Campaign Spending, Diminishing Marginal Returns, and Campaign Finance Restrictions in Judicial Elections

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For years, scholars of elections have argued about whether campaign finance limitations adversely affect electoral competition. In this article, we examine how the institutional campaign finance restrictions differentially affect the performance of incumbents and challengers. Using elections for the state high court bench between 1990 and 2004, we demonstrate that candidate spending in judicial elections has diminishing marginal returns, but that the returns to challenger spending diminish more slowly than incumbent spending. Since this is the case, campaign finance restrictions that limit candidate spending disproportionately harm challengers, increasing the incumbency advantage and decreasing electoral competition. More specifically, we show that states with more stringent contribution limits have lower levels of candidate spending, and these restrictions thus put challengers at a competitive disadvantage.

For decades, pundits and scholars have voiced concern over the skyrocketing cost of American political campaigns. Amidst congressional efforts to restructure the U.S. campaign finance system, the U.S. Supreme Court held in *Buckley v. Valeo* (1976) that limits on campaign contributions were constitutional, but not mandatory limits on candidate expenditures. Since *Buckley* and the 1970s amendments to the Federal Election Campaign Act (FECA), campaign contributions have been strictly regulated in federal campaigns. Theoretical work examining the consequences of FECA (as modified by *Buckley)* for electoral competition suggests that "the 1974 Act does discriminate against challengers to the advantage of incumbents. The challenger begins with a disadvantage, and the effect of the Act's limitations on individual contributions takes that disadvantage as a precondition and exacerbates it" (Aranson and Hinich 1979, 452).

While this may be true of current federal campaign finance laws, it is unclear if this is true of campaign finance regulations more generally. This lacunae in our understanding is due to the lack of variation in federal law: all candidates for federal office are subject to the same regulations. This is certainly not the case in the U.S. states (Witko 2005). In this article, we examine the effect of differing campaign finance restrictions on electoral outcomes using state supreme court elections. The potential effects of these restrictions are not trivial. Supporters of campaign finance restrictions argue that they are a way to level the playing field when incumbents enjoy significant fundraising advantages. However, if candidate spending is limited, even if only by contribution limits, the democratic benefits of campaign spending, such as better-informed voters and higher voter turnout, may be attenuated (Coleman and Manna 2000; Hall and Bonneau 2008).

Here we focus on a significant democratic concern: the ability of challengers to meaningfully compete in judicial elections.[1] This concern arises when one considers the twin possibilities of diminishing marginal returns to campaign spending and differential effects of campaign spending for incumbents and challengers. Jacobson (1990) notes that regardless of the amount of money a candidate spends to

[1]Data and supporting materials necessary to reproduce the numerical results in the article will be made available at www.pitt.edu/cwb7 upon publication

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defeat an opponent, that candidate will almost certainly be unable to win 100% of the vote. While there is abundant evidence that campaign spending helps judicial candidates to increase their vote shares (Bonneau 2007a), it seems equally evident that an additional $10,000 of spending on top of the first $2 million will have less of an effect on vote outcomes than the first $10,000 a candidate spends.

Given the minimal marginal effects of spending at such high levels, it may seem quite logical to restrict candidate spending to avoid the appearance of runaway electoral costs. We suspect, however, that in reality campaign spending enables judicial elections (as well as elections more generally) to promote the value they are designed to provide. Judicial elections are intended to inculcate judges with a measure of accountability to citizen preferences (Hall 2001, 2007a). We argue that campaign spending, particularly on the part of challengers, is key to achieving the healthy level of competition requisite to the emergence of judicial accountability (e.g., Bonneau 2007a; Hall and Bonneau 2006, 2008).

Rather than being an argument on behalf of campaign finance restrictions, we contend that diminishing marginal returns to campaign spending actually produce an argument against restrictions on fundraising and spending when paired with the possibility that incumbent and challenger spending have differential effects. In the legislative context, several scholars have found that dollar for dollar, challenger spending seems to exert more influence on election outcomes than incumbent spending (Gierzynski and Breaux 1991; Goidel and Gross 1994; Jacobson 1985, 1990; Stratmann 2006). If campaign spending has stronger effects for judicial election challengers than incumbents, limiting campaign spending would eliminate the challenger's best hope for overcoming the sizable advantages of incumbency (Cover 1977; Gelman and King 1990). That is, campaign spending limits may make judicial elections uncompetitive, staid affairs where voter choice is unrelated to the candidates' qualities.

The Law of Diminishing Marginal Returns and Differential Spending Effects

In order to uncover the relationship between campaign finance restrictions and election outcomes, we must first discuss the nature of diminishing marginal returns and the effects such returns have on the performance of candidates.

The congressional elections literature makes it clear that the presence of diminishing marginal returns serves to decrease the incumbency advantage (e.g., Jacobson 1985, 1990; Stratmann 2006). While there is some controversy over whether incumbent spending matters (e.g., Gerber 1998; Green and Krasno 1988, 1990) or not (Aranson and Hinich 1979; Gerber 2004; Jacobson 1985, 1990), there does seem to be consensus that incumbent spending is not as efficacious as challenger spending. That is, $1 spent by the challenger gains him/her more votes than $1 spent by an incumbent. This is because, as Jacobson writes: ''Most incumbents evidently saturate the public with information about their virtues and accomplishments before the official campaign begins. Thus the additional campaigning they do during the election period has comparatively small payoffs, if any'' (1985, 24–25). Naturally, the opposite is true for the challenger: most challengers are largely unknown to the public. In order to become known (and thus viable candidates) they need to spend money. The more they spend, the better they perform (Jacobson 1980, 1990). Thus, the law of diminishing marginal returns serves to reduce the incumbency advantage. Without spending limits, challengers are able to overcome some of the advantages of incumbency (such as name recognition) simply by spending more money.

