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Simultaneity Bias in Campaign Spending Games

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SIMULTANEITY BIAS IN CAMPAIGN SPENDING GAMES

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Abstract

In this paper, I replicate Erikson and Palfrey (2000) who propose that the simultaneity problem in measuring the effects of candidate spending can be resolved by restricting the sample to close elections. Vote-on-spending effects, which vary with the expected closeness of the election outcome in a systematic way, determine the extent of simultaneity bias. The simultaneity bias becomes progressively more severe as the anticipated vote margin decreases, plaguing the estimates of spending-on-vote effects on the full sample. In the range of a 50-50 expected vote, however, the vote-on-spending effects approach zero. Thus, by restricting the sample to extremely close races, I obtain unbiased estimates of candidate spending effects.

I then extend their model using data that includes elections that took place after a pair of major campaign finance reforms: the Bipartisan Campaign Reform Act of 2002 and the Citizens United v. Federal Election Commission ruling of 2010. The BCRA heightens the perceived effectiveness of candidate spending by removing the hidden substitute for candidates' campaign funds, namely, soft money. After the Citizens United ruling, however, as soft money starts to play a crucial role in electoral campaigns, candidates' own funds matter less. The ruling appears to amplify incumbency advantage, perhaps because incumbents take advantage of their non-monetary incumbency benefits to attract soft money donations. This paper contributes to the ongoing debate in academia over the causal connection between candidate spending and vote share by presenting evidence that campaign spending has significant effects on election outcomes.

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1. Introduction: The Problem of Causal Feedback

Free, fair, and competitive elections held on a regular basis are crucial for a healthy democracy. Most congressional races in the United States, however, are lopsided in favor of the incumbent. Challengers find it difficult to overcome the incumbency advantage, and thus, they often fail to offer more than token challenges. In the absence of competitive challengers, incumbents may have little incentive to respond to voter preferences and promote their constituents' interests. What prevents challengers from presenting sufficient challenges to incumbents?

A number of factors contribute to incumbency advantage. Under the seniority system, a veteran representative is expected to deliver policy favors more effectively than a freshman representative. Thus, voters tend to vote for an incumbent over a challenger (McKelvey and Reizman 1992). In addition, by redrawing district lines to prevent competition, incumbents are able to further increase their winning prospects (Cox and Katz 2002). Direct officeholder benefits, such as franking privileges, media exposure, and fundraising advantages, help an incumbent gain momentum by raising voters' perception of his electoral competitiveness (Levitt 1997). In turn, the initial momentum built, in large part, by an incumbent's wider name recognition reinforces his fundraising advantage by attracting donors, who tend to invest in a likely winner (Morton and Myerson 2012).

While incumbents may have an advantage in raising money, much empirical work suggested that they actually receive fewer votes than their challengers for each dollar spent. The literature on campaign spending prior to Jacobson's seminal paper "The Effects of Campaign Spending in Congressional Elections" (1978) used ordinary least

squares regressions (OLS) to measure the effects of candidate spending on obtaining an additional vote. Surprisingly, the central finding of this literature was that incumbent spending has a negligible effect on the incumbent's reelection chances (e.g., Abramowitz 1998, Jacobson 1980, 1985). As Gerber (1998) points out, some studies even showed that incumbent spending actually reduces the incumbent vote share. Thus, scholars have been hesitant to endorse the view that money is a major source of incumbency advantage.

The puzzling, and seemingly implausible, estimate of counter-productive incumbent spending effects arises from the model's failure to capture the reciprocal causality between a candidate's fundraising efforts and his winning prospects. For instance, incumbents may be using a smaller portion of their budget for actual vote-winning activities because they are already expecting a landslide victory against a low quality challenger. Or, incumbents may receive less bang-for-their-buck than challengers due to saturation, as they begin the race with an established brand. Similarly, failure to account for the effects of challenger quality on a candidate's spending decision plagues the estimates of spending-on-vote coefficients with simultaneity bias. A low quality challenger may be serving his party through a ceremonial candidacy, with little prospect of victory. Conversely, for a strategic, high quality challenger who chooses to run against a weak incumbent, the conventional OLS model may yield unusually high, upward-biased estimates of spending effects.

To correct for the simultaneity problems, I replicate Erikson and Palfrey (2000)'s approach to estimate the marginal effects of candidate spending in the face of bidirectional causality. Their data includes 1792 House races, 1974-80 and 1984-90, which involve veteran incumbents who won a race from the same district in the previous

election. Their model predicts that the simultaneity bias becomes progressively more severe as the expected incumbent vote share increases. As a result, in extremely close races, estimates of spending effects will be shielded from the simultaneity bias that plagues the regression on a wider sample which includes both safe and competitive races. Thus, by restricting the sample to competitive districts, where the determinants of the expected vote have little influence on candidates' spending decisions, Erikson and Palfrey are able to obtain unbiased estimates of candidate spending effects.

Erikson and Palfrey's sample ends in 1990, but there have been two major campaign finance reforms since then. In 2002, the Bipartisan Campaign Reform Act (henceforth referred to as the BCRA) prohibited the use of soft money – nonfederal money raised outside the prescribed limits of federal campaign finance laws – in political campaigns. Then, in 2010, the Citizens United v. Federal Election Commission ruling overturned the BCRA by permitting the use and transfer of soft money. By changing the role of soft money in political campaigns, it is likely that the two campaign finance reforms altered the costs of candidates' fundraising efforts and capacities. Using a longer time series data through 2012, I explore the impact of the BCRA and the Citizens United ruling on campaign spending effects.

