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# It's the Economy, Stupid: Economic Voting and Gender Bias in U.S. Congressional Elections

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**IT'S THE ECONOMY, STUPID:  
ECONOMIC VOTING AND GENDER BIAS IN U.S. CONGRESSIONAL  
ELECTIONS**

by

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**SUBMITTED TO SCRIPPS COLLEGE IN PARTIAL FULFILLMENT OF THE  
DEGREE OF BACHELOR OF ARTS**

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## **Abstract**

This study examines the relationship between the state of the U.S. economy and the outcome of general elections for incumbents in the U.S. House of Representatives. The analysis uses a unique data set compiled from a sample of U.S. Congressional Elections and state and economic indicators between the years 1999 and 2014. We find that economic indicators are consistently related to election outcomes, but have a larger and more significant effect when the time period examined is closer to a major economic event, such as the Great Recession. We also find that female incumbent candidates are more negatively affected by increases in the unemployment rate than their male counterparts. The results imply the existence of a gender bias against women in elections that consider economic indicators highly. These findings highlight what is of greatest importance to the voting electorate during voting season in the 21<sup>st</sup> century.



## **Acknowledgements**

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I'd also like to thank my parents and Zack for supporting me through it all, even when they only understood about half of what I was saying. Their sympathetic yet confused nods and "mhms" did not go unnoticed.

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## **I. Introduction**

National economic conditions regularly influence both state and national elections. Every two years when voters return to the polls for Congressional elections, they are faced with the ability to reelect their incumbent or vote a new candidate into office. This choice is often linked with the voter's opinion of the current economic environment. The theory of economic voting posits that voters focus only on incumbent candidates and consider economic events to evaluate their performances. Since an average voter is not directly impacted by or extremely knowledgeable about many specific policies, their decision would only take into account common macroeconomic indicators, such as income, unemployment, price levels, and growth. Voters then reward incumbent candidates for positive conditions by reelecting them or punish them for poor conditions by voting in their challenger. The theory and study of economic voting hinges on one assumption known as the Responsibility Hypothesis. The Responsibility Hypothesis is the belief that voters hold the government responsible for economic events<sup>1</sup>. This simple hypothesis has given a foundation to almost all research into economic voting as it draws a connection between the economy and the vote and thus ties together economics and political science. This theory would suggest that the voting electorate only considers the incumbent candidate and a handful of economic indicators when making their voting decision. Yet, does this hypothesis hold water in today's political climate? It is necessary to further analyze the effects of the economy on voting patterns in order to provide a better explanation of the priorities of the general electorate.

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<sup>1</sup> Lewis-Beck, M. and M. Paldam, "Economic Voting: An Introduction"

Before we proceed, it is important to clarify how candidates are elected to the United States Congress. The two chambers of the U.S. Congress consist of the Senate, whose 100 members serve six-year terms, and the House of Representatives, whose 435 members serve two-year terms. Congressional elections are held every two years during which time the entire House and one third of the Senate is up for election. Unlike the president, Senate and House members have no limit on the number of terms they can serve. The reason we will be examining Congressional elections is due to the size of the governing body and the way candidates are elected. Presidential elections rely on Electoral College votes rather than the national popular vote, whereas Congressional elections rely solely on the popular vote in each state. We believe the popular vote provides a better representation of the will of the electorate and therefore a better indication of the effect of the economy on voting.

There are three types of Congressional elections: primary, general, and special. A primary election is a nominating election held by a state's political party to determine the party's candidate. During a closed primary election, a Democrat would run against a Democrat and a Republican against a Republican and only affiliated party members would be able to vote for those candidates. Occasionally, open primaries are held where non-party members are allowed to vote on party candidates. After Democratic and Republican primaries have finished, these candidates (and any others if there is another party running) face each other in a general election. In a general election, the whole state is given the opportunity to vote on any candidate, regardless of their party affiliation. The winner of the general election becomes a member of the next U.S. Congress. A special election is held to fill an office that has become vacant between general elections. This

usually occurs when a member has resigned or passed away during their term. In this situation, the state will hold special primaries and a special general election in order to fill the empty position.

In this research, only general elections that include an incumbent and occur during Congressional election years will be considered. Since these elections only happen every two years, a considerable amount of time passes between election years. Thus, by only examining the past eight congresses, we are able to cover sixteen years of economic events. These sixteen years not only provide a large sample size, but they also contain several major economic events, such as the Dot Com Boom, the Housing Bubble, and the Great Recession. We believe these eight Congressional elections will provide insight to the effects of economic voting during both good times and bad.

With an increasing percentage of women in Congress, it is worthwhile to address the effect of gender within economic voting tendencies. Women first reached a level of 10% House occupancy in 1993 and have increased this percentage every year since. Yet, it was not until the 114<sup>th</sup> Congress that at least 100 women were elected to serve in the Senate and House of Representatives. In the majority of elections, there are only a handful of female candidates as compared to males. For example, in 2014, of the 249 women who filed with the FEC to run for the U.S. House, only 161 made it past primary elections, and of them, only 80 were elected to serve in the House<sup>2</sup>. When women outnumber men in 39 states<sup>3</sup>, what can explain the stunning gender gap in American politics? From previous research, we know that male candidates are seen as stronger with

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<sup>2</sup> Women Candidates 2014, Center for American Women and Politics (CAWP), Eagleton Institute of Politics, Rutgers University.

<sup>3</sup> Schwarz, Hunter. "In Most States, Women Outnumber Men." *Washington Post*.

economic issues while female candidates are stronger with education or health care<sup>4</sup>. As such, are female candidates affected by economic voting in the same way as male candidates? For example, would a voter seeking to punish their male incumbent for poor conditions decide to reelect him if the only alternative was a female? If so, this would confirm the existence of a blatant gender bias in U.S. politics and more clearly explain the role of the economy in the results of national elections.

