TIME TO CHANGE THE TIME-FOR-CHANGE MODEL?
MODIFYING A U.S. PRESIDENTIAL VOTE SHARE PREDICTION MODEL WITH A MEASURE OF GRASSROOTS INVOLVEMENT

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ABSTRACT

Over the past two decades political scientists have produced models that take a scientific approach toward predicting and evaluating election effects and outcomes. This paper seeks to improve upon one of the most well-known U.S. presidential election forecasting models, Alan Abramowitz’s time-for-change model, by including a new measure of campaign performance. This paper tests the hypothesis of whether including a measure of small donor contributions, as a proxy for grassroots involvement as a result of campaign activity, is important to forecasting vote share outcome. This study finds that including the small donor contributions ratio in the time-for-change model does not change the signs of the other covariates. More importantly, the small donor contributions ratio is highly statistically significant, suggesting that the small donor contributions ratio may be a good predictor for presidential election vote share prediction models. Including the small donor contributions ratio improved the model’s goodness-of-fit and standard error of the estimate, but not necessarily the out-of-sample error. The results suggest that if
the two-major-party candidates in a race have similar proportions of grassroots involvement, the incumbent candidate enjoys an estimated 2.2% advantage in the two-party vote share. If this ratio favors the incumbent 2:1, then the advantage is 4.4%; if the ratio instead favors the challenger 2:1, then the incumbent’s advantage is reduced to 1.1%.
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Chapter 1. Introduction

The past two decades has given rise to the “political strategist” and the “political pundit,” politicos who are constantly reevaluating the political winds and determining which way to position a campaign’s sails. Political scientists have also entered the debate by producing models that take a more scientific approach toward predicting and evaluating campaign effects and outcomes. As the field of presidential election forecasting has matured, consensus has developed on the best predictors of election outcomes. This paper seeks to improve upon one of the most well-known U.S. presidential election forecasting models, Alan Abramowitz’s time-for-change model, by including a new measure of campaign performance. It tests the hypothesis that including a measure of small donor contributions, as a proxy for grassroots involvement as a result of campaign activity, is important to forecasting vote share outcome.

Over the past two decades several models have emerged for forecasting U.S. presidential elections. These models seek to predict the outcome of an election based on a set of key factors. Since the first appearance of these models, some consensus has developed about the best predictors of presidential elections; these include some measure of presidential popularity and current economic performance. As prediction models, it is important that they give a substantial lead-time on their prediction. However, this requirement is in tension with the model’s need to factor in a campaign’s ability to influence public opinion toward the end of an election cycle.
Most of these models take for granted differences between candidates and the role their campaigns play in persuading voters. Moreover, the models use polling data taken months prior to the election and disregard any effect that a campaign may have in the final few months before the election, one of the most crucial times to persuade public opinion.

Many factors, such as media coverage, message consistency, endorsements, and fundraising, could be incorporated into a modern model for predicting election outcomes. Lately, much attention has been given to the impact the “new media” (e.g., talk radio, blogs, video sharing, social networking, cable television, email) have on presidential elections, as opposed to the “old media” (e.g., large newspapers, network television stations). Books have detailed the substantial role the new media play in influencing modern-day elections (Halperin and Harris, 2006). However, measuring the impact of such a diverse set of media channels poses significant challenges. For instance, accurately measuring the impact of any one story on one of these mediums would be burdensome and unproductive let alone the hundreds and thousands that are produced on a daily basis. Similarly, accurately measuring the impact of message consistency, endorsements, and fundraising is also difficult. Arguably, though, the end result is more political involvement, and this aspect of political campaigns may be easier to measure.

This paper builds upon previous research by political scientists in the area of election outcome prediction. Alan Abramowitz’s time-for-change model, first
published in 1988 and subsequently refined, is one of the best election prediction models in terms of accurately predicting an election’s outcome. The success of the model is, in part, due to its incorporation of a two-term incumbency dummy variable that takes into consideration the electorate’s preference for periodic change. While Abramowitz’s model has been relatively accurate—correctly predicting the popular vote winner in every presidential election since 1988 and having an average out-of-sample error less than two percentage points (Abramowitz, 2004; 2008)—there is always room for improvement.

This paper aims to improve the time-for-change model by supplementing it with a factor for measuring low-level political involvement—a grassroots involvement factor. The incorporation of this factor both takes into consideration the difference between candidates and their campaigns and through its specification provides a head-to-head measure of each candidate’s ability to motivate people. Ultimately, the goal in producing a better presidential election forecasting model is to answer the higher-level and more important question, “What determines election outcomes?” (Rosenstone, 1983). The answers to this question will help to inform election regulators as well as campaign staff.

This study finds that including the small donor contributions ratio as a proxy for grassroots involvement does not change the sign of the other model covariates. The small donor contributions ratio is statistically significant at the 99% level. This suggests that the small donor contributions ratio is a good predictor for presidential
election vote share outcome. Additionally, including the small donor contributions ratio improved the model’s goodness-of-fit and standard error of the estimate, but not necessarily the out-of-sample error.

The implication for a campaign’s staff is intuitive: an advantage in grassroots involvement (in comparison to that of their opponent) likely leads to higher vote share outcome for their candidate. The data show that if the two-major-party candidates in a race have similar proportions of grassroots involvement, the incumbent-party candidate enjoys an estimated 2.2% advantage. If this ratio favors the incumbent 2:1, then the advantage is 4.4%; if the ratio instead favors the challenger 2:1, then the incumbent’s advantage is reduced to 1.1%.
Chapter 2. Literature Review

The past two decades have given rise to several models for forecasting U.S. presidential elections. Among the most prominent models are those of Lewis-Beck and Rice (1984) (later Tien, 1996), Campbell and Wink (1990), and Abramowitz (1988). These models seek to predict the outcome of an election based on a set of key factors. Since the first appearance of U.S. presidential election forecasting models, consensus has built toward the best predictors of presidential elections, namely measures of current economic performance and incumbent approval. The models use economic indicators and polling data taken months prior to the election in order to predict the election outcome. Such timing, however, disregards most of the effects that a campaign may have in the final few months of the election, one of the most crucial times to persuade public opinion. Most models use data from U.S. presidential elections since World War II (1948) to estimate their forecasting models.

