CLIMATE CHANGE ACCEPTORS IN THE REPUBLICAN PARTY:

A MODEL OF THE DETERMINANTS OF PARTY DEFECTION

by

Matthew I. Miller

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Project Approved:

Supervising Professor: Vanessa Bouché, Ph.D.

Department of Political Science

Grant Ferguson, Ph.D.

Department of Political Science

Mike Slattery, Ph.D.

Department of Environmental Science

ABSTRACT

Political polarization is widespread and well documented in Congress, and has been growing throughout the past two decades. This large divide is highly evident on climate change issues specifically, as almost all Democrats vote in favor of climate change policies and almost all Republicans vote against them. However, there have been several instances of party defection in Congress during climate change votes. In order to understand the nature of Congressional decision-making in a period of extreme partisanship, an investigation of party defection on climate change issues is warranted. In this paper, I analyzed Republican voting behavior on climate change policies from 107th – 110th Congresses to demonstrate the factors that most strongly influence party defection. Using a logistical regression analysis and predictive probability coefficients to compare reelection considerations and political agenda considerations, I found that Congressional Republicans are most influenced by the desire to be reelected when considering how to vote on climate change policies. When a member's district was more ideologically conservative and he or she was not electorally vulnerable, the member would not break with the Republican Party and would vote against climate change policy. If, however, the Republican member represented a more moderate or liberal district and was electorally vulnerable, he or she was more likely to vote against the Republican Party and support climate change legislation. This paper supports further research, as more and more factors that influence Congressional voting behavior can be analyzed for their effects on party defection.

I. An Unordinary Roll Call

On January 21, 2015, Republican Senator John Hoeven of North Dakota introduced Senate Amendment No. 87, which expressed that climate change is real and human activity contributes to it. However, Amendment 87 garnered only 59 of the required 60 votes to pass. After it failed, Democratic Senator Barbara Boxer of California said the United States Senate was presented with what could have been a breakthrough moment, but missed the opportunity. An earlier Amendment, S.Amdt.29, sought "to express the sense of the Senate that climate change is real and not a hoax" (Sen. Whitehouse [D-RI]). It passed 98-1 because all but one Republican voted in favor, parsing the words of the amendment and arguing that the climate has always changed, just not as a result of man (Thorp and Dann 2015). In other words, the partisan debate centers not on the existence of climate change but on the causes of climate change. Linked to this debate is the further partisan conflict over whether or not to address climate change through policymaking; Republicans that do not believe in anthropogenic climate change therefore do not support the mitigation policies that human-induced climate change acceptors support. The closeness of the vote on the Hoeven Amendment signals a deep divide within Congress on the question not of the existence of climate change but of what causes it.

This division in Congress is in stark contrast to the consensus within the scientific community. In a Pew Research Center survey published just a week after the Senate vote, 87 percent of scientists from the American Association for the Advancement of Science (AAAS) agreed with the statement that climate change is mostly due to human activity. In other words, while Congress has remained deeply divided on the issue of climate change causes, the scientific community is largely in consensus. Furthermore, the division in Congress in regard to climate

change is historically and largely along partisan lines. Democrats overwhelmingly support statements such as, "climate change is anthropogenic", while Republicans do not.

And yet, 15 Republicans did cross party lines in voting for Senate Amendment 87. What explains their decisions to vote in favor of Sen. Hoeven's amendment that climate change is contributed to by humans?[1] More generally, what factors cause members of Congress to break with their respective party on science-based policies, which are largely and fervently fought along party lines? In other words, under what conditions do members of Congress defect from their party in a polarized environment?