In order to investigate this issue more thoroughly, we will examine past Congressional elections and compare them to several macroeconomic indicators. We will look at Congressional elections beginning with the 107<sup>th</sup> Congress who were elected to serve starting in January 2001. To account for the economic state of the country, state-level data from the Bureau of Labor Statistics, the Bureau of Economic Analysis, and the Bureau of Energy Information will be used to summarize the various economic conditions. National-level data will be used to further explain what voters take into account when making decisions. Election data will come from Congressional Election Reports, which define incumbents and challengers, as well as their demographics and the result of the race. Using a multiple linear regression analysis, we will seek to find a correlation between good (poor) economic conditions and an increased percent of votes received by the incumbent (challenger). In addition, in order to analyze the effect of gender bias on election results, the data will include interaction terms between the incumbent gender dummy variable and the other variables. In this analysis, we expect to find that there will be a significant difference in voting patterns if the incumbent candidate is female. If this hypothesis proves correct, we believe it will provide a

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<sup>4</sup> Huddy, Leonie, and Nayda Terkildsen. "Gender Stereotypes and the Perception of Male and Female Candidates."

significant insight into both the patterns of economic voting as well as how gender bias affects election rates for males and females across United States House elections.

## **II. Literature Review**

### *A. History of Economic Voting Research*

When considering how voters first begin to make their decisions, it is vitally important to define the indicators used to evaluate their candidates. Much early research in this area was based on V.O. Key's seminal study that posits voters as an "electorate god of vengeance." According to research done in *The Responsible Electorate* (1966), Key found that voters used past experiences to evaluate the performances of candidates. He showed that voters evaluated only their incumbent candidates and punished or rewarded them according to their interpretation of past or current economic conditions. Following Key's work, Edward Tufte authored a similar study regarding midterm Congressional elections. He combined aggregate survey data on presidential approval ratings with aggregate economic data on the yearly change in real disposable income. While his study was mostly interested in analyzing the effect of presidential popularity on midterm elections, he found that a \$50 change in real disposable income in the past year affected the vote by 1.8 percentage points (Tufte 1975). It seems almost unbelievable that a change as small as \$50 could affect the vote by such a significant amount, however this may be the result of a relatively small window of observations where the change in real disposable income from year to year never exceeded \$150. These studies were the foundation of the belief that changes in economic conditions between the past and the current election were what voters used to evaluate candidates.

But in Fiorina's 1978 investigation, very little evidence was found to suggest that the electorate was voting using knowledge of past experiences. Using data from election surveys, Fiorina was able to measure whether respondents felt their economic condition had improved, worsened, or stayed the same over the past few years. Using this data in a regression, which also included data on similar survey questions regarding consumer prices and unemployment, he found that there is little evidence to support retrospective voting. However, we believe there are several problems with Fiorina's analysis. First, the survey question does not clearly define the time period the respondent should consider. An individual could have fared worse in the "past few years" as a result of an incumbent who had already been voted out or even a personal financial matter, such as medical bills or a car accident. Regardless of these rather weak results, Fiorina's work set the foundation for a series of studies that began to look at voter expectations as a replacement for, or an addition to, retrospective considerations. In some of the most recent literature, prospective voting has gained a serious foothold (Lewis-Beck 1988, Lockerbie 1991, Teixeira 1998). These studies use responses from election surveys or current population surveys to measure the level of optimism (or pessimism) the general electorate feels about the economy or the upcoming election. Similar to retrospective models, these studies expect to find that voters will elect an incumbent (challenger) when their expectations for the future are good (poor).

However, we believe the use of prospective variables undermines the overall theory of economic voting. We have chosen to define economic voting as the idea that voters only consider the incumbent and evaluate their performance based on economic events. However, it is impossible to evaluate a candidate based on economic events that have not

yet occurred. Voter expectations, while a valuable measure of national economic optimism or pessimism, are not a valid measure of incumbent performance. As both Lewis-Beck (1988) and Erickson (1990) argue, both past experience and future hope determine much of vote choice. If we make the assumption that voters are rational actors, their behavior should seek to maximize their *expected* utility by using their past knowledge to judge incumbents' credibility and to cement their expectations.

Expectations are a learned process largely built from past and current experiences. As such, the model will not use variables from election surveys such as the American National Election Studies (ANES) to measure voters' future expectations as it is redundant to include expectations that are built from concrete experience. Expectations do not accurately represent the theory of economic voting as a method of rewards and punishments. Thus, we will instead use data to measure economic indicators during the election year and the year preceding to estimate the overall economic voting behavior of voters during election seasons.

Past or future, the question now becomes, what do voters use to evaluate the economy? At this point, the research appears to be evenly split between collective or "sociotropic" and personal or "pocketbook" voting. Sociotropic voting considers the overall state of the economy using state and national-level economic indicators when evaluating candidates. Alternatively, pocketbook voting is when voters only consider their personal economic indicators such as disposable income or prices to measure their financial well-being and evaluate how a candidate has performed. Most of the earlier research tends to examine voters' decisions by using their personal economic grievances, as revealed by changes in real income and unemployment in the years leading up to an

election (Kramer 1971, Fiorina 1978). Kramer examined nominal and real income, unemployment, and cost of living indices for the current and preceding year. Using a regression, he finds the coefficients on income (both nominal and real) to be highly significant in every case and that price indices are significant in some regressions, but not all. Similarly, using the survey data that asked individuals to state how their personal financial situation had changed in past years, in a logit regression Fiorina found that personal financial conditions are related to presidential election results. However, he did not find as convincing results when examining Congressional elections. While we maintain that the data used by Fiorina is not strong evidence to disprove retrospective voting behavior, it does an effective job of representing the influence of pocketbook indicators.