Most of the predictive models employ the underlying assumptions of retrospective voter theory. In 1966, V.O. Key proposed the first basic referendum model for voting behavior. The model was a simple reward-punishment model and implied that incumbent performance and the voter perception of that performance (through approval ratings and macroeconomic indicators) were key determinants of vote choice (Pratt, 2004; Fiorina, 1981; Norpoth, 1996). In 1971, Gerald Kramer published an influential article observing that voting habits were largely retrospective, favorable to incumbents, and based mostly upon economic policy outcomes and not so
much on the substance of the economic policies themselves (Pratt, 2004; Kramer, 1971). This led to the formation of Kramer’s decision rule, which states: “if the incumbent’s performance is ‘satisfactory’ the voter votes against the incumbent, to give the opposition party a chance to govern” (Kramer, 1971).

In general, studies suggest that presidential voting behavior is strongly correlated with fluctuations in leading macroeconomic indicators (Pratt, 2004; Kiewiet and Rivers, 1984), but macroeconomic indicators are not the only good predictors. The literature also suggests that macroeconomic indicators are not the sole basis for voting behavior, and that voter’s perceptions of the incumbent’s responsibility for the present economic conditions is also important (Pratt, 2004; Feldman, 1982; Kiewiet and Rivers, 1984).

Presented in the following section are some of the more recent presidential vote share prediction models and their paths of evolution in incorporating measures of macroeconomic performance and incumbent responsibility.

The Economy-Popularity Model

In 1984, Lewis-Beck and Rice incorporated macroeconomic performance and electorate perception of incumbent responsibility into a single forecasting model of vote share by including both economic indicators and presidential approval ratings as explanatory variables. The initial iteration of the “economy-popularity” model correctly predicted 7 out of the 9 races (1948 – 1980). The original model relied on data that was known well ahead of time, which gave the forecasting model a lead time
of six months before the election. In their book *Forecasting Elections* (1992), Lewis-Beck and Rice updated the model, expanding the number of predictor variables to include an additional measure for incumbent appeal and another for party strength. Most importantly, the new model sought to predict Electoral College vote outcome instead of the percentage of the two-major-party popular vote.

However, the model failed to predict the outcome of the 1996 election and Lewis-Beck teamed up with Charles Tien to produce another iteration of the model. This second revision abandoned the changes of the 1992 version, on the grounds that the model had been mis-specified.¹ In their revision, Lewis-Beck and Tien sought to incorporate both retrospective and prospective variables. In 2000, the model failed to predict the correct outcome and a third revision of the model was produced that included an interaction term between GNP and incumbent status (i.e., whether the current president is running or not).

The most recent revision of Lewis-Beck and Tien’s model (2008) incorporates measures of presidential approval, GNP growth, jobs creation, and incumbency. The model uses data from 1952 through 2004 (14 elections in total), and has an adjusted $R^2$ of 0.94, meaning that the model explains 94% of the variation in election outcomes. The model also has a standard error of the estimate (SEE) of 1.43. These data are summarized below.

---

¹ Both the high SEE of 9.1 for the new model and an erroneous prediction for the outcome of the 1992 presidential election cast doubt on the model’s value for predicting presidential election outcomes, leading to the conclusion that either the model’s covariates were either irrelevant or simply poor predictors.
Table 1 summarizes the comparison statistics for each of the multivariate regression presidential election forecasting models discussed in this section. Included in Table 1 are explanatory variables, number of samples (N), adjusted $R^2$, standard error of the estimate (SEE), out-of-sample error (if available), and lead-in time. Adjusted $R^2$ tells us how well the covariates explain the variation in the outcome variable. For most of the models, around 90% of the variation in vote share outcome is explained by the covariates. In general, the adjusted $R^2$ values may be high for so few variables in the model—such a high $R^2$ may indicate that the covariates are either exceptionally good predictors or that the variables used and the small sample size gives a false sense of just how well the covariates explain the outcome. Either way, it is almost certain that such high-level variables chosen as covariates are hard for candidates and campaigns to influence. SEE is a measure of model prediction error that gives the average absolute prediction error observed across all model samples; a lower SEE essentially means that the model’s predictions are relatively more certain (i.e., have a lower margin of error). As seen in Table 1, the most recent models have similar SEEs ranging from 1.43 to 1.80. Out-of-sample error is another measure of model prediction error where a sample is removed from the known data set, the regression model parameters are re-estimated, then the removed sample point outcome variable is predicted with the known covariate values and estimated parameters (Beck, 1999). The predicted estimate is compared with the actual known point, and this is repeated for all samples. The difference between the predicted and known values is
calculated and averaged, the lower the average out-of-sample error the better. Lead-in time is the amount of time the model’s prediction is made previous to the election.

### Table 1: Summary Statistics for U.S. Presidential Election Forecasting Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Explanatory Variables</th>
<th>N (Elections)</th>
<th>Adjusted $R^2$</th>
<th>SEE</th>
<th>Out-of-Sample Error</th>
<th>Lead-In Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lewis-Beck and Rice (1984)</td>
<td>Presidential Approval (May), GDP Growth</td>
<td>9 (1948-1980)</td>
<td>0.82</td>
<td>3.68</td>
<td>---</td>
<td>6 Months</td>
</tr>
<tr>
<td>Campbell and Wink (1990)</td>
<td>Trial-Heats (Early Sept.), GNP Growth</td>
<td>11 (1948-1988)</td>
<td>0.94</td>
<td>1.53</td>
<td>1.12</td>
<td>1.5 Months</td>
</tr>
<tr>
<td>Campbell (2008)</td>
<td>Trial-Heats (Early Sept.), GDP Growth</td>
<td>16 (1944-2004)</td>
<td>0.90</td>
<td>1.80</td>
<td>1.62</td>
<td>2 Months</td>
</tr>
<tr>
<td>Abramowitz (1988)</td>
<td>Presidential Approval (May), GNP Growth, Two-Term Incumbency</td>
<td>10 (1948-1984)</td>
<td>0.92</td>
<td>1.20</td>
<td>1.9</td>
<td>4 Months</td>
</tr>
<tr>
<td>Abramowitz (2008)</td>
<td>Presidential Approval (June), GDP Growth, Two-Term Incumbency</td>
<td>15 (1948-2004)</td>
<td>0.90</td>
<td>1.78</td>
<td>---</td>
<td>3 Months</td>
</tr>
</tbody>
</table>

Notes: Authors do not always report out-out sample error. This table’s format and older data were taken from a similar table in Pratt (2004). Newer data (2008) were compiled from each author’s most recently published model estimates.