While previous studies have addressed the political polarization over the climate change issue, predictably finding that Republicans and Democrats have distinctively contrasting viewpoints, few have attempted to study the exceptions to the rule. Furthermore, the studies that have examined Republican members of Congress voting in favor of climate change have been largely descriptive in nature, and extremely narrow in terms of time and scope. Little research has focused on the causes of climate change acceptance among Republican members of Congress. What, if anything, is common among Republicans who believe climate change is human-induced? After all, if Republicans admit that human activity causes climate change, then that has serious implications for the way businesses operate. A better understanding of the circumstances under which members of Congress go against their party on issues such as climate change has great implications for future Congressional elections and legislation battles. Furthermore, it may reveal larger patterns in regard to science-based policy in general, a hotly contested and deeply partisan legislative sector. Finally, it will help to understand the factors that are most important in Congressional decision-making. We know that party and ideology have a

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[1] Sen. Harry Reid, a Democrat, did not vote, while the 15 Republicans joined the other 43 Democrats in the Senate, along with one Independent—who caucuses with the Democrats—in voting for the amendment. Hence, the amendment failed by one yea vote.

large impact on legislative decisions, but it is valuable to understand instances in which they don't play the largest role in shaping Congressional behavior.

II. Polarization Within the Climate Debate

The polarization of views on climate change is well known, largely due to the substantial body of research dedicated to its study. Frequent studies highlight the existence of extreme polarization on the issue, though they are overwhelmingly descriptive rather than explanatory.

Much of the research examines the existence of climate change polarization in the American public (Dunlap and McCright 2008; Dunlap, Xiao, and McCright 2001; Guber 2013; McCright and Dunlap 2011a; 2011b; McCright, Xiao, and Dunlap 2014), while many others demonstrate the existence of polarization of climate change in Congress (Antonio and Brulle 2011; Dunlap and Allen 1976; Dunlap and Gale 1974; Dunlap, Xiao, and McCright 2001; Hayward 2014; McCright and Dunlap 2010; 2013; Shipan and Lowry 2001). The vast majority of the literature focuses on this basic existence of polarization in public opinion and partisanship in Washington, and few studies examine the actual reasons for the interparty division within the climate debate.

The studies focused on influences on polarized climate change beliefs in the electorate examine the role of conservative think tanks (McCright and Dunlap 2000; Oreskes and Conway 2010), the moderating effect of education (McCright 2011; McCright and Dunlap 2011), and the effect of perceived understanding of the debate on position taking (Dunlap and McCright 2008). However, no studies thoroughly investigate the reasons for divide in Congress.

Furthermore, there are no studies on the reasons why legislators sometimes break with their party on climate change policy. Antonio and Brulle (2011), Hayward (2014), and McCright and Dunlap (2010) all note the existence of anthropogenic climate change acceptors in the

Republican Party in Congress, but none examine the influences on legislators who are not polarized on the issue of climate change.

In summary, the body of literature on polarization of climate change focuses overwhelmingly on its existence rather than on its influences. The few studies that do examine reasons for polarization then primarily examine public opinion rather Congressional behavior. And finally, no studies account for the exceptions to the rule, which is arguably more important to overcoming polarized gridlock in the legislature. This study aims to fill this important gap in the literature by examining the reasons for counter-normative behavior by members of Congress on science policy.

III. Theories of Legislative Decision-Making and Representation

There is no shortage of academic literature about the influences on legislative decision-making, nor about theories of representation in Congress. When examining the more general research on theories of representation, it becomes clear that political party alone cannot be assumed as the most important influence on legislative decision-making. Beyond party, two factors are deemed most important throughout the literature on political representation: Constituency considerations and political agenda considerations.

In his groundbreaking work, *Congress: The Electoral Connection*, David R. Mayhew (2004) argues that members of Congress are unitary actors motivated by one thing above and before all else, stating that, "reelection has to be the proximate goal of everyone, the goal that must be achieved over and over if other ends are to be entertained" (p. 16). In other words, legislators act as delegates, appeasing and pleasing constituents for the sole purpose of reelection. Mayhew (2004) notes that the four primary functions of legislators are to express public opinion, handle constituent requests, legislate, and oversee administration; again arguing

that reelection by constituents is the driving force behind legislative decisions. Specifically, when a member of Congress makes policy, he or she acts to insure that the resource balance or political payoffs favor himself or herself rather than somebody else (Mayhew p. 43). Reelection is the payoff that results from taking into consideration political factors such as constituent demographics and district characteristics.