The effectiveness of campaign spending in judicial elections is well established. Bonneau (2007a) found that challenger spending affects electoral competition, but incumbent spending does not. Moreover, Hall and Bonneau (2006) show that as the spending differential between incumbents and challengers increases, the incumbent receives a higher percentage of the vote. In this regard, judicial elections appear to be quite similar to legislative elections (e.g., Bonneau and Hall 2009; Hall 2001, 2007a).

Although the effects of campaign spending are clear and diminishing marginal returns are possible, the applicability of the rationale for differential campaign spending effects in legislative elections may not be entirely applicable to judicial elections. Many of the tools legislative incumbents use for self-promotion while in office are not typically available to judicial incumbents. Judges do not call press conferences to generate ''free'' publicity, send franked newsletters to constituents, or participate in similar activities. Indeed, judicial elections may even provide a better setting in which to study the effects of

campaign spending because it provides a situation where we observe significant spending but where there are no contaminating effects from the many perquisites congressional incumbents enjoy (such as the franking privilege, funds for official travel, funds for official newsletters, etc.) but which judicial incumbents lack.

Supreme Court Elections, Campaign Spending, and the Appearance of Impropriety

Not only are state judicial races well-suited for the study of campaign finance law, but recent events have shown the importance of studying the effects of campaign spending in these races. In 2009, the U.S. Supreme Court handed down their decision in *Caperton v. Massey*. The case involved whether a judge who had benefited from a large amount of campaign contributions/expenditures from someone who had a case before the court, would be forced to recuse himself from the case. In a 5-4 ruling, the Court held that regardless of whether or not impropriety can be shown, the very appearance of impropriety (as opposed to actual bias) can require a judge to disqualify himself/herself. This case followed on the heels of *Republican Party of Minnesota v. White*, which invalidated state provisions prohibiting candidates from taking positions on issues during their campaigns.

In addition to recent U.S. Supreme Court decisions on the conduct of judicial elections, there has also been a general increase in the costliness of state supreme court races. In 1990, the average amount of money spent on a race was $364,348; by 2004, average spending had nearly doubled to $711,867 (in constant dollars). Moreover, these races are increasingly contested and competitive (Bonneau and Hall 2009). As a result of these changes in the nature of judicial elections, some have called for the eradication of these elections, or, minimally, significant campaign finance reform, such as increased restrictions on campaign contributions and/or moving to a system of public financing of elections. Contesting the reformers' chorus, however, scholars have generated a growing body of empirical evidence that suggests judicial elections promote accountability and that publicity stemming from campaign spending enables voters to make meaningful choices in these elections (Baum 1987; Bonneau and Hall 2009; Hall 2001, 2007b). Moreover, citizens express a high level of support (in excess of 80% in some states that use elections) for the practice of electing judges (Bonneau and Hall 2009).

Since efforts to eradicate elections have largely been unsuccessful, critics of elections have shifted a large measure of their efforts to changing the way these elections are funded and conducted. In 2002, North Carolina moved to a system of publicly financed elections for their state appellate courts. Wisconsin, in 2008, considered an expansion of its existing partial public funding system to entice more candidates to avail themselves of public money (and accept the spending caps tied to those funds). More common than spending caps, which must be voluntarily accepted under the provisions established by *Buckley v. Valeo* (and subsequent cases), is imposition of limits on the amount of money a donor may give to a candidate. These limits force candidates to raise money in small increments from many donors. All of these reforms may be even more important in light of the recent decision in *Citizens United v. FEC*, where the Supreme Court ruled that corporations and unions could not be prohibited from funding ''electioneering communications.'' While it is still too early to assess any changes in the conduct and funding of elections since this decision, some fear that *Citizens United* could dramatically alter the current landscape of elections.

In the context of state elections, campaign contribution limits have been shown to decrease the amount of money candidates are able to raise. Stratmann (2006) examines campaign spending in state House races and finds that in states with contribution limits on individual contributions, campaign spending is equally effective in increasing vote shares for incumbents and challengers. These results would seem to contradict those of Aranson and Hinich (1979). There is, however, a significant limitation that warrants caution in expecting Stratmann's results to apply to the context judicial elections. Stratmann measures a contribution ''limit'' as simply whether the state has a contribution limit on individual contributors. This crude measure obscures the richness of campaign finance law variation across the states. Many states also include limits on corporate or union contributions, in addition to other categories of contributors (Witko 2005). There is significant diversity in campaign finance regulation among the states. Fully exploiting this variation is key to understanding the electoral consequences of campaign finance regulations.

Hypotheses

Combining the evidence of diminishing marginal returns and differential effects for spending with that of the effects of campaign finance restrictions, we expect that states that make it more difficult for candidates to raise cash will have less competitive elections, on average, because challengers will not be able to raise sufficient funds to successfully counter the incumbency advantage. Thus, we must first discover whether or not diminishing marginal returns occur in state supreme court elections. If they do, then we need to examine whether or not they hurt the incumbent more than the challenger. Finally, if diminishing marginal returns occur and disproportionately hurt the incumbent, we need to examine whether campaign finance restrictions can serve to mitigate that effect and whether they reinforce the incumbency advantage.

The above discussion leads to the following three testable hypotheses:

> *H1:* Campaign spending in judicial elections has diminishing marginal returns.
>
> *H2:* Challenger spending in judicial elections has stronger marginal effects than incumbent spending.
>
> *H3:* Campaign finance restrictions affect candidate spending for both incumbents and challengers. If Hypothesis 2 is supported (i.e., challenger spending indeed has stronger marginal effects than incumbent spending), increasing campaign finance regulations will disproportionately harm the challenger. Conversely, loosening campaign finance regulations will disproportionately help make challengers more competitive.[2]

[2]One approach to testing this hypothesis would be to run descriptive statistics to see if incumbents perform better on average in states with more restrictive campaign finance laws. A simple difference of means test shows that incumbents do slightly worse in states with restrictiveness above the median ($\bar{x}_{restrict} = 56.9$) than in states that are below median restrictiveness ($\bar{x}_{loose} = 58.0$), though the relationship is not statistically significant in a frequentist *t*-test ($p = .53$). However, there are a number of problems with this approach that limit its usefulness. First, it likely suffers from omitted variable bias, since it leaves out a number of factors that we know are correlated with the incumbent's vote share (like campaign spending). Secondly, the use of descriptive statistics does not allow us to illustrate *why* incumbents might do better or worse under different regimes. The system of equations we propose below allows us to assess all three hypotheses, allows us to control for key variables, and by statistically tracing the effect of campaign finance through changes in spending levels and eventually to election outcomes, allows us to more thoroughly test the causal process posited by our theory.