### The Trial-Heat Model

In 1990, Campbell and Wink included a measure that reflected head-to-head popularity of the presidential candidates. In what they called “trial-heat polls” they resolved the observed deficiency that presidential forecasting models then only considered popular opinion about the incumbent office holder but not the popularity of all candidates. Trial-heat polls ask respondents for whom they would vote if the election were held today in order to gauge the relative strength of each candidate. In
addition to trial-heat results from early September, the model also included second quarter real GNP growth. In 1996, Campbell updated the model by revising the measures of economic growth from second quarter growth rate of real GNP to the second quarter growth in GDP, because it proved to be a better predictor. The most recent revision of Campbell’s model (2008) uses data from 1944 through 2004 (16 elections total), and has an adjusted $R^2$ of 0.90 and an SEE of 1.80 (see Table 1).

*The Time-for-Change Model*

In 1988, Alan Abramowitz incorporated a factor that penalized a candidate whose party had been in power for two terms or more. Abramowitz observed that only one first-term incumbent party candidate since 1900 has been defeated (Jimmy Carter in 1980). This observation led Abramowitz to hypothesize that incumbent party candidates are typically penalized if their party has been in power for two or more terms, reflecting the electorate’s natural tendency toward periodic change.

Abramowitz’s time-for-change model, like the other models, combines presidential popularity and economic conditions to predict the outcome of a U.S. presidential election. As Abramowitz points out, this model reduces the election to a matter of “referendum on the incumbent president and the economy.” If the economy is doing well and the incumbent president’s approval ratings are strong, then the in-party candidate for president is likely to win.

If the economy is doing poorly, or the incumbent president is unpopular, or both, then the in-party candidate’s chance of being elected declines. Abramowitz’s
1988 model included measures of presidential job approval (incumbent responsibility) taken in May of the election year, GNP growth (macroeconomic performance), and an incumbency dummy variable. This dummy variable indicates if the incumbent’s party has been in power for two or more terms. Abramowitz’s most recently estimated penalty for two-term or more incumbency is 4.27% of the national vote share (Abramowitz, 2008).

Like the other models, the time-for-change model has been fine-tuned since it was originally published. In 1996, Abramowitz updated the model by including presidential popularity ratings in June and the annual growth rate of real GDP for the first two quarters of the year. In 2004 he further refined the model by including net approval ratings, defined as the difference between the president’s approval and disapproval ratings. With these newly updated measures, the time-for-change model correctly predicted the popular vote winner in every U.S. presidential election between 1988 and 2008 with an average out-of-sample forecasting error of less than two percentage points for all presidential elections between 1948 and 2000. The most recent revision of Abramowitz’s model (2008) uses data from 1948 through 2004 (15 elections total), and has an adjusted $R^2$ of 0.90 and an SEE of 1.78 (see Table 1).

Figure 1 depicts the data used in Abramowitz’s time-for-change model. The left axis shows the incumbent party’s percentage of the two-party vote share. The dashed line drawn at 50% indicates whether the incumbent received a majority of the two-party vote. The right axis shows second quarter annualized growth in real-GDP
and June Gallup poll presidential job approval ratings. Along the bottom axis are the election years; a dot near the year indicates that the incumbent party has been in power for two terms or more and a star indicates when the non-incumbent party was elected. Abramowitz’s insight was that in nearly all of the years where the non-incumbent party was elected (i.e., years with stars), were also years that the incumbent party had been in power for two terms or more (i.e., years with a dot); as seen in the figure, the two are highly correlated. The years 1952, 1960, 1980, 1992, and 2008 show a relationship between the non-incumbent party being elected and a slowing of economic growth and lower presidential job approval ratings.

Figure 1: Data for Abramowitz's Time-for-Change Model

Left Axis: Incumbent two-party vote share
Right Axis: Second Quarter Growth in Annual Real GDP
Right Axis: Presidential Approval Ratings (% approve - %disapprove)
While these U.S. presidential election forecasting models have been reasonably accurate over the years, there is still room for improvement. Current forecasting models use polling data taken months previous to the election, disregarding most effects that a campaign may have in the final few months before the election—perhaps the most crucial time to persuade public opinion. It is important that these models give a substantial lead-time on their prediction so that campaign staffs might have a chance to incorporate the model’s predictions and insights into their campaign planning, but incorporating some measure of campaign performance such as grassroots involvement may be of value to presidential election forecasting models.

Narrowing the number of factors that might improve presidential election prediction models is no simple task. A variety of presidential campaign actions influence election outcomes. For example, campaigns spend heavily to influence public opinion through different media channels; however, measuring the impact of such a diverse set of activities is difficult. One way to solve this problem is to examine the end result. Arguably, the end result of all campaign efforts is an increase in political involvement at the individual or community (i.e., grassroots) level, and this is something that can be measured more easily than the exact impact of individual campaign activities.

This paper incorporates a measure of grassroots involvement into the time-for-change model to test whether it is important to forecasting presidential election vote share outcome. The paper is arranged into four remaining sections: Conceptual
Framework and Hypothesis, Data and Methods, Results, and Conclusion. The Conceptual Framework and Hypothesis section explains the details of the proposed new variable and specifies the new model. The Data and Methods section describes the data used for this study in detail. The Results section presents the findings. Finally, the paper and findings are summarized in the Conclusion.
Chapter 3. Conceptual Framework and Hypothesis

This paper aims to improve the time-for-change model by supplementing it with a factor for measuring low-level political involvement—a grassroots involvement factor. The incorporation of this factor does two things in order to remedy the current shortcomings of many U.S. presidential election prediction models, namely taking for granted the differences between candidates and the role that campaigns play in persuading voters toward the end of an election cycle. First, the new grassroots factor takes into consideration the differences between candidates and the effects that their campaigns have in persuading voters. Some candidates have charismatic qualities that give them an advantage over their opponent, while other candidates are good at putting together and leading campaign organizations that work at persuading voters to vote for them (for undecided voters) or encouraging people to turnout to vote for them (for base voters). This grassroots factor, a measure of how many people are involved in the campaign at the grassroots-level, attempts to measure and incorporate both campaign and candidate characteristics into the model. Second, through the specification of this grassroots factor, a ratio of incumbent grassroots involvement over challenger grassroots involvement, the model incorporates a comparison of voter opinion of the two candidates. Ultimately, the goal in producing a better presidential election forecasting model is to answer the higher-level and more important question, “What determines election outcomes?” (Rosenstone, 1983). Finding an answer to this
question will help campaigns to better understand the effects of the money they spend and how best to gauge their progress on the campaign trail.

This study uses measures of presidential approval from the American National Election Survey (ANES), campaign finance data gathered from the Federal Election Commission (FEC), and GDP data from the U.S. Bureau of Economic Analysis (BEA). Due to the availability of FEC data, the main focus is on the eight presidential elections from 1980 to 2008.