In his invaluable work, *Personal Roots of Representation*, Barry C. Burden (2007) demonstrates that the personal characteristics of legislators have a critical affect on voting behavior, especially in the face of heightened polarization both in Washington and in the American electorate. He specifically finds that factors other than party and constituency significantly affect policy agenda considerations, the other primary factor on legislative decisions, along with constituency considerations or the reelection factor. John W. Kingdon's seminal work, *Agendas, Alternatives, and Public Policies* (1995) furthers this discussion, arguing that constituency is not the only factor that shapes agenda setting and policymaking in Congress. While pleasing constituents is one consideration that influences legislation, Kingdon demonstrates that members of Congress also pursue the goals of enhancing their reputation and making good public policy. He examines the creation of policy agendas and alternatives as a result of problems, politics, and participants (p. 197), finding that policy influences are the factors that impact the policy agenda.

Hill and Hurley (1999) demonstrate that constituencies and policy agendas do not act as independent influences on legislative decision-making, especially on party-defining, polarized issues. Party-defining issues are defined as the issues on which the parties take opposing views, are integral parts of the parties' platforms, and are understood by citizens as being polarized in government (Carmines and Stimson 1980). Hurley and Hill (2003) further their research by

demonstrating that party-defining issues create reciprocal linkages between representatives and constituents. In other words, constituency considerations alone or policy considerations alone do not explain legislative behavior on party-defining issues. In a highly polarized Congress and electorate, specifically, reelection considerations and agenda considerations act together in influencing legislative decision-making. In theory, when a legislator's considerations for reelection align with his or her agenda considerations in a polarized environment, voting behavior will be predictable. I therefore postulate my first hypothesis:

> H_1: *When reelection considerations are equal to policy agenda considerations, members of Congress will vote along party lines.*

As previously discussed and evidenced by the extreme polarization in both Washington and in public opinion, climate change is one of these party-defining issues discussed by Carmines and Stimson (1980) and Hill and Hurley (1999; 2003). Jessee and Theriault (2014), who find that party and constituency have a large influence on legislative behavior, note that, "roll-call voting is a combination of different forces acting on members of Congress" (p. 845). For this reason, my first hypothesis seeks to demonstrate that when there is congruence between constituent characteristics and agenda characteristics, Republicans will not break with the party and will vote against combatting anthropogenic climate change.

But what if there is a lack of congruence in political and policy payoffs? What if the considerations for reelection and the considerations for the policy agenda do not align with the party? Because I argue that members of Congress vote with their party when reelection and agenda considerations align, it makes sense that these members will break party lines when the

same two considerations do not align. In other words, when there is no congruence between reelection considerations and policy stream considerations, members of Congress will break with their party. This begs a more important question: when these two considerations do not align with the party, what specifically drives the defection?

Different arguments about the weight of certain influences on the voting behavior of legislators are the subject of a large body of research. Additionally, many specific policy areas provide the focus for these researchers in attempting to explain policymaking. It is important to note, however, that specific focus on one policy sector or another is not indicative of a general theory. After discussing the different policy arenas studied extensively, I argue a more general theory.

A large amount of research is dedicated to examining the influences on healthcare policymaking, many with contrasting conclusions. Holtgrave, Doll, and Harrison (1997) find that the largest impact on healthcare policymaking is the scientific knowledge of legislators, while Weissert and Weissert (2000) argue that trustworthy and knowledgeable legislative staffs have the most influence on healthcare policy decisions. Mullner et al (1982), meanwhile, find that the level of urbanism of a legislator's home district plays the largest role. Representatives that come from urban districts are far more likely to support increased healthcare spending than are those that represent suburban and rural constituents.

