Beyond GDP: Effects of Industrial Composition and Relative Wage Growth on Political Partisanship

Jacob Thorne

University of Michigan

College of Literature, Science, and the Arts

April 2018

A THESIS

Submitted to the Department of Political Science in partial fulfillment of the requirements for the degree of Bachelor of Arts in Political Science with Honors

Advisors: Dr. Jowei Chen, Dr. Mika LaVaque-Monty

Table of Contents

Abstract ii
Acknowledgements ii

INTRODUCTION 1

GETTING TO THE POLLS: INDIVIDUAL FACTORS FOR VOTER BEHAVIOR 4

Consumption and Resources 4
The Socioeconomic Status Participation Theory 5
Effects of Income 8

FROM INDIVIDUAL TO NATIONAL THEORIES 10

Pocketbook and Sociotropic Theories 11
Considering the Accuracy of Economic Assessments 14

METHODOLOGY 17

Data 17
Formatting and Design 21
Table 1: Metrics of Industrial Composition 22

ANALYSIS 28

Establishment Ratio-Based Regressions 28
Wage Ratio-Based Regressions 32

DISCUSSION 36

APPENDIX I: NAICS INDUSTRY CLASSIFICATIONS 44

APPENDIX II: CODE FOR DATA PROCESSING 47

APPENDIX III: REGRESSION RESULTS 49

TABLE 2: R-SQUARED VALUES FOR NATIONAL REGRESSION 49
SIGNIFICANCE CODES FOR REGRESSION 49
TABLE 3: NATIONAL REGRESSION RESULTS 50
ESTABLISHMENT RATIO, DEMOCRATIC VOTE SHARE 50
TABLE 4: REGIONAL REGRESSION RESULTS 51
ESTABLISHMENT RATIO, DEMOCRATIC VOTE SHARE 51
TABLE 5: NATIONAL REGRESSION RESULTS 53
WAGE RATIO, DEMOCRATIC VOTE SHARE 53
TABLE 6: REGIONAL REGRESSION RESULTS 54
WAGE RATIO, DEMOCRATIC VOTE SHARE 54
TABLE 7: INCUMBENCY REGRESSION RESULTS 56
WAGE RATIO, DEMOCRATIC VOTE SHARE 56
TABLE 8: TURNOUT REGRESSION RESULTS 58
WAGE RATIO, DEMOCRATIC VOTE SHARE 58

BIBLIOGRAPHY 60

Abstract

Previous studies on the myriad of factors influencing voter behavior tend to presuppose the existence of a personal calculus, operating under the assumption that each voter is an independent agent making decisions based on how their environment impacts their own standing. However, little is known regarding how variations in the economic environment surrounding voters, particularly changes in industrial composition and growth in wages relative to one's peers, influence political polarization. Utilizing a weighted regression model based on survey data from the Bureau of Labor and Statistics and voter data from each presidential election since 1992, this study finds evidence that changes in the composition of homogenous industries, wherein the economic environment for employees is more closely intertwined through unionization and geographic concentration, exhibit a high degree of correlation with changes in partisan support. Furthermore, earning higher wages than the average worker in a given industry tends to significantly increase support for Republican candidates. These findings present strong evidence that changes in how workers' wages and economic environments compare to their peers may play a greater role in influencing partisanship than individual economic health or nominal year-end wage growth.

Acknowledgements

I am indebted to the mentoring and guidance of Dr. Jowei Chen, Dr. Jenna Bednar, and Dr. Mika Lavaque-Monty in authoring this thesis. Additionally, I must thank Dr. Chen and Camden Cheek for their patience and persistence in teaching me how to properly use *R*, rather than suffering in Excel. Finally, this thesis would not have been possible without the support of my parents.

Introduction

On June 1st, 2017, president Donald Trump announced his intention to withdraw the United States from the Paris Climate Accords. With over 195 signatories, the United Nations-authored treaty established a framework for individual countries to set their own goals pertaining to abating the damage of global warming and climate change. Through explicitly voluntary agreements, as well as the establishment of a "Green Climate Fund", the Accords acknowledged the "common but differentiated responsibilities" of its members and varying levels of industrial capacity for reform by permitting revenue sharing and common resources to aid all nations (United Nations, 2016). Trump, however, found the agreement far too great a burden on America's economic interests. His withdrawal from the agreement ostensibly followed up on earlier campaign promises to bolster growth in the manufacturing and coal sectors. In his impromptu Rose Garden speech, Trump famously remarked, "I represent the citizens of Pittsburg, not Paris" (NY Times, 2017).

While most of the world remained as signatories of the agreement, Trump's actions imply that the interests of specific industries play a key role in influencing political decision-making. Consider that the Paris Accords served not only as a metaphorical "slap on the wrist" for climate change, but as an economic opportunity. In particular, Canada viewed the agreement not as an obstacle to growth, but rather an opportunity to build a "cleaner, more innovative economy", setting the optimistic goal of reducing coal dependence in its energy sector by 2030 (Elgie, 2015). Here in America, the Appalachian coal industry in and around Pittsburg has bigger problems to worry about. In Allegheny County, where Pittsburg is located, the size of the natural resources and mining sector has been dwindling for years, standing now at less than 0.3% of workers and companies in the region (QCED, 2016). With such a small community at risk by the

environmental agreement, perhaps Trump's metaphor was misguided; regardless, the tangible effects of his policy actions signal that the interests of discrete industries effect political processes.

In this study, I make an attempt at uncovering evidence for a theorized relationship between industrial composition at the county level and changes in political partisanship across the electorate. I hypothesize that as certain industries grow or shrink in terms of how prevalent they are at the county level, citizens of those affected regions will tend to vote for certain parties. By this logic, coal miners from the Appalachian region — those who overwhelmingly voted for Trump in the 2016 election — may have done so in part due to the decline in manufacturing and mining jobs over time (Voting and Elections Collection, 2018). Additionally, citizens working in the rapidly booming technology and information sectors, such as those near Silicon Valley, may tend to vote for Democratic candidates in part due to the growth of their industries. Overall, this study seeks to address a gap in previous research regarding political participation and voter behavior, which traditionally has focused on either individual motivating factors or national-level economic factors, such as those regarding sociotropic or pocketbook voter behavior. Furthermore, this study expands on theories elaborated on in sociotropic research by focusing on *specific* industries and their effects on voter behavior, as opposed to previous research considering the economy only as a whole.

As a notable point of departure from the previous body of literature, this study spends a significant amount of time analyzing variations in the degree of homogeneity amongst different sectors of the economy, as well as the effects of relative wage growth in terms of analyzing employee's wages. Workers within a specific sector of the economy may experience varying degrees of interconnectedness in terms of how they respond to similar economic shocks. This

impacts how workers respond to these shocks in terms of voter behavior. For workers in more homogeneous sectors, this study hypothesizes that the effects of economic change are more broadly felt, which corresponds to a higher degree of predictability in terms of analyzing voter behavior. Additionally, previous studies have focused their attention on *nominal* wage growth, comparing workers in terms of their take-home pay between different years. While this allows for comparisons to be drawn between workers regarding their real economic standing, it fails to adequately compare how workers consider their wages as compared to those around them. This study, therefore considers the effects of *relative* wage growth, isolating the degree to which workers are paid more than their peers in a given industry as an explanatory factor in analyzing political polarization.

Getting to the Polls: Individual Factors for Voter Behavior

Studies intending to examine how voters respond to external stimuli must first ask what factors influence voters to turn out to polls in the first place. To this end, much of the existing literature places heavy emphasis on individual motivating factors that influence one's likelihood to vote in an election. These studies set aside issues of partisanship or election results in order to isolate individual deterministic factors for voting while mitigating the risk of confounding results. In short, these studies care more about *why* people vote in the first place, rather than *how* they choose to do so. Understanding what factors lead voters to the polls may provide crucial insight into how election results change from year to year. This older branch of political theory attempts to explain the individual as a crude economic calculator of sorts, considering the relative weights of socioeconomic status, income, education level, and internal valuations of time in choosing when to vote.

Consumption and Resources

An older branch of research on voting behavior seeks to explain the individual's decision-making process through elaborate applications of economic theories. These models consider voters as rational consumers, fixating on price-based consumption behavior to describe a consumer's willingness to vote. Voting, in this sense, is analogous to a "superior" good sought after by many (Crain, 1977). Using such a model has many benefits for researchers, as it fosters much explanatory power as to why and under what circumstances people choose to vote in terms of incentives; however, its effectiveness has been questioned by some who find flaws in the model's applicability.

One of the first to apply a consumption model to voting behavior was Dr. Bruno Frey. His research argued that voting has a cost in terms of the consumption of one's free time (Frey,

1971). In this sense, consumers — likely voters — must consider the opportunity costs of their time, such as foregone wages and hours that could have been earned by working. While this relationship may imply that higher income individuals are less likely to vote, Frey noted that an individual's *productivity* in the use of their time merits significant consideration as well. For higher income consumers, many of which are paid a yearly salary and can afford to leave work, the opportunity costs of voting are significantly diminished as compared to those who live paycheck to paycheck. Because of this, Frey argues the notably higher voter turnout rates for high income individuals is derived from "the proportionally greater weight of efficiency" (Frey, 1971).

Frey's assertions sparked a rather large debate over the applicability of his model. Notably, his work utilized little quantitative data to support his arguments. In order to fill this gap of empirical research, Crain's work tested the validity of this model, eschewing theory with data. Using electoral data from 1972, Crain created an empirical model to estimate one's propensity to vote as a function of household income. The model, reliant on regression analysis, controlled for a multitude of factors, including education level, unemployment rates, race, gender, and overall competitiveness of individual political races. His study found that while opportunity costs may be an important factor to consider, income and substitution effects play a far greater role in predicting one's propensity to vote (Crain, 1977). As income increases, Crain argued the relative cost of voting decreased; consumers were then more likely to substitute away from abstaining from voting and more likely to engage in the political process.

The Socioeconomic Status Participation Theory

One of the strongest and most thoroughly researched branches of theory regarding political participation focuses on the impact of socioeconomic status. In short, *socioeconomic*

status (SES) refers to an individual's economic and sociological position relative to others in a region, primarily factoring income, education level, and current occupation (Verba, 1972, 1978). In general, most studies find a positive relationship between SES and voter turnout; however, the literature seems to disagree over which specific component of SES produces the strongest positive effect.

In his 1972 study, Verba examined not only the effects of socioeconomic status on voting, but on less explicit forms of participation in general. Through survey data, his study argued a stronger correlation between SES and participation exists for more "difficult" types of engagement beyond voting, including volunteerism and activism (Verba, 1972). Additionally, the study found that higher levels of SES positively correlate with higher levels of general interest in the political system, making citizens far more likely to interact with their political systems.

Education levels have received special attention from researchers, even described by Olsen as "the most powerful predictor" among socioeconomic factors (Olsen, 1982). Using survey and voter data from both the United States and Sweden, the study not only found that education levels were the most predictive of all SES factors, but that its indirect effects — socialization or acquisition of civil skills, for example — played a large role as well (Olsen, 1982). The study discredited the role of SES based on income and occupation alone, as the data found no direct relationship between these factors and voting behavior. More recently, researchers have begun to doubt the strength of education's impact on voter turnout. In particular, researchers Kam and Palmer believed education to be a more auxiliary role to a more direct causal mechanism. Using a carefully designed propensity-score matching test to connect pre-adult experiences with education level, the study found virtually no effect on higher

education levels on voter behavior (Kam, 2008). Instead, their research suggests education functions more as a proxy for socialization and pre-adult experiences with family members and local communities that instill the value of political participation in citizens.

In relation to the consumption and resource-based models discussed earlier, some researchers have taken a similar approach in describing the effects of socioeconomic status. In his 1993 study, Hansen examined voter data from the United States to identify the role of mobilization and individual considerations as they relate to voter behavior. His research found that at the most basic level, voters choose to participate based on the perceived benefits of doing so (Hansen, 1993). For citizens, the "costs" of participation include income, education, age and race, while the "benefits" include a sense of partisanship and feeling of closeness toward particular candidates. After data examination, Hansen discovered that declines in turnout can be traced to a lack of effort from political entities to *mobilize* potential supporters, creating a weakened state of social involvement for many communities. His study acknowledges the importance of SES in evaluating participation; however, his focus on mobilization of supporters is important to note, as it is necessary for proper analysis of socioeconomic status.