In 1979, Kinder and Kieweit published a study specifically analyzing personal economic discontent and found no connection between personal grievances and voting patterns. Using survey data, they took responses from questions such as “would you say that you (and your family) are better off or worse off financially than you were a year ago?” and “are you making as much money now as you were a year ago, or more, or less?” Using these responses as well as information regarding unemployment from the Current Population Survey (CPS), they performed regressions on the elections between 1956 and 1976. Of these eleven elections, only two were shown to have been significantly affected by personal economic conditions. However, we find the sources of data used in this study to be weak. These survey responses allow too much room for error, as personal grievances may have been caused by events completely unrelated to the

performance of a candidate and therefore likely only loosely related to a voter's perception of their incumbent.

Nevertheless, this study opened the door to a wave of research that moved away from personal economic grievances and toward a more collective interpretation of voting behavior. The theory of collective voting makes an important assumption that the average voter is aware of the state of the national economy and votes according to their expectations for the future. While this assumption may seem like a reach, according to surveys by the Pew Research Center, roughly 60% of respondents either "very closely" or "fairly closely" followed stories about the state of the U.S. economy in the prior week<sup>5</sup>. Similarly, the economy has been considered "very important" in elections by more than 80% of respondents<sup>6</sup> for the past six years. Therefore, we believe it is safe to make the assumption that the average voter is aware of the economy and considers it a high priority. However, it is important to note that while 60% of respondents "closely or fairly closely" followed stories about the U.S. economy, they may not have been following stories that examined issues such as inflation or GDP.

As anyone who has turned on the news recently can tell you, only a select few economic indicators are regularly mentioned on television. A study by the Project for Excellence in Journalism found that during the Great Recession, only three major storylines accounted for nearly 40% of coverage on economic issues. These three were the bailout, the stimulus, and the auto industry. In fourth place, unemployment accounted

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<sup>5</sup> "Pew Research Center for the People & the Press Poll." *Pew Research Center for the People and the Press*.

<sup>6</sup> "Pew Research Center for the People & the Press Religion & Politics Poll." *Pew Research Center for the People and the Press*.

for just over 6% of total economic media coverage<sup>7</sup>. This could suggest that while voters are exposed to and follow storylines about the U.S. economy, they may only be exposed to a small percent of all the issues present. This same study also found an interesting correlation between a positive performance of the Dow and a decrease in media coverage about the economy. This could suggest that voters are bombarded with more economic news coverage when times are bad than when they are good, leading to a bias towards negative economic voting.

Nagler and Niemann's 1997 study of economic reference groups provides a framework that combines the concepts of pocketbook and sociotropic voting patterns. As they claim, the sociotropic theory posits that voters believe the state of the national economy is the best predictor of how the voter's pocketbook will fare. The great deal of overlap between sociotropic and pocketbook voting is a result of voters' understanding of the national economy being colored by their own hopes and experiences. Due to these connections, we believe that analyzing both types of voting provides a more well-rounded explanation of voting behavior. We will use state-level data to serve as a proxy for pocketbook indicators. We believe analyzing state-level economic conditions such as real income and unemployment are as important as national factors, such as GDP growth and inflation.

### *B. Demographic Effects*

In a country as large as the United States, the demographic differences are vast. As such, it would be impossible to assume that the interests of voters are the same regardless of their geographical and cultural differences. Fortunately, other researchers have noted

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<sup>7</sup> Project for Excellence in Journalism. "Covering the Great Recession: How the Media Have Depicted the Economic Crisis During Obama's Presidency." Pew Research Center. 2011.

this problem and responded accordingly. Ebeid and Rodden (2006), Ansolabehere, Rodden, and Snyder (2006), and Levernier and Barrilla (2006) all address the issue of demographic and partisan differences across the country and how they affected voting patterns. Ansolabehere, Rodden, and Snyder found that economic issues had a greater effect on the vote than moral issues and actually may be responsible for more of the divide between “regularly Republican” and “regularly Democratic” states than previously thought. They did find that socioeconomic status had a connection to economic policy preferences, with individuals with higher income tending to be more aligned with conservative policies. Ebeid and Rodden’s analysis focused more on the geography of the United States and the industrial sectors that were associated with different regions. They found that the cultural differences between rural and metropolitan economic structures had an effect on voting patterns with economic voting occurring most strongly in non-rural and non-farming states. Finally, Levernier and Barrilla performed county-level analyses to determine how region and demographics affected the 2000 presidential vote. They found that a variety of different variables had an effect on voting, such as public assistance income, labor force participation, race, and religion. The results of these studies imply that demographic considerations will need to be included in order to reach a better understanding of the political economy of the United States.

The demographic differences across the United States also likely have a connection to the varying expectations for female and male candidates across the country. The most obvious evidence comes from an article in which college students are asked to explain their preferences on a series of fictional elections (Fox and Smith 1998). The cultural and geographical differences that exist between California and Wyoming likely contributed to

results where California students only favored men by about 1% whereas Wyoming students favored men by 10-12%. This stunning difference opens the door to deeper investigations into the regional and cultural divides that exist in the United States and the way those differences affect the political status of women.