An additional research sector of the influences on legislative decision-making focuses on the defense and national security policy arena. The studies consistently find that one influence alone is not enough to shape policy decisions, but focus respectively on the influence of the President's views of war (Howell and Rogowski 2013), experts' analysis of defense options (deLeon 1987), business and interest group influence (Jacobs and Page 2005), and the impact of

public opinion about war and conflict (Bartels 1991). While these related academics focus on different spheres of influence on defense policymaking, all agree that these respective factors alone do not explain legislative decisions about defense and security policy. An understanding of the relationship between influences is necessary to truly assess the factors impacting Congressional decision-making on defense policy.

Education policy is another area in which a significant body of research examines the influences on legislative voting behavior. As with healthcare policy, researchers find differing influences have greater impact on votes and spending across time and place. Roberson (1992) concludes that the personal feelings of legislators have the most significant affect on education policy decisions. Canfield-Davis and Jain (2009), meanwhile, find that personal feelings alone do not account for decisions, as constituents and interest groups also have a large impact on education policymaking. Soon thereafter, Canfield-Davis et al (2010) demonstrate that potential fiscal impacts play the largest role in shaping education policy, followed by the influence of trusted insiders and then constituent beliefs.

The question of what are the largest influences on tax and economic policy decisions by legislators is also very much up for debate, as the academic literature is comprised of differing viewpoints. While Aplin and Hegarty (1980) find that the presence of thorough information as well as the opinions of business interests and other interest groups have the more significant affect on fiscal policymaking, Jackson and King (1989) argue that personal feelings of legislators and constituent opinions play larger roles in shaping economic and tax-related voting patterns.

Taken together, studies in these and other policy areas indicate that interest groups, constituency demographics, personal opinions of representatives, and expertise by both representatives and staffs are most important in shaping legislative behavior and policymaking.

However, as mentioned earlier, the study or one policy arena or another does not define the rule; it is more important to posit a general theory and then apply it to different policy sectors.

In his formative work, *The Logic of Congressional Action*, Douglas R. Arnold (1990) argues that voters make election decisions based on evaluations of the candidates' policy positions. Therefore, legislators make policy decisions with the goal of inducing voter support in the next election (Bishin 2000). This relates to the relationship between Mayhew (2004) and Kingdon (1995). As noted earlier, Mayhew (2004) argues that members of Congress are unitary actors, solely seeking reelection; this logic aligns with the arguments made by Arnold (1990) and Bishin (2000). Furthermore, Kingdon's (1995) argument that the political agenda is shaped by pressing problems, knowledge and perspectives, and political processes does not ignore the influence of constituents on policymaking. In fact, constituents or reelection considerations play a major role in shaping the problems, perspectives, and processes of agenda setting. As such, constituents have a larger impact on the political agenda than vice versa. Building on the argument of political linkages presented by Carmines and Stinson (1980) and Hill and Hurley (1999), it becomes clear that there is a larger link from constituents to legislators than the other way around. Jessee and Theriault (2014) find that on final passage votes—the subject of examination in this study, as opposed to procedural votes—votes are more strongly influenced by constituency views. This is because majority party members can usually vote with their conscience or constituency without repercussion from party leadership (Jessee and Theriault 2014). Put another way, it is clear that when party is not explanatory in decision-making, constituency payoffs are worth more than policy payoffs. When the linkages between reelection consideration and agenda considerations are not equal—or reciprocal—there is a more

significant impact on legislative decisions by reelection considerations than by agenda considerations. As such, I posit my second and third hypotheses:

H$_2$: When a member of Congress is electorally vulnerable, and the district is not ideologically conservative, the member will break party lines.

H$_3$: When a member of Congress is not electorally vulnerable, and the district is ideologically conservative, the member's agenda considerations will cause party defection.

What is important to note about the body of research on influences on legislative decision-making is that while many policy areas are the focus of study, one specific arena is left relatively untouched: Science-based policy. There are no specific studies on the factors that influence legislative voting behavior on science-related policies. While many studies on healthcare, defense, education, and economic policy focus on either state or federal legislative influences, there has been no significant study on the influences on science policymaking at any level. For this reason, this research seeks to use science-based policy—specifically climate change legislation—as the case study on which I will test my general theory of the determinants of party defection.

