



January 2013

Effect Of Candidate Spending On Vote Share

Charles Denowh

Follow this and additional works at: <https://commons.und.edu/theses>

Recommended Citation

Denowh, Charles, "Effect Of Candidate Spending On Vote Share" (2013). *Theses and Dissertations*. 1525.
<https://commons.und.edu/theses/1525>

This Thesis is brought to you for free and open access by the Theses, Dissertations, and Senior Projects at UND Scholarly Commons. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of UND Scholarly Commons. For more information, please contact zeinebyousif@library.und.edu.

EFFECT OF CANDIDATE SPENDING ON VOTE SHARE

by

Charles Denowh
Bachelor of Arts, University of Montana, 2003
Master of Arts, University of Montana, 2007

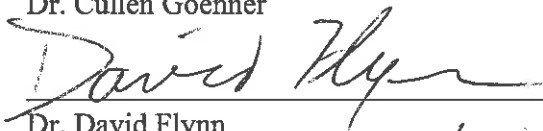
A Thesis
Submitted to the Graduate Faculty
of the
University of North Dakota
in partial fulfillment of the requirements
for the degree of
Master of Science in Applied Economics

Grand Forks, North Dakota
December
2013

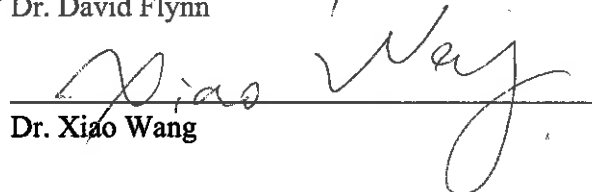
This thesis, submitted by Charles Denowh in partial fulfillment of the requirements for the Degree of Master of Science in Applied Economics from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.



Dr. Cullen Goenner




Dr. David Flynn



Dr. Xiao Wang

This thesis is being submitted by the appointed advisory committee as having met all the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.



Wayne Swisher

Dean of the School of Graduate Studies



Date

PERMISSION

Title Effect of Candidate Spending on Vote Share
Department Applied Economics
Degree Master of Science

In presenting this thesis in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my thesis work or, in his absence, by the Chairperson of the department or the dean of the School of Graduate Studies. It is understood that any copying or publication or other use of this thesis or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my thesis.

Charles Denowh
November 20, 2013

TABLE OF CONTENTS

LIST OF TABLES.....	v
ABSTRACT.....	vi
CHAPTER	
I. INTRODUCTION.....	1
II. THE MODEL AND DATA.....	7
III. CONCLUSION.....	24
REFERENCES.....	25

LIST OF TABLES

Table	Page
1. Summary statistics.....	13
2. OLS Regression of spending on incumbents' percent vote in 2012 U.S. House Elections.....	14
3. OLS Regression of candidate advertising on incumbents' percent vote in 2012 U.S. House Elections.....	19
4. 2SLS Regression of candidate advertising on incumbents' percent vote in 2012 U.S. House Elections.....	22

ABSTRACT

Prior research on the effect that candidate spending has on vote share has produced conflicting results, with some research finding that only spending by challenger candidates has an effect on the vote outcome and other research finding incumbent and challenger spending roughly equally effective. The paper explores two suspected causes of the discrepancy in prior results: measurement error and endogeneity in the spending variables. Using new spending data from the Federal Election Commission that can readily be categorized into different spending types, I find evidence of significant amounts of inconsequential spending that should be excluded from candidate spending totals. Additionally, I show that isolating spending on broadcast media reduces underestimation of the effect candidate spending has on vote outcomes, and employ a new instrumental variable incorporating differences in television advertising costs to find both incumbent and challenger spending have a positive impact on vote share, but to different degrees.

CHAPTER I INTRODUCTION

Over \$3 billion was spent in the 2012 election cycle by candidates seeking federal office—an average of \$18.59 for every voter registered that year. Even more is spent by political parties and independent committees. The magnitude of resources being invested in candidate campaigns suggests that there is an expectation that more money spent will yield additional votes. However, the relationship between candidate spending and vote share is not well understood.

The challenge is that it's not a straightforward relationship. The races where the most money is spent tend to be those that are closely contested, often resulting in large sums of money being put forth to achieve relatively modest vote shares. Conversely, races that aren't considered competitive tend to draw lower-quality challengers, who don't raise as much money, and find in-party candidates spending relatively modest amounts to achieve a strong share of the vote. The quality of the challenger surely has a large impact on the election results as well, but is difficult to measure.