Despite the breadth of research on socioeconomic status, there are some who disagree with the literature consensus and doubt its predictive power on participation. Cho noted that although there is much empirical evidence to support the positive correlation between SES and voter turnout, there still remain instances of lower socioeconomic individuals participating at higher levels than their higher socioeconomic counterparts (Cho, 2006). This fact led Cho to investigate what other factors may be responsible for such discrepancies. Using data and participation patters from multiple Arab-American nations, this study argued that socioeconomic status may be yet another proxy for external factors. In particular, the study

argues for increased attention toward socialization experiences and policy threats. Cho asserts if the political climate that individuals live in includes the "apprehension of worrisome (...) policy actions", it may actually *motivate* low socioeconomic individuals who had the ability to participate, but in past years chose not to do so (Cho, 2006). While Cho's work does not represent the literature as a whole, his findings garner merit and are worth ample consideration.

Effects of Income

It is well documented in the literature and income level and voter turnout are positively correlated (Bruno, 1971). Bruno's previously mentioned study on the effects of income on political participation argued this point using an economic consumption model, demonstrating that higher incomes make it relatively less costly for voters to miss hours of work in order to reach the polls. While the opportunity cost of voting increases, the efficiency and productivity lost from missing work decreasing as incomes rise, making high income individuals more likely to vote (Bruno, 1971). Multiple other studies have brought up their own explanations in response to Bruno's work. In general, while these studies generally agree upon the positive relationship between income and political participation, they challenge the idea that high-income individuals are more efficient at voting, and that this factor alone makes them more likely to vote. In a rebuttal, Keith argues that high-income individuals simply have more time available for them to vote, as compared to lower-income individuals who likely cannot afford or don't have the ability to miss out on work (Keith, 1972). In a separate response, Fraser follows the same line of reasoning as Keith, arguing that opportunity costs for high-income individuals are actually incredibly low, as it is very easy for them to leave work. Because there is no "punishment" for leaving work for such employees, who in many cases are salaried, their opportunity costs in relation to voting are far lower, making them more likely to vote (Keith, 1972). In summary,

while the literature continues to debate the exact causal mechanism of the proposed positive relationship between higher incomes and political participation, the vast majority of political scientists believe the correlation exists.

From Individual to National Theories

Having reviewed the factors driving voters to the polls, the literature transitions into a thorough discussion regarding *how* voters choose to cast their ballots. A myriad of competing explanatory theories exist to predict the voting behavior of particular blocs; however, for the purposes of this study, economic motivators will be given primary focus.

Previous research has already concluded that the national economy —specifically the impacts of macroeconomic change — are of vital importance in examining American elections (Kinder, 1981). Bloom and Price from Harvard University first hypothesized a relationship between voting behavior and economic conditions, particularly in times of prosperity. Their study, analyzing consumption and voter behavior during the 1970's, found that changes in one's short-run real income corresponded to a measurable change in partisan voting behavior (Bloom, 1975). These changes can stem from a variety of sources. As Figure 1 demonstrates, short-run

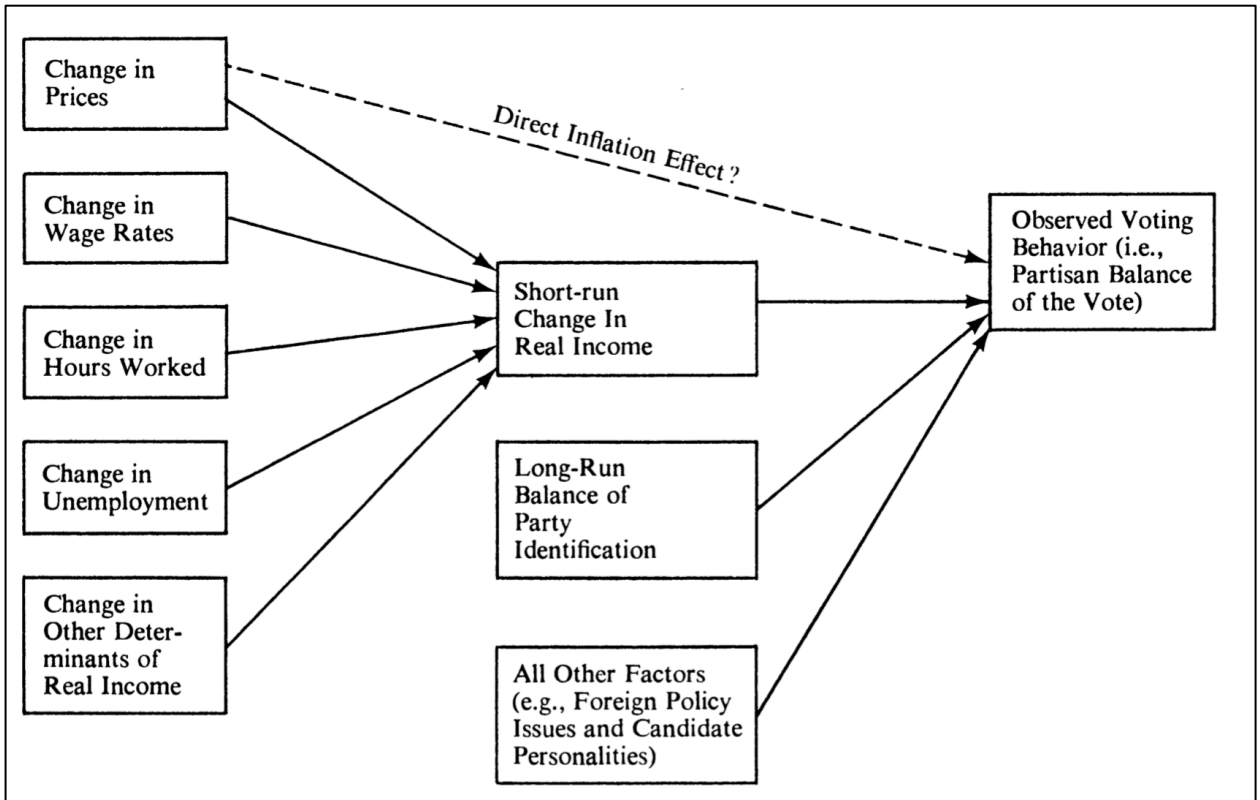


Figure 1. Model of the Impact of Income Changes and Party Identification on Voting Behavior

changes in income are derived not only from changes in wages or hours worked, but also changes in price levels (Bloom, 1975). Additionally, their research suggested that short-run economic changes, which are realized at the individual level more easily than long run economic growth or decline, have the greatest impact on observed voting behavior.

This hypothesis was further tested by analyzing election data from the national vote for the US House of Representatives. With data spanning nearly seven decades of elections, Kramer's statistical analysis of voter behavior determined that election outcomes have an explicitly "rational" response to objective changes occurring under the incumbent party (Kramer, 1971). In some cases, economic changes accounted for nearly half of the variance in congressional elections; however, presidential elections were found to be far less responsive. Furthermore, real income seemed to be the most influential economic factor, confirming the model set forth by Bloom and Howard (Kramer, 1971). While some studies have expressed skepticism at the raw predictive power of these models, especially as they pertain to the presidency, these studies imply that economic health has a pervasive and tangible impact on voter behavior (Meltzer, 1975).

Pocketbook and Sociotropic Theories

While studies have confirmed the economy's impact on voter behavior, the literature is less conclusive on the specifics of how the economy's changes manifest themselves in observable patterns of voter behavior. To this end, the literature separates itself into two main strands. The first, known as *pocketbook voting*, refers to voters who consider economic conditions only insofar as they impact their own financial situation (Kinder, 1981). Pocketbook voters, as the term implies, are influenced almost entirely by the prospects of their private lives being influenced by public policy. Such voters support candidates and political parties that

advocate for policies that improve their own economic interests, rather than the interests of the nation at large. Conversely, pocketbook voters directly oppose candidates that appear to threaten their own financial health (Kinder, 1981). Research into pocketbook voters long controlled the study of political behavior, dominating scholarly thought on the subject for decades.

By the 1980's a new category of voters emerged to factor the role of nationwide economic health in how the electorate chooses to vote. Meehl first noted that previous research on voter behavior failed to address the staunch unlikelihood that individual behavior could influence election results on a large scale, such as those for a presidential race (Meehl 1977). Instead, he alluded to the existence of a more *sociotropic* form of voting, one where voters take into account the "collective interest" of the country. This school of thought, now formalized as *sociotropic voting*, refers to voters that are influenced most heavily by the nation's overall economic health (Kinder, 1981). To be clear, sociotropic voters are by no means altruists, as Meehl fervently asserts (Meehl, 1977). Instead, sociotropic voters vote according to the "country's pocketbook" rather than their own, supporting candidates that appear to have improved the nation's overall economic well-being as opposed to solely their own financial standing (Kinder, 1981).

By and large, most modern political science research considers sociotropic voting to better explain voter behavior as opposed to pocketbook voting. In a survey of economic data from 1956 to 1984, Markus found that while notions of pocketbook voting certainty exist and are noteworthy, changes in macroeconomic data matter far more (Markus, 1988). This is not to say that pocketbook voting garners no significance; on the contrary, such voting behavior has a modest impact on *individual* voting behavior. However, from the perspective of the nation as a whole, the calculus of voting trends toward a sociotropic perspective (Markus, 1988). Once

more, income remained the most important factor in regression results, with each 1% change in real income corresponding to a 2.3% change in probability of voting for the incumbent party (Markus, 1988).

Further research into both pocketbook and sociotropic voting attempts to further qualify how voters evaluate economic conditions into their decision-making, specifically considering which economic factors voters consider and when. Much of the debate around this issue centers upon whether voters look retrospectively at past economic conditions or prospectively at hypothesized future conditions (Linn, 2010). In general, the academic opinion on this issue is mixed. While results on an individual-level analysis are inconclusive, the overall body of evidence suggests that voters tend to vote more prospectively than retrospectively (Linn, 2010). Additionally, this effect is further bolstered when no incumbent is running for reelection.

Finally, researchers have given special attention to situations of *divided government*, where the party in control of congress does not match that of the President. These situations present an interesting dilemma for voters, as they must choose who to attribute changes in economic health to, either congress or the President. In such cases, Norpoth places voters into four distinct categories:

1. *Hung Jury:* Voters cannot decide between the two candidates, so no economic votes are cast.
2. *Split Decision:* Voting at the presidential level reflects the president's party, while voting at the congressional level reflects on the party in control of congress.
3. *President Liable:* All blame is levied against the President's party, in both presidential and congressional elections.

4. *Congress Liable:* All blame is levied against Congress' party, in both presidential and congressional elections.

In his research, parsing over the exit poll data of voters during times of divided government, Norpoth found most support for the *President Liable* thesis, implying that the vast majority of voters' economic evaluations trend toward actions undertaken by the President's party. (Norpoth, 2001). Unfortunately, his study did not consider times of unified government, thereby undermining the conceptual validity of his conclusions. Regardless, his work implies that divided government may obscure the effects of economic voting on a national scale (Linn, 2010). Whereas the delineation between sociotropic and pocketbook appears clear, not all voters will attribute economic change to the same people, let alone the same party. As such, studies into economic voting must take into consideration the multifaceted analysis voters undergo when choosing how to vote.

Considering the Accuracy of Economic Assessments

The preceding theories on economic voting are underpinned by the assumption that individual voters have the economic knowledge necessary to assess the health of the economy in some way. While it is comparatively easier to assess one's own economic standing — as a pocketbook voter would — much of the citizenry may not have the knowledge necessary to assess national economic indicators. As such, individual assessments of the economy, and therefore economic voting in general, are subject to multiple biases. In fact, a 1995 study conducted by Goidel and Langly found that the tone of news coverage regarding the nation's economic health strongly correlated with public opinion, even when controlling for real economic conditions (Goidel, 1995). These findings hint at American citizens' relative ineptitude at remaining impartial when attempting to understand the ebbs and flows of the economy.