IV. Testing the Model of the Determinants of Party Defection

As mentioned above, while there have been studies of climate change acceptance by Republicans in Congress (Antonio and Brulle 2011; Hayward 2014; McCright and Dunlap 2010), none have actually stated who these acceptors are. In their groundbreaking research on the

polarization of the climate change debate, Fisher, Waggle, and Leifeld (2013) analyze the content of Congressional hearings on climate change during the 109th and 110th Congresses (2005-2009), mapping the networks of acceptance and denial by Democrats, Republicans, and third parties. However, the study does not explicitly demonstrate who are the Republicans that break with their party on climate change beliefs. Furthermore, their research covers a short period of time; in order to better understand the reasons for party defection on science-based policy, I analyzed Congressional behavior on climate policy over a longer period of time, accounting for different political party leadership in the legislature (Fisher, Waggle, and Leifeld 2013).

In order to compile a cumulative data set of Republicans that believe in anthropogenic climate change, I analyzed Congressional roll-call votes from the 107th to 110th Congresses, beginning in January 2001 and concluding with the 110th Congress in January 2009. This constitutes a valuable data set because it occurs during an entire two-term presidency of an anti-climate change president and a fluctuating majority in Congress[2]. In this way, I controlled for the influence of the president on party defection, as George W. Bush did not influence Republicans to defect on climate change votes. Because of the longer time period of analysis, as well as the existence of fluctuating political party control in Congress, the validity in testing my hypotheses was better assured. I only analyzed votes in the House because of the consistency in elections throughout a two-term presidency. Because the Senate has elections every 6 years, an exclusive analysis of the House was needed to control for the effects of midterm and general election years on voting behavior. The unit of analysis for determining influences on Republican acceptors was votes on climate change legislation. In other words, the factors of influence on party defection

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[2] Democrats controlled the House during the 110th Congresses. Republicans controlled the House during the 107th-109th Congresses.

among Republicans were analyzed for each Congressional vote on climate change legislation from the 107th-110th Congresses. Party defection occurred in two ways: Republicans voted in favor of pro-climate change legislation or voted against anti-climate change legislation. Predictably, this meant that Republicans voting in favor of Democrats' climate change-related bills and voting against other Republicans' climate change-related bills characterized party defection. Each roll call vote was analyzed separately and clustered by member. In other words, every Republican votes on individual climate change bills in each session of Congress constituted a single data point. This accounted for the fact that some House Republicans defected on climate change bills but not others in the same session of Congress.

In analyzing the Congressional roll-call votes, I utilized the "Congress Collection" by *CQ Press*, "Roll-Call Votes" on *govtrack.us*, and the "Roll-Call Vote Tallies" on the official House website. I filtered all roll-call votes during the time period discussed above using the search terms, "climate change", "global warming", and "environment", and then analyzed the content for all resulting roll-call votes to ensure that they were truly related to climate change legislation. There were a total of 12 bills related to climate change in the House during the 107th-110th Congresses, and an average of 210 Republicans in the House during George W. Bush's two terms. As a result, I collected 2,523 total roll-call votes for analysis on party defection. After compiling a comprehensive list of roll-call votes directly related to climate change from the 107th-110th Congresses, I analyzed the votes to determine the Republicans that broke with their party on these pieces of legislation.