Data and Variables

Data

We examine all contested incumbent-challenger races in state supreme court elections from 1990 to 2004. Following the well-trod path of legislative elections, our dependent variable to test Hypotheses 1 and 2 about diminishing marginal returns is the percentage of the vote received by the incumbent (Incumbent Vote). Higher percentages of the incumbent's vote correspond to decreased levels of electoral competitiveness. To test Hypotheses 3, we add two additional equations which have incumbent and challenger spending (in $100,000s, using constant dollars), respectively, as their dependent variables.

Our primary variables of interest for the incumbent vote share equation are incumbent and challenger spending. Naturally, we also include several other variables that scholars have found influence the competitiveness of the election: characteristics of the candidates, characteristics of the elections, and institutional arrangements. For the other two equations in the system, in which incumbent and challenger spending serve as dependent variables, the primary variable of interest is the level of campaign finance restrictiveness. As additional controls, we include most of the independent variables that appear in the first equation with the addition of a few others that have particular relevance to campaign fundraising and spending abilities. For convenience, a list of these variables and their exact coding can be found in Table 1.

Characteristics of the candidates. As mentioned above, the key independent variables of interest in this analysis are the amounts of spending by the candidates in the election. We collected the total amount of money spent by each candidate, as reported in their official campaign finance reports.[3] For incumbent-challenger races, consistent with the congressional and state legislative research (and Hypothesis 1), the amount spent by the incumbent (*Incumbent Spending)* should not affect the electoral support of the incumbent (Ansolabehere and Gerber

[3]We do not include expenditures made on behalf of candidates by independent groups because there is no way to reliably and systematically obtain this data. Unlike campaign spending reports that candidates must file with the state, the disclosure requirements for such groups are not as strict. Moreover, these groups often campaign for multiple candidates at a time, making the assignment of a specific spending total to an individual race impossible.

Table 1 Variable Descriptions

Variable	Description
Incumbent Spending	Campaign spending by the incumbent in $100,000s of 1990 dollars.
Challenger Spending	Campaign spending by the challenger in $100,000s of 1990 dollars.
Challenger Quality	1 = previous judicial experience and 0 otherwise.
Appointed First	1 = incumbent appointed to fill out the remainder of a term but who has not yet faced election and 0 otherwise.
Primary Competitive	1 = contested primary election, 0 otherwise.
Previous Competitive Race	1 = if a recent judicial election was decided by 55% of the vote or less, 0 otherwise.
State Party Competitiveness	Folded Ranney index of party competition, with a theoretical range of .5 (least competitive) to 1 (most competitive).
Murder Rate	Murders and non-negligent manslaughter per 100,000 population in the state, lagged one year.
Partisan	1 = partisan election, 0 otherwise.
District	1 = district-wide election, 0 = state-wide election.
Term	Length of term (in years).
Number of Lawyers	Number of Lawyers in the state.
% of Docket on Torts	Average proportion of state supreme court docket devoted to torts cases.
Disposable Income	State Per Capita disposable income (in thousands).
Voting Age Pop.	Voting Age Population (in millions).
Contribution Limit Restrictiveness Index	Number of restrictions placed on contributions from individuals, corporations, unions, self-funding, and family members (ranges from 0-6).

1994; Jacobson 1980, 1990) or at best have a relatively small effect (Green and Krasno 1988, 1990; Thomas 1989). However, contrary to the findings about incumbent spending, challenger spending (*Challenger Spending)* has been found to significantly affect the percentage of the vote received by the incumbent in a negative direction (Ansolabehere and Gerber 1994; Gierzynski and Breaux 1991; Jacobson 1978, 1980, 1990; but see Erikson and Palfrey 2000). That is, the more money spent by the challenger, the lower the incumbent's electoral support. We expect the same to hold true here.

In addition to the spending variables, there are two other candidate characteristics that should affect the incumbent's percentage of the vote. First, challengers with prior judicial experience (*Challenger Quality)* should fare better than candidates without such experience (Hall and Bonneau 2006), just as candidates with prior elected experience perform better than candidates without such experience in legislative races (Green and Krasno 1988; Jacobson 1980; Van Dunk 1997). Second, not all incumbents are alike. Incumbents who have previously won election have faced the electorate before and have had their candidacies approved. This is not the case for those who are facing their first election. Thus, incumbents who have not yet faced the electorate (*Appointed First)* may receive less electoral support than their previously elected colleagues (Bonneau 2007a).[4]

Characteristics of the election. Whether the incumbent was challenged in the primary (*Primary Competitive)* may also affect his or her level of electoral support. In the context of legislative and presidential elections, the literature on the effects of divisive primaries is mixed, with most studies showing a small negative effect for individuals who face a competitive primary.[5] Lazarus (2005) contends that this effect is particularly pronounced for incumbents, because it signals that the incumbent is weak even among those who should be his or her core supporters (but see Kanthak and Morton 2003). All else being equal, if an incumbent had to run in a primary as well as a general election, we expect his or her percentage of the vote in the general election will be lower.

The climate of state supreme court elections in the states should also affect electoral competition. That is, if there is a history of competitive high court elections in a state, one would expect future elections

[4]Candidate party identification is omitted because many of the races are nonpartisan. Moreover, the fact that rates of victory and spending are not significantly higher for one party or the other in our data should assuage concerns about the exclusion of candidate party identification from the model.