I proceed as follows. Section 2 reviews statistical solutions to the simultaneity bias. Section 3 introduces the three-equation system used to obtain unbiased estimates of spending-on-vote effects. Section 4 describes the data I analyze. Section 5 presents my replication results. Section 6 builds upon Erikson and Palfrey's work by examining the impact of the BCRA and the Citizens United on candidates' campaign spending effects. Section 7 concludes.

2. Literature Review: Statistical Solutions to the Simultaneity Bias

Several statistical methods have been proposed as a solution to the problem of causal feedback. Jacobson (1978) applies a two-stage least squares (2SLS) regression model, using a measure of the challenger's political experience as an instrument for challenger's expenditures. He shows that even when purged of simultaneity bias, the 2SLS results recapitulate the OLS finding that challenger spending is more effective than incumbent spending.

Green and Krasno (1988) criticize Jacobson's failure to include the independent influence of challenger quality in his model. Incumbents that are faced with high quality challengers raise and spend more money than safe incumbents who are against a low quality challenger. Thus, failure to control for the effects of challenger quality plagues the estimates of spending effects with endogeneity bias. To account for the influence of challenger quality on each candidate's spending decision, Green and Krasno constructed a scoring scale for traits that are likely to affect the electoral outcome, such as physical attractiveness or skill. As a proxy for another possibly endogenous regressor – incumbent spending in the current election – they rely on the lagged value of incumbent spending.

Green and Krasno (1988) depart from Jacobson's analysis by concluding that incumbent spending effects are statistically significant. Challenger spending effects, on the other hand, are not only lower than estimated in Jacobson (1978), but also subject to diminishing marginal returns. The validity of their approach, however, depends on the problematic assumption that incumbent expenditures in the previous election have no effect on the outcome of the current election. Oftentimes, incumbency advantage in the current election is a cumulative result of spending in the past. Incumbent spending in the

past election carries over to the current election cycle to improve and sustain the durability of incumbency advantage, which undermines the validity of Green and Krasno's key assumption.

Moreover, as Gerber (1998) points out, due to the lack of an adequate instrument for challenger spending, Green and Krasno are forced to treat challenger spending as exogenous. Treating challenger spending as an exogenous variable becomes problematic, since the spending decisions of both incumbent and challenger jointly affect the outcome of the election. Gerber improves upon the existing literature by treating both challenger and incumbent spending as endogenous. To do so, he employs a new set of instrumental variables – variables that are likely to influence campaign spending without directly affecting the election itself, such as state population and challenger wealth. State population is a valid instrument; while there is no causal relationship between population and vote share, it does influence candidate spending levels as candidates from smaller states raise larger sums per capita than those from populous states. Gerber's choice of challenger wealth as an instrument, on the other hand, is questionable. Candidate wealth may affect vote-share by influencing voters' perception of the candidate's viability (or lack thereof). To some voters, a candidate's fame as a business executive may imply a lack of good governance skills. Other voters may be particularly supportive of the idea of business executives making a leap into political office. In both cases, candidate wealth will have a direct impact on the electoral outcome. Gerber's 2SLS model may therefore still be subject to the problem of endogeneity.

In an alternative approach, Erikson and Palfrey (1998) apply the "uncorrelated errors" model to control for the problem of causal feedback. Due to bidirectional

causality between X and Y, a simple OLS estimate represents the correlation between X and Y, not the effect of Y on X. The correlation between X and Y, in turn, consists of some combination of p_{xy}, the effect of Y on X; p_{yx}, the effect of X on Y; and the correlation between the error terms (Erikson and Palfrey 1982).

With the assumption that the correlation between error terms is zero, the correlation between X and Y is attributed solely to the two reciprocal paths between X and Y. Using an instrumental variable that affects Y only through X, one can estimate p_{yx}, which can then be used to estimate the unknown path p_{xy}, the effect of Y on X. Thus, assuming that shocks to incumbent and challenger spending are uncorrelated allows unbiased estimation of the effect of spending on votes.

The uncorrelated errors model, however, "over-adjusts" for the causal feedback between campaign spending and vote share as it assumes that candidates have access to perfect information about the election. The model fails to account for the fact that while candidates may have access to additional information that is not captured in the simple OLS model, such information may still be imperfect.

To account for the disparity between the uncorrelated errors model and the conventional OLS approach, Erikson and Palfrey (1998) construct a parameter λ to measure how well candidate spending responds to national short-term forces and to the unobserved residual of the vote equation. λ captures candidates' perception of forces that can potentially affect the election outcome, such as local campaign-specific circumstances or the prior election's short-term forces. Using maximum likelihood estimation, Erikson and Palfrey obtain different values of λ for veteran incumbents, veteran challengers, freshmen incumbents, and freshmen challengers.

Through this specification, they find that the challenger spending effects remain stable throughout an incumbent's career cycle, whereas incumbent spending effects decline considerably after the freshman election and continue to run into diminishing marginal returns. Yet, incumbents offset their relative disadvantage in spending effects by outspending their challengers. After about the fifth term, however, the incumbent's net spending effect becomes negative due to the progressively lower efficacy of incumbent spending. Erikson and Palfrey conclude that while challengers may find it difficult to combat freshmen incumbents' initial spending advantage, they enjoy a competitive spending effect against senior incumbents whose extra dollar fails to earn them as many votes as before.