### *C. Gender Bias*

While little research has yet to be performed on the effect of the economy as it specifically pertains to the success of female candidates, past research has explored how the economy relates to general candidate strength and success (Huddy and Terkildsen 1993, Dolan 2004, King and Leigh 2010). In the investigations into political gender bias against women, many researchers have attempted to define whether it is voter or selection bias that is more harmful to female candidates. Selection bias is defined as a bias against females by a political party that has implemented barriers to entry against women (such as selecting them to run for unwinnable seats or running them against popular or unbeatable candidates) whereas voter bias is defined as the individual bias a voter may have against a female candidate. While some evidence of selection bias was found in an Australian study (King and Leigh 2010), no similar results were found in studies of the U.S. (Milyo and Schosberg 2000). It can be suggested then that the majority of bias against females comes not from parties, but from individual voters, as was seen in the study by Fox and Smith.

In the U.S. political environment, females are not only disadvantaged by gender stereotypes but also policy stereotypes. In several studies, researchers found that women are viewed to have a stronger capacity to handle “compassion” issues such as poverty, health care, the elderly, education, children and family issues, and the environment

whereas men are more equipped to handle the economy and the military (Dolan 2004, Huddy and Terkildsen 1993). Overall, the stereotypical traits of women as kind and compassionate hurts their image with issues that voters have decided require more masculine traits, such as strength or assertiveness. This is especially disadvantageous when we have already seen a great deal of evidence to prove that economic considerations are some of the most influential in voting behavior. If a female candidate is viewed as a weak competitor for economic policies because of gender bias, she faces a much more challenging battle for the vote. By interacting a gender variable with other variables, we will be better able to determine if a gender bias is what causes different patterns in voting behavior.

Prior research into the area of economic voting and gender bias has built a foundation on which we would like to update and expand upon. With the convincing research conducted in the areas of retrospective voting, sociotropic voting, and pocketbook voting, we hope to combine all three considerations to better account for economic effects on voting patterns. In this way, this study will widen the scope from prior research. Since the years following 1999 have been economically tumultuous, we will also provide more recent and relevant results as the majority of the literature only analyzed elections prior to 2000. Finally, we will expand our research to a new area of study by analyzing the effects of gender bias; a dimension that has not been adequately explored in existing studies. Specifically, this approach allows us to find the influence of economic conditions on voting patterns and whether these results are consistent regardless of gender.

### **III. Research Methods**

We examine past Congressional elections and compare them to the changes in several macroeconomic indicators over the previous 22 months. We look at eight Congressional elections beginning with the 107th Congress who were elected to serve starting in January 2001 and ending with data on the 114th Congress, who began their terms in January 2015. This set of Congressional elections will span a diverse sample of economic trends in the United States, from the Dot Com Boom in the early 2000s to the Great Recession beginning in late 2007.

Using the eight regions defined by the Bureau of Economic Analysis, numbers were assigned to the states within these regions and a random number generator was used to pick two states from each region. Since regional areas in the United States experience different economic conditions as a result of differing patterns of productive sectors, it is important that the data include samples from states in every geographical region but in a way that avoids selection bias. From the sixteen states that have been randomly selected, a random number generator randomly selects two races from each election year to decide which district's elections to analyze. Since we are only interested in the effects of economic voting as it pertains to incumbent candidates, if the race randomly selected did not include an incumbent candidate, another race was chosen at random until each state had two incumbent races. Given these states and individual races, data from U.S. government bureaus were collected and compiled into a data set containing demographic variables for the incumbent and states, as well as economic indicators on the state and national level.

This data will be used to run a multiple regression analysis. We expect to find a correlation between good (poor) economic conditions and an increase in the percent of the vote received by the incumbent (challenger). If this hypothesis is correct, it would do a great deal to explain some of the variation in voting patterns in the United States. In addition, in order to analyze the effect of gender bias on election results, we included an interaction term between the candidate gender dummy variable and the state unemployment variable and reestimated the regression. In this analysis, we expect to find a significant difference in the effect of being female on voting outcomes. Following the estimation of the models, we compare the predicted results to the actual election results and examine the discrepancies.

We believe that the role of gender in the U.S. political environment will lead voters to reelect a male incumbent regardless of poor economic conditions due to a negative bias towards female politicians. As such, we expect to find that any elections the model fails to correctly predict may be due to the presence of a female challenger. If this hypothesis proves correct, it will provide significant insight into how gender bias affects election rates for males and females across United States House elections.

#### **IV. Data**

The data set compiled is a unique collection of data from a variety of sources. First and foremost, the data regarding the percent of the general election received by the incumbent as well as their party affiliation was collected from the Congressional Election Reports that are published by the Office of the Clerk of the U.S. House of Representatives. Demographic information regarding each individual incumbent was

collected from their personal website or government profiles. Race and gender were determined based on visual examination of photos and name and age were set at the age they were in the election year. Given that voters also determine race and gender through the visual examination of their candidates, there should be little room for error in these variables. Tenure was measured in the number of terms previously served, and if an incumbent had served a partial term through a special election, it was considered a full term. We also only considered races in which there was an incumbent candidate and challenger(s). Districts that had an open seat or races where the incumbent ran unopposed were not included in the analysis.

State demographic variables were collected from the 2000 and the 2010 Census. Election years 2000-2008 use data from the 2000 Census, and 2010-2014 uses 2010 Census data. Variables on the male, white, and 65+ populations were measured as dummies, where 1 indicates that the state has a larger population than the national average. For instance, 72.4% of the U.S. population is white. If a state has a percentage of white population greater than or equal to 72.4%, it would be assigned a 1, whereas a state with less than 72.4% white population would be assigned a 0 for that variable. State-level data from the Bureau of Labor Statistics and the Bureau of Economic Analysis was used to define how well the selected states are doing economically and summarize their demographic composition. This data includes percent changes in unemployment levels, and income growth as well as other demographic variables that measure the composition of the state population's gender division, racial division, and age. Information regarding changes in regional retail gasoline prices from the U.S. Energy Information Association (EIA) was included. We believe gas prices serve as the best proxy for a change in

consumer price indices as most voters are acutely aware of penny changes in gas prices while a change in price for a loaf of bread may go unnoticed.