A large source of bias comes from partisan influence. Gerber and Huber investigated this theory by directly examining variations in economic behavior. Using panel surveys from the November 2006 midterm elections, their research found that strong partisans tend to evaluate the economy in a more positive light when their respective party has control of the presidency (Gerber, 2009). This, they argue, stems from the idea that partisans hold differing beliefs on the economic competence of each party, depending on which party they support. This salient impact on how voters evaluate the economy may occur for a variety of reasons. Alongside aforementioned issues of race and socioeconomic status, Gerber argued that there exists a correlation between perceived economic performance and opinions of a political party; psychologically, voters tend to overestimate economic performance and attribute economic successes to parties they like, and vice versa (Gerber, 2009). This study casts doubt on the infallibility of voters' economic knowledge and implies that partisanship imbues a noteworthy bias on voters.

In a further study, Gerber and Huber sought to explain this hypothesized relationship by directly examining consumption habits. Using county-level quarterly taxable sales as a proxy for consumption habits, their study found that partisanship actively influences post-presidential consumption level (Gerber, 2010). This, they argue, indicates voters' beliefs about the economy, rather than simply party support. In times of perceived economic decline, voters tend to consume less; in times of perceived growth, voters tend to consume more. This result also correlates with a county's "partisan complexion", indicating that partisanship has a direct and active effect on both consumption and perceptions of the economy (Gerber, 2010). Also, Gerber noted that voters respond quickly in the short-term to changes in their economic situation, confirming the opinions of previous researchers that short-term economic change is of vital importance in examining

voter behavior (Gerber, 2010). Overall, Gerber and Huber's contributions to the literature demonstrate that voters can be biased in their economic evaluations, and that partisanship, through its direct effects on economic voting, may breed more biased partisanship on its own.

Previous research has successfully analyzed a wide range of factors that influence voting behavior, from individual characteristics to manifestations of attitudes toward national economic trends. However, research on the direct effects of the economy on voter patterns has been constrained to either overly-broad metrics — including Gross Domestic Product or unemployment, which may not apply or be relevant to the average voter — or considers the overall economy as a single unit of analysis. This study proposes a different approach, wherein the varying sectors of the economy are treated as unique agents rather than being bundled together as one. Industries, both how they grow and migrate over time, provide the central unit of analysis for this study. In doing so, direct attention can be paid on if and how variations in industrial composition might influence voting behavior.

Methodology

In this section, I outline the origins of the data used for this study, as well as the methodological and design choices employed. This study investigates how changes in industrial health between presidential elections correspond to changes in partisan voting behavior. Focusing on data at the county level allows for a greater degree of discretion and specificity in analyzing the results, as it accounts for highly concentrated sectors of the economy that may not receive proper representation at the state or national level. Using election returns data and employment data from the Bureau of Labor and Statistics, this study attempts to uncover a weighted linear regression between changes in industrial composition and changes in partisanship at the county level. In all, my study attempts to answer five key questions:

I. Is there an observable relationship between changes in industrial composition at the county level and changes in voting behavior?
II. What economic indicators — employment rates, establishment levels, or earned wages— best measure the health and relative prevalence of an industry at the county level?
III. What industries/indicators, if any, exhibit this hypothesized relationship? Is this relationship stronger for some industries/indicators than others?
IV. Is this relationship stronger in areas of the country with a strongly concentrated industry?
V. Does this relationship remain after examining external factors, such as incumbency advantage or turnout rates?

Data

To create the large data set necessary for my analysis, I merged information about the industrial composition and employment rates for each US county with each county's respective presidential election results. Doing so allowed for specific comparisons to be drawn between

each cast ballots and the unique economic environments from which they originated. Furthermore, the choice to focus solely on presidential election results stems from a desire to reaffirm Norpoth's *Presidential Liability Hypothesis* mentioned earlier, among other issues of data availability and ease of instituting adequate controls. This study, therefore, places greater emphasis on changes in voter behavior between presidential elections, rather than accounting for the myriad of other relevant elections — most notably congressional elections — that occur during a president's term. Finally, this data set only considers economic and employment data from the year of the relevant election itself, rather than creating a weighted average of economic data from the four years prior to said election. This allows for a more accurate depiction of change between elections, which are hypothesized to matter more in determining voter behavior than swings in industrial composition before the election year itself. Short run variations in economic composition or output in the interim periods between elections are irrelevant; instead, the data places greater emphasis on the magnitude of overall change between elections.

The data set incorporates industrial and voter data from each of the seven presidential elections between 1992 to 2016. The reasons for such a seemingly narrow set of data are twofold. First and foremost, beginning with Bill Clinton's election in 1992 allows me to compare and contrast the growth and decline of two major industries relevant to popular political discourse. These two industries are the mining sector — particularly coal mining — and the technology sector. President Clinton's election marked the beginning of the exponential rise in internet usage across the globe, gaining an average of 345 million users from 1995 to 2000 (Internet Growth Statistics, 2018). Clinton himself explicitly advocated for growth in the internet and technology sectors, arguing that innovations in the field will, among other things, "enable universities to communicate with each other 100 to 1000 times faster than they can do today"

(Lawler, 1996). This immense growth directly contrasts with the marked decline in mining across the US. The number of employed coal miners, mostly concentrated in the Appalachian region, has been reduced by over half in the past two decades, from a peak of around 140,000 in 1990 to less than 60,000 today (US BLS, Mining and Logging: Coal Mining, 2018). These findings, which seem to reaffirm previous studies analyzing the flexibility of the US service-based economy and departure from raw manufacturing and mining work, present a fantastic framework for voter behavior analysis (Christopherson, 1989). While this study focuses on far more than two industries, choosing a narrower timeframe allows for greater scrutiny in analysis toward these increasingly relevant and noteworthy fields in American political discourse. Finally, modern industrial data from the Bureau of Labor and Statistics only stretches back as far as 1992, presenting a more practical obstacle to a broader analysis.

Industrial composition data originates from the US Bureau of Labor and Statistics' Quarterly Census of Employment and Wages (QCEW), compiled at the county level for every presidential election since 1992 (Quarterly Census of Employment and Wages — Data Files, 2018). This census utilizes the North American Industry Classification System (NAICS), dividing the US economy into two major supersectors, which are then further categorized into individual sectors. An explanation of the specific NAICS industry classifications utilized in this study can be found in Appendix I. The QCEW uses three primary metrics to measure industrial composition of each sector of the economy at the county level: Total Employment, Total Establishments, and Wage Quotient (Glossary, 2018). Each of these metrics is computed as an annual average of quarterly data. *Total Employment* is defined as the total number of persons aged 16 or older who, during a reference week:

a) Did at least one hour of work as paid employees, or

b) Did not work but held jobs or owned businesses from which they were temporarily absent due to vacation, illness, weather, childcare, etc.

Each employed person is counted only once and in only one industrial sector, even if he or she holds more than one job. This definition explicitly excludes homemakers, entrepreneurs or others whose work is confined to their own home, or volunteerism. *Total Establishments* refers to the number of establishments — physical locations of a specific economic activity (I.E. a factory, mine, office) that produces a single good or service — that exist in a particular sector (Glossary, 2018). Finally, the QCEW records a *Wage Quotient* for each sector to analyze the relative wage level of a particular sector within a county as compared to the national average wage of that sector for the entire country, referred to as the "base area". The wage quotient is computed by using the following formula:

$$Wage\ Quotient = \frac{\frac{(Total\ Wages\ in\ Industry\ X\ in\ Analysis\ Area)}{Total\ Wages\ in\ Analysis\ Area}}{\frac{(Total\ Wages\ in\ Industry\ X\ in\ Base\ Area)}{Total\ Wages\ in\ Base\ Area}}$$

Using a wage quotient, rather than simply comparing the aggregate wages of each sector, eliminates comparison problems inherent to normative analysis of wage growth by allowing for a more accurate analysis of voter behavior by measuring variations in *real* pay across sectors themselves. For example, a county with a wage quotient of 2.0 in sector X implies that its workers are paid twice as much as the national average worker in that sector (Glossary, 2018). In all, these three statistics serve as the primary economic indicators of interest for analyzing industrial composition across counties.

Finally, the CQ Press Library's Voting and Elections Collection provides voter data from each presidential election since 1992 (Voting and Elections Collection, 2018). These data sets

include county-level voter data for each US county, including percent vote shares and total number of votes casts for each candidate. For this study, I consider only votes cast for the official nominees of the Democratic and Republican parties, excluding third party or write-in ballots. CQ data only lists one "third party" per election, generally the party with the highest vote share out of all challengers; as such, there is too much variation in the ideologies of which third party had the greatest vote share from election to election to derive any meaningful results from analyzing them. Therefore, this data set focuses primarily on the "Major Percentage" statistic provided by CQ for each party, defined as the total number of votes per party cast for either the Democratic or Republican party divided by the total votes cast for *only* both major parties, excluding any challengers or write-in votes (Voting and Elections Collection, 2018). Finally, a new statistic referred to in the data as *Vote Share*, was created in the process of formatting CQ data, utilizing its data on the total number of votes cast per county. This metric is figured by dividing the total number of votes in a county by the total number of votes in the entire election. Figuring vote share enables a meaningful weighted least squares analysis to occur, factoring the relative importance of each county's voters in terms of the percentage of votes cast by a particular county into my findings.

Formatting and Design

In a large combined data set, voter data for each individual county was matched with its corresponding QCEW data, effectively organizing the data by county. The specific coding necessary for this process can be found in Appendix II. From here, four metrics were calculated to identify the relative size and density of each industry, as well as the relative size of each county in terms of its impact on the election. These four metrics include *Establishment Ratio, Employment Ratio, Wage Quotient, and Voter Share*. Calculating these ratios allows for further

comparisons to be drawn between counties in terms of the magnitude of variations in industrial composition. The specific formulas for each metric are further elaborated on in Table 1. Using proprietary ratios, rather than simply analyzing the raw number of workers or establishments in a particular sector, controls for variation in population and provides a more accurate sense of the composition of industries in a county. Wage quotient remains unchanged by industry, as it already exists as a ratio, and requires no further calculation. Where values were invalid or equated to 0 — especially for counties with certain industries left unrepresented — a value of "N/A" was entered and not considered in any further analysis. Furthermore, as this data set considers seven specific elections, each county and its respective economic and voter data were coded with the specific years they represented. In all, this combined data set comprised of industrial composition and voter data for each county, repeated seven times for each presidential election considered.

TABLE 1: METRICS OF INDUSTRIAL COMPOSITION

ESTABLISHMENT RATIO	$\frac{\#\ of\ Establishemnts\ in\ Industry\ X}{\#\ of\ Total\ Establishments\ in\ County}$
EMPLOYMENT RATIO	$\frac{\#\ of\ Employees\ in\ Industry\ X}{\#\ of\ Total\ Employees\ in\ County}$
WAGE QUOTIENT	$\frac{\frac{(Total\ Wages\ in\ Industry\ X\ in\ Analysis\ Area)}{Total\ Wages\ in\ Analysis\ Area}}{\frac{(Total\ Wages\ in\ Industry\ X\ in\ Base\ Area)}{Total\ Wages\ in\ Base\ Area}}$
VOTER SHARE	$\frac{\#\ of\ Votes\ Cast\ by\ County\ X}{\#\ of\ Votes\ Cast\ in\ Election}$

At this point, the data is only capable of measuring the nominal differences in voter support for both major political parties between elections, and how these differences relate to the

size of a given industry during an election year. For example, if the Manufacturing sector establishment ratio in Oakland County, MI grew by ten percentage points between the 2004 and 2008 presidential elections, the data could identify the corresponding growth in voter share between Democratic candidates John Kerry and Barrack Obama. However, the actual size of the growth in voter share is irrelevant; what matters instead is the *change* between elections. Without factoring in the degree of change in voter share between elections, this study cannot accurately assess the impacts of changes in industrial composition on changes in voter behavior between elections.