[5]See Gurian et al. (2009) for a thorough evaluation of this literature.

to also be highly competitive (Burbank and Friedman 2002). Consistent with previous studies (e.g., Hall and Bonneau 2006, 2008), we include a variable indicating whether there was a close state supreme court election in the most recent electoral cycle (*Previous Competitive Race)* and expect that a previous competitive state supreme court race will lead to a lower percentage of the vote for the incumbent.

Beyond the history of competitive high court elections in a state, we account for *State Party Competitiveness* more generally using a folded Ranney Index of party competition (Ranney 1965). The Ranney index is based on the percentage of the vote received by the parties' respective nominees for governor, the percentage of seats held by each party in the state legislature, and the amount of time the parties have held unified party control of the state government. We expect that the more competitive the state, the lower the incumbent's percentage of the vote.

Like other elected officials, state supreme court justices may be held accountable for issues perceived to be under their control. There has been a significant body of literature demonstrating that voters make retrospective decisions on incumbent governors and legislators based on the state of the economy (Atkeson and Partin 1995; Carsey and Wright 1998; Niemi, Stanley, and Vogel 1995). Applying this to state high court elections, Hall (2001) found that incumbent justices performed worse the higher the murder rate in their state, indicating that these incumbents were held responsible for the state of public safety. Consistent with this, we expect that there will be more competition in incumbent-challenger races the higher the murder rate in the year prior to the election (*Murder Rate)*.

Institutional Arrangements. The most fundamental institutional arrangement is the type of election. Some states elect their state supreme court justices on partisan ballots, while others do so on nonpartisan ballots. The only institutional difference between these two types of elections is that the political party affiliation of the candidate is listed on partisan ballots and omitted on nonpartisan ballots. However, this difference can be significant (e.g., Bonneau and Hall 2009). Thus, we include a variable that takes into account the type of race (*Partisan)*.

Additionally, not all supreme court candidates run in statewide elections. Thus, we include a dummy variable to take into account the electoral constituency of the election (*District)*. Districts tend to be more politically homogenous than states. Consequently, we expect there to be less competition in districts compared to statewide races (Bonneau 2007a).

Finally, the term of office may affect the incumbent's percentage of the vote. Longer terms should be more attractive to candidates since there is increased job security (Bonneau and Hall 2003). Thus, there should be more competition for seats that have longer terms of office (*Term)* associated with them.

Finally, we include a dummy variable for the year of the election, using 2004 as the baseline category, to control for any temporal effects (*1990, 1992, 1994, 1996, 1998, 2000, 2002*).

Additional Independent Variables for the Spending Equations. The incumbent and challenger spending equations include the same set of controls as the incumbent vote share equation with the exception of the murder rate variable which is not theoretically relevant to spending.[6] A number of additional factors are incorporated in the spending equations that do not appear in the incumbent vote share equation because they are related to spending but there is no theoretical reason to believe they would have direct effects on election outcomes. Among these variables, the one most central to our thesis is the stringency of contribution limits in each state (*Contribution Limit Restrictiveness Index*). In the literature on state campaign finance law, campaign finance stringency is typically measured using an index of the number of different entities that are limited in (or prohibited from) making contributions to candidates for state-level offices (Hamm and Hogan 2008; Witko 2005). We use Witko's (2005) measure of contribution limit stringency, which is based on the presence of a variety of bans or limits on individuals, corporations, unions, candidates, and candidates' family members in 2002 (the index ranges from 0 to 6 with 6 being the most restrictive). There is significant variation on this variable across states, with about 40% of our cases having either 0–3 restrictions, about 20% of cases having 3–4 restrictions, and about 40% having 5–6 restrictions. This measure is highly correlated with other measures of state campaign finance regulation developed by other scholars (Witko 2005).[7]

We expect that judicial candidates in states with more restrictive contributions limits will raise (and thus spend) less money than candidates in states with less stringent campaign finance regulations. Hypothesis

[6]When it is included in the spending equations, it is not statistically significant.

[7]Witko reports that ''these scores are fairly stable over time.'' See http://www.csus.edu/indiv/w/ witkoc/CampaignFinanceData Comments.htm (last accessed March 9, 2011).

3 posits that if, due to diminishing marginal returns, challengers benefit more from campaign spending than incumbents, the indirect effect of more restrictive campaign finance laws will be to increase incumbent vote shares. We do not test for a direct effect of the contribution limit restrictiveness index on incumbent vote share because there is no theoretical reason to believe contribution limits would have an effect on vote shares except by limiting campaign spending.

In addition to campaign finance stringency, there are four other control variables that are unique to this equation. The first such variable is the percentage of the docket in the state that is devoted to torts (*% of Docket on Torts*). While crime is perhaps the most salient issue for voters in judicial elections (Hall 2001), moneyed interests that make campaign contributions are typically most interested in high-stakes tort cases. Indeed, one only needs to look at the differences between the Texas Supreme Court and the Texas Court of Criminal Appeals. Both of these courts are courts of last resort; one deals exclusively with civil cases and the other exclusively with criminal cases. The only difference between these two courts is the docket. Bonneau (2007b) reports that from 1990 to 2004, an average of $1,155,125 was spent in contests for the Supreme Court, while only $116,841 was spent in contests for the Court of Criminal Appeals. What explains this large disparity? The presence of tort cases on the docket. Thus, we expect states with many torts cases to have candidates that attract more funds and thus spend more.