The economic indicators are measured as a percent change between January of the preceding year and October of the election year. The percent change in the unemployment rate was calculated using seasonally adjusted data from the BLS and stated as a percentage change, not a percentage point difference. They provide monthly data on the state level that was used to calculate a unique percent change in unemployment for each state for each election year. The Bureau of Economic Analysis provided data on personal income growth, GDP, real GDP, and per capita GDP. Personal income growth was the compounded annual growth rate between Q1 of the year prior to Q3 of the election year provided at the state-level. For all GDP data, the percent change was calculated at a state-level. Unfortunately, data has not yet been published for 2013 or 2014, making change in GDP data unavailable for the 2014 election cycle. The EIA provided data on retail gas prices. The EIA have seven regions called Petroleum Administration for Defense Districts, or PADDs. Using this monthly data, the percent change in gas prices for states was calculated based on the PADD in which they were located. All these data were then imported into STATA and properly encoded. A summary of the variables and their definitions can be found in Table 1.

Table 2 lists the descriptive statistics for all variables. Given the many dummy variables used for the demographic characteristics of incumbents, the composition of the data set is quickly made apparent. Of the 253 incumbents, 92% are white, 47% are Democrat, 13% are female and the average tenure is just under five terms. The economic variables are measured in percent changes from the previous January. While the mean

values all appear to suggest that unemployment, gas prices, personal income, and all GDP variables have risen steadily on average, these values can be deceiving. When examining the data more closely, the trends in growth and decline vary considerably from year to year. For example, unemployment was relatively steady until the Great Recession, at which point unemployment rates skyrocketed and then eventually began to fall starting in 2012. Gas prices also steadily grew from 2000 until 2014, when they fell rapidly to some of the lowest prices the country had seen in years. As such, it is important to take these mean values with a grain of salt. The final variable to consider is that of “incumfemalestateunem.” This variable was created by interacting the incumbent female dummy variable with the variable on state unemployment. It is used later to measure the effect of changes in the unemployment rate on specifically female incumbents.

## V. Empirical Models

In order to understand the impact of the economy on congressional election outcomes, we estimate three ordinary least squares (OLS) regression models. Each model will examine the relationship between the votes received by the incumbent candidate and economic conditions. The first and simplest model is defined as the following:

$$(1) \quad \text{PERCENT}_i = \alpha + \beta_1 \text{STATEUNEM} + \beta_2 \text{STATEGAS} + \varepsilon_i$$

where PERCENT is the percent of the general election votes received by the incumbent, STATEUNEM is the percent change in state level unemployment from the previous January to October, STATEGAS is the percent change in regional level gas prices from the previous January to October, and  $\varepsilon$  is the error term. The second model includes

several explanatory variables regarding the demographics of the incumbent candidate and is estimated as:

$$(2) \quad \text{PERCENT}_i = \alpha + \beta_1 \text{STATEUNEM} + \beta_2 \text{STATEGAS} + \beta_3 \text{INCUMDEM} + \beta_4 \text{INCUMFEMALE} + \beta_5 \text{INCUMWHITE} + \beta_6 \text{INCUMTENURE} + \varepsilon_1$$

where INCUMDEM is a dummy variable equal to 1 if the incumbent is a Democrat, INCUMFEMALE is a dummy variable equal to 1 if the incumbent is female, INCUMWHITE is a dummy variable equal to 1 if the incumbent is white, and INCUMTENURE is the number of congressional terms served by the incumbent prior to the election. The third model takes the form of the second model but includes a single interaction term between INCUMFEMALE and STATEUNEM and takes the following form:

$$(3) \quad \text{PERCENT}_i = \alpha + \beta_1 \text{STATEUNEM} + \beta_2 \text{STATEGAS} + \beta_3 \text{INCUMDEM} + \beta_4 \text{INCUMFEMALE} + \beta_5 \text{INCUMWHITE} + \beta_6 \text{INCUMTENURE} + \beta_7 \text{INCUMFEMALESTATEUNEM} + \varepsilon_1$$

For each of these three specifications, we estimate the models during two different time periods; 2000-2012 and 2000-2014. The purpose of these two time periods is to isolate the effects of the Great Recession. In 2012, the economy and the general population were still recovering from the aftermath of the Great Recession and the economy still took the forefront in election concerns. However, in 2014, the economy had mostly recovered and the focus during election season had shifted to new concerns. As such, there are two estimates for each of the three models for a total of six different OLS estimations.

## VI. Results

The results for equations 1, 2, and 3 are listed in Table 3 for the time specifications A of 2000-2012 and B of 2000-2014. The values listed are the coefficients and the heteroskedasticity-robust standard errors.

