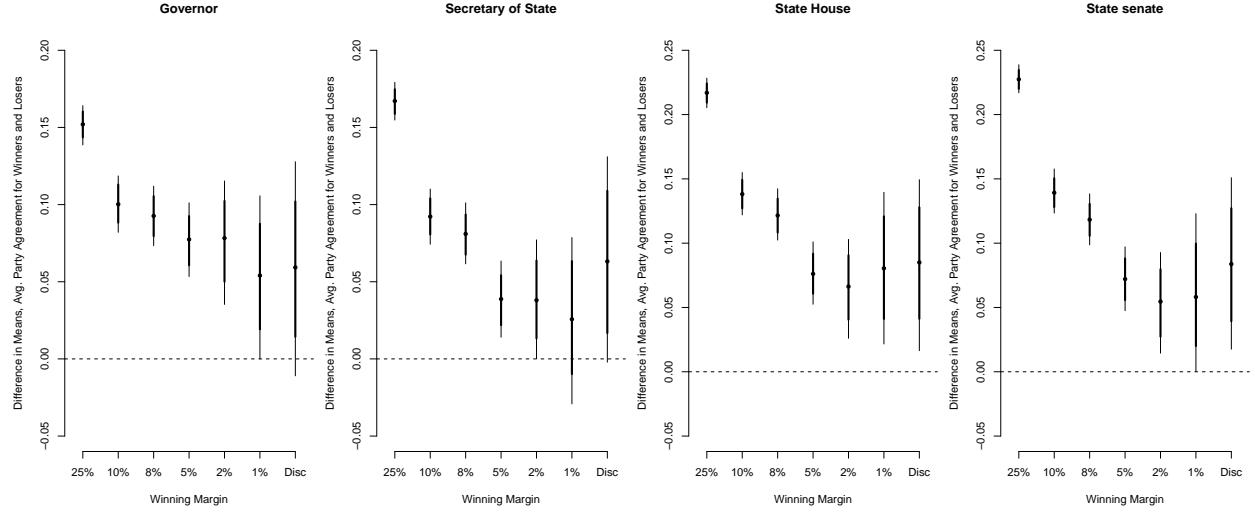
<sup>6</sup> The bandwidths in this plot are fairly narrow (approximately 6.02% of observations at discontinuity) and were chosen to be illustrative, below we select bandwidths using well established selection criteria that validates the point here.

Figure 3: Gubernatorial and State House Control is Correlated with Winning Close Elections for the U.S. House



This figure demonstrates that U.S. House candidates who win very close elections are systematically more likely to belong to the same party as the Governor and as the majority party in the state legislature's lower chamber. The large gaps at the discontinuities show that structural political advantages predict who win close elections. This is evidence that pre-election campaigning and post-election legal challenges are inducing differences in marginal elections.

Figure 4: Winners of Close U.S. House Elections Hold Systematic Structural Advantages



Each plot represents the proportion of U.S. House winners who are of the same party as the state office (e.g. governor) minus the proportion of U.S. House losers who are of same party as the state office. Statistically significant positive values suggest systematic differences between winners and losers in very close U.S. House elections.

contests across offices representing party control (the different plots) and different bandwidths (the lines in each plot). In each plot, moving left to right we move from a wide bandwidth (25% (62.5-37.5) or closer) to a narrow bandwidth (a 1% (50.5-49.5 or closer)) bandwidth, and finally an estimate at the discontinuity (50%) using a third-order polynomial, fit within a 10% (55-45 or closer) bandwidth (Lee, 2008; Green et al., 2009). The dots are the point estimates and the thick and thin lines are 80 and 95 percent confidence intervals. (We provide numerical values for these figures in the online appendix, along with the number of observations used to compute each difference).

The left-hand plot in Figure 4 shows that winners of elections are systematically more likely to belong to the same party as the governor than the losers of close elections. The winners of extremely close House elections (within a 1% band around 50%) are 5.6 percentage points more likely to share the same party as the governor ( $p < 0.05$ ). There is also a systematic difference at the discontinuity: according to the model, winners at the discontinuity are 5.8 percentage points

more likely to belong to the same party as the governor ( $p<0.07$ ). The other plots reveal similar differences at the discontinuity: winners are systematically more likely to belong to the same party as the secretary of state (6.1 percentage points more likely than losers, second plot from left), share the same party label as the party controlling the State House (8.6 percentage points, second plot from right), and belong to the same party as the party controlling the State Senate (8.3 percentage points, far right plot). And the figures show that all these differences are statistically significant at standard levels. As we detail in the supplemental appendix, the results are robust to a variety of modeling and bandwidth decisions, employing the many different ways to analyze RDD models developed in Green et al. (2009).