This dichotomy makes for unreliable results when analyzing the data using standard OLS regression. The deficiency in OLS to analyze the relationship between vote share and candidate spending was flagged in the earliest study in this area of research. Jacobson (1978, 1990) found that when analyzed using OLS, spending by challenger candidates had the effect of reducing incumbent vote share, but that spending

by incumbents had a negative effect on their own vote share—in other words the more incumbents spend the worse they do at the ballot box.

Jacobson (1978) recognized that the odd results in his regression were likely the result of simultaneity bias in the data. Jacobson theorized the cause of this bias was due to OLS models presupposing unidirectional causality—i.e. spending produces votes—but candidate campaigns are more a reciprocal relationship, with candidates who are expected to do well being able to raise (and spend) more money. As such, both challenger and incumbent spending are endogenous.

Jacobson (1978, 1990) attempted to overcome this endogeneity by constructing instrumental variables and using 2SLS regression, finding a positive coefficient for incumbent spending, but at a much smaller magnitude than challenger spending. He concluded with the still-unsatisfactory result that spending by incumbents has little effect on elections.

Since Jacobson's seminal work scholars have debated this conclusion, with some confirming his results that challenger spending is effective and incumbent spending is not (Giles and Pritchard 1985, Ansolabehere and Gerber 1994, Bardwell 2005, Moon 2006). Experimental studies have shown effective spending for challengers and negligible spending for incumbents (Gerber 2004, Panagopoulos and Green 2008). Other researchers have found that spending by incumbents and challengers is roughly equal (Green and Krasno 1988, 1990; Gerber 1998; Partin 2002; Stratmann 2006, 2009). It is also worth noting that Levitt (1994) found positive correlation between both types of

spending, but at such a small magnitude that he concluded “campaign spending has an extremely small impact on election outcomes.”

Much of the work in this area of research has been devoted to finding valid instrumental variables to overcome the suspected endogeneity of incumbent and challenger spending. Different instruments that have been employed to produce significant results include challenger wealth, state population, and lagged incumbent spending (Gerber 1998); radio advertising rates (Stratmann 2006); length of the general election period, the total land area of the state, the size of the voting-age population, a measure of consumer price differences among states, party affiliation, and a control variable for self-financed candidates (Bardwell 2005)¹.

Green and Krasno (1998) challenge Jacobson’s findings, proposing to set aside endogeneity in the model and instead focus on unobserved variables, specifically the quality of the challenger. Using the same data as Jacobson they show that incumbent and challenger spending are roughly equal when controlling for challenger quality.

There has also been speculation that the odd results found by Jacobson and others could be the result of measurement error. Some candidates spend on items that could be expected to have little or no impact on the election outcome, for instance expensive office space or extensive travel out of district. Including inconsequential spending in candidate spending totals could potentially be the culprit that researchers have been looking for.

¹ Bardwell’s data is unique in that it analyzed the effect of spending on vote share for gubernatorial elections.

Ansolahehere and Gerber (1994) test this theory using data for U.S. House candidates in 1990, reporting that challengers, on average, spent 58% of their campaign budgets on direct communication with voters and incumbents just 42%. Despite the relatively low level of candidate spending going to direct voter communication, these researchers found that isolating voter communication expenditures still resulted in a negative coefficient for the effect incumbent spending on the incumbent's vote share, leading to the conclusion that measurement error is not the cause of the peculiarities in the findings of this area of research.

However, Ansolahehere's and Geber's (1994) work does show that isolating spending on voter communication does result in increasing the magnitudes on both the incumbent and challenger spending coefficients. This suggests that using a measure of total spending, instead of isolating voter communication spending, underestimates the effects spending has on vote share. Ansolahehere and Geber note "Conventional regression analyses using total spending produced estimates of the effects of House incumbents' expenditures that were nearly three times smaller than the estimates produced with the best available measure, campaign communication expenditures."

Taking a different approach on the assumption that total spending matters less than the *type* of spending employed, Stratmann (2009) found challenger and incumbent advertising in U.S. House races in 2000 and 2002 to have a similar effect on vote share when isolating spending on television advertising and controlling for differences in

advertising prices among districts.² Stratmann concluded that controlling for advertising prices is a solution to the quandary found by previous researchers, writing:

Estimates that do not account for the price of media advertising show that incumbent campaign spending has no effect or a negative effect on incumbents' votes shares. *This puzzle is solved by recognizing that advertising prices differ across districts.* After accounting for the wide variation in media prices, the results show that incumbent advertising has a positive marginal product. (Stratmann 2009, pp. 375, emphasis added)

This paper builds on the previous work in a number of ways. First, I confirm Ansolabehere's and Gerber's (1994) hypothesis that correcting for measurement error by isolating spending on direct communication with voters does not produce results that show a positive effect for incumbent spending on vote share, in other words correcting the simultaneity bias found in prior research. My findings agree with theirs that isolating voter communication spending, however, does help to more accurately estimate the effect spending has on vote share.