Since change in voter behavior serves as the primary dependent variable of focus for this study, my methodological design necessitated the creation of *election pairs*, created to account for changes in each proprietary metric between elections. By combining each of the seven elections studied into six election pairs, the data can more accurately depict the changes in voter behavior and industrial composition that occur between elections, rather than being limited to studying ambiguous variations in nominal vote share for candidates. For example, the change in voter and industrial data between Clinton's 1992 election and 1996 reelection is considered as one of six election pairs. This new metric, using inputs from the previous data set sorted by year, calculated the change in majority voter share for both Democrats and Republicans at the county level between elections. Additionally, the changes in each of the proprietary metrics of industrial composition for each industry was recorded, providing insight into how a county's economy changed between elections. This data set remained organized by county; however, each county was tagged with which election pair it represented, resulting in six entries for each county, corresponding to the six elections pairs created by this analysis. Calculating change at the county level allows for regression analysis to consider change in majority voter share for Democrats and

Republicans as a function of change in specific industrial indicators for each industry at the county level.

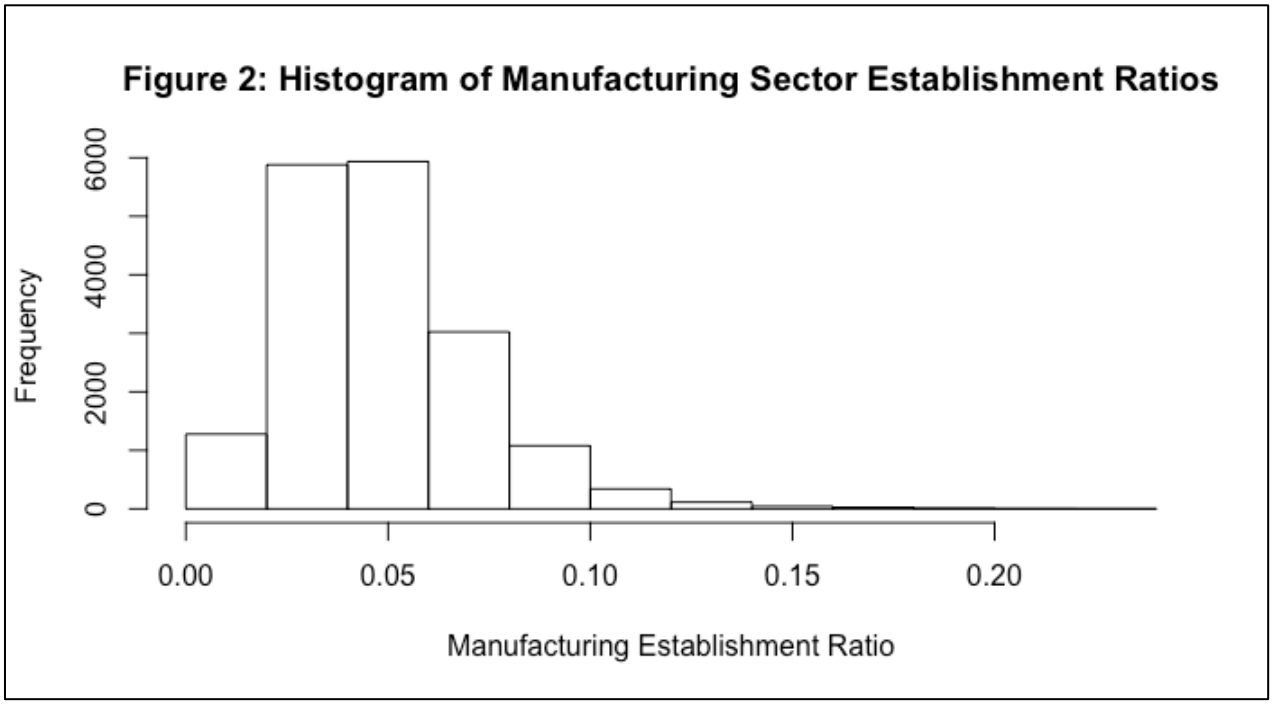
With the data now fully organized, analysis proceeded by conducting a weighted least squares regression, considering change in voter share for both major parties as a function of changes in each of the three industrial composition metrics by each unique industry. Each data point is weighted by the respective county's total voter share. Choosing to consider voter share over other competing metrics of population density, including each county's share of the US population, helps to exclude portions of the non-voting population that do not relate to this study's hypothesized relationship. This study seeks to examine *voter behavior*, not citizen behavior; as such, considering total population would skew results away from voters and toward citizens who have no bearing on the elections in question. For each industrial composition indicator, the regression table calculates the predicted percent change in voter share for both Republicans and Democrats as a function of percent change in the aforementioned indicator for every industry. Since Republican and Democratic voter share equate to 100% of the analyzed vote, the additive inverse of regression results for one party equals the regression results for the other. This eliminates the need to conduct redundant regression analysis for both parties. These results are referred to as *national regression results*, indicating the observed relationship between voter share and industrial composition as an average of the entire country.

Additional regression analysis considered variations in this relationship between the national average and concentrated baskets of the economy with highly concentrated industries. To conduct this analysis, the data was further divided into individual subgroups for each industry, consisting of counties for which the establishment ratio of the relevant industry exceeded a certain percentile. The specific threshold used matters little; any threshold used above

the 50th percentile would effectively create a subgroup more concentrated than the national average. However, choosing a constant threshold necessarily entails a tradeoff between two competing obstacles. Choosing too low a threshold would return a large subgroup, one that could potentially be too large to derive any meaning from. On the other hand, choosing too high a threshold would artificially limit the size of my subgroups to such a small number of data points that could return insignificant results. With these competing tradeoffs in mind, I choose to search for a natural threshold of sorts.

Ultimately, the rationale for choosing the 85th percentile as a cutoff for sorting came from their investigation into the relative distributions of establishment ratios across industries. For example, in the manufacturing sector, the 50th percentile establishment ratio equaled 0.0486, with its 85th percentile equaling 0.0707 (QCEW, 2018). In Figure 2, a histogram of the distribution of manufacturing establishment ratios exhibits a long tailed normal distribution which begins to divide at approximately the 85th percentile. As such, I chose to divide my industries at the 85th percentile, as the data appeared to show a clear demarcation between highly concentrated industries and the average basket of industrial composition at the 85th percentile. While this cutoff may appear arbitrary, it adequately serves its purpose of creating highly concentrated subgroups while minimizing the risk of conducting data analysis with too large or too small a data set. With each industry divided between its national average and a highly concentrated basket of counties with establishment ratios above the 85th percentile, additional regression analysis of the same nature as previously conducted can occur. This allows for comparisons to be made between the regression relationship at the national level and the relationship for highly concentrated counties in each industry.

Finally, a variety of further tests were conducted with the national-level data to account for external factors, including incumbency and voter turnout. Doing so tests the robustness of the hypothesized relationship in the regression data when accounting for external factors simultaneously influencing voter behavior. In order to account for incumbency advantage, defined mathematically as the benefit the incumbent president receives in running for reelection as a function of the difference between the proportion of the vote earned by the incumbent and the proportion of the vote received by the entire party, each election pair was placed into two groups (Gelman, 1990). The first, termed the *incumbency group*, consists of elections where the incumbent president won reelection — 1996, 2004, and 2012. The second, termed the *non-incumbency group*, consists of elections where either the incumbent lost, or two new candidates ran for office —2000, 2008, and 2016. From here, each group underwent the same national regression analysis, allowing these results to be compared with the national average and identify what effect incumbency has on the results.



To analyze the effects of varying degrees of voter turnout, another two groups of elections were created, this time corresponding to election pairs with the highest and lowest turnout, as measured by voter data. Using the average turnout between both elections in a pair as the metric to be compared, the *high turnout* group consisted of the three most recent election pairs, whereas the *low turnout group* consisted of the three oldest election pairs (Voting and Elections Collection, 2018). Again, the same comparisons can be drawn with the national data by subjecting each turnout group to regression analysis, then comparing the results to the national regression results. This allows for the effects of turnout to be considered in my analysis.

Analysis

In this section, I analyze and discuss the results of the aforementioned regression tests conducted with the combined QCED and Voting and Elections Collection data. The results of these regression tests are contained within Appendix III, which contains Tables 2-8 of regression results. I begin by analyzing the results of the national regression results, which are then further broken down by specific industries. Second, I discuss my findings from regression testing of several highly concentrated regions of the economy. Finally, I go more in depth into regression testing based on changes in wage ratio, as well as address multiple tests regarding incumbency and voter turnout. A guide to interpreting each regression table can be found at the beginning of Appendix III. For the sake of clarity, each regression table lists the estimated linear relationship as it pertains to changes in *Democratic* vote share.

Establishment Ratio-Based Regressions

Table 2 lists the R-Squared values from the national regression output, sorted by which economic indicator was utilized as the independent variable of partisan change. As this table shows, regression tests relying upon changes in establishment ratios explained a greater share of variation in the data than either employment or wage ratios. In fact, the percentage of variation explained by changes in establishment ratios — nearly 7% — is nearly double that of employment ratios. While this figure seems small, it is important to keep in mind that this study analyzes one of the many contributing factors to voter behavior in the US. An R-Squared coefficient of 7 percent implies that variation in *one* of many variables explains seven percent of variation in the data. If further studies were to control for other factors in the calculus of voter behavior, this figure would almost certainly be higher. More importantly, however, this result implies that placing more weight on changes in establishment ratios over employment or wage

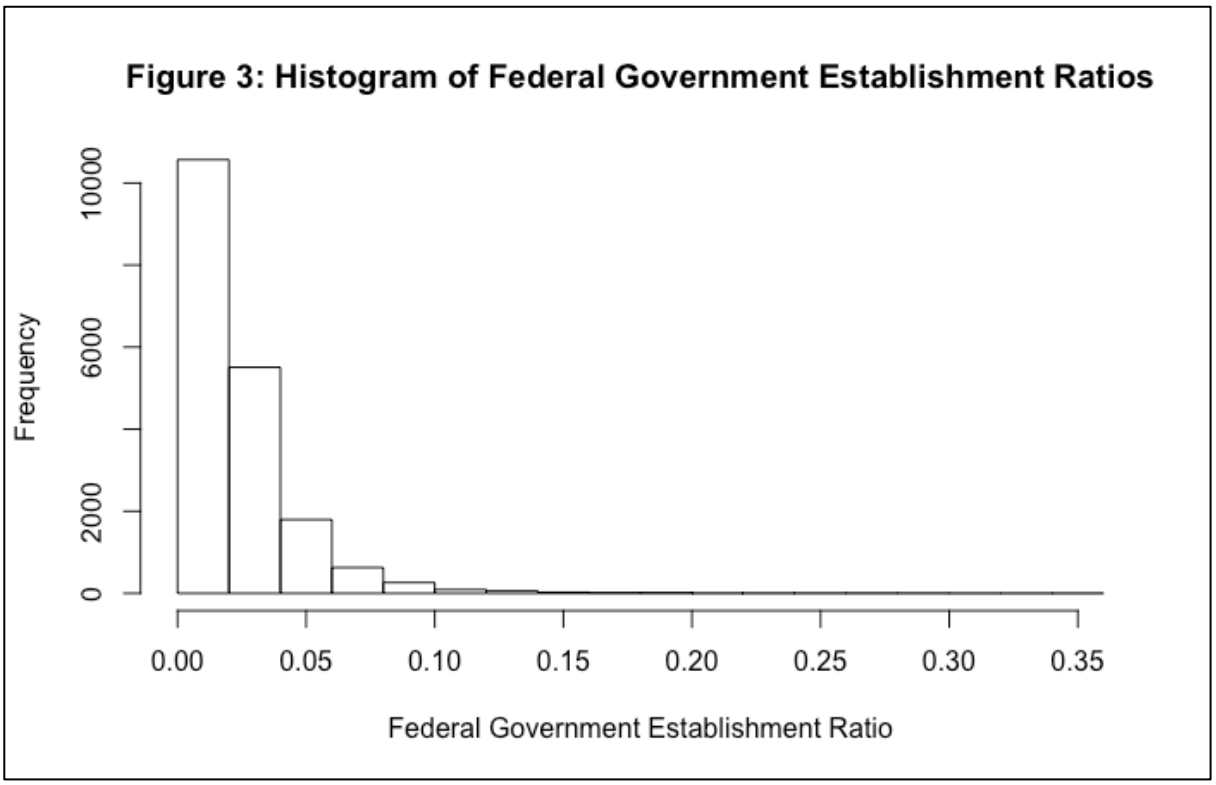
ratios may explain more of the hypothesized variation in voter behavior. For this reason, further analysis of both national and regional regression results focuses only on those explained by variations in establishment ratios.