### A. *Dropped Variables*

Prior to defining the final three equations, regressions of every shape and size were run on the full data set. First, we were forced to eliminate most of the GDP variables due to their high levels of collinearity. Second, due to the lack of observations of state and national GDP from the 2014 election cycle, we were limited to using a data set of only 221 observations when including those variables rather than the full 253. Down to only the variables on real GDP for 2000-2012, we could not find statistical significance for any combination of regression attempts. There appeared to be simply no correlation between the percent of the vote received and the percent change in state or national real GDP. The same result was found with state personal income. There appeared to be very little to no correlation between a change in personal income and the general election vote. As a result, we were left with only state unemployment and state gas prices as economic variables. While difficult to let go of so many variables, their inclusion in the regression did not add any explanatory value and only hindered the degrees of freedom. We also believe the two remaining variables account for a significant amount of a voter's understanding of the economy. Unemployment statistics are widely used in news media coverage and are easily and commonly interpreted as a comprehensive understanding of the condition of the national and state economy. Gas prices are also a wonderful proxy for the influence of price changes, given that voters

interact with gas prices on a nearly daily basis. High and low gas prices are the topics of friendly conversation and the population complains over even a penny's change. As a result, we believe the remaining two variables provide a good measure of a voter's economic knowledge.

*B. Equation 1*

The intention of equation 1 was to identify the effect of solely economic indicators on the results of general elections. 1A estimates that a 1% increase in unemployment will decrease the percent of the vote received by 5.27 percentage points and a 1% increase in gas prices will decrease the percent by 6.49 percentage points. The coefficient on unemployment is significant at the 1% level and gas prices are significant at the 10% level. Including data from the 2014 election, a 1% increase in unemployment and gas prices causes the vote received to decrease by 3.41 and 2.28 percentage points, respectively. In this specification, only state unemployment is significant and at the 10% level. These results follow the logic that the economy has a weaker effect on voting behavior when a major economic event is less prominent.

*C. Equation 2*

Equation 2 includes an additional four variables, which seek to measure the effect of the characteristics of the incumbent candidate. Equation 2A estimates that a Democratic candidate receives an extra 2.90 percentage points over a Republican candidate, a female candidate receives 4.63 percentage points less than a male candidate, a white candidate receives 7.83 percentage points less than candidates of other races, and that for every additional term of tenure, an incumbent receives an additional 0.354 percentage points. The coefficients for Democratic, white, and tenure are all significant at

the 5% level, while the coefficient on female candidates is significant at the 1% level. A surprising coefficient sign in this model is that of a white incumbent. We did not expect to find that white incumbents would receive less of the general vote than a person of color, and especially not by almost 8 percentage points. However, this could be explained by the extremely low number of non-white incumbents in the data set. Of the 221 observations in this specification, only 16 were non-white. Of those 16, only six had less than three terms of prior tenure experience while nine had more than four terms of tenure experience. As such, the more tenured incumbents won their districts by a considerable margin. Ten of the elections were won by a margin greater than one standard deviation away from the predicted percent. These significant wins could lead the coefficient on white incumbents to a prediction that assumes nonwhite incumbents will perform better and that white incumbents will perform worse accordingly. The 2A equation also estimates a 1% increase in unemployment and gas prices will lead to a 5.38 and 5.66 percentage point decrease in votes received, respectively. However, in this specification, only the coefficient on unemployment is statistically significant at the 1% level.

With the inclusion of 2014 observations, equation 2B sees a loss in overall explanatory power from an  $R^2$  of .1448 in 2A to .1010 in 2B. The model estimates a Democratic incumbent will receive an additional 1.28 percentage points, a female will receive 3.44 fewer percentage points, a white incumbent will receive 6.23 fewer percentage points, and that every 1 term of tenure gives an additional 0.478 percentage points. Again, we see a similar result with the sign on the coefficient for white incumbents. This is likely a continuation of the effect that was mentioned previously. In this specification, the additional four nonwhite incumbents all received a percent of the

vote that was more than one standard deviation from the predicted mean, further solidifying the effect that white candidates will receive less of the general vote. The coefficients on females and white incumbents are both significant at the 5% level while the coefficient for tenure is again significant at the 1% level. The coefficient on Democrat is not statistically significant in this model. A 1% increase in unemployment or gas prices causes a 3.34 and 1.67 percentage point decrease in vote received, respectively. Gas prices are again not significant but in this model, the statistical significance of unemployment has fallen from the 1% level in 2A to only the 10% level in 2B. This again suggests that the importance of economic factors declines when the country is more removed from an economic event such as the Great Recession.

*D. Equation 3*

The final equation includes an interaction term that attempts to measure how differently women are affected by economic conditions. First, however, equation 3A estimates that a Democrat will receive an additional 3.01 percentage points, a female will receive 4.21 fewer, a white incumbent will receive 7.82 fewer, and for each prior term, an incumbent will receive 0.345 more percentage points in the general election. The coefficients on all four of these variables are significant at the 5% level. A 1% increase in gas prices leads to a 5.29 percentage point decrease but is not statistically significant. A 1% increase in state unemployment leads to a decrease of 4.91 percentage points and is significant at the 5% level. The difference in significance between these two variables may be a result of the relative "importance" of gas prices versus unemployment rates. It may be that voters consider a change in the unemployment rate to be more important than a change in gas prices and react accordingly during the election. To measure this effect

specifically on female candidates, we created a variable that interacted the female dummy variable with the state unemployment variable. Then, after running the regression, an F-test of joint significance was performed to find the P value for the two variables. The coefficient on the interaction term plus the coefficient on the state unemployment term equaled the coefficient for the effect of state unemployment on female candidates. For model 3A, the coefficient was -11.98, meaning that a female incumbent received 7.08 percentage points less than a male for the same 1% increase in unemployment. The F-test found this coefficient to be significant at the 5% level. This solidifies our belief that female incumbents are punished more harshly for unemployment rates than are male incumbents.