The other three controls in the spending equations pertain to the fundraising base in the state. One major factor determining the fundraising base is simply the size of the state's adult population. Where there are more people, candidates have more individuals they may approach for money (additionally, candidates who live in states with more people will perceive the need to raise more money to reach their broader audience). As such we control for states' *Voting Age Population* in millions. In addition to the sheer number of people in the state, one should account for the wealth of individuals in the state; candidates should be able to raise more money in states with a wealthier populations (consider Brady, Verba, and Schlozman 1995's evidence on the connections between wealth and various forms of civic participation, including campaign contributions). We accordingly control for state per capita *Disposable Income* in thousands of dollars. Finally, as lawyers represent the largest occupational group of contributors in most states (Dubois 1986; Nicholson and Nicholson 1994), judicial candidates seeking office in states that have a higher concentration of lawyers in their populations (*Number of Lawyers*) may be more successful in raising funds.

Model

In order to test our three key hypotheses, we must estimate a system of equations. The first equation models the incumbent's percentage of the vote as a function of incumbent spending, candidate spending, and the control variables discussed above. The second and third equations model incumbent spending and challenger spending, respectively, as a function of the restrictiveness of campaign finance laws in the state where the judicial election takes place plus controls. Reasonably straightforward cross-equation statistical tests will allow us to assess the indirect effect of campaign finance restrictiveness on incumbent vote percent posited in Hypothesis 3.[8]

The fundamental problem in assessing diminishing marginal returns is specifying a functional form. Perhaps the most common practice is to transform an independent variable, x, into a new variable, $x^\star$, and include $x^\star$ on the right-hand side of an OLS regression model. While a range of basic transformations, such as $x^\star = \ln(x)$ or $x^\star = \sqrt{x}$, each result in a functional form where each additional increment in x yields increasingly smaller gains in the dependent variable, the specific shape of the diminishing marginal returns varies with each transformation. Without theoretical guidance, there is little *a priori* reason to select one transformation over another.

One alternative to such hodge-podge specification searches is a transformation that includes a range of common functional forms as special cases: the Box-Cox transformation (Box and Cox 1964). For a strictly positive variable x the transformation is

$$x^{(\lambda)} = \frac{x^{\lambda} - 1}{\lambda}. \tag{1}$$

As λ varies, the rate at which marginal returns diminish varies. For example,

$$\lim_{\lambda \to 0} x^{(\lambda)} = \ln(x) \tag{2}$$

[8]Simultaneous estimation is necessary for making these cross-equation tests. Additionally, the standard errors from a two-stage approach would not properly account for the uncertainty in the estimates from the first stage, while simultaneous estimation of the equations allows the uncertainty from the spending equations to propagate through the entire model.

and for $\lambda = 1$, $x^{(\lambda)} = x - 1$, or a simple linear relationship. As λ approaches 1, the diminishing marginal returns occur a slower pace (i.e., the relationship is more nearly linear). One particular advantage of the Box-Cox transformation is that we can estimate different λ parameters for incumbents and challengers, allowing us to model differences in the rate of diminishing returns between challengers and incumbents.

Beginning with a simple linear equation, let y_i represent incumbent vote share, x_1 represent incumbent spending, x_2 represent challenger spending, and $\gamma_1 z$ represent a matrix of the remaining variables premultiplied by a vector of coefficients. If we apply the Box-Cox transformation in (1) above to both incumbent and challenger spending (with subscripted λ to indicate possibly different levels of diminishing marginal returns to spending), one finds

$$y_i = \alpha + \beta_1\left(\frac{x_1^{\lambda_1} - 1}{\lambda_1}\right) + \beta_2\left(\frac{x_2^{\lambda_2} - 1}{\lambda_2}\right) + \gamma z + \varepsilon_i. \quad (3)$$

Because the Box-Cox transformation makes the model nonlinear in the parameters, regular least squares estimation of the model is not possible. We take a Bayesian approach to estimation. The Bayesian approach has three advantages. First, it allows us to simultaneously estimate all of the parameters of the model, allowing uncertainty to propagate through the model and facilitating cross-equation hypothesis tests. Second, the Bayesian approach also makes the estimation of uncertainty around auxilliary predictions from the nonlinear model straightforward. Finally, because we have the universe of state supreme court elections 1990–2004 instead of a sample, classical statistical assumptions (e.g., repeated sampling from an infinite population) are not appropriate for our data. The second and third equations in the model have no nonlinear terms, so they can be approached with conventional linear methods.

We propose the basic model[9]

$$y_i \sim N(\mu_{1i}, \tau_1) \quad (4)$$

$$x_{1i} \sim N(\mu_{2i}, \tau_2) \quad (5)$$

$$x_{2i} \sim N(\mu_{3i}, \tau_3) \quad (6)$$

where

$$\mu_{1i} = \alpha_1 + \beta_1\left(\frac{x_1^{\lambda_1} - 1}{\lambda_1}\right) + \beta_2\left(\frac{x_2^{\lambda_2} - 1}{\lambda_2}\right) + \gamma_1 z \quad (7)$$

$$\mu_{2i} = \alpha_2 + \gamma_2 z \quad (8)$$

$$\mu_{3i} = \alpha_3 + \gamma_3 z. \quad (9)$$

We place diffuse Normal(0, .001) priors on the constant terms and the coefficients, Gamma(.01, .01) priors on the precisions, and Uniform(-2,2) priors on the shape parameters for the Box-Cox transformations in equation (1).[10]

A Word Regarding Simultaneity

Before we proceed to a discussion of the results, a word about simultaneity is in order. Some of the earliest studies of the effect of campaign contributions on election outcomes argued that campaign spending was endogenous because incumbents only spent large sums of money when they were in hotly contested races, making it appear in some instances that incumbent spending actually *decreased* their vote share (Green and Krasno 1988, 1990; Jacobson 1978, 1990). However, spending cannot logically be conceived of as "reciprocally caused" by the observed vote share because the actual vote share is not determined until after all of the campaign spending has taken place. Instead, spending is based on candidates' expectations about election outcomes. Following the literature on campaign spending in judicial elections (especially Bonneau 2007a) and state-level elections more generally (Gierzynski and Breaux 1991), we maintain that the effect of expectations on spending (which in turn effects election outcomes) can be controlled for, or in our case explicitly modeled, using a system of equations. We account for expectations of election outcomes based particularly on a wide variety of factors: the presence of a quality challenger, whether or not the previous high court election in the state was competitive, whether the race was partisan or nonpartisan, the level of state party competitiveness generally, and whether the primary was contested. By adequately controlling for the effects of these variables on campaign spending, we avoid the circumstances that led some early scholars to conclude that incumbent spending had a negative effect on incumbent vote share. With these controls in place, our system of

[9]We follow Bayesian convention in specifying the normal distribution in terms of the mean and precision (τ) as opposed to the mean and variance (σ^2). The relationship between the two is inverse, i.e., $\tau = \frac{1}{\sigma^2}$.