Erikson and Palfrey (2000) use a game-theoretic approach to neutralize the effects of candidates' expectations of the election outcome on their spending decisions. They solve for the Nash equilibrium of a spending game between challenger and incumbent, defined as a pair of spending decisions for each candidate, I* and C*, through which each maximizes his payoff, given the spending level of the opponent and the current electoral conditions. Both I* and C* vary with the anticipated vote margin in a systematic way. They both decrease in elections that favor the incumbent, and increase in elections where the anticipated vote margin is small. In the closest possible race, in which the anticipated vote margin is zero, equilibrium spending is maximized for both candidates. As a result, for extremely close races, the slope of spending with respect to expected vote share approaches zero. Thus, the vote-on-spending effects that cause the simultaneity bias are virtually nonexistent in this region. However, the vote-on-spending slope becomes steeply negative in safe districts. Consequently, the extent of simultaneity bias becomes

progressively more severe as the expected vote margin increases in favor of the incumbent.

The vast majority of races in the U.S., however, are lopsided in favor of the incumbent. Thus, even if instrumental variables are employed to control for candidates' expectations of the election outcome, prior studies that pool data across both safe and competitive districts are fundamentally flawed. Erikson and Palfrey (2000) depart from the prior studies by focusing on the range of a 50-50 expected vote, in which the spending-on-vote effects are shielded from the simultaneity bias that plagues the estimates on a wider set of races.

3. Model

I replicate Erikson and Palfrey's estimation of spending-on-vote effects using the following three-equation system.

$$V = \beta_{VC}C + \beta_{VI}I + \gamma Z + \varepsilon_V \quad \textbf{(1)}$$
$$C = \beta_{CV}V + w_C \quad \textbf{(2)}$$
$$I = \beta_{IV}V + w_I \quad \textbf{(3)}$$

where
V= incumbent percentage of the (two-party) vote;
C=the log of challenger spending (in 1978 dollars)
I=the log of incumbent spending (in 1978 dollars)
Z=an instrumental variable, used as a measure of anticipated incumbent vote that is uncontaminated by spending effects
β_{CV} = Challenger's vote-on-spending effects
β_{IV} = Incumbent's vote-on-spending effects
β_{VC} = Challenger's spending-on-vote effects
β_{VI} = Incumbent's spending-on-vote effects
$w_I = \beta_{IV}u_I + \varepsilon_I$ and $w_C = \beta_{CV}u_C + \varepsilon_C$ (includes vote-on-spending effects, imperfect signal observed by candidates, and noise term)

Equation (1) is a 2SLS model which estimates the effects of the expected incumbent vote on the incumbent and challenger spending. As vote-on-spending effects vary with expected vote margin in a nonlinear way, spending-on-vote effects must be estimated contingent on the value of Z, the expected incumbent vote. The systematic variation of β_{CV} and β_{IV} enables easy grouping of the sample into progressively more problematic bins, as the strength of the vote-on-spending effects determines the extent of the endogeneity bias. Following Erikson and Palfrey, I group the sample into four cases according to different values of Z,: $Z < 52; 52 < Z < 55; 55 < Z < 58; 58 < Z$.

As established in the previous section, the simultaneity bias vanishes in the neighborhood of a 50-50 expected vote, yet becomes progressively more severe as the expected vote margin increases. Thus, by restricting the sample to cases in which Z<52, a subset of races for which the game-theoretic model predicts near-zero simultaneity bias, I derive unbiased estimates of spending-on-vote effects.

Conceptually, the disturbances in equations (2) and (3) include the effects of unmeasured sources of the vote on each candidate's electoral expectations. As in Erikson and Palfrey (1998), the uncorrelated errors assumption applies to the covariances between the error term of the vote and each spending variable, but not between the two spending variables. By assuming nonzero effects of incumbent and challenger spending on each other, the model can capture the following possibilities: 1) Spending by one candidate may affect the other's spending decision, apart from an indirect effect via the expected vote; 2) Factors such as district demographics and the nature of the local media market can affect both spending variables, independent of the expected closeness of the race (Stratmann 2007).

4. Data

My data come from Gary Jacobson. The data cover every House election from 1972-2012. Jacobson's data, however, are not identical to that of Erikson and Palfrey, perhaps due to the retrospective nature of the campaign finance reports. In my replication of Erikson and Palfrey (2000), I use 2122 contested House races, 1974-80 and 1984-90, only including veteran incumbents who were elected in the same district in the previous election. Freshmen incumbents are excluded from the analysis as they tend to enjoy unusually high spending effects due to the surge of electoral success in their first reelections. Thus, of the 3480 House elections from this period, I exclude 891 races that involved freshmen incumbents or seats not defended by major party incumbents. Since the focus of my analysis is the disparity between the incumbent and challenger spending effects, I also exclude 337 races that did not have a challenger up against a veteran incumbent, such as races for an open seat or elections involving two freshmen incumbents. To match Erikson and Palfrey's data, the 1982, 1992, and 2002 races were excluded from my analysis, because the lagged incumbent vote of the previous elections did not match the 1982/1992/2002 incumbent vote due to redistricting. Table 1 shows summary statistics for the key variables used in the analysis.