#### 4.1 Structural Advantages Over Time

The imbalance we identify suggests that the closest Congressional elections are subject to systematic determination. To assist in identifying the mechanisms that cause this systematic imbalance, in this section we examine the overtime variation in advantage for candidates from strong parties. We show that partisan candidates were most advantaged when previous studies have identified political parties as strongest: in the late 19th and early 20th century. Coupled with detailed case study evidence, we argue that the advantages afforded to candidates from strong parties emerged as a result of parties manipulating electoral results on Election Day and during the vote counting process.

To show how the structural imbalances have changed over time we construct an index of party strength. To create this index we measure the proportion of offices each candidate's party holds.<sup>7</sup> We analyze partisan imbalance with an index of partisan strength for practical and theoretical reasons. Practically, the individual offices exhibited over time dynamics, suggesting that creating an index is reasonable. Theoretically, aggregating across offices provides a more reliable measure of latent party strength (Anscombe, Rodden and Snyder, 2008).

Using this index we then compare the average party strength of winners and losers in close elections (decided by 5% or less) in each year. Because only a small number of elections are close

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<sup>7</sup>In the supplemental appendix, we show that this index is similar to indices created using Item-Response Theory models Clinton, Jackman and Rivers (2004) or principal components. Further, we show that this index exhibits the same partisan imbalance in the aggregate.

in each year, we smooth the estimates over time.<sup>8</sup> The left-hand plot in Figure 5 contains the results: dynamic estimates of how much more likely winners of close elections are to belong to strong political parties than the losers of those contests.

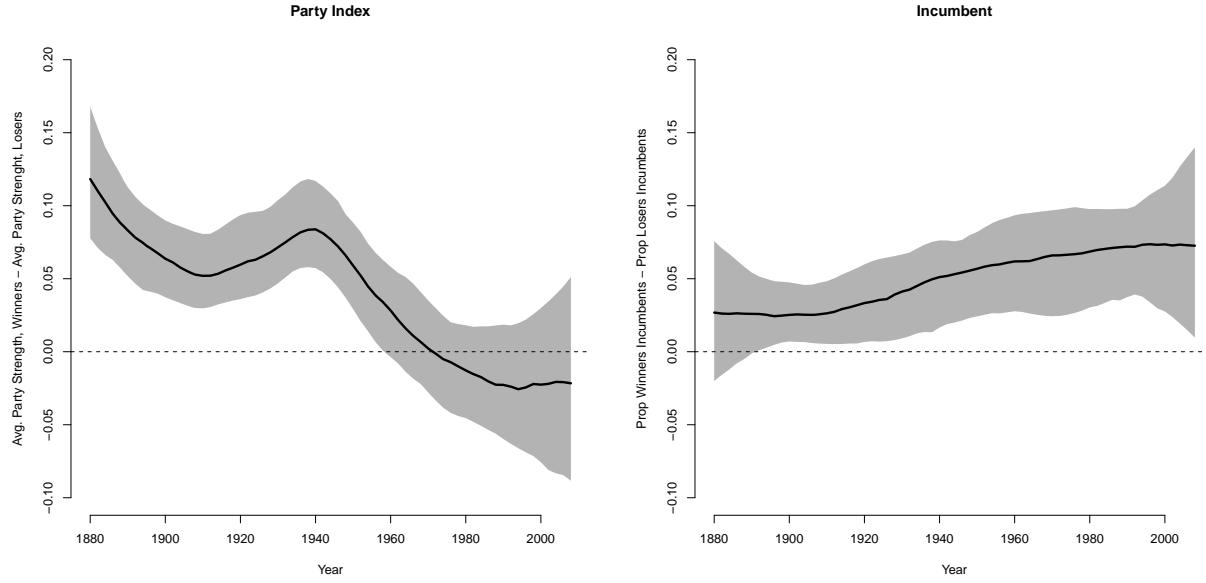
This plot shows that the greatest imbalance in party strength for close elections occurs in those contests occurring when political parties were widely recognized as exercising substantial political influence in Congress and Congressional elections. While it varies over time, a similar imbalance persists until the 1950's. Around 1960, the imbalance in favor of candidates from strong parties disappears statistically. Indeed, in recent elections the winners of close elections are no more likely to belong to the same party that controls state offices.