This paper estimates the effect of small donor contributions as a proxy for grassroots involvement on U.S. presidential campaign outcomes. The study investigates whether including this factor is of value to the time-for-change model. To do so, the amount of grassroots involvement in a particular campaign is measured by the ratio of total money donated by small donors to the incumbent party presidential candidate over the total money donated by small donors to the challenging party candidate. Campaign finance information is taken from the publicly available FEC filing data. For the purposes of this study, a small donor is measured as someone who donated between $201 and $500 dollars to a presidential candidate. Typically, the definition of a small donor is limited to donations totaling under $200; however, campaign finance laws do not require campaigns to report individual donations totaling less than $200 (FEC, 2007).

In recent years, it has become conventional wisdom that the more money a candidate has the more likely they are to win. However, it is useful to broaden the
scope of understanding by restating: the more resources a candidate has the more likely they are to win. The time that people are willing to dedicate volunteering and advocating is also a resource and building a grassroots organization full of motivated people can be more valuable than money alone. Broadening the scope beyond cold hard cash acknowledges this fact. One way of estimating the level of grassroots involvement in a campaign is through the amount of small donations contributed.

Incorporating a measure of small donations into the time-for-change model yields the following empirical specification:

\[
\%VS_t = \beta_0 + \beta_1 APPROVAL_t + \beta_2 ECON_t + \beta_3 TERM_t + \beta_4 SMALLDONORS_t + u_t
\]

Where \%VS is the percentage of the two-party vote share for the incumbent party candidate, APPROVAL is the difference between the current president’s approval and disapproval ratings taken from the ANES data set (the time-for-change model uses the final Gallop poll in June), ECON is a measure of economic performance, either the growth of real GDP from January of the year previous to the election year to January of the election year or second quarter growth in personal income are used (the time-for-change model uses the annual growth rate of real GDP take from the first two quarters of the election year), TERM is a dummy variable that takes on the value “1” if the president’s party has been in office for two terms or more (“0” otherwise), and

\[\footnote{A more thorough explanation of data choice is provided in Chapter 4.}\]
SMALLDONORS is the ratio of total money donated by small donors to the incumbent party’s presidential candidate over the total money donated by small donors to the challenging party’s presidential candidate before July 1 of the election year. Again, for the purposes of this study a small donor is someone who donated between $201 and $500 in a given election cycle to a presidential candidate. This paper tests the hypothesis of whether including a measure of small donor contributions, as a proxy for grassroots involvement as a result of campaign activity, is important to predicting vote share outcome of a U.S. presidential election.
Chapter 4. Data and Methods

Regionalization and Unit of Analysis

Due to the limited number of years in which campaign finance data are reported, the data used in this study are divided into six geographical regions. In the U.S., the Federal Election Commission (FEC) oversees the collection of presidential election campaign contribution data. The FEC was created in 1975 and campaign contribution data have only been made available electronically for the election years 1980 though the present. As a result, microdata on campaign contributions are not available before 1980, severely reducing the available sample size from 15 to 7 samples, less than half of the sample size in the 2008 iteration of the Abramowitz model (2008). Regional grouping, as opposed to state grouping, was chosen in order to keep the number of samples per unit of analysis relatively similar. In the ANES and FEC data some states with smaller populations have only a few samples within a single year, while the regionalized data samples for the ANES data contain between 141 and 477 observations per region. The regionalized data samples for the FEC data contain between 1866 and 65832 observations per region. The unit of analysis in this study is thus at the regional level.
Table 2 provides a summary of the distribution of reported campaign contributions by region and election year. Regions like the Northeast and South Atlantic consistently have higher numbers of individual donors and the Mountain Midwest region is consistently lower. For the most part the percentage of contributors within a given region considered small donors\(^3\) (values in parentheses) are comparable across regions.

### Table 2: Distribution of Reported Campaign Contributions by Region and Election Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Northeast</th>
<th>South Atlantic</th>
<th>South Central</th>
<th>Great Lakes</th>
<th>Mountain Midwest</th>
<th>West</th>
<th>Total Donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>25.7(^3)</td>
<td>19.1(^3)</td>
<td>17.6(^3)</td>
<td>13.0(^3)</td>
<td>8.5(^3)</td>
<td>16.1(^3)</td>
<td>38,826</td>
</tr>
<tr>
<td>1984</td>
<td>28.3(^3)</td>
<td>16.4(^3)</td>
<td>14.0(^3)</td>
<td>10.5(^3)</td>
<td>11.5(^3)</td>
<td>19.3(^3)</td>
<td>17,821</td>
</tr>
<tr>
<td>1988</td>
<td>41.5(^3)</td>
<td>17.1(^3)</td>
<td>12.1(^3)</td>
<td>11.0(^3)</td>
<td>5.1(^3)</td>
<td>13.3(^3)</td>
<td>39,322</td>
</tr>
<tr>
<td>1992</td>
<td>26.0(^3)</td>
<td>26.5(^3)</td>
<td>26.9(^3)</td>
<td>27.6(^3)</td>
<td>27.5(^3)</td>
<td>33.5(^3)</td>
<td>49,378</td>
</tr>
<tr>
<td>1996</td>
<td>28.1(^3)</td>
<td>40.5(^3)</td>
<td>49.2(^3)</td>
<td>32.0(^3)</td>
<td>50.5(^3)</td>
<td>36.2(^3)</td>
<td>50,784</td>
</tr>
<tr>
<td>2000</td>
<td>19.2(^3)</td>
<td>20.0(^3)</td>
<td>26.4(^3)</td>
<td>10.3(^3)</td>
<td>7.8(^3)</td>
<td>14.3(^3)</td>
<td>130,495</td>
</tr>
<tr>
<td>2004</td>
<td>25.2(^3)</td>
<td>36.3(^3)</td>
<td>41.7(^3)</td>
<td>32.0(^3)</td>
<td>37.6(^3)</td>
<td>33.4(^3)</td>
<td>261,579</td>
</tr>
<tr>
<td>2008</td>
<td>24.2(^3)</td>
<td>21.6(^3)</td>
<td>10.2(^3)</td>
<td>12.5(^3)</td>
<td>10.3(^3)</td>
<td>21.1(^3)</td>
<td>243,290</td>
</tr>
</tbody>
</table>

Percent of region donors that are considered small donors for this study are shown in parentheses.