Equation 3B estimates a Democrat will receive 1.36 additional percentage points, a female will receive 3.32 fewer, a white incumbent will receive 6.31 fewer, and a year of tenure gives an additional 0.465 percentage points. In this case, the coefficients on female and white are significant at the 5% level and tenure is significant at the 1% level. However, Democrat is not found to be statistically significant. This model does not find a change in gas prices or state unemployment to be statistically significant. We applied the same procedure to the addition of the interaction term and found that the coefficient of a change in unemployment on female incumbents to be -10.92; 8.07 percentage points more than for a male incumbent. A test of joint significance gave a P value of 0.1022, which can be considered marginally significant. This would suggest that the negative effect of higher unemployment rates on female candidates is both greater than for male incumbents and also marginally significant. As was seen in the previous models, the effect of economic indicators on a data set that includes observations from a time period

more removed from the Great Recession is weaker and less significant. While the interaction term in 3B was only marginally significant, the overall results from 3A and 3B are clear; female incumbent candidates are punished more harshly for a negative economic effect than are male incumbents.

*E. State Demographic Effects*

Given the prior research in this area, we were interested to see if the state demographics had an effect on the outcomes of the elections. When the state dummy variables were included in the regressions, they were consistently insignificant. They also caused the models to lose vital degrees of freedom and as a result, were dropped from the main models. In a second attempt to measure their effect on election outcomes, we generated the residual values from the predicted values of both time specifications. Then, using the residuals as the dependent variable, we ran regressions that included only the state dummy variables. Again, it was found that there was no statistical significance in these models. Finally, in an attempt to measure the effect of state demographics on female incumbents, interaction terms were created between the female incumbent dummy variable and the state white and state male variables. These variables were included in the regressions and then tested for joint significance. Yet again, there were no significant results. It may be that the variables created were not specific enough to measure the true effects of state demographics on election outcomes. Perhaps variables that measured urban and rural populations or levels of education would provide greater explanatory power. However, in this model, state demographics appear to have no significant effect on the outcomes of congressional elections for either male or female candidates.

*F. Predicted Values and Wrongful Losses*

Following the creation of the third equation, predicted values for both the A and B specifications of the model were generated. We also calculated the residuals from the true value for each of these specifications and examined the races where the predicted values fell more than two standard deviations from the true percentages. In each case, we then closely examined the incumbent and the surrounding details of the race. We expected to find predicted male losers as winners when pitted against a female challenger, but unfortunately, no such situation occurred. In fact, every incumbent who won or lost by more than two standard deviations from the predicted value faced off against a male challenger. While we hoped to find an indication of what caused these incumbents to win or lose by so much, there was no pattern to be found. However, there were interesting results when we examined the “wrongful” losers. In this situation, “wrongful” was defined as losers who were predicted to win by the model. Because of the two specifications, 2000-2012 and 2000-2014, we have two different predicted and residual variables. For the 2000-2012 specification, the model predicted that 24 of the 35 total female incumbent candidates lost when they should have won. This is a “wrongful loss” rate of 68%. For male incumbents in the same period, the model predicted that 108 of the 218 total male candidates lost when they should have won. This gives a wrongful loss rate of 49.5%. While the model clearly does not predict vote percentages with complete accuracy, there is a significant discrepancy between 68% and 49.5%. For the 2000-2014 specification, the wrongful loss rate for women is 51% while the wrongful loss rate for men is 50%. There is clearly much less of a discrepancy during this time specification. This further supports the hypothesis that women are more strongly affected by economic

events than men. As seen in the earlier results, the 2000-2012 specification always saw larger coefficients and stronger statistical significance in the economic variables. The interaction term between the female dummy variable and the unemployment changes was also larger and more statistically significant in the 2000-2012 specification. This suggests that the economy was a more important election issue in 2000-2012 and that women were more negatively affected by the increases in unemployment. This increased negative effect on women would support the stronger wrongful loss rate in the 2000-2012 predicted results. As such, when the economy is a more important issue, women wrongfully lose at a higher rate.

## **VII. Conclusion**

The importance of the economy in election results is undeniable, but there may be many factors that are not traditionally assumed to be important. The models suggest that the percent change in unemployment has a consistently large and significant effect on the outcome of a general election for Congress. However, the demographic characteristics of the incumbent candidate cannot be understated. Their addition to the model improved explanatory power by 300% and were consistently significant through each specification. It may in fact be that who you are in an election matters more than the political events happening around you. While experience has an undeniably significant effect, the coefficients on race, gender, and party affiliation are larger and sometimes equally significant. In fact, it is possible even for the effects created by demographic characteristics to outweigh the effect of the economy in the result of the election.

Unfortunately, these demographic characteristics can work against female incumbents. As suspected, female incumbents see a larger negative effect of an increase in the unemployment rate. The true reasons for this impact are unknown, but it is likely that gender bias and policy stereotypes negatively affect female candidates who are running for reelection in a time of economic downturn. Because of the ingrained stereotypes against women as weak economic leaders, competent incumbents suffer when the economy suffers. Even a 0.1 percentage point increase in the unemployment rate could cause a female incumbent to lose a full percentage point in a close race. Furthermore, our country is currently “represented” by a governing body that is 81% male, 80% white, and an average of 57 years old. The overwhelming male majority in the House represents a history of gender inequality and the longstanding tradition of male-only politics. While women are certainly taking strides forward, the biases that lead to unfair and significant negative effects for female incumbents must be eradicated too. Until then, our Congressional elections cannot be considered truly fair.