TABLE 1. Summary Statistics for Model Variables

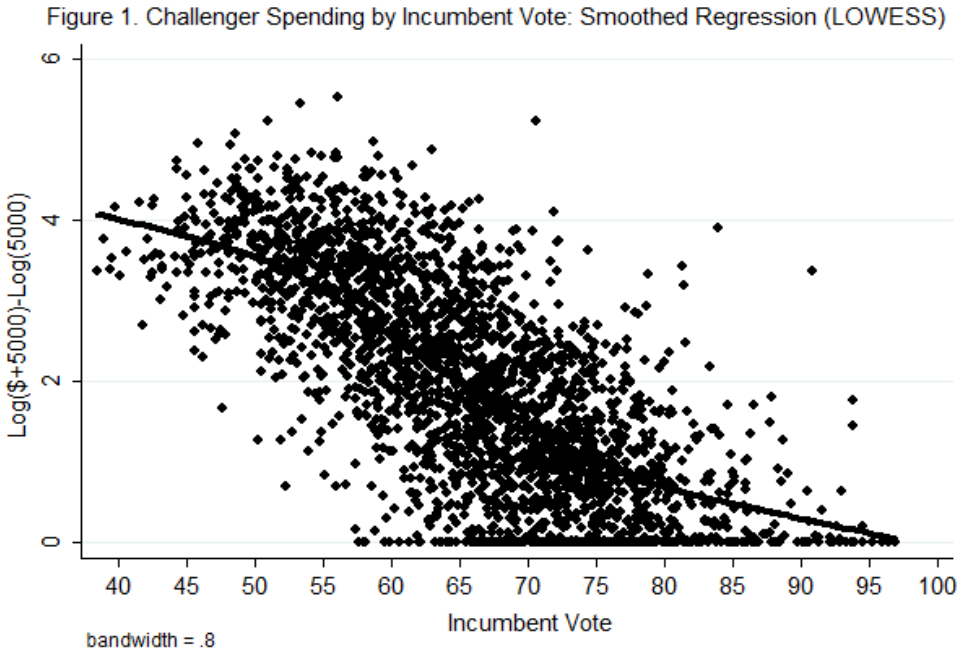
Variable	Mean	Standard Deviation	Skewness	Kurtosis	N
Incumbent Vote Share	65.66	9.92	0.13	2.98	6583
District Presidential Vote for the Incumbent Party	57.11	12.13	0.27	3.35	7748
Logged Incumbent Spending	3.76	0.91	-0.56	3.99	7738
Logged Challenger Spending	2.09	1.49	0.29	2.06	6514

I replicate Erikson and Palfrey (2000)'s construction of the instrumental variable Z, the measure of the expected incumbent vote that is uncontaminated by spending effects. I obtain Z from a reduced-form regression that predicts the incumbent vote from a number of exogenous sources: lagged incumbent vote; district presidential vote for the incumbent's party; fixed effects for year, incumbent party, a dummy for southern states, and the relevant interaction terms generating separate intercepts for different groups according to year, incumbent party, and region (South/non-South), such as "non-southern 1974 Republicans."

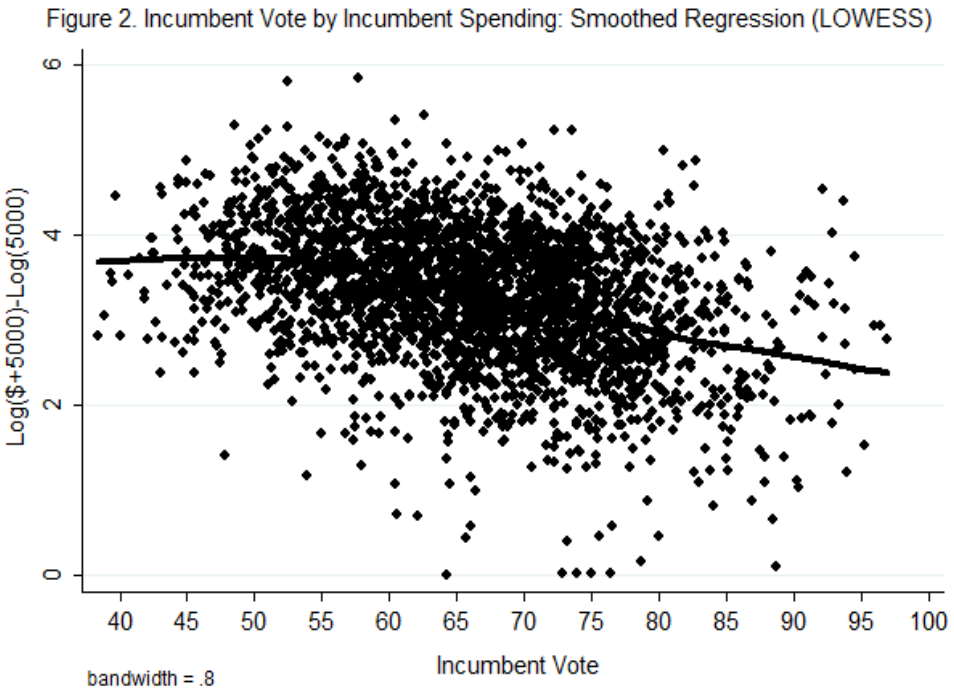
5. Replication of Erikson and Palfrey (2000)

Figure 1 is a scatter plot of the logarithm of real challenger spending (in 1978 dollars) in the U.S. House elections between 1972-1980 and 1984-1990 against incumbent vote share. The fitted nonlinear regression line shows that challenger spending reaches its maximum near 40% of the incumbent vote and slightly decreases thereafter. Challengers' spending pattern as shown in Figure 1 closely replicates the pattern shown in Erikson and Palfrey (2000). The downward sloping regression line becomes steeper when incumbent vote share exceeds 50%.