Table 3 displays the national regression results relating to changes in establishment ratio, broken down by industry. Looking at the P-values of each industry, the regression results indicate that changes in county-level ratios for eight of the thirteen individual industries tested show no significant correlation to changes in Democratic vote share. Natural Resources and Mining was particularly insignificant, with a P-value above 0.8. However, five industries in particular exhibited a statistically significant relationship between changes in establishment ratio and Democratic vote share. These industries were:

- Trade, Transportation, and Utilities
- Information
- Education and Health
- Other Services (except Public Administration)
- Government (Federal)

Outside of the federal government, an increase in the establishment ratio of these four industries showed a statistically significant decline in Democratic vote share. The magnitude of this decline varied by industry, with an average coefficient of -40.75. This signifies that for a county that saw its proportion of establishments in a particular industry grow by ten percent, one could expect Democratic vote share to decline by nearly 4.1 points. Democratic vote share appears particularly sensitive to changes in the establishment ratio for Information-sector companies, as its coefficient reached over -100. This implies that in any given county, for every one-point increase in the establishment ratio of the information sector, Democratic vote share declines

nearly 100 times as much. From these results, regression analysis implies that the aforementioned industries are likely most relevant for further investigation into the hypothesized relationship in this study. Furthermore, growth in these industries seems, at least in a strict statistical sense, correlated to a decline in Democratic vote share.



Regression analysis on the effects of change in the federal government returned surprisingly strong results. As the final line of Table 3 shows, growth in the ratio of federal government establishments correlated with an over 500-point increase in Democratic vote share. This staggeringly high figure, combined with its high level of statistical significance, may imply that growth of the federal government serves as a massive benefit for Democrats in office; however, this figure must be treated with caution. Figure 3 shows a plot of the average establishment ratio for federal government institutions for all US counties. This histogram exhibits a long-tailed distribution, with the average establishment ratio equaling less than 1% (QCED, 2016). It is safe to say, therefore, that most counties' economies do not rely heavily on

— if at all —the presence of federal government institutions. In terms of regression analysis, this signals a lack of applicable data for this model, meaning the recorded coefficient has likely been overestimated. As such, I must discount the relevance of this metric; it has been omitted from any further analysis.

Table 4 shows the results of regional-based regression analysis, using subsets of the data consisting of counties exhibiting an establishment ratio above the 85th percentile for three of the statistically significant industries found in table 3. Notably, Other Services are excluded from this table. As the NAICS explains, Other Services serves as a catch-all category of sorts, bundling together an assortment of industries that do not meet the criteria for any already-established classification. This means that comparisons across counties might not be comparing the same jobs; one county's "other services" could comprise of religious industries, while another might include laundry services. As such, using this category provides no meaningful method of comparing between same industries.

Table 4 allows for comparisons to be drawn between the national regression results and more concentrated regional results, broken down by each industry. Unfortunately, segregating the economy by its most highly concentrated sectors did not strengthen neither the statistical significance nor the strength of the coefficient on voter share change. In fact, for both the Trade and Information sectors, the direction of the coefficient actually *reversed*. In general, no discernable pattern could be distinguished between national regression and regional regression results. This implies that analyzing data solely from counties with highly concentrated and statistically significant industries did nothing to bolster the validity of the correlation.

Wage Ratio-Based Regressions

Regression analysis on changes in wage ratio explained a lower percentage of variation in the data — around 4.1%, per Table 2 — than establishment ratio. However, while not as statistically significant in terms of R-Squared figures, focusing on changes in wage ratio returned surprisingly significant and profoundly interesting results. Table 5 lists the results of this regression test, in a similar format as Table 3. With the notable exception of the Service supersector, *every* industry exhibited a negative coefficient of change in voter share for Democrats in response to an increase in wage ratio. The magnitude of these coefficients appears tightly bunched, all within an order of magnitude of one another. Notably, each coefficient is smaller in magnitude than the coefficients found in analyzing the effects of change in establishment ratio; most industries show an average 2.45-point drop in Democratic vote share for every 1-point increase in wage ratio. In other words, as workers begin to make double the average salary of the average worker in that industry, Democrats gain a two to three percentage point boost in their electoral performance. Finally, the coefficient of change for each industry is remarkably significant; the P-values for each industry appear to approach zero. These results imply that Democratic vote share suffers from negative changes in wages. However, this does not mean that growth in nominal wages influences partisanship; rather, by nature of the wage ratio statistic, these results indicate that Democratic vote share begins to decrease when workers of nearly every industry begin receiving wages above that of their peer average.

To further examine the robustness of this correlation, Table 6 shows regional regression results based on wage ratio changes, divided by the same significant industries identified by the analysis conducted in Table 4. Overall, the negative correlation between wage ratio and Democratic vote share remains intact, even after segmenting the economy by its most highly

concentrated sectors. The average coefficient of change increased in magnitude from -2.45 to -4.69. In counties with highly concentrated Education and Health sectors, this relationship suffered in terms of significance, with P-values growing on average as compared to the national results. Additionally, the average coefficient of change for this sector is -3.3104, which is more than a point lower than average. However, for the remaining two industries, the relationship between wage ratios and Democratic vote share change remained significant and strong. Table 6 demonstrates that the observed linear relationship between wage ratios and partisanship persists in counties with concentrated industries, although this finding comes with a few exceptions.

Finally, Tables 7 and 8 explore whether incumbency effects or variations in voter turnout impact the resilience of this relationship. Beginning with incumbency effects, Table 7 splits national regression results into two groups, one where incumbent candidates won reelection and the other where entirely new challengers ran for election. For elections in transition between incumbent administrations, the relationship between changes in wage ratio and Democratic vote share remains intact, if not more statistically significant than in Table 5. The average coefficient of change in Democratic vote share reaches -7.94 — higher than any observed average in the previous tables. Notably, the coefficient of change in the Leisure and Hospitality industry deviates from the trend, reversing signs into a *positive* 3.15-point benefit for Democrats. Despite this outlying example, it appears that increases in wage ratio remain negatively correlated with Democratic vote share in cases where incumbency advantage plays no role.

When incumbency advantages are in play, contrary to previous findings, the data shows less conclusive evidence in support of a correlation between wage ratio changes and Democratic vote share. As Table 7 shows, each coefficient of change — excluding Construction and Other Services — remains statically significant, implying that the observed relationships in the data are

not simply due to change. However, the direction of each coefficient no longer remains overwhelmingly negative. The average coefficient of change increases nearly 6 points when accounting for incumbency advantage, from -7.94 to -1.0006. Additionally, a majority of industries, nine of thirteen, actually show a net *benefit* for Democrats, contrary to previous findings. Only the Goods and Service producing industries, supersector categories encompassing a wide variety of subsectors, retain a negative correlation with Democratic vote share. Interestingly enough, while these overarching categories preserve a negative correlation, each of their component industries return a positive correlation. These findings complicate interpretations of regression analysis; while on a national scale the statistical validity of this correlation seems strong, accounting for incumbency advantages seriously confounds the applicability of this relationship to a wide range of elections.

Examining variations in turnout creates a similar pattern of results. Table 8 shows variation in regression analysis between high turnout and low turnout elections. For elections conducted under low turnout levels, the data preserves a negative correlation with Democratic vote share, exhibiting an average coefficient of change of -2.687. Deviating from this pattern, the Service industry reverts back to its Table 5 relationship, with a positive coefficient of change for Democratic vote share. Additionally, each relationship by industry preserves its statistical significance.

On the other hand, when accounting for elections with higher turnout on average, regression analysis finds far less conclusive results. In these elections, statistical significance takes the biggest hit, with five industries — Construction, Service-Providing, Education and Health, Leisure and Hospitality, and Government — exhibiting statistically insignificant correlations with changes in voter share for either party. Despite this decline in significance,

coefficients of change for most industries remained negative for Democratic vote share. The average coefficient of change for counties in elections with high turnout does not change much as compared to those with low turnout, equaling -2.27 — a change of less than half a point. Finally, in terms of outliers, the correlation between wages and voter share for workers in the Information sector seems particularly affected by changes in turnout. Data from high turnout elections show a positive correlation with Democratic vote share for Information sector employees, presenting the only major deviation from the pattern of negative correlations. In all, accounting for differing levels of turnout presents yet another challenge to the reliability of this relationship. Whereas examining incumbency advantages primarily impacted the magnitude of each coefficient of change, variations in turnout primarily impact each relationship's statistical significance. This finding implies that each confounding factor impacts the applicability of regression findings, albeit in differing ways.

Discussion

This study provides evidence for multiple significant findings pertaining to the relationship between industrial composition and changes in partisanship. First and foremost, as Table 2 shows, a county's establishment ratio seems most relevant in examining a county's industrial composition, rather than wage or employment metrics. This may be attributable to the overwhelming effect large establishments have on a surrounding area. Different industries necessarily employ differing amounts of employees; for example, it likely takes far more workers to run a hospital, which requires much more human labor, than it does to manufacture a car, which has become heavily automated and robotized. As such, examining differences in employment levels does not properly account for inter-industry variations in employment levels. Since the economy is measured primarily by output (GDP, for example), and establishments, not workers, are responsible for producing output, measuring changes in establishment ratio have a greater direct effect on a county's distribution of economic output by industry than measuring employment or wage levels.

Second, this study shows mixed evidence in support of a relationship between changes in industrial composition and partisan variation between presidential elections. Using changes in establishment ratio as the primary independent variable, as was shown in Tables 3 and 4, there exists a weak relationship for only a few industries. Growth in these industries — Trade, Transport and Utilities, Information, and Education and Health — appear correlated with a decline in voter share for Democratic presidential candidates. A key similarity between these industries comes from the fact that each exists within the broad Service-Providing supersector of the NAICS. This observation, combined with the notion of America's increasing transition towards becoming a service economy, provides evidence that Democratic success in future

elections may suffer in the wake of growing change in industrial composition (Buera, 2012). However, it is important to note that this hypothesized relationship does not hold for every industry examined, nor does the data show this relationship for every service-based industry. This implies that while a relationship between establishment ratio change and voter behavior may exist, its scope is limited to specific industries, precluding any broad interpretations from being rendered.

Scrutinizing the degree of heterogeneity within each analyzed economic sector might provide further insight into why the data exhibits such a poor and inconsistent correlation with political polarization. As previously mentioned, growth in the relatively narrow and homogenous sectors of Trade, Education and Health, and Information correlated with varying degrees of statistically significant political polarization. These sectors encompass relatively homogenous sectors of the economy; growth in the Health sector, for example, might ostensibly impact *all* employees in that sector to some degree. Since employees in these relatively similar sectors are equally impacted by growth in their industry, a relatively consistent voting bloc emerges amongst them, meaning their voter behavior patterns may be more consistent. On the other hand, employees in broader and more heterogeneous sectors — those that returned statistically insignificant results, such as Manufacturing — are not equally impacted by growth in their sectors. Growth in the manufacturing of automobiles will likely not impact the job prospects of those manufacturing computers. This presents an obstacle to generalizing the voter behavior patterns of such employees; since the impacts of growth in the large sector are manifested differently for different employees within varying subsectors of the large heterogeneous sector, it is difficult to make any sweeping conclusions regarding their voter behavior as a whole. This

may explain why statistically significant results only emerged for more homogeneous sectors of the NAICS.