**Note:** Data includes contributions to the two-major-party candidates between $201 and the maximum allowable contribution reported before July 1 of the election year.

---

\(^3\) Donations between $201 and $500 dollars
Figure 2 illustrates the grouping of states into regions for this study. Two maps are shown: the map on the left depicts the nine regions used by the U.S. Census Bureau for collecting census statistics; the map on the right depicts the six regions used for this study. The Census Bureau regions have been combined in order to make six regions with comparable populations. This is also useful because population, ANES samples, and Electoral College votes are all relatively proportional, therefore, the number of samples in the ANES data set and the relative importance of each region to the overall vote share outcome balance out. It is important that the regions have similar populations so that they can be pooled into one model. Failing to balance the populations between regions might give one region substantially more weight in the model than the others.

Figure 2: Breakdown of Regions for Analysis
Data Sources

A variety of data, measured at the state or individual level and aggregated at the regional level, are combined in order to measure regional economic performance, regional presidential job approval ratings, and regional small donor campaign contributions. Campaign contribution data are taken from the Federal Election Commission (FEC) and include names, addresses, and contribution values for individuals since 1980. The American National Election Studies (ANES) data is a time-series, cross-sectional, intra-election-year panel study data set that contains presidential approval data since 1948. Macroeconomic variables, such as growth in regional real GDP are collected from the U.S. Bureau of Economic Analysis (BEA). Finally, political data on vote share outcome by region and two-term incumbency are taken from Dave Leip’s Atlas of U.S. Presidential Elections.

FEC Campaign Finance Data

Campaign finance data are collected by the FEC through its authority established by the Federal Election Campaign Act (FECA), Primary Matching Payment Act, and Presidential Election Campaign Fund Act. Combined, these statutes limit the sources and amounts of the contributions used to finance federal elections in the U.S., require public disclosure of campaign finance information, and provide public funding of U.S. presidential elections. Reporting is compulsory; under the campaign finance law, campaigns are required to disclose individual contributions of more than
$200. Also, individuals and organizations have caps on the total amount of money they can donate to any one campaign.

The FEC data set includes information on the campaign committees, candidates, individual contributors, and campaign/committee expenditures. It also includes city, state, and zip code for each contributor and committee, which make it possible to separate the data by region. The data are grouped by election cycle, and electronically reported data are available on the Internet for the 1979-1980 election cycle through the present election cycle.

*ANES Presidential Approval Data*

A jointly run project by the University of Michigan and Stanford University, the American National Election Studies (ANES) data contain polling data for each presidential election beginning in 1948 (except 1950). Each of the unweighted cross-sectional samples contains about 1,000 person observations with more recent samples containing slightly more observations. Interviews are conducted both by phone and in person, and respondents are paid either $20 or $50 dollars for their time in responding to the survey. Cross-section cases from the time-series election studies have been pooled and the total unweighted cross-section sample size is 48,812 person observations. ANES presidential job approval ratings are collected over a slightly longer period of time than a typical Gallup poll and the number of months the data is collected before the election day varies; however, the data should still be comparable.
For example, the 2008 ANES sample data used\(^4\) was collected during the month of September 2008, two months closer to Election Day than the approval data typically used by Abramowitz.

**BEA Real GDP and Personal Income**

The Bureau of Economic Analysis (BEA) estimates real-GDP at the state-level since 1963 and personal income by state since 1929 (quarterly since 1948). Real GDP by state is not available on a quarterly basis, which is important because Abramowitz’s model uses the annualized second quarter estimate for national real GDP growth; however, personal income is available quarterly. Annualized GDP figures by state, growth from January of the previous year to January of the current election year, should still be reasonable predictors of economic performance. Real-GDP figures incorporate estimates for state labor income, non-corporate and corporate capital income, and business taxes less subsidies paid. In 1997, the BEA changed its method of estimating GDP by state\(^5\) and as a result, the data is only available in current dollars between 1980 and 2007. This study adjusted the current dollar figures for inflation using the CPI-U (2000) in order to convert them into real-GDP growth. Second quarter growth in personal income by state was calculated from the quarterly personal income by state data (i.e., growth between the first and second quarter of the election year).

---

\(^4\) Because the ANES takes time to release and combine its data the 2008 data was pulled from the ANES 2008 2009 Panel Study and combined with the data from the ANES Cumulative Data file (2005 version) by the author.

\(^5\) The BEA made a major revision to the GDP series in 1997. This study appended the two data series together.
year). Both real GDP and personal income were aggregated regionally with a state population weighted sum using the U.S. Census Bureau reported population estimates for the election year.

Two-Party Vote Share Outcome and Two-Term Incumbency

Finally, this study incorporates the two remaining variables of Abramowitz’s model: vote share outcome (taken from Dave Leip’s Atlas of U.S. Presidential Elections) and two-term incumbency (compiled by the author). The two-term incumbency dummy is equal to “1” if the party in power has held the office for two or more terms.

Analysis Plan

This study first reproduces Abramowitz’s model using the June Gallup presidential approval polling data and annualized second quarter real GDP to verify the parameter estimates at a national level. The data are compared to Abramowitz’s most recently published estimates (2008). Then the small donations ratio is included into the model to see if its inclusion jeopardizes model integrity. The model parameters are estimated using ordinary least squares regression for the years 1948 through 2004 (with the small donations ratio set to one for years before 1980) and 1980 through 2004. Next, the data are broken down regionally to increase the sample size. The parameter estimates are compared with the estimates from the first step in order to verify the integrity of the time-for-change model. Finally, this study includes the small
donor contributions ratio into the regional-level model. With the new variable included, this study investigates whether the variable is important in predicting the election vote share outcome.

Figure 3 depicts the hypothesized relationship between the outcome variable, incumbent percentage of the two-party vote, and the new explanatory variable, the small donor contributions ratio. The expected relationship is positive, meaning that the larger the ratio of incumbent party candidate donations to non-incumbent party candidate donations the more likely the incumbent party is to being reelected. This relationship raises an important point also made by other scholars (Morton and Cameron, 1992): campaign spending by an incumbent candidate is usually not as effective in influencing public opinion as equal spending from a challenger. Therefore, a ratio of one is not necessarily the equilibrium point where neither candidate has an advantage.
Figure 3: Expected Impact of the Small Donor Contributions Ratio

<table>
<thead>
<tr>
<th>Small Donor Contributions Ratio Specification</th>
<th>Description</th>
<th>Expected Impact on Incumbent Party Vote Share Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio &gt;&gt; 1</td>
<td>• Incumbent party candidate significantly out-fundraises challenger</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>• Incumbent party candidate and challenger raise similar amounts of money</td>
<td>No impact</td>
</tr>
<tr>
<td>Ratio &lt;&lt; 1</td>
<td>• Non-incumbent party candidate significantly out-fundraises incumbent</td>
<td>-</td>
</tr>
</tbody>
</table>
Chapter 5. Results

Descriptive Statistics

Table 3 provides the summary descriptive statistics for all of the variables used in the analysis (except for dummy variables). The mean and median of the dependent variable, incumbent candidate percentage of the two-party voter turnout, are 50.87% and 50.61% respectively, meaning that the incumbent usually won the election. The mean and median of the variable of interest—the ratio of small donor contributions to the incumbent over small donor contributions to the non-incumbent—are 0.84 and 0.55 respectively, meaning that on average fewer small donors contributed to the incumbent than the non-incumbent.