The left-hand plot in Figure 5 should be interpreted in the context of well-established arguments about the waxing and waning of party strength in the electoral and congressional spheres. In the mid- to late-nineteenth century, turnout among the eligible voting population (on the whole, white males) was at its highest levels in American history. State and local patronage (Sheftler 1993; Ginsburg, Mebane and Sheftler 1994) and the polarizing contests of the Civil War, the Progressive Era and the New Deal contributed to the strong linkage between party organization and electoral turnout. A critical feature of nineteenth-century party structure lay in the power of state and local party officials, so much so that the history of parties in this period is often told through the changing nature of state party organizations (Gienapp 1988, Holt 2003). Even as party organizations nationalized from the 1880s onward (Klinghard 2010), the power of patronage and the stark political divides of the tariff meant that parties could mobilize voters and shape election outcomes increasingly through national-level organizations as well as through state and local organizations. Only with the decline of party organization in the middle twentieth century, and the corresponding rise of the “independent voter” in American politics (Abramson 1976), did these forceful abilities of party organizations to shape election contests wane. With the apex of party organization in the nineteenth century, the resurgence in the New Deal (Sundquist 1983), and its decline in the 1950s, these broader trends in the strength of party organization map well onto the associations displayed in the left-hand plot in Figure 5. A deeper investigation of the historical evolution of partisan

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<sup>8</sup>To perform the smoothing, we use a two-stage approach that closely approximates more sophisticated dynamic smoothing methods. First, we use a Bayesian hierarchical model to estimate the imbalance in each election, but ignoring the time of election. We then used a parametric bootstrap and a loess curve to smooth over time

Figure 5: Candidates from Strong Parties Are More Likely to Win Elections When Parties are Strong



This figure demonstrates that candidates who hold structural advantages are more likely to win close elections, but the advantages associated with increased likelihood of winning close elections changes over time. The left-hand plot demonstrates that before the 1960's, candidates from stronger parties were systematically more likely to win close elections, but this advantage erodes in more recent contests. The right-hand plot carries out the comparison made in Caughey and Sekhon (2010) and shows that incumbents were not much more advantaged over challengers in contests before 1945, but are significantly advantaged in more recent contests.

close-election advantages is in order, we believe, through beyond the scope of the present analysis.

While it appears that the importance of party strength decreases over time, other structural characteristics begin to matter more. Caughey and Sekhon (2010) show that *incumbent* parties are much more likely to win close elections than non-incumbent parties. The right-hand plot replicates this imbalance, but shows that it has grown over time. From 1880 until about the 1940's, incumbent candidates are only marginally more likely to win close contests. Before 1900, winners of close contests were only 3 percentage points more likely to be incumbents than the losers ( $p < 0.33$ ). During the mid-century, this difference grew considerably. From the 2000 to 2008, winners of close elections are over 11 percentage points more likely to be incumbents than losers ( $p < 0.01$ ).

The overtime variation in incumbent's ability to win close elections corresponds with the growth in incumbent resources that led to the growth of the incumbency advantage. Part of the incumbency advantage grew with the ability to cultivate personal votes, scare off potential challengers, and with increased name recognition. But it appears that a component of this advantage grew as incumbents developed campaign resources. Caughey and Sekhon (2010) show that incumbents secure more money in close contests and perhaps more information about the vote total before Election Day, but incumbents appear unable to systematically determine election results after the contest. This suggests incumbents developed their advantage through the ability to more effectively deploy resources in close contests and not through the manipulation of election results after the contest.

In the next section we rely on primary and secondary accounts of Congressional elections to argue that parties exercised influence on election results *after* the polls closed. We show how parties used their ability to influence results to systematically remove the votes of opposing partisans or to manipulate vote counts in favor of their candidate.