Second, following the conclusion that focusing on a particular type of spending may produce more accurate estimates, I borrow Stratmann's (2009) approach in focusing on broadcast television spending. My results, however, conflict with Stratmann's conclusion that controlling for differences in advertising prices will produce statistically significant results showing a positive effect on vote share for both incumbent and challenger spending using OLS regression.

Finally, in the absence of results that confirm Stratmann (2009), I suspect endogeneity in both the incumbent and challenger advertising regressors and attempt to control for that endogeneity by using 2SLS regression with instrumental variables,

² Stratmann also includes a measure of candidate quality in his data.

employing a new instrument utilizing the significant differences in the price of television advertising among Congressional districts. This approach shows positive effects for both incumbent and challenger advertising, but with challenger advertising being more than twice as effective at affecting vote share.

CHAPTER II THE MODEL AND DATA

The general model to assess the effect of candidate spending on vote share is:

$$IV_d = IE_d + CE_d + I_d + P_d + PV_d + e_d.$$

The dependent variable is the percentage of the 2-party vote received in district d by the incumbent-party's candidate (IV_d). For simplicity, the incumbent party's candidate is referenced as the "incumbent" throughout this paper, regardless of whether that candidate had previously served in that district before or not.

The election data analyzed comes from the Federal Election Commission (FEC) for U.S. House races in 2012. Only races contested by a Republican and Democrat in the General Election were included in the analysis. Races were excluded when one or both candidates did not file reports with the FEC, indicating they did not reach minimum spending thresholds to require reporting.³

The explanatory variables are expenditures by the incumbent candidate (IE); expenditures by the challenger candidate (CE); and a set of variables that control for other factors known to influence election outcomes.

³ Third party candidates were excluded from the analysis and 2-party vote shares were adjusted accordingly. Vote totals were corrected for candidates in New York, Connecticut, South Carolina, and Louisiana in cases where those candidates are allowed to appear on the ballot for multiple parties—the combined vote total is used. Races in Guam, the U.S. Virgin Island, and Northern Mariana Islands were excluded; the District of Columbia is included.

The first of those is an indicator variable (I) that is equal to one if there is an incumbent candidate in the general election, and zero otherwise. The incumbency indicator variable would be zero in cases where the seat was open due to retirement or an incumbent candidate was defeated in a Primary Election. A second indicator variable (P) indicates whether the incumbent party is Democratic (one) or Republican (zero) in order to account for differences in party affiliation.

To account for the partisan makeup of individual districts, a measure of the previous presidential vote (2008) in that district is utilized (PV). This measure reflects the district's incumbent party presidential candidate vote percentage—if the incumbent party is Democratic, the vote percentage for Barack Obama is used, if Republican, John McCain.⁴

One suspected deficiency in the previous research is that all spending by a candidate is lumped together—all dollars spent are treated as having an equal effect on vote share. However, it is logical that certain types of spending have a greater effect than others, and that strategic spending decisions by candidates would be expected to influence vote share. Candidate A may spend a disproportionate share on television advertising, while Candidate B may focus his spending on sending mailers, while Candidate C may hire a large and expensive staff. Treating all candidate spending as equally effective, by using total candidate spending, could lead to measurement error and has been one suspected cause of the peculiarity in campaign finance research.

⁴ Other researchers frequently use a measure called “normal vote,” which is an average of recent, previous elections for the district. In this case, presidential vote is used because the 2012 election was the first after redistricting changes made to Congressional district boundaries in 2010. The data used for the Presidential Vote measure take these redistricting changes into account and reflect the vote of each Presidential candidate based on the districts as they existed in 2012.

With the exception of Ansolabehere and Gerber (1994) and Strattman (2009), consideration has not been given to different types of spending, and consequently the spending strategies of different candidates; nor has inconsequential spending been excluded. The work of these researchers is the only I am aware of in the literature that does not use unaltered candidate spending totals as the right-hand side regressors in their model.

Using a dataset of categorized spending for 1990 U.S. House candidates, Ansolabehere and Gerber (1994) found that significant fractions of campaign budgets were dedicated to spending that they surmised would have little or no impact on the election outcome—in their dataset incumbents spent less than half of their campaign budgets on direct communications with voters, and challengers only slightly more than half. Applying Jacobson’s 1978 OLS regression model to their data, they found results similar to his when using total candidate spending, that is, challenger spending is effective but incumbent spending was negatively correlated with incumbent vote share. Next, isolating what they considered to voter communication spending, they found larger magnitudes for the regression coefficients for both challenger and incumbent spending, but with incumbent spending remaining negative. These results led them to the conclusion that while isolating voter communication spending was desirable in order to eliminate underestimation of spending effects, measurement error was not the cause of the simultaneity bias found by Jacobson and others.