[10]We specify very diffuse priors on the parameters, but the priors on the λ values are specified as Uniform(-2, 2). Greene (2003) notes that least squares estimates of λ generally lie in the interval (-2,2). Rerunning the model with Normal(0, .001) priors does not change the substance of the results.

equations (the spending equations and the incumbent vote share equation) is recursive, so it may consistently be estimated without resorting to techniques for reciprocal causation (Gujarati 2003).

Results

Our estimation results appear in Table 2. MCMC estimation of the system via Gibbs sampling is carried out in the popular WinBUGS software (Lunn et al. 2000). We ran a single chain for 30,000 iterations, discarding the first 10,000 as a burn-in.[11] We obtain posterior distributions for α_m, the campaign spending coefficients β_j, the control variable coefficients γ_{mk}, and the Box-Cox shape parameters λ_j. We summarize these posteriors in Table 2 using the posterior mean as our point estimate and the 95% highest posterior density (HPD) intervals as expressions of uncertainty.

We test hypothesis 1 using the λ parameters on the Box-Cox transformed spending variables in the incumbent vote share equation. If there are diminishing returns to campaign spending, we should observe values of λ that are significantly different from 1. The test of Hypothesis 2 involves calculating marginal effects for the spending variables in the incumbent vote share equation to determine whether or not challenger spending is more efficacious than incumbent spending. The full system of equations is used to test Hypothesis 3 (the indirect effect of campaign finance restrictions on incumbent vote share). We assess how much a one-unit change in campaign finance restrictiveness affects spending using the incumbent and challenger spending equations and then use the coefficients on incumbent and challenger spending in the incumbent vote share equation to ascertain how much the decreased spending due to increased campaign finance restrictions affects incumbent vote share.

Hypothesis 1: Diminishing Marginal Returns to Campaign Spending

The first hypothesis to be tested is that campaign spending in judicial elections has diminishing marginal returns. One simple way to test for diminishing marginal returns is to consider the estimated values of the shape parameters, λ_1 and λ_2, for the Box-Cox transformations of incumbent and challenger spending, respectively. Recall that $\lambda = 1$ signifies a linear relationship. Neither of the 95% HPDs for incumbent spending and challenger spending contain 1, allowing us to reject the hypothesis of a linear relationship between campaign spending and vote outcomes. Some example predicted values more concretely illustrate the effect of diminishing marginal returns. Increasing spending at low levels (from $100,000 of spending to $200,000 of spending) improves the spender's vote share; that specific increase for an incumbent increases incumbent vote share by .999% (95% HPD of .222, 1.84) while that level of spending by a challenger decreases incumbent vote share by 2.155 (95% HPD of -2.922 to -1.394). In contrast, increasing spending from $500,000 to $600,000 for an incumbent increases incumbent vote share by only .218% (95% HPD of .036, .538); the same increase in spending for a challenger decreases incumbent vote share by .242 (95% HPD of -.976, -.383). The effectiveness of each additional unit of candidate spending decreases clearly for both incumbents and challengers.

Hypothesis 2: Differential Marginal Effects of Campaign Spending

Our second hypothesis holds that the effects of incumbent spending are generally weaker than the effects of challenger spending. Due to the nonlinear nature of the model, the marginal effects for incumbent spending are found by taking partial derivatives of (3) with respect to incumbent spending. Thus, incumbent spending has a marginal effect of

$$\frac{\partial y}{\partial x_1} = \beta_1 x_1^{\lambda_1 - 1}. \tag{10}$$

The same process for challenger spending yields

$$\frac{\partial y}{\partial x_2} = \beta_2 x_2^{\lambda_2 - 1}. \tag{11}$$

Because the marginal effects of spending vary as spending varies, the effects can be most elegantly portrayed graphically. Figure 1 shows the marginal effects for challenger spending while Figure 2 shows the marginal effects for incumbent spending. Both incumbents and challengers show clear diminishing marginal returns, but the pattern of diminishing returns is less steep for challengers than for incumbents. The marginal effects for challenger spending are at least over one-half of a percent of the vote through nearly $800,000 of spending and continue to have positive and statistically significant effects across the range of values of spending observed in the data, despite diminishing marginal returns. In contrast, while the

[11]Both the Geweke and the Heidelberger-Welch diagnostics indicate convergence.