Perhaps more troublesome for the political environment is the shockingly high incumbency reelection rate of around 95%. Even in our small sample, only 20 of the 253 incumbents were not reelected. While it may be that the electorate is simply reelecting the best candidate year after year, we believe it more likely that voters simply do not investigate their other options and quickly reelect the name they recognize. Yet, there may still be some hope to be found. Our results showed that during elections that occurred closer to the aftermath of the Great Recession, economic indicators had a larger and more statistically significant effect on election outcomes. Of the 20 incumbents in the data set who were not reelected, 14 of them failed to be reelected in the 2008 and 2010

elections. Beyond this data set, in the 2004 House election only seven incumbents lost reelection while in 2010, fifty eight incumbents lost reelection. This could suggest that in this time of economic turbulence and general dissatisfaction with our governing bodies, the electorate used their voting power to express their distaste.

It is our hope that this study can be expanded upon in the future. We still have very high hopes for where this research can go. We would like to see this data set expanded to include all incumbent election races for every state going back decades. We believe the way the electorate treats their incumbent holds a key for a great deal of political analysis and understanding. We also believe that with the expansion of this data set, some of the original economic variables could be reintegrated and used to boost the explanatory power of these models. This research holds a great deal of potential for incumbents, challengers, political strategists, reporters, analysts, and the general voting electorate alike. We hope to see this research used to create further transparent analyses and combat election inequalities.

## VIII. Appendix

TABLE 1 *Variable Summary Statistics*

Variables	Mean	Standard Deviation	Minimum	Maximum
percent	63.81573	10.0206	33.08	97.89
year	2007.012	4.607174	2000	2014
incumdem	.4743083	.5003293	0	1
incumfemale	.1383399	.3459408	0	1
incumwhite	.9209486	.2703538	0	1
incumtenure	4.885375	4.020619	1	27
statemen	.4940711	.5009559	0	1
statewhite	.798419	.4019761	0	1
state65	.7193676	.4501988	0	1
stateunem	.0638051	.3145912	-.4028	1.1538
stategas	.2901329	.2239963	-.06992	.752311
usgdp	.0464379	.0169737	.0163058	.0664988
stategdp	.0485898	.0290803	-.0265138	.1403821
usrealgdp	.0230736	.0135334	-.0064534	.0393826
staterealgdp	.0255237	.0256168	-.0429289	.1033916
uspercapgdp	.0136943	.0131876	-.0157885	.027895
statepercapgdp	.0156673	.0242165	-.0546681	.0833291
stateperinc	.0451225	.0240762	-.004	.111
incumfemalestateunem	.005251	.0799069	-.25	.433

TABLE 2 *Variable Definitions*

Variables	Definitions
percent	Percent of the general election vote received by the incumbent, measured from 0 to 100
year	Year the election took place
incumdem	A dummy variable equal to 1 if the incumbent was a Democrat
incumfemale	A dummy variable equal to 1 if the incumbent was female
incumwhite	A dummy variable equal to 1 if the incumbent was white
incumtenure	The number of terms previously served in Congress by the incumbent
statemen	A dummy variable equal to 1 if the state male population was equal or greater than the national male population
statewhite	A dummy variable equal to 1 if the state white population was equal or greater than the national white population
state65	A dummy variable equal to 1 if the state population over the age of 65 was equal or greater than the national population over 65
stateunem	Percent change in state unemployment levels from previous January to October of election year
stategas	Percent change in regional gas prices from previous January to October of election year
usgdp	Percent change in national GDP from previous January to October of election year
stategdp	Percent change in state GDP from previous January to October of election year
usrealgdp	Percent change in national real GDP from previous January to October of election year
staterealgdp	Percent change in state real GDP from previous January to October of election year
uspercapgdp	Percent change in national per capita GDP from previous January to October of election year
statepercapgdp	Percent change in state per capita GDP from previous January to October of election year
stateperinc	Percent change in personal income from previous January to October of election year
incumfemalestateunem	Dummy interaction variable between incumfemale and stateunem

TABLE 3 *Congressional Election Outcomes*

Independent Variable	Equation 1			Equation 2			Equation 3		
	2000-2012	2000-2014	2000-2012	2000-2012	2000-2014	2000-2012	2000-2012	2000-2014	
Constant	66.72079*** (1.412)	64.69349*** (1.032)	71.20008*** (3.296)	67.68998*** (3.276)	71.01459*** (21.18)	67.72956*** (3.313)			
Democratic Incumbent	-	-	2.897277** (1.320)	1.279281 (1.255)	3.013826** (2.27)	1.362936 (1.254)			
Female Incumbent	-	-	-4.630582*** (1.791)	-3.44277** (1.669)	-4.205731** (-2.43)	-3.3170229** (1.586)			
White Incumbent	-	-	-7.825535** (3.173)	-6.235671** (3.113)	-7.816859** (-2.43)	-6.305147** (3.150)			
Incumbent Tenure	-	-	.3543889** (.1495)	.4780084*** (.1438)	.344938** (2.30)	.4654414*** (.1440)			
State Unemployment	-5.267443*** (1.999)	-3.409789* (1.896)	-5.383564*** (1.965)	-3.341904* (1.858)	-4.909172** (-2.41)	-2.847015 (1.916)			
Female Interaction	-	-	-	-	-11.984638**†	-10.919772†			
State Gas Price	-6.492668* (3.522)	-2.275498 (2.825)	-5.663357 (3.451)	-1.668337 (2.740)	-5.289879 (-1.53)	-1.257383 (2.745)			
N	221	253	221	253	221	253			
R <sup>2</sup>	0.0355	0.0142	0.1448	0.1010	0.1476	0.1046			

\*\*\* Significant at 0.01; \*\* Significant at 0.05; \* significant at 0.10.

† Level of significance determined through a test of joint significance between interaction term and unemployment variable.

Note: The dependent variable is the incumbent's share of the two-party general election vote

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