Table 3: Interval-Ratio Variable Descriptive Statistics

<table>
<thead>
<tr>
<th>1980-2008 Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incumbent % of Two-Party Vote Share (%)</td>
<td>50.87</td>
<td>50.61</td>
<td>6.56</td>
<td>38.86</td>
<td>62.50</td>
</tr>
<tr>
<td>Real-GDP Growth (%)</td>
<td>2.06</td>
<td>2.21</td>
<td>2.09</td>
<td>-2.82</td>
<td>7.25</td>
</tr>
<tr>
<td>Personal Income Growth (%)</td>
<td>1.64</td>
<td>1.63</td>
<td>0.80</td>
<td>-1.51</td>
<td>3.20</td>
</tr>
<tr>
<td>ANES Approval Ratings (%)</td>
<td>6.06</td>
<td>11.53</td>
<td>26.20</td>
<td>-44.55</td>
<td>45.11</td>
</tr>
<tr>
<td>Small Donors Ratio</td>
<td>0.84</td>
<td>0.55</td>
<td>0.94</td>
<td>0.22</td>
<td>6.16</td>
</tr>
</tbody>
</table>

Number of Observations = 48
Figure 4 depicts Republican’s percentage of two-party vote share by region for election years in which the term dummy is equal to one (the incumbent party had been in power two terms or more). The Northeast and West regions tend to vote Democratic, while the South Central region tends to vote Republican. The South Atlantic, Great Lakes, and Mountain Midwest tend to be swing regions.  

**Figure 4: Republican Percentage of Two-Party Vote Share in Change Election Years (Term=1)**

---

6 A table of incumbent and non-incumbent U.S. presidential candidates from 1980 through the 2008 is included in the Appendix.
Figure 5 depicts the correlation between incumbent two-party vote share and the small donor contributions ratio. The correlation is strong for the election years 2000, 2004 and 2008, moderate for election years 1980, 1984 and 1988, and weak for the years 1992 and 1996. This correlation (specifically the relationship in 1980 and 2000—election years where many models had problems) may indicate that the small donor contribution ratio will be useful in making vote share predictions.

**Figure 5: Correlation between Vote Share and Small Donor Contributions Ratio**

![Correlation between Incumbent Two-Party Vote Share and Small Donor Contributions Ratio](image)

Figures 6 and 7 analyze the regional variation within two key regression variables: regional GDP growth and presidential job approval. Insights drawn from these figures may influence the interpretation of regression results. Both figures are
presented as notched box plots. A box plot\(^7\) consists of a whiskered line overlaid with a box. Either extreme of the whiskered line represents the extreme values (max and min) of the data set. The top of the box represents the third quartile value while the bottom of the box represents the first quartile. The center line of the box represents the median value. A “notched” box plot also depicts the 95% percent confidence interval around the median by tapering the sides of the box out from the median value. If the first and third quartile values lie inside the 95% confidence interval then the box appears to have “horns,” as most of these boxes do—this is due to the small sample size per box of only six (the number of regions).

\(^7\) For a more in depth explanation of box plots and their many variations see McGill et al. (1978, February). Variations of Box Plots. *The American Statistician*, 32:12-16.
Figure 6 depicts the variation in real-GDP growth for the time period being considered. It is noteworthy that the variation in real-GDP growth was higher in the years preceding the 1992 election as compared to those that followed, this reflects a decline in the volatility of economic output (Blanchard and Simon, 2001) that has come to be known as “the Great Moderation” (Bernanke, 2002). Because this lack of variation may lead to GDP being a less valuable predictor of election outcome, this study also uses second quarter personal income growth as an economic indicator.

Figure 6: Variation in Regional Annual Real-GDP Growth
Figure 7 depicts the percentage of ANES respondents who approved of the president’s job performance minus the percentage of ANES respondents who disapproved of the president’s job performance. The focus of this figure is a comparison of variation within each year to that of other years; therefore, the median values, which differ from year-to-year have been aligned to make the comparison more clear. As shown, regional presidential job approval varies between years with 1980 having a substantially large variation while variation between regions for the election years 1996 and 2000 is relatively low.