In order to confirm the results of Ansolabehere and Gerber (1994) and to determine if different types of spending have an effect on the model, a dataset was

acquired from the Federal Elections Commission that contained a separate line item for each disbursement made by U.S. House candidates in the 2012 election cycle, including the “purpose” of the disbursement.⁵ The dataset contained 657,000 records totaling \$1.023 billion in expenditures.

It seems reasonable that certain types of spending would have a lesser impact on the election results—direct messaging to voters through paid media would be expected to move votes to a greater degree than having expensive office space or purchasing lavish gifts for major donors, for example. Nonetheless, most campaign spending that falls outside the voter communication category still would be expected to have some impact on vote share, albeit to a lesser degree.

For example, spending on opinion polling would be expected to help a candidate improve his messaging, thereby affecting vote share in some way. But it seems reasonable the marginal effect of spending that falls outside voter communication would diminish at a faster rate than the marginal effect of spending on voter communication—an additional dollar spent on polling would have less an impact on vote outcome than if that dollar were spent on additional television advertising.

Showing the magnitudes that different types of spending have different effects on the vote outcome should be welcome data especially for candidates and campaign

⁵ It should be noted that Ansolabehere and Gerber (1994) did not themselves categorize the data for their research, rather they retrofitted a dataset of categorized spending data compiled by Sarah Fritz and Dwight Morris. My data differs in that it was purposely categorized to fit the assumptions in this subfield of campaign finance research. I suspect prior researchers have not attempted to categorize spending due to the availability of the data. The FEC dataset employed in this research was only made available starting with the 2010 election cycle for U.S. House candidates. Similar data for U.S. Senate candidates is still not available as they are not required to file electronic campaign finance reports. To construct a similar dataset for prior election years would take a considerable amount of work.

consultants with an interest in maximizing their vote outcomes, in addition to providing better explanatory data for researchers. Two types of spending in particular, though, clearly do not have an impact on vote share: loan repayments and committee transfers.

Many candidates loan personal funds to their campaign with the expectation that they'll be paid back later, often after the campaign has concluded. In fact, candidates are allowed to continue to raise money after Election Day in order to pay back the loans they've made. Loan repayments are counted as expenditures and included in the campaign finance spending tallies, but clearly do not have an impact on vote share. A total of \$33 million of candidate loan repayments was identified in the data, about 3% of the total expenditures in the dataset.

Candidate campaigns also often transfer money to other political committees, usually to national or state political party committees. It is a common practice for incumbent candidates who are considered "safe" to transfer excess campaign funds to the national committee structure so that it may be used to support candidates in tougher races⁶. Just over \$100 million in candidate-to-committee transfers were identified in the data, nearly ten percent of the spending analyzed. Records classified as loan repayments or committee transfers were excluded from the spending totals used in this analysis.

Using the purpose field, the data was differentiated into three categories: Broadcast Media (TV and Radio)⁷, Direct Mail, and a catchall category for everything

⁶ Many candidates classify these transfers as "dues" to their national party committees, indicating that they are not necessarily voluntary donations, rather expected contributions to the national party structure.

⁷ Radio advertising typically accounts for a much smaller portion of the campaign budget compared to television. However, because campaigns frequently purchase radio and TV advertising through the same media buyer, it is impossible to isolate one or the other using this dataset.

else and aggregated for each federal candidate. The broadcast and mail categories were also added together to produce a Voter Communication category to approximate the measure used by Ansolabehere and Gerber (1994).

Broadcast and direct mail were singled out for specific categories because they are traditionally two of the largest spending categories found on candidate campaign budgets and they are the primary means for messaging directly to voters. Other major campaign expenditures, like polling, staffing, and travel surely have an impact on vote share, but do not have the same type of direct “touch” on the voter as do the two, major paid-media categories.

For 2012 U.S. House candidates, the average incumbent spent a total of \$1.532 million, including \$480,000 on broadcast and \$151,000 on direct mail. Challengers spent an average of \$634,000, including \$289,000 on broadcast and \$62,000 on direct mail. Put another way, incumbents spent 41% of their campaign budgets on voter communication (broadcast and mail combined) and challengers 55%. These percentages are approximate to those found by Ansolabehere and Gerber (1994)—their data show 42% of incumbents’ spending was for voter communication, and 58% for challengers.