Similarly, as predicted by Erikson and Palfrey (2000)'s theoretical spending game, Figure 2 shows that incumbent spending is maximized in the range of 40-55% incumbent vote share. On the other hand, when the incumbent vote share exceeds 55%, incumbent spending begins to decline as incumbents feel safe.

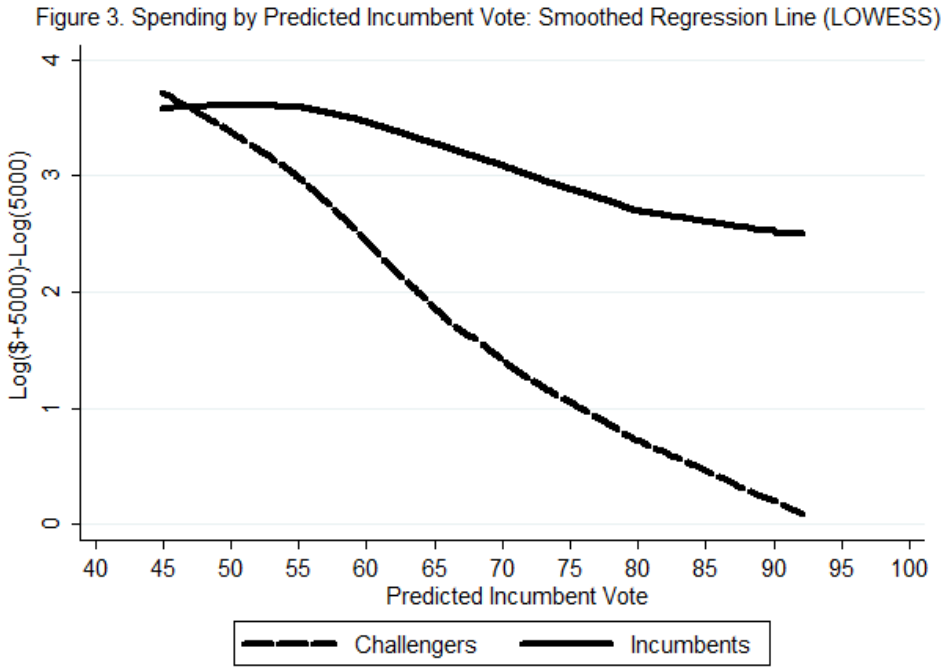


Challengers increase their spending in close elections, when the electoral outcome is slightly in favor of challengers.



Incumbents maximize spending in the range of 40-55% incumbent vote share. This is consistent with Erikson and Palfrey's finding that incumbents tend to spend more in close elections.

Figure 3 displays the effects of anticipated vote (Z) on spending. The vote-on-spending slopes replicate the patterns in Figures 1 and 2. Consistent with Erikson and Palfrey (2000)'s theory, despite the decrease in the level of effort on the part of both incumbents and challengers, the safer the expected outcome of the race, the larger the spending gap between the incumbent and challenger. The incumbent's chances of victory rise as the challenger quality declines. Consequently, when the seat is perceived as safe for incumbents, the decline in both challenger quality and challenger's winning prospects makes it harder for the challenger to raise money for a given level of effort. Therefore, an incumbent's advantage over a challenger in raising and spending campaign funds increases with the incumbent's likelihood of winning.



The gap between incumbent and challenger spending virtually disappears in very competitive districts. Incumbents' spending advantage over challengers increases in safe races.

However, note that the spending gap virtually disappears in close races where the predicted incumbent vote is slightly below 50%. All else equal, challengers spend more when their electoral prospects are good, whereas incumbents tend to spend more when they are in electoral trouble (Erikson and Palfrey 2000). Therefore, in general, challenger spending is positively correlated with challenger vote share, whereas incumbent spending is negatively correlated with incumbent vote share. Conventional OLS models are thus likely to overestimate the challenger spending effect and underestimate the incumbent spending effect. Since approximately 95% (2014 of 2122) of the U.S. House elections are lopsided in favor of the incumbent, conventional OLS models give rise to the

puzzling result that incumbent spending has little or no effect on obtaining votes, while challenger spending does.

Candidates' ability to raise and spend campaign funds is determined by the level of effort and winning prospects. In the range of 45-55% expected incumbent vote, the incumbent's ability to raise campaign funds is jeopardized by poor electoral chances, which offset the increased effort, leading to a flat curve as shown in Figure 3. Therefore, incumbent spending in this range can be treated simply as exogenous and thus be estimated via OLS. Challenger spending, on the other hand, exhibits no such flat area. An increase in the winning prospects amplifies, rather than offsets, the increased effort, leading to a steep curve; for challengers, the higher the chance of winning, the greater the amount of spending. Thus, the difference in the magnitude of the two slopes in the range of close elections implies that Erikson and Palfrey's approach more reliably predicts incumbent spending effects than it does challenger spending effects. Still, the slope of the challenger spending is flatter in the range of close races than in safer races. Thus, restricting the sample to the range of close races will reduce the bias. Furthermore, a high variance for challenger spending, as exhibited by the relatively steeper challenger spending curve, will attenuate the remaining upward bias of the OLS estimate of the spending-on-vote coefficients (the reader is referred to Erikson and Palfrey 2000 for mathematical detail).

Table 2 displays three different estimates of the spending effects coefficients from equations that predict the effects of incumbent and challenger spending using the measure of expected vote.

The three columns respectively display Erikson and Palfrey's original estimates (Erikson and Palfrey 2000 Table 1), naïve OLS estimates, and replication regression estimates using a robust regression technique (the last two each estimated using Jacobson's data). Robust regression excludes high leverage data points from the analysis and down-weighs data points with large absolute residuals[1].