Using roll call votes to compile an explicit list of Republican stances on climate change is the most logical and sensible method I could have used. While Fisher, Waggle, Leifeld (2013) utilize congressional hearings, this method was far too complex considering I conducted

explanatory analysis in addition to descriptive analysis. Additionally, Congressional hearings do not only include the opinions of members of Congress; third parties and interests groups also play a part. By using roll-call votes to explicitly name Republican acceptors, I demonstrated the exact position that members of Congress took on science-based policy. Roll-call votes are explicit demonstrators of the positions that members of Congress take, which make it far easier to distinguish between partisan voters and party defectors. Granted, the position a member of Congress takes on a roll-call vote does not necessarily reflect his or her view of the issue, as he or she may actually disagree personally with his or her formal vote. As such, using roll-call votes as the unit of observation for climate change position may not be perfectly indicative of legislator beliefs, but it is the most explicit and easiest to analyze when compared to Congressional hearings, legislation sponsorship, or other methods of observation.

This study seeks to demonstrate the factors that influence members of Congress to break with their party, using climate change as the case study. Through analysis of Republicans who support climate change policies, I hope to further the general understanding of party defection in Congress. As such, it makes sense that for the purposes of this present study, the dependent variable was the likelihood of party defection, specifically on climate change legislation. I discussed above that the data set for this study was comprised of House Republicans that have voted on climate change policies during the 107th-110th Congresses, utilizing each climate change-related roll-call vote as the unit of analysis. The dependent variable, likelihood of party defection, was thus measured by the occurrence of pro-climate change policy votes by Republicans. Republicans that voted in favor of climate change policy and defected from the party were coded "1", while Republicans that voted with the party were coded "0". While it can be argued that a member of Congress' vote does not always represent his or her beliefs, there are

no better methods by which I could measure a Congressional Republican's climate change beliefs. It can be inferred that members of Congress are unlikely to explicitly discuss their position on climate change if it is opposite of their political party's position, and therefore roll-call votes are the most effective and reliable measure of acceptance of climate change by Congressional Republicans.

Based on my hypotheses, one primary independent variable is reelection considerations. Reelection considerations, as discussed regarding the general theory, include constituent ideology and the electoral vulnerability of the member of Congress. Intensity of opinion among constituents, otherwise known as constituent beliefs or ideology, was measured using the Cook Partisan Voting Index, which measures how strongly a U.S. district or state leans toward the Republican or Democratic Party. The Cook PVI analyzes a district or state's voting behavior in the previous two presidential elections, and assigns a number relating to the difference between that district or state and the national voting average in those two elections. The Cook PVI is a strong operationalization of intensity because it accounts for the margin of beliefs among constituents. A district or state with a high PVI in one direction or the other can be inferred as having a small margin of difference in beliefs between constituents. A small PVI in either direction demonstrates a large margin of debate among constituents, as they can be inferred as more moderate or split. Because Cook PVI is a literal measure of district ideology, but is calculated by comparing constituent votes to national voting behavior, I also utilized individual district voting in presidential elections as an independent reelection variable. In doing so, I better accounted for national momentum or issues in elections and utilized another measure of district ideology. This also served to bolster the significance of the variables on party defection, as a single measure of district ideology would not necessarily fully capture constituent beliefs.

Finally, vulnerability was measured by analyzing the margin of victory by members of Congress in their respective primary and general elections. Members that narrowly won primaries and general elections were coded as more vulnerable than members that won comfortably. Additionally, the effect of unopposed elections will be utilized in measuring vulnerability, as unopposed members of Congress are far less vulnerable than are members with general election opponents.

The other primary independent variable analyzed in this study is policy agenda considerations. Kingdon (1995) demonstrates that political problems and processes shape the policy agenda. As such, I measured agenda considerations using interest group funding (shaping problems) and committee membership (shaping processes). In order to analyze interest group funding, I utilized the Center for Responsive Politics, which tracks all interests group donations to Congress. What is highly useful about the Center is that it tracks where money comes from by group and sector, as well as which members are generally targeted by different groups and sectors. Finally, I utilized the Senate and House archives to measure committee membership of members of Congress during the session in which a particular climate change vote occurred. The committee memberships of which members of Congress are a part play a role in shaping the political windows that drive agenda setting (Kingdon 1995).