## 4.2 Contested Elections in the Late 19th and Early 20th Century

Our analysis demonstrates that candidates from strong parties were most advantaged in Congressional elections from the late 19th to the early 20th century. In this section, we rely on detailed primary and secondary sources of some of these close contests to learn *how* parties secured this advantage. Following Bensel (2004) and Jenkins (2004), we use testimony documented in hearings on *contested* elections to learn the tools that parties and candidates used to secure elections. This reveals that the structure of elections during this time opened up many opportunities for the systematic manipulation of vote totals after the election. At the highest levels, partisan officials—governors and other party officials who oversaw elections—were able to use their discretion over ballot counting and certification to secure victories for their candidates. But at lower levels, stronger parties were able to rig election judges and ballot counting in order to secure votes for their candidate. The result of these processes is the systematic determination of close contests for candidates from stronger parties.

**Why Contested Elections** The details of contested elections provide primary source historical accounts of the elections that occurred when we observe the greatest advantage for candidates from strong parties. When election results are disputed the Constitution empowers Congress to act as its own judge. When acting as a judge, Congress creates *ad hoc* committees that collect facts, oversee witness testimony, and then make a recommendation to the floor on a final decision. When making this recommendation, the committee details the facts that lead to the recommendation—recounting the alleged frauds, manipulations, and errors in recounts that are all recorded in the US serial set. Contested elections were most common during the late 19th and early 20th century, with both parties regularly appealing the results of elections to Congress (Jenkins, 2004).

One may worry that relying on contested elections will provide biased accounts of how elections during the period of interest were decided. One source of bias is that contested elections are systematically different than other contests and more likely subjected to systematic manipulation. While this is certainly a possibility, contested elections also compromised a large proportion of all close elections. Of the 100 closest contests before 1900, over 25% were contested in Congress. So even if these elections compromise a distinctive set of contests, they are a large and important set of contests. A second source of bias is partisan: the majority in Congress was able to decide the election in its favor. But in cases where the majority and minority disagreed, the minority is allowed to offer their own response to the majority report. Focusing on facts that both the majority and minority agree mitigates the potential for partisan bias.

Using data from Jenkins (2004) as a guide to identifying contests, we examine a sample of contested elections from 1880-1910, placing particular emphasis on the closest contests. This reveals how parties use their institutional power at the state level and machine-like organizations at the local level, to manipulate the closest contests.

#### **4.2.1 Manipulation By Statewide Elected Officials**

We have shown that candidates from the same party as the Governor, Secretary of state, and the party controlling the legislature are systematically more likely to win close contests. The reports of some close elections suggest that a reason for this systematic advantage is the direct influence that elected officials exert over the vote counting and final certification of elections. Election laws that

were loosely enforced and basic election technology allowed elected officials to exercise influence over which vote tallies they accepted and how they interpreted vote tallies from the electoral units that compromised the electoral districts. The result is that elected officials were able to manufacture just enough votes to secure victory in the closest elections.

Perhaps the most egregious case of a statewide elected official manipulating vote results for his party's candidate occurred in the 1888 House election in West Virginia's fourth Congressional district, a contest between James Jackson, a Democrat, and Charles Smith, a Republican.<sup>9</sup> West Virginia law empowered the governor to certify election winners and to act as a judge when tabulating vote totals. After surveying the vote totals, Emanuel Wilson, the Democratic governor, declared Jackson the winner of the election with a three vote margin. If close elections are decided randomly at the discontinuity, then we would presume that this three vote total provides as good as random assignment to office for Jackson.

But the details of how Wilson arrived at this vote total show that Jackson's victory was far from random. Governor Wilson used his power as judge of election returns to secure a victory for his party's candidate using two different kinds of manipulation. First, before tabulating a final count of the votes the Governor refused to accept two county recounts that would have advantaged the Republican candidate Smith. While this favored Jackson, refusing the recounts from two counties was insufficient to sway the election for Jackson. To secure the seat for his party, Governor Wilson intentionally misread a handwritten vote report from Pleasant county (a county with disputed election returns). There, according to the Pleasant county clerks, Jackson received "Eight-hundred and two votes". But Wilson argued that the handwritten note read, "Eight-hundred and twe" where "twe" was interpreted as an abbreviation for *twelve*. Even though the electoral clerks of Pleasant county clearly informed Wilson that Jackson received *802* votes, Wilson used his power of state office to attribute the additional votes to Jackson and throw him the election.