The first row displays spending coefficients for extremely close races with an incumbent vote below 52%. In contrast to Erikson and Palfrey, whose estimates yield virtually identical coefficients for incumbent and challenger spending effects, both OLS and robust regression reveal that a dollar spent by a challenger is more effective than a dollar spent by an incumbent. However, both incumbent and challenger spending still matter significantly in close races across all three columns, even after controlling for high leverage data points and outliers. The extent to which estimates in the third column resemble the coefficients in the first column confirms the robustness of Erikson and Palfrey's model by showing that their estimates were not simply driven by anomalous data points.

In relatively close races with an incumbent vote in the range of 52-55%, I see a slight decrease in the magnitude of both incumbent and challenger spending coefficients in all estimates. However, similar to the case above, challenger spending is more effective than incumbent spending.

[1] I use STATA's rreg command with the default settings.

Table 2. Regression of Spending on Incumbent Vote by Expected Incumbent Vote (Z)

Z<52%	**(1) Original**	**(2) Naïve OLS**	**(3) Replication**
CE	-4.11	-5.68***	-5.21***
	(-3.49)	(1.114)	(1.287)
IE	4.04	4.05***	3.65**
	(2.21)	(1.363)	(1.530)
Constant	50.55	55.50***	55.65***
	(2.23)	(3.899)	(4.211)
Observations	40	34	39
Adj. R^2	0.193	0.421	0.275
52<Z<55%	**(1) Original**	**(2) Naïve OLS**	**(3) Replication**
CE	-4.37	-4.47***	-4.00***
	(-7.80)	(0.979)	(0.576)
IE	3.06	3.28***	4.01***
	(3.64)	(0.979)	(0.914)
Constant	16.72	56.38***	51.73***
	(0.48)	(3.382)	(3.157)
Observations	77	74	65
Adj. R^2	0.457	0.395	0.437
55<Z<58%	**(1) Original**	**(2) Naïve OLS**	**(3) Replication**
CE	-2.94	-3.53***	-3.62***
	(-6.47)	(0.489)	(0.485)
IE	0.86	1.75***	2.05***
	(1.59)	(0.703)	(0.701)
Constant	34.21	60.70***	59.67***
	(1.10)	(2.316)	(2.303)
Observations	119	124	128
Adj. R^2	0.291	0.294	0.300
Z>58%	**(1) Original**	**(2) Naïve OLS**	**(3) Replication**
CE	-3.41	-4.79***	-4.79***
	(-26.34)	(0.139)	(0.138)
IE	-0.10	-0.96***	-0.91***
	(-0.56)	(0.210)	(0.209)
Constant	54.10	79.11***	78.87***
	(17.52)	(0.636)	(0.635)
Observations	1556	1890	1893
Adj. R^2	0.675	0.458	0.458
All Cases Pooled	**(1) Original**	**(2) Naïve OLS**	**(3) Replication**
CE	-3.36	-5.24***	-5.26***
	(-27.83)	(0.129)	(0.129)
IE	0.07	-0.64***	-0.59***
	(0.38)	(0.210)	(0.205)
Constant	53.92	78.27***	78.08***
	(19.56)	(0.621)	(0.624)
Observations	1792	2122	2122
Adj. R^2	0.722	0.509	0.507

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes for Table 2: I replicated Erikson and Palfrey's original estimates using robust regression which drops high leverage outliers. All three columns show that both incumbent (IE) and challenger spending (CE) matter significantly in close races. The simultaneity bias appears gradually as the expected incumbent vote share increases, underestimating the incumbent spending effects while overestimating the challenger spending effects. When the expected incumbent vote exceeds 58%, the simultaneity bias is so strong that the incumbent spending coefficient takes a puzzling, negative sign.

Row 3 expands the analysis to races that are slightly lopsided in favor of the incumbent. As shown in Figure 3, this is the range in which the slope for the incumbent vote-on-spending curve reverses its sign and becomes negative. Thus, as predicted, the coefficient for the incumbent spending effect is smaller than that in the more competitive races. From row 1 to row 3, all three estimates predict a steady decline in incumbent spending effect. In fact, the estimated incumbent spending effect becomes negative when the expected incumbent vote share exceeds 58%, as the simultaneity bias overwhelms the true effect.

As Erikson and Palfrey (2000) point out, however, it would be a mistake to treat the coefficients in rows 4 and 5 as true spending effects. Once the seat is perceived as safe, incumbents tend to spend less on vote-winning activities. Thus, the vote-on-spending effects and the spending-on-vote effects have opposite signs. Consequently, the former offset the latter, causing a severe downward bias in an OLS estimate of spending-on-vote effects. Conversely, for challengers, vote-on-spending effects and the spending-on-vote effects always have the same sign. A challenger's electoral viability enables the challenger to more effectively raise funds, which in turn has a positive influence on the

vote. Thus, vote-on-spending effects cause an upward bias in the spending-on-vote effects.

6. Extension of Erikson and Palfrey (2000): Post-Citizens United

In this section, by pooling data across a longer time series (1974-2012), I build on the work of Erikson and Palfrey (2000) to examine the impact of the Bipartisan Campaign Reform Act (2002) and the Citizens United v. FEC ruling (2010) on candidates' campaign spending effects. The BCRA prohibited the parties' use of soft money in elections. Then, in 2010, the Citizens United v. FEC ruling overturned the BCRA by lifting the federal limit on the soft money contributions in a political campaign.