Table 1 presents summary statistics for the data, including the spending data above, as well as means for the indicator variables incumbency and political party, and the measure of district partisanship, 2008 presidential vote.

Table 1. Summary Statistics	Mean
Incumbent 2-Party Vote %	0.624 (0.095)
Incumbent Total Spending (in \$100,000s)	15.324 (14.237)
Challenger Total Spending (in \$100,000s)	6.341 (9.548)
Incumbent Voter Communication Spending (in \$100,000s)	6.310 (8.921)
Challenger Voter Communication Spending (in \$100,000s)	3.512 (6.326)
Incumbent Broadcast Spending (in \$100,000s)	4.801 (7.059)
Challenger Broadcast Spending (in \$100,000s)	2.890 (5.515)
Incumbent in the race = 1, 0 otherwise	0.891 (0.312)
Incumbent party: D = 1, R = 0	0.438 (0.497)
Incumbent-party 2008 Presidential Vote %	0.575 (0.098)
N	322

Note: Standard errors in parenthesis. * indicates significance at the 5% level.

In order to confirm that measurement error is not to blame for the odd results found in election spending research, a slight modification of Ansolabehere and Gerber's analysis is recreated here using the 2012 U.S. House election spending data. Table 2 presents three specifications: the first uses total candidate spending (excepting loan

repayments and committee transfers), the second uses voter communication spending (including broadcast and direct mail), and the third uses broadcast spending only.

Table 2. OLS Regression of spending on incumbents' percent vote in 2012 U.S. House Elections (\$100,000s)

Coefficient	Specification		
	(1)	(2)	(3)
Incumbents' total \$	0.00011 (0.00017)	—	—
Challengers' total \$	-0.00294* (0.00029)	—	—
Incumbents' voter comm. \$	—	-0.00027 (0.00031)	—
Challengers' voter comm. \$	—	-0.00361* (0.00046)	—
Incumbents' broadcast \$	—	—	-0.00033 (0.00041)
Challengers' broadcast \$	—	—	-0.00406* (0.00054)
Incumbent	0.027* (0.007)	0.030* (0.007)	0.031* (0.007)
Party	-0.006 (0.005)	-0.008* (0.005)	-0.009* (0.005)
2008 Presidential Vote	0.707* (0.028)	0.729* (0.029)	0.735* (0.029)
Constant	0.213* (0.017)	0.197* (0.017)	0.191* (0.017)
N	322	322	322
R ²	.84	.83	.83

Note: Standard errors in parenthesis. * indicates significance at the 5% level.

The results are reasonably consistent with Ansolabehere and Gerber (1994). In Specification (1), challenger spending is found to reduce incumbent vote share, and is statistically significant, and incumbent spending is found to increase vote share at a much smaller magnitude, but the results are not significant. The magnitude for challenger spending on voter communication increases in Specification (2), and increases further even more in Specification (3) for spending on broadcast media. Only in Specification (2) does the coefficient for incumbent spending become negative, but in all three specifications the magnitude of incumbent spending confirms the usual results that incumbent spending is not effective.

It is also worth noting a fourth specification was attempted using the measure of direct mail spending. However, the results for both incumbent and challenger spending on direct mail were not statistically significant, and the results are not reported.

The coefficients for challenger spending show the change in vote total for every \$100,000 spent. In Specification (1), \$100,000 spent by the challenger reduces the incumbent's vote share by 0.3%. In specification (3), which isolates spending on broadcast media, shows that spending an additional \$100,000 on broadcast reduces the incumbent's vote share by 0.4%. In each subsequent specification, the magnitudes of the indicator variables and the measure of district partisanship increase, albeit by small degrees. The increasing magnitudes on the spending coefficients suggest that using total spending alone underestimates the effect of spending on vote share—singling out spending on broadcast media, then, more accurately explains the relationship between spending and vote share.

Even after correcting the measure of total spending by excluding inconsequential spending (loan repayments and committee transfers), the results in Table 2 confirm Ansolabehere's and Gerber's (1994) findings that measurement error is not to blame for simultaneity bias in previous research. My results also show that data that isolates spending on broadcast media may result in showing stronger explanatory power in the regression.

Stratmann (2009) takes isolating broadcast media one step further by developing a variable that takes into account differences in the cost of broadcast media from district to district. Noting that the cost of television advertising varies widely between media markets, similar amounts spent on broadcast media could result in relatively few advertising spots airing in an expensive media market like New York City, compared to an inexpensive one, like Missoula, MT. Because of the variation in advertising costs, looking at total amounts spent on broadcast advertising do not capture the full effect that the advertising has. To account for that variation, Stratmann constructed a measure of campaign advertising by dividing broadcast spending by the price of television advertising.