Quantifying homogeneity presents a rather difficult task; however, using estimates of unionization rates as a proxy may help further explain variations between different industries. Unions, wherein employees of a particular economic sector engage in collective bargaining with employers as a unit rather than as individuals, necessarily entail a degree of interconnectedness and homogeneity within a sector. As many workers cooperate together to advocate for workplace benefits and higher wages, the effects of industrial growth or decline in a sector impact a larger portion of its employees. This starkly contrasts with less unionized industries, where workers are so far displaced and unconnected from one another's actions that growth in their sector will not impact as broad a range of its employees. If this hypothesis holds, more homogeneous industries — those shown to exhibit statistically significant correlations with political partisanship above — should have higher rates of unionization as compared to heterogeneous industries.

This hypothesis appears to be true. On average, the more homogenous and statistically significant sectors tend to have higher rates of union membership than the more heterogeneous sectors. In particular, workers in the Utilities subsector are represented by unions at a rate of 24.1% (QCEW, 2018). Even smaller industries like Health Care and Educational Services participate in unions at rates of 8.2% and 13.5%, respectively. This is markedly different from more heterogeneous industries, like Financial Activities, whose members join unions at only a rate of 3.1%. Even geographically concentrated industries, such as Mining or Oil and Gas Extraction, exhibit a low rate of union participation at around 4.8%. Overall, using unionization rates presents an excellent opportunity, albeit far from the only metric available, to quantify the homogeneity of a particular sector. Since all of the statistically significant industries examined

hold higher rates of unionization than their statistically insignificant counterparts, this implies that one explanatory factor accounting for their differences may stem from variations in the interconnectedness of their workers. When variations in the economy at the industrial level impact all workers of a union, rather than being dispersed throughout the country, this signifies that the impacts of such variations will be felt by a large proportion of workers, contributing to statistically significant results.

Third, this study shows evidence for complications that arise when looking at regions of the country with highly concentrated industries, as measured in Table 4 by dividing the country by regions with high establishment ratios for the aforementioned statistically significant industries. In some cases, the magnitude of each coefficient grew in counties with near-homogenous industrial composition. However, no discernable pattern came from this analysis; for most industries, the coefficient of change either completely reversed direction, remained unchanged, or even became statistically significant. These findings undermine the original logic behind this study's key hypothesis.

Originally, I hypothesized that one contributing factor toward a stronger correlation in highly concentrated industry might come from an increasing degree of homogeneity within each county's voting bloc. With one industry dominating economic activity in a region, it could reasonably follow that most voters would have similar economic interests and therefore vote in both similar and more predictable manners to advance those interests. However, the opposite appears to be true, especially from an economic standpoint. Using income inequality as a metric of economic homogeneity, studies have shown that as the prevalence of sectors —specifically the Construction sector — increase in magnitude over time, income inequality actually *decreases* (Moore, 2009). This implies that economic homogenization of industrial composition may

actually contribute to a more diverse voting bloc. While I assumed conducting regression analysis in highly concentrated industries would bolster the strength of each correlation, in actuality this method of sorting only further complicated my results, meaning these findings are inconclusive at best.

Unlike changes in establishment ratio, analyzing the effects of variations in wage ratio returned surprisingly significant and powerful results. Table 5 demonstrates that increases in the wage ratio of workers in a county — in other terms, the wages of a county's employees increase in comparison to the national average — correspond to a staunch decrease in vote share for Democrats. This implies that the more money a voter makes as compared to peers in the same industry, the more likely that voter is to vote for a Republican presidential candidate. Besides being the most statistically significant relationship of all those observed, this finding is made especially interesting due to the fact that the relationship does not vary by industry. Instead, we see the same negative correlation for growth in the wage ratio of nearly every industry, regardless of which field workers preside in.

The rationale for why such a relationship emerges in the data may stem from, at least in part, the variety of socioeconomic factors previously discussed. From a purely economic perspective, political scientists like Frey would argue that given a higher level of income as compared to one's peers, the opportunity costs of voting diminish as wages increase (Frey, 1971). Frey's research, however, does not tune into the causal mechanism behind why higher wage ratios correlate with more *Republican* success. Studies on the impacts of broader causal mechanisms, such as those on socioeconomic status conducted by Kam or Hansen, fall similarly short. Their findings find evidence to support higher levels of turnout, but not higher levels of Republican partisanship.

This is not to say that socioeconomic status and income play no role in explaining the effects of wage ratio; on the contrary, considering the findings of previous research in light of this study's quantitative findings implies the positive effects on turnout from increases in socioeconomic status may disproportionately affect Republicans over Democrats. In fact, there exists evidence that such a causal relationship exists. A study by Dr. Benjamin Page analyzing the policy preferences of the top one percent of wage earners found that wealthy Americans are not only "extremely active" politically but tend to be more conservative than the public as a whole (Page, 2013). Additionally, these conservative beliefs tend to be strongest on issues of taxation, economic regulation, and social welfare — all issues that apply most heavily to those generating more income. These findings make sense with the data; as wage ratio directly relates with issues of income and socioeconomic status, increasing one's income will likely increase the relevance of issues relating to maintaining a high level of financial security, which conservative policies tend to address.

The issue of financial security as it relates to partisanship received further attention in research conducted by Dr. Philipp Rehm. In his study, seeking to explain increased levels of polarization across the United States, Rehm argued that political affiliation derives partially from *risk exposure*, or the degree of uncertainty towards future income (Rehm, 2011). For those with lower incomes, Rehm's work finds the greatest degree of risk exposure and thereby higher voter sympathy for Democrats, and vice versa. While his work notes the "overlapping concerns" of risk exposure for those with average income levels, this study lends itself well to explaining the effects of wage ratio change on political partisanship (Rehm, 2011). Higher wage ratios correlate to higher levels of income for workers on average, implying the risk of future wage loss has diminished. This may explain why increases in wage averages disproportionately benefit

Republicans across all industries. Since the value of income does not discriminate across industries —a dollar is worth a dollar, regardless of where it was earned — a positive relationship between wage ratio growth and conservative vote share should not discriminate either.

Although this study finds strong evidence for a correlation between wage ratio and partisanship, it does not come without a few exceptions and controls to take note of. The strong relationship between average wages and vote share for Democrats became significantly less convincing when separating counties by both incumbency and turnout. Further, each control impacted the validity of this relationship in different ways; incumbency primarily impacted the magnitude of correlation, whereas high turnout maintained similar coefficients at the cost of statistical significance. Overall, these findings present the limitations of this relationship for further study. Wage ratio tends to have the greatest impact on political partisanship in elections where no incumbent candidate is running, and turnout remains low. This seems to confirm previous studies on the effects of income, mentioned earlier. Since high levels of turnout generally correlate with Democratic success in elections, examining high turnout elections may explain why Table 8 found such confounding results (Hansford, 2010). In the absence of these effects, especially with low levels of turnouts, this study shows evidence that Republicans receive higher levels of support from voters who earn more than their average peers, regardless of industry.

This finding comes with immense implications for how political scientists ought to study voter behavior; contrary to previous research, this finding moves emphasis away from *where* or *how* workers earn their wages and moves it toward further study of how workers' wages compare with their peers. Considering the multitude of controls inherent to any study of voter

behavior, this study additionally invites further investigation into relationships between industrial composition and voter behavior. First, stemming directly from this study's failure to surmount sufficient evidence in favor of a broad relationship between establishment change and voter behavior, further research might specifically examine variation within the aforementioned industries exhibiting significant results. Especially in the growing fields of Education, Health and Trade, further analysis of these industries might provide greater insight into the impact these establishments have on both their counties and the surrounding regions. Second, as it pertains to the effects of wage ratio change, this study presents an opportunity for a myriad of controls to be factored in to regression analysis on voter behavior. Beyond incumbency and turnout, further study might isolate additional controls that either undermine or bolster the statistical validity of this study's findings. Perhaps factors such as popular opinion polls, lobbying efforts by industry, or a broader definition of socioeconomic status may play a role in influencing this relationship. Additionally, wage ratio change only represents one measure of income. Further study might consider grouping voters into income brackets to examine whether or not growth in wage ratio exhibits a uniform effect on vote share for voters from various household incomes. Finally, while this study specifically focused on presidential elections, further study might consider examining variations in partisan support at the congressional level, in order to further test the robustness of this relationship.

Appendix I: NAICS Industry Classifications

(*About the Data,* 2017*)*

Industry	**Description**
Goods-Producing	This supersector consists of all sectors of the economy pertaining to the production of goods. It includes a variety of subsectors employing nearly 20,000,000 people annually.
Natural Resources and Mining	This sector consists of two primary subsectors. The first, pertaining to agriculture, includes establishments engaged primarily in growing crops, raising animals, harvesting timber, or farming fish in a variety of settings. The second, pertaining to mining, includes establishments that extract naturally occurring solids, such as coal and other ores, as well as liquid materials and natural gasses.
Construction	This sector consists of all establishments engaged in the construction of buildings or engineering projects, including highways and utility systems. These establishments engage in the preparation of new sites for construction.
Manufacturing	This sector consists of all establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products.
Service-Providing	This supersector consists of a variety of establishments pertaining to the provision of services to individuals. It includes a variety of subsectors employing nearly 127,677,000 million workers annually.
Trade, Transportation, and Utilities	This sector consists of multiple subsectors pertaining to the transportation and trade of services. These subsectors include: Wholesale Trade, Retail Trade, Transportation and Warehousing, and Utilities.

Information	This sector consists of establishments engaged in one of the following processes: (a) Producing and distributing information and cultural products (b) Providing the means to transmit or distribute these products as well as data or communications (c) Processing data
Financial Activities	This sector consists of establishments engaged in the Finance and Insurance subsector, as well as those engaged in real estate sales or leasing. Financial institutions include raising funds through deposits or securities, incurring liabilities, pooling of risk, or other miscellaneous specialized services.
Professional and Business Services	This sector consists of establishments engaged in professional, scientific and technical services, as well as the management of companies and enterprises. Additionally, this sector includes those engaged in activities relating to administrative support and waste management services.
Education and Health Services	This sector consists of establishments that provide instruction and training in a wide range of subjects, both through specialized establishments (colleges, schools, etc.) and training centers. Additionally, this sector includes all establishments providing health care and social assistance for individuals.
Leisure and Hospitality	This sector consists of establishments engaged in activities relating to Arts, Entertainment, and Recreation, which conduct the following activities: (1) Promoting, producing, or participating in liver performances intended for public viewing (2) Preserving and sharing objects and sites of historical, cultural, or educational interest

	(3) Operating facilities that enable patrons to participate in recreational activities or pursue amusement Additionally, this sector includes establishments that provide customers with either lodging or prepared meals.
Other Services (Except Public Administration)	This "catch-all" sector consists of establishments that provide services not specifically provided for in the classification system. These include: repairs, promotion, grant making, advocacy, pet care, parking services, dating services, and many others.
Government (Federal)	This sector consists of all establishments under the purview and operation of the federal government.