This example illustrates why close elections may not be randomly determined and suggests how elected officials in the late 19th and early 20th century could use the power of state office to secure electoral victories for their candidates. Because Governor Wilson knew *exactly* how many votes were needed to secure a victory for Jackson, he was able to tabulate the votes to secure victory for

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<sup>9</sup> US Serial Set 51st Congress, Session 1; Report No. 19.

his candidate. But the reports reveal that this precise manipulation of post-election totals was not isolated to West Virginia. In 1882, Democrats contested the result of Ohio's 18th Congressional district.<sup>10</sup> William McKinley, the future Republican President, was afforded an eight vote victory over Jonathan Wallace, a Democrat candidate, by an election board led by the Republican Governor and Secretary of State. To construct this victory, the board failed to attribute to Wallace 23 votes that were clearly intended for the Democrat candidate, though contained a misspelling or incorrect abbreviation. Similarly, in the Iowa's 5th Congressional district in 1882, a Republican-controlled state electoral board overturned the decision of a county electoral board to secure a narrow victory for a Republican candidate,<sup>11</sup> and in 1916 a Republican Iowa state canvassing officials, in concert with local election officials, used their discretion over disputed ballots to secure a victory for their candidate.<sup>12</sup>

These cases (and others not detailed here) show state party officials were able to use their discretion over the tabulation of votes and the counting of votes from lower electoral units to secure victories in the closest elections. The precise knowledge of the number of votes needed after the votes were cast allowed election officials to secure votes for their candidates. The result: elections that appear razor-thin are actually systematically decided in favor of the candidate from the stronger party.

#### **4.2.2 Manipulation By Strong Parties at Local Level**

The previous section demonstrated how state elected officials exercised direct influence over the tabulation of votes in close contests. But the measure of party agreement used in Section 4 is also useful because it provides one measure of latent party strength: parties that control statewide elected office are also likely to be stronger at the local level. The reports from contested elections make clear that strong parties used their control over the ballot box and local institutions to manipulate vote totals on Election Day by depressing opposition turnout and after the election through the stuffing of ballot boxes. The result is elections that appear razor-thin but that are actually the result of the systematic manipulation of voting rolls.

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<sup>10</sup> *US Serial Set* 48th Congress, Session 1; Report No. 1548.

<sup>11</sup> *US Serial Set* 48th Congress, Session 2; Report No. 2623.

<sup>12</sup> *US Serial Set* 65th Congress, Session 2; Report No. 595.

Across several elections, strong local parties used control over local police to intimidate voters in local elections. For example, Indiana Democrats alleged that Republicans used their control over the police force to repel voters from the ballot box and secure a narrow victory in the 1882 election in the 7th Congressional District.<sup>13</sup> In San Francisco in 1886, Democrats accused the Republican controlled police force of controlling polling locations and suppressing Democratic turnout.<sup>14</sup> Similar accounts of voter intimidation were alleged (and at times, substantiated) across many contests—including elections in Pennsylvania and California.<sup>15</sup> This systematic manipulation could be deployed on Election Day, depressing turnout as the parties learn about the vote totals throughout the day.

But strong parties at the local level were able to use their control over electoral institutions—registration rolls, in particular, to systematically secure narrow victories for their candidate. In the 1892 election for Kansas’ 2nd Congressional District, Republican Edward Funston secured an 81 vote win over Democrat Horace Moore.<sup>16</sup> To secure the victory Republican party officials registered several fraudulent names. Then, after the polls closed, Republican election judges cast ballots from the fraudulent “voters”. The result is superficially close election results that mask systematic manipulation. Similar accounts of post-election manipulation through fraudulent registration are recorded in contests in California, Pennsylvania, Ohio, and Indiana (among other locations).<sup>17</sup>

This section provides direct evidence that the close elections where candidates from strong parties held the greatest advantage were also subject to systematic partisan manipulation *after* the polls closed. Certainly, the pre-election campaign advantages we described mattered in these contests. But post-election vote manipulation appears to be the most effective tool for strong parties to secure close contests for their party’s candidate.

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<sup>13</sup> US Serial Set 48th Congress, Session 1; Report No. 1547.

<sup>14</sup> US Serial Set 50th Congress, Session 2; Report No. 3538

<sup>15</sup> Pennsylvania, 1890, US Serial Set 52nd Congress, Session 1, Report No 367; California, 1886, US Serial Set 50th Congress, Session 1; Report No. 2035.