By substituting this measure of campaign advertising for the general campaign spending that is typically employed in studies of this nature, Stratmann (2009) found that "advertising has a positive and statistically significant effect on incumbents' and challengers' vote shares" using standard OLS regression.

One drawback to Stratmann's (2009) research is that he did not use FEC-generated candidate spending data for his analysis, instead relying on data constructed by

the Campaign Media Analysis Group (CMAG) provided to the Wisconsin Advertising Project for only 75 of the more than 200 DMAs in the country. CMAG's data originates from the informal reports of hundreds of broadcast television stations where the advertisements are purchased, leading to suspicion of significant measurement error in the data. Stratmann notes that the data used in his analysis does not include spending on radio or cable television advertising, nor does it include the costs of production and creative work.

The spending data presented in this analysis should be more reliable because it originated from the FEC.

The variation in advertising costs from area to area is significant. A dataset was acquired from *Spot Quotations and Data, Inc. (SQAD)* for prime time spot television rates for the fourth quarter of 2012 for the 209 *Nielsen* Designated Market Area (DMA) in the country.⁸ This data shows a minimum of \$21.93 for Oklahoma City, a maximum \$1,060.41 for Glendive, MT, and a median of \$42.43. The most expensive media markets tend to be those at the opposite ends of the population spectrum—either urban, densely-populated or vast, low-population rural areas, though there is a great deal of variation in the data. The rates show little correlation to the population of the media market, for instance Minneapolis-St. Paul, Phoenix, and Miami comprising roughly the same populations but varying in spot cost of \$33.06, \$62.58, and \$102.36 respectively.

⁸ The spot television rate is the cost of purchasing a single advertisement, in this case during the evening “prime time” period. Most advertising is not purchased at spot rates, rather as gross rating points, however, the spot rates satisfy our purpose here to provide a relative measure of advertising costs between different media markets.

A particular congressional district may be contained in one DMA, or be spread among several. Fortunately, a dataset was acquired from *Kantar Media, Inc.* that included the number of television spots purchased for each congressional race by media market in 2012. Based on the number of spots purchased in each market, I constructed a weighted average television spot price for each congressional district. For example, the candidates in the Arkansas 1st Congressional District ran 212 spots in the Jonesboro DMA, and 580 in the Little Rock DMA; prime time spot prices in those DMAs were \$161.74 and \$30.12, respectively, yielding a weighted average of \$65.35 for that district. For districts where broadcast media was not purchased in 2012, an estimate was used based on the average spot price for adjacent congressional districts.

Using this data on relative price television advertising an approximation of Stratmann's (2009) approach was attempted by substituting the measure candidate advertising (broadcast spending divided by average TV spot price) for total candidate spending as independent variables in an OLS regression. Table 3 presents the results of this regression.

Unlike Stratmann (2009), the results of incumbent advertising are not statistically significant. And though positively correlated with incumbent vote share, incumbent advertising has a much smaller effect on vote share relative to challenger advertising—so small it can be considered insignificant.

To be fair, the results in Table 3 are not a replication of Stratmann's (2009) analysis, merely an employment of his innovation on fairly similar models. The drawbacks in Stratmann's spending data have already been noted. In addition, lacking

data on the number of spots purchased in each DMA for specific races, Stratmann had to approximate his DMA/district matchup by overlaying maps and estimating a weighted average cost accordingly.

Table 3. OLS Regression of candidate advertising on incumbents' percent vote in 2012 U.S. House Elections (\$100,000s)

Coefficient	
Incumbent advertising	0.00078 (0.01545)
Challengers advertising	-0.18682* (0.02399)
Incumbent	0.029* (0.007)
Party	-0.008 (0.005)
2008 Presidential Vote	0.741* (0.029)
Constant	0.189* (0.017)
N	322
R ²	.83

Note: Standard errors in parenthesis. * indicates significance at the 5% level.

The results in Table 3 suggest, then, that accounting for differences in relative district television advertising costs do not correct for the omitted variables in the model,

and suggest endogeneity in the incumbent and challenger advertising variables. To correct that endogeneity, two instrumental variables are introduced.⁹

The first instrumental variable is the average prime time television spot price for each congressional district. To be a valid instrument, average television spot prices must be correlated with campaign expenditures, but not with the vote outcome. As previously discussed, television advertising costs are highly variable among different DMAs—the same amount of money would buy nearly twice as much advertising (at prime time spot prices) in Miami compared to Denver, for instance, yet reach similarly-sized audiences. These differences in advertising prices surely have an effect on the amount spent by candidates, yet have no discernible, independent effect on vote share. Prior research has shown cost differences in advertising among Congressional districts to be a valid instrument in the case of radio advertising rates (Stratmann 2006). Television advertising has also been shown to influence voter choice (Franz and Ridout, 2007).