APPENDIX II: CODE FOR DATA PROCESSING

```
counties <- unique(d1$Area_x)
counties <- counties[counties != ""]
w <- as.data.frame(counties)
Govt <- unique(d1$Ownership)
Govt <- Govt[Govt != ""]
Govt <- Govt[Govt != "Total Covered"]
Govt <- Govt[Govt != "Private"]
Industry <- unique(d1$Industry)
Industry <- Industry[Industry != ""]
Industry <- Industry[Industry != "Total, all industries"]
Votes1 <- d1$TotalVotes[match(counties, d1$Area_x)]
Votes2 <- d2$TotalVotes[match(counties, d2$Area_x)]
AvgVotes <- (Votes1 + Votes2) / 2
w$VoteShare <- AvgVotes / sum(AvgVotes, na.rm = TRUE)
Dem1 <- d1$DemVotesMajorPercent[match(counties, d1$Area_x)]
Dem2 <- d2$DemVotesMajorPercent[match(counties, d2$Area_x)]
w$DemChange <- (Dem2 - Dem1)
Rep1 <- d1$RepVotesMajorPercent[match(counties, d1$Area_x)]
Rep2 <- d2$RepVotesMajorPercent[match(counties, d2$Area_x)]
w$RepChange <- (Rep2 - Rep1)
for (I in Industry) {
  w[paste(I, "Establishment.Ratio1", sep=" ")] <- merge(w, d1[d1$Industry == I, c("Area_x",
"Establishment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Establishment.Ratio
  w[paste(I, "Establishment.Ratio2", sep=" ")] <- merge(w, d2[d2$Industry == I, c("Area_x",
"Establishment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Establishment.Ratio
  w[paste(I, "Establishment.Ratio.Change", sep=" ")] <- (w[paste(I, "Establishment.Ratio2",
sep=" ")] - w[paste(I, "Establishment.Ratio1", sep=" ")])
} ## Establishment Ratios
for (I in Industry) {
 w[paste(I, "Employment.Ratio1", sep=" ")] <- merge(w, d1[d1$Industry == I, c("Area_x",
"Employment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Employment.Ratio
 w[paste(I, "Employment.Ratio2", sep=" ")] <- merge(w, d2[d2$Industry == I, c("Area_x",
"Employment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Employment.Ratio
 w[paste(I, "Employment.Ratio.Change", sep=" ")] <- (w[paste(I, "Employment.Ratio2", sep="
")] - w[paste(I, "Employment.Ratio1", sep=" ")])
} ## Employment Ratios GOVT
for (I in Industry) {
 w[paste(I, "Total.Wage.Location.Quotient.Relative.to.U.S.1", sep=" ")] <- merge(w,
d1[d1$Industry == I, c("Area_x", "Total.Wage.Location.Quotient.Relative.to.U.S.")], by.x =
```

```
"counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE, incomparables =
NA)$Total.Wage.Location.Quotient.Relative.to.U.S.
 w[paste(I, "Total.Wage.Location.Quotient.Relative.to.U.S.2", sep=" ")] <- merge(w,
d2[d2$Industry == I, c("Area_x", "Total.Wage.Location.Quotient.Relative.to.U.S.")], by.x =
"counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE, incomparables =
NA)$Total.Wage.Location.Quotient.Relative.to.U.S.
 w[paste(I, "Total.Wage.Location.Quotient.Relative.to.U.S.Change", sep=" ")] <- (w[paste(I,
"Total.Wage.Location.Quotient.Relative.to.U.S.2", sep=" ")] - w[paste(I,
"Total.Wage.Location.Quotient.Relative.to.U.S.1", sep=" ")])
} ## Wage Ratios END INDUSTRY BEGIN GOVT
for (G in Govt) {
 w[paste(G, "Establishment.Ratio1", sep=" ")] <- merge(w, d1[d1$Ownership == G, c("Area_x",
"Establishment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Establishment.Ratio
 w[paste(G, "Establishment.Ratio2", sep=" ")] <- merge(w, d2[d2$Ownership == G, c("Area_x",
"Establishment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Establishment.Ratio
 w[paste(G, "Establishment.Ratio.Change", sep=" ")] <- (w[paste(G, "Establishment.Ratio2",
sep=" ")] - w[paste(G, "Establishment.Ratio1", sep=" ")])
} ## Establishment Ratios GOVT
for (G in Govt) {
 w[paste(G, "Employment.Ratio1", sep=" ")] <- merge(w, d1[d1$Ownership == G, c("Area_x",
"Employment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Employment.Ratio
 w[paste(G, "Employment.Ratio2", sep=" ")] <- merge(w, d2[d2$Ownership == G, c("Area_x",
"Employment.Ratio")], by.x = "counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE,
incomparables = NA)$Employment.Ratio
 w[paste(G, "Employment.Ratio.Change", sep=" ")] <- (w[paste(G, "Employment.Ratio2", sep="
")] - w[paste(G, "Employment.Ratio1", sep=" ")])
} ## Employment Ratios GOVT
for (G in Govt) {
 w[paste(G, "Total.Wage.Location.Quotient.Relative.to.U.S.1", sep=" ")] <- merge(w,
d1[d1$Ownership == G, c("Area_x", "Total.Wage.Location.Quotient.Relative.to.U.S.")], by.x =
"counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE, incomparables =
NA)$Total.Wage.Location.Quotient.Relative.to.U.S.
 w[paste(G, "Total.Wage.Location.Quotient.Relative.to.U.S.2", sep=" ")] <- merge(w,
d2[d2$Ownership == G, c("Area_x", "Total.Wage.Location.Quotient.Relative.to.U.S.")], by.x =
"counties", by.y = "Area_x", all.x = TRUE, all.y = FALSE, incomparables =
NA)$Total.Wage.Location.Quotient.Relative.to.U.S.
 w[paste(G, "Total.Wage.Location.Quotient.Relative.to.U.S.Change", sep=" ")] <- (w[paste(G,
"Total.Wage.Location.Quotient.Relative.to.U.S.2", sep=" ")] - w[paste(G,
"Total.Wage.Location.Quotient.Relative.to.U.S.1", sep=" ")])
} ## Wage Ratios GOVT
```

APPENDIX III: REGRESSION RESULTS

(QCED, 2018); (Voting and Elections Collection, 2018)

TABLE 2: R-SQUARED VALUES FOR NATIONAL REGRESSION	
Economic Indicator	**R-Squared**
Establishment Ratio	*0.06629*
Employment Ratio	0.03124
Wage Ratio	0.04096

SIGNIFICANCE CODES FOR REGRESSION	
Code	**P-Value**
(.)	*> 0.05*
(*)	> 0.01
(**)	> 0.001
(***)	> 0

TABLE 3: NATIONAL REGRESSION RESULTS ESTABLISHMENT RATIO, DEMOCRATIC VOTE SHARE		
Industry	**Coefficient**	**P-Value**
Intercept	*-0.73122*	*< 2E-16 (***)*
Goods-Producing	*28.42052*	*0.73545*
Natural Resources and Mining	*17.01995*	*0.81543*
Construction	*52.41784*	*0.47134*
Manufacturing	*-48.98939*	*0.50205*
Service-Providing	*103.42745*	*0.11081*
Trade, Transportation, and Utilities	*-15.05071*	*0.00376 (**)*
Information	*-105.44918*	*0.000000000191 (***)*
Financial Activities	*8.06379*	*0.27676*
Professional and Business Services	*2.09279*	*0.68533*
Education and Health Services	*-15.30405*	*0.0000407 (***)*
Leisure and Hospitality	*10.16796*	*0.22604*
Other Services (Except Public Administration)	*-27.20267*	*0.000000000000203 (***)*
Government (Federal)	*501.03234*	*0.0000000000000557 (***)*

TABLE 4: REGIONAL REGRESSION RESULTS ESTABLISHMENT RATIO, DEMOCRATIC VOTE SHARE				
Region	**Industry**	**Original Coefficient**	**New Coefficient**	**P-Value**
Trade, Transportation, and Utilities (R-Squared = 0.09372)				
	Trade, Transportation, and Utilities	*-15.05071*	*87.483*	*0.0000244 (***)*
	Information	*105.44918*	*6.6034*	*0.885*
	Education and Health	*15.30405*	*60.3777*	*0.008574 (**)*
	Other Services	*27.20267*	*97.8302*	*0.00000926 (***)*
	Federal Government	*501.03234*	*344.6051*	*0.001662 (**)*
Information (R-Squared = 0.07382)				
	Trade, Transportation, and Utilities	*-15.05071*	*-11.406*	*0.331*
	Information	*105.44918*	*-176.0044*	*0.00000000000312 (***)*
	Education and Health	*15.30405*	*-8.8621*	*0.242*
	Other Services	*27.20267*	*-21.9142*	*0.00329 (**)*

	Federal Government	*501.03234*	*414.9652*	*0.00109 (**)*
Education and Health (R-Squared = 0.08268)				
	Trade, Transportation, and Utilities	*-15.05071*	*-4.6068*	*0.639*
	Information	*105.44918*	*-10.3981*	*0.779*
	Education and Health	*15.30405*	*23.5842*	*0.000318 (***)*
	Other Services	*27.20267*	*11.9862*	*0.069063 (.)*
	Federal Government	*501.03234*	*556.3898*	*0.000434 (***)*

TABLE 5: NATIONAL REGRESSION RESULTS WAGE RATIO, DEMOCRATIC VOTE SHARE		
Industry	**Coefficient**	**P-Value**
Intercept	*0.04054*	*0.33553*
Goods-Producing	*-4.18857*	*0.00000000000118 (***)*
Natural Resources and Mining	*-0.39581*	*0.0000000000406 (***)*
Construction	*-0.54741*	*0.00901(**)*
Manufacturing	*-2.11942*	*0.00000000343(***)*
Service-Providing	*11.27888*	*0.0000000449 (***)*
Trade, Transportation, and Utilities	*-9.6485*	*0.0000000449 (***)*
Information	*-1.23753*	*0.0000000000265 (***)*
Financial Activities	*-5.53816*	*< 2e-16 (***)*
Professional and Business Services	*-6.40398*	*< 2e-16 (***)*
Education and Health Services	*-3.75251*	*0.00000000000000419 (***)*
Leisure and Hospitality	*-1.60197*	*0.000000000558 (***)*
Other Services (Except Public Administration)	*-1.8089*	*0.000000000000000389 (***)*
Government (Federal)	*-1.02175*	*0.000000221 (***)*

TABLE 6: REGIONAL REGRESSION RESULTS WAGE RATIO, DEMOCRATIC VOTE SHARE				
Region	**Industry**	**Original Coefficient**	**New Coefficient**	**P-Value**
Trade, Transportation, and Utilities (R-Squared = 0.1031)				
	Trade, Transportation, and Utilities	*-9.6485*	*-16.06664*	*< 2e-16 (***)*
	Information	*-1.23753*	*-3.7948*	*0.00000000011 (***)*
	Education and Health	*-3.75251*	*-9.80184*	*< 2e-16 (***)*
	Other Services	*-1.8089*	*-3.41257*	*0.0000000117 (***)*
	Federal Government	*-1.02175*	*-3.09383*	*0.000000000000348 (***)*
Information (R Squared = 0.0353)				
	Trade, Transportation, and Utilities	*-9.6485*	*-7.37446*	*0.000000028 (***)*
	Information	*-1.23753*	*-1.32001*	*0.0000347 (***)*
	Education and Health	*-3.75251*	*-5.13194*	*0.0000115 (***)*
	Other Services	*-1.8089*	*-2.13573*	*0.0000665 (***)*

	Federal Government	*-1.02175*	*-1.19403*	*0.020496 (*)*
Education and Health (R-Squared = 0.0498)				
	Trade, Transportation, and Utilities	*-9.6485*	*-11.395302*	*0.013773 (*)*
	Information	*-1.23753*	*-0.415228*	*0.26*
	Education and Health	*-3.75251*	*-2.744156*	*0.006186 (**)*
	Other Services	*-1.8089*	*-1.804682*	*0.000011 (***)*
	Federal Government	*-1.02175*	*0.204075*	*0.265029*

TABLE 7: INCUMBENCY REGRESSION RESULTS

WAGE RATIO, DEMOCRATIC VOTE SHARE

Industry	**Coefficient (Incumbency) R-Squred = 0.05128**	**P-Value**	**Coefficient (No Incumb.) R Squred = 0.09631**	**P-Value**
Intercept	*-0.37442*	*<2e-16 (***)*	*-0.73956*	*<2e-16 (***)*
Goods-Producing	*-3.93227*	*0.0000000196 (***)*	*-5.04409*	*0.00000000516 (***)*
Natural Resources and Mining	*0.1621*	*0.025573 (*)*	*-0.72364*	*<2e-16 (***)*
Construction	*0.09752*	*0.678703*	*-0.83087*	*0.00951 (**)*
Manufacturing	*-0.75858*	*0.087555 (.)*	*-2.51797*	*0.000000718 (***)*
Service-Providing	*-23.38026*	*<2e-16 (***)*	*-35.57961*	*<2e-16 (***)*
Trade, Transportation, and Utilities	*1.925*	*0.018836 (*)*	*-16.72675*	*<2e-16 (***)*
Information	*0.54353*	*0.010672 (*)*	*-2.31605*	*<2e-16 (***)*
Financial Activities	*1.77295*	*0.000221 (***)*	*-9.52813*	*<2e-16 (***)*
Professional and Business Services	*3.69424*	*0.0000000140 (***)*	*-13.22982*	*<2e-16 (***)*
Education and Health Services	*5.51948*	*<2e-16 (***)*	*-10.60408*	*<2e-16 (***)*
Leisure and Hospitality	*0.8882*	*0.001164 (**)*	*3.15828*	*0.000000000000551 (***)*
Other Services (Except Public Administration)	*-0.02288*	*0.927803*	*-3.23717*	*<2e-16 (***)*