<sup>16</sup> US Serial Set 53rd Congress, Session 2, Report No. 1164.

<sup>17</sup> California, 1892, US Serial Set 53rd Congress, Session 2, Report No 614; Pennsylvania, 1890, US Serial Set 52nd Congress, Session 2, Report No. 2333; Ohio, 1882, US Serial Set 48th Congress, Session 1, Report 1845, Part 1; Indiana US Serial Set 48th Congress, Session 1; Report No. 1547 (The contest between English and Peele in Indiana’s 7th District in 1882 had both documented intimidation and fraudulent registration.)

#### **4.2.3 The Changing Nature of Electoral Contests**

Campaigning over the course of American history has evolved with technology and with cultural shifts (Hillygus and Shields, 2008). With these changes, the locus of power over campaign resources and post-election manipulations has shifted in turn. Before the era of mass media and reliable polling, campaigns had little choice but to mobilize voters on the ground, through face-to-face and network-based interactions. These interactions required a sophisticated organization of volunteers and precinct captains to keep a pulse on the electorate (Ranney and Kendall, 1956). On account of the manpower required to manage a large-scale mobilization campaign in this era, parties dominated. Individual candidates were dependent on the coordination that the party provided. However, with the shift to mass media campaigns, politicians could engage with many more voters through a technology that may not have been less expensive than the ground campaign but required less manpower and therefore less reliance on the party infrastructure. With the shift toward mass media campaign advertising, well-resourced candidates, like incumbents, played a larger role in electoral strategy and parties took a back seat (Aldrich, 1995).

If this characterization is correct, then the current and dramatic changes in information and technology lead to an interesting prediction about electoral manipulation going into the future. In the last five to ten years, the information about individual voters accessible to campaigns has changed dramatically (Hersh, 2010). New data resources have led campaigns to shift back to a personalized mobilization strategy, in which voters are contacted not just through micro-targeting contacts but through volunteer-centered social networks. Leveraging the power of these networks may require individual candidate campaigns to join forces, sharing data and volunteers with co-partisans, in a way that has not been done since before the rise of mass media. This centralization may entail a power shift back to umbrella groups like political parties dominating strategic choices related to campaign effort and electoral manipulation.

## **5 Discussion**

Close elections may not reflect randomness and are the precise venue where candidate and partisan advantages in organization most show themselves. In the single non-transferable vote systems employed in the United States, where the plurality winner takes the full value of the seat, it is

the marginal elections that will consume the focus of candidate and party resources during the campaign and even after the votes have been cast. Our analysis suggests that further research is in order before scholars confidently use close elections as quasi-experiments or as benchmarks for necessary democratic competition.

We have introduced a new theoretical model to explain how campaigns behave both before and after extremely close elections. Our theoretical results point to an expectation that these elections will be systematically determined. Our empirical results uncover one form of this systematic determination: the winners of close elections belong to parties that are substantially stronger. This finding is significantly robust, across models and different measures of partisan strength.

Our results have substantive importance, methodological relevance, and normative implications. Substantively, this paper suggests the need for a new literature examining who wins close elections. There are both immediate extensions of our work and more general implications that point to an important puzzle in the study of elections. Our theoretical model posits two sources for manipulation. Before elections, the increased attention to marginal districts amplifies differences in partisan strength. And after an election, candidates engage in systematic manipulation that privileges candidates from stronger parties. Our qualitative case studies provide strong evidence that post-election manipulation was essential for the advantage afforded to parties. But further inquiry, both quantitative and qualitative, is necessary to better understand how pre- and post-election manipulation interact to construct the systematic advantages observed in Congressional elections.

Beyond this immediate extension, we view our results as opening an important line of inquiry into the relationship between electoral institutions, party influence and the systematic determination of close elections. Our theoretical models are based on intuition from the American case, with electoral institutions that are subject to partisan manipulation. Of course, the extent to which parties hold control over electoral institutions varies across American states and across countries. A host of questions emerge naturally from the recognition of variation in electoral institutions and party politics. In the American context, does partisan control of gerrymandering influence how well parties can determine close elections? Why are incumbents better equipped to win razor-thin elections than non-incumbents (Caughey and Sekhon, 2010)? Voting technology, campaign style, and party influence have changed over the course of American history; when have close contests

appeared to be least randomly determined? From a comparativist perspective, are similar differences found in proportional representation systems as in the American system? Does bureaucratic administration of elections (such as Germany’s electoral system) dampen a party’s ability to swing an election? With these (and many other) questions in mind, a comparative study that demonstrates how incidence of different electoral institutions correlates with systematic differences in close elections will provide insights into how candidates determine the closest elections.