Table 3 displays the regression estimates of spending-on-vote effects. I restrict the sample to close races with an incumbent vote share below 52% to minimize simultaneity bias. Column (1) presents estimates from the 1974-2000 election cycles, before the Bipartisan Campaign Reform Act (2002) came into effect. The 2002 races are excluded from the analysis due to redistricting. Column (2) presents estimates from the 2004-2008 election cycles, when the BCRA was in full force. Column (3) displays estimates from the 2010 and 2012 races, which took place after the Citizens United v. Federal Election Commission ruling (2010) overturned the BCRA.

Table 3. Spending Effectiveness by Era of Campaign Finance Law

	(1)	(2)	(3)
Date Range	1972-2000	2002-2008	2010-2012
	Pre-BCRA	BCRA	Post-Citizens United
Challenger Spending	-5.003***	-8.079***	-4.097***
	(0.860)	(2.015)	(1.243)
Incumbent Spending	4.447***	6.406	0.286
	(1.134)	(4.003)	(3.621)
Constant	52.28***	58.90***	67.43***
	(3.693)	(15.20)	(17.16)
Observations	66	29	27
Adj. R^2	0.336	0.402	0.278

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes for Table 3: The results display a vast increase in both spending coefficients after the BCRA came into effect. By removing the influence of soft money, the BCRA seems to have heightened the perceived effectiveness of candidate spending. The Citizens United ruling, on the other hand, led to a steep decline in candidate spending effects. The seemingly implausible estimate of negligible incumbent spending effects strongly suggests that the coefficients are plagued with omitted variable bias.

As presented in column (1), both incumbent and challenger spending matter significantly in the pre-BCRA era. Prior to the BCRA, soft money served as a substitute for candidates' own campaign funds. In the 1999-2000 election cycle, before the BCRA came into effect, soft money accounted for 40% of fundraising for the two major parties (Briffault 2002). Soft money was used for voter registration efforts, "get-out-the-vote" drives, and vote-winning activities to build support for a particular candidate. Thus, with soft money donations, candidates had less incentive to attend fundraisers to raise

campaign resources, as fundraising activities not only consumed a large portion of candidates' time, but also often involved taking compromising issue positions (Erikson and Palfrey 2000).

Column (2) shows that when the BCRA came into effect, both challenger and incumbent spending effects increased sharply. Under the BCRA, candidates could no longer rely on soft money to pay for vote-winning activities. By removing the hidden substitute (i.e., soft money), the BCRA heightened the perceived effectiveness of candidate money.

Column (3) shows that the Citizens United v. FEC ruling has led to a drastic decline in both incumbent and challenger spending effects. With the ruling in effect, soft money, the hidden substitute for candidates' own campaign funds, is now back on the political scene, crowding out the perceived spending effect of candidates' own budget. Candidates that receive more soft money donations are also likely to raise and spend less money of their own, ceteris paribus. Yet, since my data on reported candidate expenditures do not include soft money transfers, I only observe the effect of candidates' own funds. In this case, if both types of spending are effective, the omitted variable (soft money), which is negatively correlated with the variable of interest (official campaign spending), will give rise to a downward bias of the estimated coefficient. In fact, a drastic decrease in both spending coefficients implies that the estimated spending effects in the post-Citizens United sample may be subject to omitted variable bias.

According to column (3), a dollar spent by an incumbent has a negligible effect in obtaining an additional vote, whereas a challenger's marginal spending effect remains significant. While the estimated marginal effect of challenger spending declines by a

factor of two, the estimated marginal effect of incumbent spending declines by a factor of six. The magnitude of the decline in spending coefficients represents the extent of the omitted variable bias (i.e., soft money). Thus, it appears that soft money plays a bigger role in an incumbent's campaign than in a challenger's. Incumbents are able to use their incumbency status (such as name recognition, free media access, and political connections) to attract soft money donors.

Also, the difference between the number of observations in the BCRA sample (2004-2008) and the post-Citizens United sample (2010-2012) is striking. The BCRA sample includes 1036 races involving senior incumbents, whereas the post-Citizens United sample includes 590 such races, just over half as many. The number of close races, however, is virtually identical, implying a vast increase in the frequency of close races after the Citizens United ruling.

Changing campaign finance laws is one of many potential sources of the rising incidence of close races. The difference in the frequency of close races under the BCRA and the Citizens United ruling offers mixed policy implications for campaign finance reform. An increase in the number of close races suggests a rise in challengers' initial electoral viability. As the BCRA blocked the challengers' access to outside funds, it is likely that challengers found it difficult to overcome the incumbent's fixed financial advantage associated with being in office. The Citizens United ruling, by contrast, allows soft money to funnel into challengers' campaign activities, enabling challengers to undercut the initial fundraising ability of an incumbent. Soft money donations increase the amount of money used to finance challengers' campaigns, which in turn raises voters' perception of candidates' electoral viability. As a result, challengers are more likely than

before to emerge as frontrunners. In the face of an amplified incumbency advantage under the ruling, however, whether or not these new frontrunners can sustain their status remains unanswered. While the Citizens United ruling seems to have leveled the playing field by raising the challenger's ex-ante winning prospects, an increase in the number of competitive races may be misleading if incumbents are able to more than compensate for the initially dampened financial advantage by attracting larger soft money donations.

7. Conclusion

This paper adopts Erikson and Palfrey (2000)'s focus on close races to control for the problem of causal feedback in measuring campaign spending effects. The extent to which I was able to replicate Erikson and Palfrey's estimate of spending effects shows that in close races, spending effects are shielded from the simultaneity bias that plagues the estimates on the full sample.