**Figure 7: Variation in ANES Regional Presidential Job Approval by Region and Election Year**
Regression Results

Table 4 summarizes the regression results for the estimated effect of the small donor contributions ratio with the unit of observation at the national level. The first set of three regression models are Abramowitz’s most recently published (2008) model parameter estimates, this paper’s replication of the Abramowitz’s model, and this paper’s replication of the Abramowitz’s model with the incorporation of the small donor contributions ratio. The results show that the incorporation of the small donor contributions ratio into the time-for-change model does not change the sign or statistical significance of the model’s other parameter estimates. The small donor contributions ratio is set to 1 for the years before 1980, providing neither candidate an advantage. The estimated parameter is not statistically significant with a p-value of 0.281; this is most likely due to the restricted number of actual data. The last two regressions (columns 3 and 4) show the time-for-change model parameter estimates for just the years 1980 through 2004, the years for which FEC campaign contribution data is available. The model parameter estimates have the same sign and similar magnitude, but significantly greater standard errors resulting in none of the parameters being significant. This loss of significance is primarily due to the reduction of sample size from 15 elections to 7 elections. Once again, the reduced sample size is due to FEC campaign finance data being available starting in 1980. For the election years 1948-2004, the estimate of the small donor contributions ratio can be interpreted to mean that if the incumbent-party candidate and challenger raise the same amount of
money from small donors, then the incumbent has an estimated 2.9% advantage in the popular vote. If the incumbent-party candidate raises twice as much from small donors as the incumbent then this advantage doubles to 5.8% and if the non-incumbent out-raises the incumbent two-to-one then this halves to 1.4%.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<tr>
<td>June Approval</td>
<td>0.109**</td>
<td>0.106**</td>
<td>0.096**</td>
<td>0.168</td>
<td>0.171</td>
<td></td>
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<tr>
<td></td>
<td>(0.021)</td>
<td>(0.023)</td>
<td>(0.025)</td>
<td>(0.143)</td>
<td>(0.160)</td>
<td></td>
</tr>
<tr>
<td>Q2 GDP</td>
<td>0.604**</td>
<td>0.566**</td>
<td>0.564**</td>
<td>0.271</td>
<td>0.214</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.115)</td>
<td>(0.125)</td>
<td>(0.123)</td>
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<tr>
<td></td>
<td>1.013</td>
<td>(1.102)</td>
<td>(1.143)</td>
<td>(2.501)</td>
<td>(2.813)</td>
<td></td>
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<td>Small Donations Ratio</td>
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<td>----</td>
<td>2.888</td>
<td>----</td>
<td>6.123</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.533)</td>
<td></td>
<td>(9.428)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>51.417**</td>
<td>51.530**</td>
<td>49.488**</td>
<td>51.696**</td>
<td>48.021*</td>
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<td>(0.835)</td>
<td>(0.917)</td>
<td>(2.007)</td>
<td>(1.747)</td>
<td>(5.983)</td>
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<td>15</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>.920</td>
<td>.904</td>
<td>.915</td>
<td>.818</td>
<td>.850</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.898</td>
<td>.878</td>
<td>.881</td>
<td>.636</td>
<td>.549</td>
<td></td>
</tr>
<tr>
<td>SEE</td>
<td>1.782</td>
<td>1.931</td>
<td>1.905</td>
<td>2.900</td>
<td>3.228</td>
<td></td>
</tr>
</tbody>
</table>

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01
Column 0 contains the parameter estimates published in 2008 by Abramowitz for the time-for-change model. Columns 1 and 2 contain the parameter estimates for this study’s replication of the national-level time-for-change model for the election years 1948-2004. Column 3 and 4 contain the same for only election years 1980-2004.

Also reported in Table 4 are adjusted $R^2$ and the SEE for each model. When including the small donor contributions ratio into the time-for-change model with data for years 1948-2004 both adjusted $R^2$ (.878 to .881) and SEE improved (1.931 to
1.905). This indicates that including the small donor contributions ratio may improve both the goodness-of-fit and certainty of the model’s estimates. However, when including the small donor contributions ratio into the model for years 1980-2004 adjusted $R^2$ decreased (.636 to .549) and SEE increased (2.900 to 3.228). This set of mixed results could be due to a number of factors including the reduced small sample size in the second model.

In order to determine whether or not the small donations ratio is of value to the time-for-change model’s vote share predictions, the sample size was increased by decomposing the data into the six regions as previously described. Dummy variables for each region were added to ensure that any regional differences were taken into account.

Table 5 summarizes the regression results for the estimated effect of the small donor contributions ratio with the unit of observation at the regional level. A comparison of the parameter estimates in Table 4 to those in Table 5 show that decomposing the model from a national to regional level did not significantly alter the parameter estimate signs or their significance. Including the small donor contributions ratio into the regionalized time-for-change model (in model 2) shows that the small donor contributions ratio is statistically significant at the 99% level with regional fixed effects and clustered robust standard errors. The small donor contributions ratio parameter estimate can be interpreted that if the incumbent-party candidate and challenger raise the same amount from small donors then the incumbent has an
estimated 2.2% advantage in the popular vote. If the incumbent-party candidate raises
twice as much from small donors as the incumbent then this advantage doubles to 4.4%
and if the non-incumbent out-raises the incumbent two-to-one then this halves to 1.1%.
These values are similar to the estimates produced by the national-level model for the
years 1948-2004 (see Table 4). It is interesting to note that the parameter estimates for
the effect of real-GDP are less statistically significant in this regional model. This
finding could be attributed to the reduced number of sample years, the use of annual
instead of second quarter estimates of real-GDP growth, and the relatively low
variation in GDP growth.
Table 5: Regional-Level Regression Model Estimates (1980-2008)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval</td>
<td>0.130***</td>
<td>0.120+</td>
<td>0.096**</td>
<td>0.082</td>
<td>0.121***</td>
<td>0.117</td>
<td>0.111***</td>
<td>0.110</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.053)</td>
<td>(0.034)</td>
<td>(0.062)</td>
<td>(0.027)</td>
<td>(0.063)</td>
<td>(0.027)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Annual GDP Growth</td>
<td>0.497</td>
<td>0.605</td>
<td>0.822+</td>
<td>0.916+</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(0.423)</td>
<td>(0.356)</td>
<td>(0.411)</td>
<td>(0.433)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Q2 Personal Income Growth</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>3.370***</td>
<td>3.462*</td>
<td>3.138**</td>
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<td></td>
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<td></td>
<td>(0.906)</td>
<td>(1.267)</td>
<td>(0.884)**</td>
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<tr>
<td>Term</td>
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<td>-1.754**</td>
<td>-2.386</td>
<td>-2.405**</td>
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<td>-1.535</td>
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<td>(1.506)</td>
<td>(0.158)</td>
<td>(1.425)</td>
<td>(0.523)</td>
<td>(1.334)</td>
<td>(0.958)</td>
<td>(1.308)</td>
<td>(1.201)</td>
</tr>
<tr>
<td>Small Donations Ratio</td>
<td>---</td>
<td>---</td>
<td>2.208**</td>
<td>2.175**</td>
<td>---</td>
<td>---</td>
<td>1.431*</td>
<td>1.399*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(0.795)</td>
<td>(0.355)</td>
<td>---</td>
<td>---</td>
<td>(0.707)</td>
<td>(0.428)</td>
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<tr>
<td>Constant</td>
<td>49.909**</td>
<td>49.540**</td>
<td>47.920**</td>
<td>48.321**</td>
<td>45.321**</td>
<td>45.477**</td>
<td>44.780**</td>
<td>45.358**</td>
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<td></td>
<td>(1.324)</td>
<td>(0.583)</td>
<td>(1.426)</td>
<td>(0.723)</td>
<td>(1.760)</td>
<td>(1.737)</td>
<td>(1.722)</td>
<td>(1.612)</td>
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<td>---</td>
<td>Yes</td>
<td>---</td>
<td>Yes</td>
<td>---</td>
<td>Yes</td>
</tr>
<tr>
<td>Clustered Robust Standard Errors</td>
<td>---</td>
<td>Yes</td>
<td>---</td>
<td>Yes</td>
<td>---</td>
<td>Yes</td>
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<tr>
<td>Number of Observations</td>
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<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>R-squared</td>
<td>.428</td>
<td>.459</td>
<td>.515</td>
<td>.533</td>
<td>.551</td>
<td>.579</td>
<td>.590</td>
<td>.602</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>.389</td>
<td>.348</td>
<td>.470</td>
<td>.422</td>
<td>.521</td>
<td>.482</td>
<td>.552</td>
<td>.508</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01
Fixed effects without robust standard errors were also run and the results were similar to slightly less significant than the clustered robust results.
The second set of four regressions (columns 5 through 8) in Table 5 substitute second quarter personal income growth in place of real-GDP growth. The parameter estimate for the effect of second quarter personal income growth is considerably higher than the effect of real-GDP growth. Figure 8 compares the summary statistics for Jan-Jan real-GDP growth to second quarter personal income growth. One possible reason for the difference in the magnitude of the estimate is that there is a relatively smaller variance in second quarter personal income growth as compared to annual growth in real GDP. The parameter estimates of the last model are significant. The estimated effect of the small donor contributions ratio is 1.4% if the incumbent-party and non-incumbent-party candidates raise the same amount of money from small donors, 2.8% if the incumbent-party candidate out-raises his challenger 2:1, and 0.7% if the non-incumbent-party candidate out-raises the incumbent 2:1.
The adjusted R\(^2\) is also reported for each model in Table 5. Controlling for fixed effects and robust standard errors adjusted R\(^2\) rose of .348 to .422 for the model that included regional real GDP as a covariate and .482 to .508 for the model that included second quarter growth in personal income as a covariate. This confirms that including the small donor contributions ratio improves the model’s goodness-of-fit.