TABLE 2 Incumbent Vote % and Campaign Spending System of Equations

	Eq. 1: Incumbent % Posterior Mean (95% HPD Interval)	Eq. 2: Inc. Spending in $100,000s Posterior Mean (95% HPD Interval)	Eq. 3: Chal. Spending in $100,000s Posterior Mean (95% HPD Interval)
Incumbent Spending$^{(\lambda_1)}$ (in $100,000s)	1.530* (.078, 2.862)	-	-
λ_1	-.141 (-.778, .633)	-	-
Challenger Spending$^{(\lambda_2)}$ (in $100,000s)	-2.984* (-4.175, -1.812)	-	-
λ_2	.109* (.009, .217)	-	-
Challenger Quality	-3.445* (-6.563, -.561)	1.123* (.240, 1.988)	1.460* (.606, 2.305)
Appointed First	-2.317 (-5.093, .395)	-.076 (-.960, .774)	-.463 (-1.301, .384)
Primary Competitive	1.067 (-1.117, 3.179)	.995* (.149, 1.860)	.413 (-.382, 1.252)
Previous Competitive Race	-1.327 (-4.280, 1.605)	.822 (-.170, 1.839)	1.836* (.875, 2.814)
State Party Competitiveness	-9.12 (-26.52, 7.58)	-7.820* (-14.93, -.702)	-6.149 (-12.95, .874)
Murder Rate	.507 (-4.403, 1.082)	-	-
Partisan	-4.195 (-8.282, .011)	-1.516* (-2.894, -.182)	-1.225 (-2.554, .085)
District	-7.234* (-12.14, -2.40)	1.684 (-.488, 3.831)	-2.522* (-4.603, -.454)
Term	1.569* (.343, 2.762)	.731* (.222, 1.250)	.554* (.053, 1.046)
Number of Lawyers	-	-.00026* (-.00036, -.00016)	.00006 (-.00003, .00016)
% of Docket on Torts	-	.137* (.107, .166)	.064* (.037, .093)
Disposable Income	-	.520* (.083, .989)	.146 (-.284, .582)
Voting Age Pop. (in millions)	-	1.086* (.612, 1.559)	-.435 (-.883, .028)
Contribution Limit Restrictiveness Index	-	-.487* (-.911, -.067)	-.476* (-.883, -.078)
1990	-7.98* (-13.42, -2.45)	5.004 (-.721, 10.66)	3.252 (-2.221, 8.687)
1992	-8.44* (-13.73, -3.06)	3.858 (-1.273, 8.928)	2.611 (-2.255, 7.521)
1994	-7.38* (-13.03, -1.54)	4.834* (.217, 9.273)	2.414 (-1.929, 6.749)
1996	-8.12* (-13.35, -2.81)	3.532 (-.583, 7.457)	2.900 (-1.018, 6.688)
1998	.154 (-4.852, 5.172)	3.467* (.153, 6.808)	2.028 (-1.148, 5.214)
2000	-3.439 (-8.603, 1.431)	1.915 (-.934, 4.727)	2.620 (-.108, 5.358)

TABLE 2 (Continued)

	Eq. 1: Incumbent % Posterior Mean (95% HPD Interval)	Eq. 2: Inc. Spending in $100,000s Posterior Mean (95% HPD Interval)	Eq. 3: Chal. Spending in $100,000s Posterior Mean (95% HPD Interval)
2002	-5.798*	.849	1.59
	(-11.28, -.281)	(-1.087, 2.803)	(-.304, 3.464)
Constant	57.47*	-11.54*	-1.481
	(39.84, 75.75)	(-22.80, -4.33)	(-12.57, 8.797)

*denotes that 0 is not contained in 95% HPD Interval

marginal effect of incumbent spending is statistically significant through about $300,000 of spending, it becomes statistically significant from there up through the highest observed values of spending. Even in the range of the data where incumbent spending has a statistically significant marginal effect, the marginal effect of challenger spending is greater than the marginal effect of incumbent spending.[12] In short, as hypothesized, while incumbent spending is not ineffective, it does not have the same magnitude of effect on election outcomes as challenger spending.

Hypothesis 3: Campaign Finance Restrictions Hurt Challengers more than Incumbents

Given that challenger spending has larger marginal effects than incumbent spending, we can now move to consider the indirect effects of campaign finance law on election outcomes. It is clear from the differential marginal effects of incumbent and challenger spending that any aggregate cap that decreases challenger spending puts the challenger at a disadvantage relative to the incumbent. Typically, however, instead of aggregate spending caps, the weapon of choice in campaign finance law has been to limit the size an individual or organization may contribute to a candidate's campaign. If these limits serve to reduce spending, they may indirectly advantage incumbent candidates.

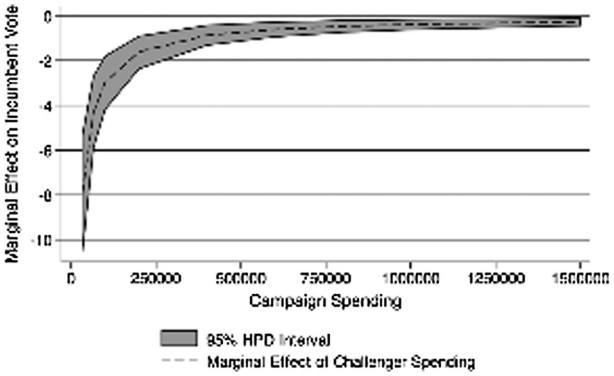
Returning to the results in Table 2, we find that the restrictiveness of state campaign finance law indeed decreases both incumbent and challenger spending, and the magnitude of the effect is similar for incumbents and challengers. A 1-point change in the 7-point campaign finance restrictiveness index decreases incumbent spending by about $48,700 on average and challenger spending by about $47,000, all else being equal.[13] These decreases in campaign spending translate into statistically and substantively significant changes in election outcomes.

For instance, if we move from the most restrictive value of our contribution limit index to the least restrictive value, predicted challenger spending increases by about $285,600 and predicted incumbent spending would increase by about $292,200. The increase in incumbent spending from the mean (just over $300,000) to about $292,200 above the mean increases the incumbent's vote by a modest .791% (95% HPD of (.070, 1.991)). In contrast, the additional challenger spending that comes from less restrictive campaign finance regulations is more efficacious. Increasing campaign spending from mean challenger spending (just under $200,000) to $285,600 above the mean decreases incumbent vote share by about 3.223%, with a 95% HPD of (-5.349, -1.09). In short, the decreased incumbent spending associated with stricter campaign contribution limits seems to have a relatively small effect on incumbent performance, while the decreased challenger spending is more consequential in its effects. If we take a hypothetical incumbent and challenger in a state with the most restrictive campaign finance laws who spend at average levels for their incumbency status, moving the state's campaign finance restrictiveness from the most restrictive to the least

[12]A formal test of the hypothesis that the marginal effect of spending for challengers plus the marginal effect of spending for incumbents is equal to zero was conducted across the range of the data. At the very lowest levels of spending (each candidate spends 10,000 or less), there is no significant difference between the effects of incumbent and challenger spending. However, from about $30,000 out to the maximum spending levels observed in the data, the marginal effect of challenger spending is significantly larger than the marginal effect of incumbent spending.