I then extend my analysis to examine the impact of the Bipartisan Campaign Reform Act (2002) and the Citizens United v. Federal Election Commission ruling (2010) on candidates' spending effects. I find that removing the influence of soft money heightens the perceived effectiveness of campaign spending, as candidates are no longer able to rely on soft money donations as a substitute for their own funds. Both incumbent and challenger spending coefficients increase significantly during the BCRA period. Estimates of spending effects in the post Citizens United election cycles, however, imply that while official challenger spending still matters, official incumbent spending has little to no effect on obtaining votes.

In the 2010 and 2012 races, soft money began to play a significant role in electoral campaigns. With a vast amount of outside funds back on the political scene, the size of the candidate's own campaign fund is likely to matter less than before. Since the reported data on campaign expenditures do not include soft money donations, the negative correlation between soft money and candidates' own funds seems to have caused a downward bias in both incumbent and challenger spending coefficients.

Thus, the smaller coefficient on incumbent spending effects should not be interpreted as evidence that a dollar spent by a challenger is substantially more effective than a dollar spent by an incumbent. Rather, the difference between the magnitudes of the omitted variable bias, represented by the size of the decline in the two spending coefficients, may arise because incumbents are able to take advantage of their non-monetary incumbency benefits to attract monetary help from soft money donors. If it turns out that unreported soft money donation does indeed result in omitted variable bias, this study suggests that deregulation of soft money amplifies the incumbency advantage. While the Citizens United ruling opens up the possibility for challengers to receive soft money to finance their campaigns and increase their electoral competitiveness, it would appear that soft money is yet another dimension along which incumbents enjoy an advantage.

Due to uncertainty over the proper econometric method, academic researchers have been hesitant to establish a causal connection between incumbent spending and vote shares (Stratmann 2005). The BCRA, although no longer in effect, provides academics with a new, more accurate source for future research. Because the BCRA reduced the influence of soft money from the political scene, the 2004-2008 election cycles are the

period in which measured spending most closely matches actual spending. Estimates of spending effects using the BCRA data are thus less subject to the omitted variable bias that likely complicates the estimates of the pre-BCRA and post-Citizens United spending coefficients. According to the estimates presented in the previous section, under the BCRA, both incumbent and challenger spending play a much bigger role than predicted by previous campaign spending literature, such as Erikson and Palfrey (2000) and Gerber (1998). If indeed the BCRA spending coefficients represent the "true" marginal effect of candidate spending, this paper suggests that candidates' fundraising activities are in fact worth their time and effort, unlike what is suggested by academic measures of the candidate spending effect.

References

Abramowitz, Alan. 1988. “Explaining Senate Election Outcomes.” *American Political Science Review* 82(June):385-403.

Abramowitz, Alan I. 1991. “Incumbency, Campaign Spending, and the Decline of Competition in the U.S. House Elections.” *Journal of Politics* 53 (Feburary):34-56.

Briffault, Richard. 2002. “Future of Reform: Campaign Finance after the Bipartisan Campaign Reform Act of 2002” 34, *Ariz. St. L.J*. 1179, 1205-08.

Cox, Gary W., and Jonathan Katz. 2002. Elbridge Gerry's Salamander: The Electoral Consequences of the Reapportionment Revolution. New York: University of Cambridge Press.

Erikson, Robert S. 1982. "The 'Uncorrelated Errors' Approach to the Problem of Causal Feedback." *Journal of Politics* 44:863-81.

Erikson, Robert S., and Thomas R. Palfrey. 1998. “Campaign Spending and Incumbency: An Alternative Simultaneous Equations Approach.” *Journal of Politics* 60 (May): 355-73.

Erikson, Robert S., and Thomas R. Palfrey. 2000. “Equilibria in Campaign Spending Games: Theory and Data.” *American Political Science Review* 94 (September): 595-609.

Gerber, Alan. 1998. “Estimating the Effect of Campaign Spending on Election Outcomes Using Instrumental Variables.” *American Political Science Review* 92 (June): 401-11.

Green, Donald P., and Jonathan S. Krasno. 1988. “Salvation for the Spendthrift Incumbent: Re-estimating the Effects of Campaign Spending in House Elections.” *American Journal of Political Science* 32 (November): 884-907.

Jacobson, Gary C. 1978. “The Effects of Campaign Spending in Congressional Elections.” *American Political Science Review* 72 (June): 469-91.

Jacobson, Gary C. 1980. *Money in Congressional Elections*. New Haven: Yale University Press.

Jacobson, Gary C. 1985. “Money and Votes Reconsidered: Congressional Elections, 1972-1982.” *Public Choice* 47(1):7-62.

Levitt, Steven D., and C.D. Wolfram. 1998. "Decomposing the Sources of Incumbency Advantage in the US House." *Legislative Studies Quarterly* 22:45-60.

McKelvey, Richard D. and Raymond G. Reizman. 1992. "Seniority in Legislatures." *American Political Science Review* 86: 951-965.

Morton, Rebecca B., and Roger B. Myerson. 2012. “Decisiveness of Contributors’ Perceptions in Elections.” Economic Theory 49 (April): 571-590.

Stratmann, Thomas. 2005. “Some talk: Money in Politics: A (partial) Review of the Literature.” *Public Choice* 124(1,2):135-156.

Stratmann, Thomas. 2007. “How Prices Matter in Politics: The Returns to Campaign Advertising.” George Mason University. Working Paper.