As presented in the literature review, two common ways of evaluating the precision of a predictive model’s estimates are SEE and out-of-sample error. Evaluating the SEE of the national-level model produced mixed results. The national-level model with a larger sample size had a smaller SEE with the small donor contributions ratio included, while the SEE of national-level model with the smaller
sample size increased. The SEE of the regional time-for-change model (controlling for fixed effects and robust clustered errors) before including the small donor contributions ratio is 5.294 and after including it was reduced to 4.986 (4.721 before and 4.589 after for the model using personal income). This suggests that including the small donor contributions ratio increased the model’s precision.

Out-of-sample error was also calculated for both the national and regional models. For the national-level model years 1948-2004, the out of sample error before including the small donor contributions ratio was -0.299 and after -0.270, a small increase in forecasting certainty. For the regional-level model with real GDP as a covariate, fixed effects, and robust clustered errors, the out of sample error before including the small donor contributions ratio was 0.145 and after 0.834, an increase in forecasting uncertainty. The results are mixed and suggest that while the small donor contributions ratio is highly statistically significant including it may not reduce out-of-sample error.
Chapter 6. Conclusion

Over the past two decades political scientists have produced models that take a scientific approach toward predicting and evaluating election effects and outcomes. This paper sought to improve upon one of the most well-known U.S. presidential election forecasting models, Alan Abramowitz’s time-for-change model, by including a new measure of campaign performance.

Over the years, election forecasting literature has converged on two classes of variables for predicting presidential election outcomes: a measure of economic performance such as real GDP and a measure of incumbent-party responsibility such as presidential job approval ratings. In addition, Alan Abramowitz included a two-term or more incumbency dummy variable that has made his time-for-change model among the more accurate.

While these models have been relatively accurate they have done so while largely ignoring differences between candidates and a campaign’s ability to persuade voters. This paper sought to remedy these shortcomings by including a measure of grassroots involvement.

This study modified the time-for-change model by including a measure of small donor campaign contributions as a proxy for grassroots involvement. FEC campaign contribution data was used to derive the small donor contributions ratio. Because FEC campaign contribution data is only available beginning in 1980 (greatly reducing the
national-level model sample size) the model data was divided into six roughly even-sized (in terms of population) regions.

This study showed that incorporating the small donor contributions ratio did not change the sign of the other model parameter estimates. The small donor contributions ratio is statistically significant at the 99% level, suggesting that it is a good predictor for forecasting election outcomes. More importantly, including the small donor contributions ratio improved the model’s goodness-of-fit and standard error of the estimate, but not necessarily the out-of-sample error.

Future studies may want to focus on finding better measures of economic performance. This study included measures of economic performance that were taken up to 11 months before the election; this could be improved if annual real-GDP estimates or a comparable measure of economic performance by state were used for the regional-level model.

Future studies may also want to incorporate similar measures of grassroots involvement using other data sources that are available over longer periods of time. Since FEC campaign contribution data is only available starting in 1980 this severely reduced the sample size of the national-level model. Finding a data set that would provide a measure of grassroots involvement over a long enough period of time to allow its testing in the national-level model would help confirm the validity of these results.
One limitation of this study is that it uses data from the ANES survey, which are typically not available publicly until after the election has occurred. Because it is important that these forecasting models actually give some time for their predictions, so that candidates and campaigns have time to take their predictions into consideration, one way around this problem is to use the past ANES data to estimate the model, and a similar poll on presidential job approval available before the election to make the forecast.

The implication of this study’s findings to a campaign’s staff is intuitive: the more grassroots involvement the better. This study does not suggest that campaigns should focus solely on small donors. To the contrary, it is important that campaigns maintain a healthy balance of small and large donors. This study does suggest that measuring small donor contributions relative to those of your opponent may be of value in assessing the vote share outcome. This study estimates that in a race where both the incumbent and challenger have the same number of small donor contributions, the incumbent enjoys somewhere around a 2.2% advantage in the popular vote with all else being equal. If this ratio favors the incumbent 2:1 then the advantage is 4.4%, or if the ratio instead favors the challenger 2:1 then the incumbent’s advantage is reduced to 1.1%.
References


## Appendix: FEC and Election Information

### Table 6: FEC Regulated Campaign Contribution Limits

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<thead>
<tr>
<th>Year</th>
<th>Max Contribution Limit (per election)</th>
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<td>2008</td>
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<tr>
<td>2004</td>
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<tr>
<td>2000 and Earlier</td>
<td>$1,000</td>
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### Table 7: U.S. Presidential Candidates since 1980

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<td>Bush</td>
<td>Bush</td>
<td>Clinton</td>
<td>Gore</td>
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<td>McCain</td>
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<td>Bush</td>
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