In addition to the substantive implications, our work has wide-ranging implications for the use of close elections in causal inference. Our empirical analyses demonstrate that close elections are in fact systematically determined, in large measure because these contests attract disproportionate investment by the candidates. Our theoretical models provide two explanations for this result. First, RDD analysts rely upon a theoretical result about the causal assignment mechanism at the discontinuity point (one-half of the votes cast), but in practice they must choose a bandwidth which includes races with larger margins. These margins will include races where one candidate has systematic advantages over another candidate, and there are many reasons to believe that these advantages are correlated with downstream variables like later earnings, later voting patterns and policy outcomes. Second, elections do not end when people are finished casting their ballots. Ballots have to be counted and certified, and election results must be declared legal and legitimate. Candidates can also deploy advantages at this post-voting stage, breaking the continuity of the regression function at the 50 percent threshold.

Our theoretical arguments and empirical evidence imply that more care is needed before natural experiments are used to identify causal effects. Across applications, we believe that assumptions made to identify causal effects using a natural experiment carry with them important political assumptions. Therefore, to identify and exploit natural experiments, it is incumbent upon the researcher to understand and examine the underlying political process that determines the assignment mechanism. This includes more than quantitative demonstrations of balance in covariates across treatment and control groups. It may also require qualitative, ethnographic or historical study to show that the ways observations are assigned to treatment and control are not systematically related to the outcome of interest. To that end, we believe that future work should examine not only the practice of RDDs, but also the equally vital question of who wins close elections. Depend-

ing on the margin, what are predictors of winning these elections? How often do legal challenges occur and with what conditional probability of success? How can the various causal pathways of candidate advantage be disentangled from one another?

Finally, our theoretical and empirical results call into question whether elections decided by razor-thin margins are truly marginal. Marginal elections, where either party has a chance to win, represent an important source of voter influence on national government (Mayhew, 1974). Certainly the marginals are vanishing, a large literature argues, but at least some “toss-up” seats remain. Our analyses present a bleaker portrait of party competition for seats. Even the closest elections are determined, at least in part, by systematic structural advantages of one party. This blunts the effectiveness of close elections as a tool to translate voter preferences into national government.

## A Proofs Appendix

**Proposition 1.** *A pure strategy symmetric Nash-Equilibrium exists to the this game, with Candidate 1's equilibrium investment strategy given by*

$$\begin{aligned} c_1 = & \frac{1}{2(\gamma_1 - \gamma_2)^2} (\gamma_1 - \gamma_2 - 2\sigma_0^2 - 2\gamma_1 x_0 + 2\gamma_2 x_0 + 2(\gamma_1 - \gamma_2)\gamma_2 \log[\frac{k_1}{\gamma_1 t}] \\ & + 2\gamma_1 \gamma_2 \log[\frac{k_1}{\gamma_1 t}] + 2\gamma_1 \gamma_2 \log[\frac{\gamma_2 t}{k_2}] - 2\gamma_2^2 \log[\frac{\gamma_2 t}{k_2}] \\ & + 2(\sigma_2(-\gamma_1 + \gamma_2 + \sigma_0^2 + 2\gamma_1 x_0 - 2\gamma_2 x_0 - 2\gamma_1(\gamma_1 - \gamma_2) \log[\frac{k_1}{\gamma_1 t}] + 2\gamma_2(\gamma_2 - \gamma_1) \log[\frac{\gamma_2 t}{k_2}]) \end{aligned}$$

where  $t = \frac{1}{2\pi\sigma_0^2}$ .