[13]While the coefficient on contribution limit restrictiveness differs slightly between incumbents and challengers, a simple cross-equation hypothesis test fails to reject the null hypothesis of no difference between the size of these coefficients.

FIGURE 1 Marginal Effects of Challenger Spending



restrictive results in the incumbent losing 2.432% of the vote, on average (a significant effect with a 95% HPD of (-4.515, -.158)). The results are clear that decreasing contribution limits improves challengers' ability to meaningfully compete against incumbents. While magnitude of changes in vote shares may seem small (2.432% for incumbents and challengers who spend at their respective means), it is important to remember that election campaigns are often decided by a relatively small margin. Indeed, in our data set, 10.8% of the elections involved an incumbent who won by less than 2.432%. Such a shift in the composition of state supreme courts could have significant effects for the decisions reached by those courts.

Results for Control Variables

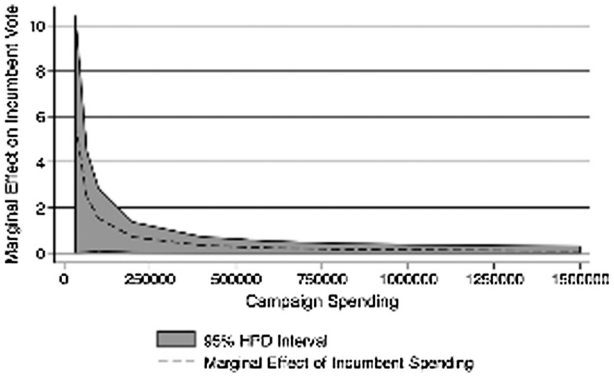
Consistent with the findings of Hall and Bonneau (2006), we find that quality challengers get about 3.4% higher vote shares than nonquality challengers, all else being equal. Quality challengers also lead to more vigorous fundraising on the part of both incumbents and challengers. We find no significant difference in terms of spending activity or incumbent performance between incumbents who have previously been elected and incumbents who were appointed first, but had not yet faced a contestable election.

Both the competitive primary election and previous competitive race variables are not significant in the incumbent vote share equation, though they do increase the amount of money candidates spend. More specifically, incumbents who face a contested primary election spend more money than those who do not. We suspect the reason this effect is significant for the incumbent but not the challenger is largely because the incumbent must bear the added cost of the primary election (expensive for an incumbent, while primaries for challengers are usually low cost). A previous competitive race for state high court increases challenger spending by about $183,600, on average. We suspect that the previous competitive race variable is not significant in the incumbent spending equation because incumbents already plan to spend for a competitive race.

General state party competitiveness does not directly effect incumbent vote share, but it appears that a very competitive state party environment cuts into incumbents' fund-raising abilities. A 0.1 increase in party competitiveness decreases incumbent spending by about $78,000; this decrease in incumbent spending translates into a negative indirect effect on incumbent vote share. While state party competitiveness does not directly increase challenger spending, the decreased ability of incumbents to raise and spend funds in more competitive states serves to advantage challengers. The coefficient on state murder rate is not statistically significant.

Among our controls for judicial institutional arrangements, we find that challengers tend to do better in district based elections. This may be because challengers have a smaller geographic space and audience in which to campaign. Still, we find that the smaller fundraising base of district elections seems to hurt challengers' levels of spending (though district-based elections do not hamper incumbent spending). While we had expected that the added attractiveness of longer terms would increase competitiveness, we find that longer terms seem to advantage the incumbent, with each additional year of the term increasing incumbent vote share by about 1.6%, on average. It may be that the advantages of incumbency accrue over the years of the term, including favorable coverage and

FIGURE 2 Marginal Effects of Incumbent Spending



more time for citizens to identify the judge as "their judge." The added prize of a longer term does lead candidates to spend more in their quest to win a seat, with incumbent spending increasing the most per added year of term length, on average. Partisan election arrangements have no significant direct effect on incumbent vote share, but incumbents running in partisan elections do appear to spend slightly less than those in nonpartisan elections (recall that this effect is observed controlling for our other variables). This makes for a small negative indirect effect of partisan elections on incumbent vote share.

Among the variables that appear only in the spending equations, we find that the percentage of a state's docket devoted to torts increases both challenger and incumbent spending as expected. We had hypothesized that a larger population would provide a larger fund-raising base (as well as requiring more spending to reach the larger population) but find that the population variable is only significant in the incumbent spending equation. It may be that only incumbents are able to capitalize on the larger donor base. Similarly, we find that incumbent spending increases with state per capita disposable income but that challengers do not appear to reap benefits from a wealthier donor base. The number of attorneys in a state has no statistically significant effect on challenger spending, but has a small (though statistically significant) negative effect on incumbent spending.

Conclusion

Campaign finance restrictions like contribution limits are often promoted as a democratic good, touted as a method for "leveling the playing field" between incumbents and challengers (International Institute for Democracy and Electoral Assistance 2002). The evidence we present here suggests otherwise, showing that these limits disproportionately handicap challengers. Given that challengers already face an uphill battle against incumbents, depriving them of the funds they need to compete virtually sentences challengers to defeat.

Critics of judicial elections have, at times, faulted elections for failing to promote the very virtue they are designed to provide: accountability to citizens. These results show that contribution limits (and likely any other reform that limits candidate spending) disadvantage challengers, making judicial elections less competitive. In the absence of meaningful competition, incumbents have little incentive to be accountable to citizens. Campaign finance restrictions serve to decrease accountability and reinforce the incumbency advantage.

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