Government (Federal)	*0.48487*	*0.021514 (*)*	*-2.30044*	*0.000000000000 (***)*

TABLE 8: TURNOUT REGRESSION RESULTS WAGE RATIO, DEMOCRATIC VOTE SHARE				
Industry	**Coefficient (Low Turnout) R-Squared = 0.09162**	**P-Value**	**Coefficient (High Turnout) R-Squared = 0.05503**	**P-Value**
Intercept	*-0.94344*	*<2e-16 (***)*	*0.91274*	*<2e-16 (***)*
Goods-Producing	*-5.90948*	*0.000584 (***)*	*-3.52288*	*0.00000000179 (***)*
Natural Resources and Mining	*-0.26858*	*0.032825 (*)*	*-0.42684*	*0.000000000210 (***)*
Construction	*-1.3799*	*0.002648 (**)*	*-0.29963*	*0.20117*
Manufacturing	*-3.98303*	*0.000276 (***)*	*-1.82589*	*0.000000790 (***)*
Service-Providing	*19.08045*	*0.0000000343 (***)*	*-1.14953*	*0.672*
Trade, Transportation, and Utilities	*-14.51781*	*<2e-16 (***)*	*-6.81731*	*0.000000000000000235 (***)*
Information	*-3.26191*	*<2e-16 (***)*	*0.42819*	*0.06815 (.)*
Financial Activities	*-4.02465*	*0.0000000000765 (***)*	*-7.89975*	*<2e-16 (***)*
Professional and Business Services	*-8.22129*	*<2e-16 (***)*	*-5.07172*	*0.000000000229 (***)*
Education and Health Services	*-5.64776*	*<2e-16 (***)*	*-0.3964*	*0.576*
Leisure and Hospitality	*-3.09146*	*<2e-16 (***)*	*-0.46739*	*0.219*

Other Services (Except Public Administration)	*-1.87351*	*0.00000000417 (***)*	*-2.07651*	*0.00000000000307 (***)*
Government (Federal)	*-1.84047*	*0.0000000000248 (***)*	*-0.12237*	*0.653*

Bibliography

About the Data. U.S. Bureau of Labor Statistics. Accessed February 07, 2018. https://www.bls.gov/iag/

Ali, S. Nageeb, and Charles Lin. "Why People Vote: Ethical Motives and Social Incentives." *American Economic Journal: Microeconomics,* vol 5, no. 2, 2013, pp. 73-98. www.jstor.org/stable/43189921.

Barnes, Samuel and Max Kaase et al., "Political Action: Mass Participation in Five West Democracies", Beverly Hills, Sage, 1979

Blais, André, and Robert Young. "Why Do People Vote? An Experiment in Rationality." *Public Choice*, vol. 99, no. 1/2, 1999, pp. 39–55. www.jstor.org/stable/30024507.

Brady, H.E., Verba, S. and Schlozman, K.L. (1995) 'Beyond SES: A Resource Model of Political Participation', *American Political Science Review*, 89(2), pp. 271–294.

Bloom, Howard S., and H. Douglas Price. "Voter Response to Short-Run Economic Conditions: The Asymmetric Effect of Prosperity and Recession." *The American Political Science Review* 69, no. 4 (1975): 1240-254. doi:10.2307/1955284.

Buera, Francisco J., and Joseph P. Kaboski. "The Rise of the Service Economy." *The American Economic Review* 102, no. 6 (2012): 2540-569. http://www.jstor.org/stable/41724664.

Cho, W. K. T., Gimpel, J. G. and Wu, T. (2006), "Clarifying the Role of SES in Political Participation: Policy Threat and Arab American Mobilization". Journal of Politics, 68: 977–991.

Christopherson, Susan. "Flexibility in the US Service Economy and the Emerging Spatial Division of Labour." *Transactions of the Institute of British Geographers* 14, no. 2 (1989): 131-43. doi:10.2307/622808.

Conge, Patrick J. "The Concept of Political Participation: Toward a Definition." *Comparative Politics* 20.2 (1988): 241-49. Web.

Crain, W. Mark, and Thomas H. Deaton. "A Note on Political Participation as Consumption Behavior." *Public Choice* 32 (1977): 131-35. Web.

Downs, Anthony. "An Economic Theory of Democracy." New York: Harper, 1957. Print

Elgie, Stewart, and Geoffrey R. McCarney. "Big Ideas for Sustainable Prosperity: Policy Innovation for Greening Growth." *Canadian Public Policy / Analyse De Politiques* 42, no. S1 (2016): Siii-Sv. http://www.jstor.org/stable/canapublpolianal.42.s1.siii.

Frey, Bruno S. "Why Do High Income People Participate More in Politics?" Public Choice, XI (Fall 1971).

Gelman, Andrew, and Gary King. "Estimating Incumbency Advantage without Bias." *American Journal of Political Science*34, no. 4 (1990): 1142-164. doi:10.2307/2111475.

Gerber, Alan S., and Gregory A. Huber. "Partisanship and Economic Behavior: Do Partisan Differences in Economic Forecasts Predict Real Economic Behavior?" *American Political Science Review* 103, no. 3 (2009): 407–26. doi:10.1017/S0003055409990098.

Gerber, Alan S., and Gregory A. Huber. "Partisanship, Political Control, and Economic Assessments." *American Journal of Political Science* 54, no. 1 (2010): 153-73. http://www.jstor.org/stable/20647977.

Goidel, Robert K., and Ronald E. Langley. "Media Coverage of the Economy and Aggregate Economic Evaluations: Uncovering Evidence of Indirect Media Effects." *Political Research Quarterly*48, no. 2 (1995): 313-28. doi:10.2307/449071.

"Glossary." U.S. Bureau of Labor Statistics. Accessed February 07, 2018. https://www.bls.gov/glossary.htm/.)

Hansford, Thomas G., and Brad T. Gomez. "Estimating the Electoral Effects of Voter Turnout." *The American Political Science Review* 104, no. 2 (2010): 268-88. http://www.jstor.org/stable/40863720.

Hansen, John M., and Steven J. Rosenstone. "Mobilization, Participation, and Democracy in America". 4th ed. N.p.: Macmillan Publishing Company, 1993. N. pag. Web. 9 Oct. 2016.

"Internet Growth Statistics 1995 to 2017 - the Global Village Online." *Internet World Stats*. Accessed February 11, 2018. http://www.internetworldstats.com/emarketing.htm.

Kam, Cindy D., and Carl L. Palmer. "Reconsidering the Effects of Education on Political Participation." *The Journal of Politics* 70.3 (2008): 612-31. Web.

Keith P. Russell. "Political Participation and Income Level: An Alternative Explanation." Public Choice, XIII (Fall, 1972).

Kinder, Donald R., and D. Roderick Kiewiet. "Sociotropic Politics: The American Case." *British Journal of Political Science* 11, no. 2 (1981): 129-61. http://www.jstor.org/stable/193580.

Kramer, Gerald H. "Short-Term Fluctuations in U.S. Voting Behavior, 1896-1964." *The American Political Science Review* 65, no. 1 (1971): 131-43. doi:10.2307/1955049.

Lawler, Andrew. "Clinton Pushes Internet Initiative." *Science* 274, no. 5286 (1996): 335. http://www.jstor.org/stable/2891926.

Linn, Suzanna, Jonathan Nagler, and Marco A. Morales. "Economics, Elections, and Voting Behavior." In *The Oxford Handbook of American Elections and Political Behavior*. : Oxford University Press, 2010-02-25. http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199235476.001.0001/oxfordhb-9780199235476-e-20.

Markus, Gregory B. "The Impact of Personal and National Economic Conditions on the Presidential Vote: A Pooled Cross-Sectional Analysis." *American Journal of Political Science* 32, no. 1 (1988): 137-54. doi:10.2307/2111314.

McFarland, Daniel A., and Reuben J. Thomas. "Bowling Young: How Youth Voluntary Associations Influence Adult Political Participation." *American Sociological Review*, vol. 71, no. 3, 2006, pp. 401–425. www.jstor.org/stable/30038997.

Meehl, Paul E. "The Selfish Voter Paradox and the Thrown-Away Vote Argument." *The American Political Science Review* 71, no. 1 (1977): 11-30. doi:10.2307/1956951.

Meltzer, Allan H., and Marc Vellrath. "The Effects of Economic Policies on Votes for the Presidency: Some Evidence from Recent Elections." *The Journal of Law & Economics* 18, no. 3 (1975): 781-98. http://www.jstor.org/stable/725062.

Moore, William S. "Income Inequality and Industrial Composition." *Public Administration Quarterly* 33, no. 4 (2009): 552-81. http://www.jstor.org/stable/41219998.

Norpoth, Helmut. "Divided Government and Economic Voting." *The Journal of Politics* 63, no. 2 (2001): 414-35. http://www.jstor.org/stable/2647715.

Olsen, Marvin Elliott." Participatory pluralism: Political participation and influence in the United States and Sweden". *Burnham Inc Pub*, 1982.

Page, Benjamin I., Larry M. Bartels, and Jason Seawright. "Democracy and the Policy Preferences of Wealthy Americans." *Perspectives on Politics* 11, no. 1 (2013): 51-73. http://www.jstor.org/stable/43280689.

Quarterly Census of Employment and Wages -- Data Files." U.S. Bureau of Labor Statistics. Accessed February 07, 2018. https://www.bls.gov/cew/datatoc.htm

Rehm, Philipp. "Risk Inequality and the Polarized American Electorate." *British Journal of Political Science* 41, no. 2 (2011): 363-87. http://www.jstor.org/stable/41241751.

Rosenstone, Steven J. "Economic Adversity and Voter Turnout." *American Journal of Political Science*, vol 26, No. 1, 1982, pp. 25-46. *www.jstor.org/stable/2110837*

Russell, Keith P., John Fraser, and Bruno S. Frey. "Political Participation and Income Level: An Exchange." *Public Choice* 13 (1972): 113-22. Web.

Stoker, Laura, and M. Kent Jennings. "Life-Cycle Transitions and Political Participation: The Case of Marriage." *The American Political Science Review*, vol. 89, no. 2, 1995, pp. 421–433. www.jstor.org/stable/2082435.

United Nations (2016). "Paris Agreement" Paris: *United Nations*, pp.1-27.

U.S. Bureau of Labor Statistics, "All Employees: Mining and Logging: Coal Mining [CEU1021210001]." *FRED, Federal Reserve Bank of St. Louis*; https://fred.stlouisfed.org/series/CEU1021210001, February 11, 2018

Verba S, Nie N. "Participation in America: Political Democracy and Social Equality". *New York: Harper and Row;* 1972.

Verba, Sidney, Norman H. Nie, and Jae-on Kim. "Participation and Political Equality: A Seven-Nation Comparison". Cambridge, Eng: Cambridge University Press, 1978. Print.

Verba, Sidney, and Norman H. Nie. "Participation in America: Political Democracy and Social Equality." University of Chicago Press, 1987.

"Welcome to the Voting and Elections Collection." *CQ Voting and Elections Collection.* Accessed February 11, 2018. http://library.cqpress.com/elections/.

Zukin, Cliff, Ph.D, and Carl Van Horn, Ph.D. "Turning Points: Americans' Growing Confidence in the Job Market, Perspectives on the Presidential Election, and Assessments of Foreign

and Immigrant Workers". *John J. Heldrich Center For Workforce Development*, Sept. 2016. Web.