*Proof.* We begin by calculating Candidate 1's probability of Winning.

$$\begin{aligned} \text{Prob}(x_1 \geq 0.5) &= \text{Prob}(\gamma_1 c_1 - \gamma_2 c_2 + w \geq 0.5) \\ &= \text{Prob}(-\gamma_1 c_1 + \gamma_2 c_2 + 0.5 \leq w) \\ &= \int_{-\gamma_1 c_1 + \gamma_2 c_2 + 0.5}^{\infty} f(w|x_0, \sigma_0^2) dw \end{aligned}$$

where  $f(\cdot|\cdot)$  represents the normal density function. Of course,  $\text{Prob}(x_2 \geq 0.5) = 1 - \text{Prob}(x_1 \geq 0.5)$ .

To find the symmetric pure strategy Nash, we'll solve the first order conditions for both candidates, which sets up the following equations

$$\begin{aligned} \gamma_1 t \exp\left[-\left(\frac{(-\gamma_1 c_1 + \gamma_2 c_2 + 0.5 - x_0)^2}{2\sigma_0^2}\right)\right] &= k_1 \exp[c_1] \\ \gamma_2 t \exp\left[-\left(\frac{(-\gamma_1 c_1 + \gamma_2 c_2 + 0.5 - x_0)^2}{2\sigma_0^2}\right)\right] &= k_2 \exp[c_2] \end{aligned}$$

And all that remains is to solve the simultaneous equations.  $\square$

**Proposition 2.** *Without loss of generality assume that  $\eta_1 \log\left(\frac{1+k_1}{k_1}\right) > \eta_2 \log\left(\frac{1+k_2}{k_2}\right)$ . A pure strategy sub-game perfect Nash-Equilibrium to the game is characterized by the following investments,*

$$\begin{aligned} l_1 = 0, l_2 = 0 &\quad \text{if } x_c \leq 0.5 - \eta_1 \log\left(\frac{1+k_1}{k_1}\right) \\ l_1 = 0, l_2 = x_c - \left(0.5 - \eta_1 \log\left(\frac{1+k_1}{k_1}\right)\right) &\quad \text{if } 0.5 - \eta_1 \log\left(\frac{1+k_1}{k_1}\right) < x_c \leq 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) - \eta_1 \log\left(\frac{1+k_1}{k_1}\right) \\ l_1 = 0.5 - x_c, l_2 = 0 &\quad \text{if } 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) - \eta_1 \log\left(\frac{1+k_1}{k_1}\right) < x_c \leq 0.5 \\ l_1 = 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) - x_c, l_2 = 0 &\quad \text{if } 0.5 < x_c \leq 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) \\ l_1 = 0, l_2 = 0 &\quad \text{if } 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) < x_c \end{aligned}$$

*Proof.* Candidates can always guarantee  $-k_1$  and  $-k_2$ , respectively, without investing. Therefore, the maximum possible equilibrium investment for candidate 1 is  $l_1 = \log\left(\frac{1+k_1}{k_1}\right)$ , with a total possible effect of  $\eta_1 \log\left(\frac{1+k_1}{k_1}\right)$ . For candidate 2, the maximum equilibrium investment is  $l_2 = \log\left(\frac{1+k_2}{k_2}\right)$ , with a total possible effect of  $\eta_2 \log\left(\frac{1+k_2}{k_2}\right)$

For the candidate who is behind after Election Day, the subgame perfect strategy is to invest if a win is possible and to not invest if the legal challenges are too expensive. Therefore, in elections where the election is close, but  $x_c$  favors the low resource candidate,  $0.5 - \eta_1 \log\left(\frac{1+k_1}{k_1}\right) < x_c \leq 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) - \eta_1 \log\left(\frac{1+k_1}{k_1}\right)$  the winning candidate must invest to prevent the higher resource candidate from stealing the election (which is a credible threat).

Consider  $x_c$  such that  $0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right) - \eta_1 \log\left(\frac{1+k_1}{k_1}\right) < x_c \leq 0.5 + \eta_2 \log\left(\frac{1+k_2}{k_2}\right)$  and first suppose that the resource advantaged candidate is behind on the Election Day total,  $x_c < 0.5$ . In this case, the sub-game perfect response for the advantaged candidate is to invest enough to steal the election,  $0.5 - x_c + l_2$ . Since the resource advantaged candidate is able to outspend the first moving candidate, her equilibrium response is to not invest. If  $x_c > 0.5$  then the resource advantaged candidate just needs to invest enough to deter the credible threat from her opponent.

This describes the complete sub-game perfect Nash equilibrium.

□

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