The second instrumental variable is lagged challenger spending, similar to an instrument employed by Geber (1994). Because most Congressional districts were redrawn and renumbered due to redistricting between the 2010 and 2012 elections, this variable represents the amount of money spent by a challenger in 2010 against a specific incumbent candidate who was on the ballot in both years. A consequence of this variable tracking a specific incumbent candidate from one election to the next is that it reduces the number of observations from 322 to 185.

⁹ Other instrumental variables were attempted, but not with good result. The measures of district land area and population used by Gerber (1998) were found to be ineffective.

Lagged challenger spending is a reasonable instrument because it should not be related to vote share in the subsequent election, but it could have some impact on the amount of money spent by both candidates in 2012. An incumbent who faces a strong challenger in one election, as indicated by a large amount of challenger money spent, would be expected to raise more money in the next election to forestall a serious threat again. Likewise, challengers in subsequent elections may be emboldened by challengers who've come close to winning in the past, thereby raising and spending more money.

Finally, the third instrument employed is an indicator variable that is one if there was a contested challenger primary election, and zero otherwise. Primary elections are known to have little impact on the vote share in the general election. But because we are using a measure of money spent throughout the entire election cycle, monies spent in a primary election would increase the total amount of money spent in that cycle. It is not uncommon for incumbent candidates to spend money during the primary election period, whether they are challenged or not, in order to maintain visibility with voters. It seems reasonable an incumbent would spend more money to increase visibility during the primary period when the challenging party has a contested primary election—a contested primary may indicate there are higher-quality challengers in the race who may be able to raise and spend more money in the general election as well.

Both incumbent and challenger advertising are treated as endogenous variables in the TSLS analysis using the two instrumental variables. The first stage F-statistics for incumbent and challenger advertising is found to be 12.41 and 8.67, respectively, indicating in the latter case that the instruments may be slightly weak. Given we have

more instruments than endogenous repressors, we are able to test whether the instruments are exogenous. The null hypothesis of over-identification test assumes the instruments are exogenous. We find the p-value associated with the statistic is .8226, which implies our instruments are exogenous.

Table 4. 2SLS Regression of candidate advertising on incumbents' percent vote in 2012 U.S. House Elections (\$100,000s)

Coefficient	
Incumbent advertising	0.256* (0.154)
Challengers advertising	-0.573** (0.220)
Incumbent	0.023 (0.055)
Party	-0.003 (0.011)
2008 Presidential Vote	0.735** (0.080)
Constant	0.196** (0.071)
N	185
R ²	.99

Note: Standard errors in parenthesis. * indicates statistical significance at the 10% level, ** at 5% level.

Table 4 presents the results the 2SLS estimates, and shows that both incumbent and challenger advertising have a positive, statistically significant effect on vote share.

However, challenger advertising is shown to be more effective than incumbent spending—challenger advertising is more than two times more effective at reducing the incumbent’s vote share than incumbent advertising is at improving it.

To make sense of the coefficients of the candidate advertising term, one need adjust for the average television spot advertising price in a particular district by dividing the coefficient by that spot price. For instance, if the average spot price is \$50, each additional \$100,000 spent on television by the incumbent would increase her vote share by 0.5 percentage points; and \$100,000 spent by the challenger would decrease the incumbent’s vote share by 1.1 percentage points. If that spot price were adjusted to \$35, \$100,000 of incumbent spending yields a 0.7 percentage point increase, and \$100,000 of challenger spending yields a 1.6 percentage point decrease.

As expected, the partisanship of the district, as measured by the 2008 Presidential vote, has a strong effect on the election outcome. For each additional one-percentage point earned by the in-party’s Presidential candidate in 2008, the district’s incumbent would have an advantage of 0.7 percentage points.

CHAPTER III CONCLUSION

The results in this analysis should add to the ongoing debate about the effectiveness of incumbent and challenger spending. Starting with the 2010 election cycle, the Federal Elections Commission has made available datasets for U.S. House elections that make the process of categorizing spending data an easier task for researchers. At the very least, researchers should take the step of eliminating candidate loan repayments and committee transfers from the spending data as these types of spending have no discernable effect on a district's voters, yet they account for more than one in ten dollars spent in an election cycle.

Focusing the data on specific types of spending has shown in prior research, and confirmed here to, increase the magnitudes of the spending coefficients, suggesting that it is less productive to look at overall candidate spending than it is to attempt to zero in on the spending categories that are expected to have the greatest impact on voters.

This direction is helpful to candidates and campaign consultants who want to know what spending strategies will help them achieve the most votes. It could also be helpful to campaign finance reformers looking for novel ways to curtail the advantages of incumbency and provide a level playing field for challenger candidates.

These results also show that the endogeneity in the candidate spending variables cannot be set to the side, as suggested by Green and Krasno (1988), even when focusing

the analysis on a specific type of spending, such as television advertising (Stratmann 2009). Instead, the approach taken here, to focus on one type of spending (television) controlling for the variation in advertising costs among districts, and employing the instrumental variables—average television cost and an artificial instrument for challenger quality rank—produce statistically significant results using 2SLS regression.

While those results do not fall into the camp that show equally effective effects of spending by both incumbents and challengers, neither do they suggest that incumbent spending is wholly ineffective either. The results do show, however, that challenger candidates enjoy some advantage in having a greater effect on vote share—a greater bang for their buck, as it were—relative to incumbent spending. So while incumbents have the upper hand in a number of ways, challengers are not entirely toothless either.

REFERENCES

Stephen Ansolabehere and Alan Gerber, "The Mismeasure of Campaign Spending: Evidence from the 1990 U.S. House Elections," *The Journal of Politics*, Vol. 56, No. 4 (Nov., 1994), pp. 1106-1118

Kedron Bardwell, "Reevaluating Spending in Gubernatorial Races: Job Approval as a Baseline for Spending Effects," *Political Research Quarterly*, Vol. 58, No. 1 (Mar., 2005), pp. 97-105

Michael M. Franz and Travis N. Ridout, "Does Political Advertising Persuade?," *Political Behavior*, Vol. 29, No. 4 (Dec., 2007), pp. 465-491

Alan Gerber, "Estimating the Effect of Campaign Spending on Senate Election Outcomes Using Instrumental Variables," *The American Political Science Review*, Vol. 92, No. 2 (Jun., 1998), pp. 401-411

Alan S. Gerber, "Does Campaign Spending Work?: Field Experiments Provide Evidence and Suggest New Theory," *American Behavioral Scientist* (2004) Vol. 47, 541-574

Michael W. Giles and Anita Pritchard, "Campaign expenditures and Legislative Elections in Florida," *Legislative Studies Quarterly*, Vol. 10, No. 1 (Feb., 1985), pp. 71-88

Donald Philip Green and Jonathan S. Krasno, "Salvation for the Spendthrift Incumbent: Reestimating the Effects of Campaign Spending in House Elections," *American Journal of Political Science*, Vol. 32, No. 4 (Nov., 1988), pp. 884-907

Donald Philip Green and Jonathan S. Krasno, "Rebuttal to Jacobson's 'New Evidence for Old Arguments,'" *American Journal of Political Science*, Vol. 34, No. 2 (May, 1990), pp. 363-372

Gary C. Jacobson, "The Effects of Campaign Spending in Congressional Elections," *The American Political Science Review*, Vol. 72, No. 2 (Jun., 1978), pp. 469-491

Gary C. Jacobson, "The Effects of Campaign Spending in House Elections: New Evidence for Old Arguments," *American Journal of Political Science*, Vol. 34, No. 2 (May, 1990), pp. 334-362

Steven D. Levitt, "Using Repeat Challengers to Estimate the Effect of Campaign Spending on Election Outcomes in the U.S. House," *Journal of Political Economy*, Vol. 102, No. 4 (Aug., 1994), pp. 777-798

Woojin Moon, "The Paradox of Less Effective Incumbent Spending: Theory and Tests," *British Journal of Political Science*, Vol. 36, No. 4 (Oct., 2006), pp. 705-721

Costas Panagopoulos and Donald P. Green, "Field Experiments Testing the Impact of Radio Advertisements on Electoral Competition," *American Journal of Political Science*, Vol. 52, No. 1 (Jan., 2008), pp. 156-168

Randall W. Partin, "Assessing the Impact of Campaign Spending in Governors' Races," *Political Research Quarterly*, Vol. 55, No. 1 (Mar., 2002), pp. 213-233

Thomas Stratmann, "Contribution limits and the effectiveness of campaign spending," *Public Choice*, Vol. 129, No. 3/4 (Dec., 2006), pp. 461-474

Thomas Stratmann, "How Prices Matter in Politics: The Returns to Campaign Advertising," *Public Choice*, Vol. 140, No. 3/4 (Sep., 2009), pp. 357-377