It is vital to the understanding of factors influencing party defection that potential explanatory factors are analyzed as interacting variables. Because of this, it is essential to this study that control variables are analyzed and tested alongside reelection and agenda considerations. The use of a logistical regression analysis ensured the validity of this study's results, as it better avoided positing a spurious relationship between reelection considerations, agenda considerations, and party defection. Therefore, it was important that control variables of

both constituent characteristics and personal demographics of members of Congress were tested

for effects on party defection. A logistical regression analysis tests the relationship between

multiple independent variables and one dependent variable and controls for the effects of many

variables on a categorical dependent variable (Barakso et al 167). Because party defection is a

dichotomous dependent variable – either members of Congress vote with or against their party –

a logistic regression transforms the choice to defect or not to defect into the probability of

defecting (Barakso et al 167). The most important aspect of the logistic regression is that it

demonstrated the strength of the relationship between reelection and agenda considerations and

party defection, and because it also classifies the relationship as spurious or statistically

significant (Barakso et al 168).

In order to control for the effects on party defection without becoming inundated with too

many variables, I followed my logistical regression analysis with predictive probability

coefficient tests. This controlled for all other variables while analyzing the effects of a single

variable on party defection.

Due to the complex nature of factors influencing Congressional decision-making, it

seems essential to conduct a large-N study of Republicans that vote on climate change issues.

Additionally, because climate change serves as my case study for party defection, a large-N

study is advantageous because it produces better generality. In other words, the results of a large-

N study of Republicans that break with their party on climate change can be much better applied

to a general theory of party defection than can case studies, especially when multiple models

such as logistic regression and predictive probabilities are utilized (Barakso et al 175). I

conducted a cross-sectional time-series study as well, as it allowed me to examine a lot of cases

of Republican climate change voting behavior over a longer period of time. As mentioned above,

this study used logistical regression analysis and predictive probability coefficient tests, which allowed for better control of other factors and against positing a spurious relationship between reelection and agenda consideration congruence and party defection in Congress.

V. Results of the Model of the Determinants of Party Defection

As mentioned above, I analyzed 2,523 clustered data points, or climate change votes, from the 107th to 110th Congresses. My variables were classified first by reelection and agenda and then by ideology, vulnerability, interest group money, and committee membership. The full descriptive statistics can be found below in Figure 1.

Figure 1

Variable	Obs.	Mean	Std. Dev.	Min	Max
Defection	2523	.097	.295	0	1
Cook PVI	2523	.301	.458	0	1
% Victory	2523	65.234	11.256	45.6	100
Unopposed	2523	.044	.205	0	1
Pres. Voting	2523	19.376	14.169	−35	57
Energy	2523	.132	.332	0	1
Resources	2523	.104	.306	0	1
Science	2523	.101	.302	0	1
Oil & Gas	2523	1.602	1.451	0	3
Environment	2523	.041	.198	0	1

It is especially important to note the extreme lack of party defection overall when analyzing further results. Defection votes were coded as "1" while all other votes with the party were coded as "0", and the mean was .097. In other words, there were very few votes against the Republican Party on climate change at all. It is also interesting to note the overall lack of both competitiveness in elections and moderate to liberal districts represented by Republicans. Cook PVI, which was coded as a "0" for a conservative district and a "1" for moderate and liberal districts, had a mean of .301, demonstrating the strong, unified conservativeness of most Republican-represented districts. Likewise, the mean for Presidential Voting was 19.376,

meaning that districts represented by Republicans during George W. Bush's two terms voted for Bush over Al Gore and John Kerry by an average of almost 20 percentage points. The actual of elections of the Republican House members were also highly uncompetitive, as the average House Republican in the 107th to 110th Congresses won his or her general election with an average of 65 percent of the popular vote, a huge number.

As for the agenda considerations, it is interesting to note the disparity between money given to Republicans by the oil and gas lobby and the environmental lobby. If a Republican received any money from the environmental lobby, it was coded as a "1", while the lack of any environmental money was coded as a "0". With a mean of .041, fewer Republicans during George W. Bush's presidency received money from the environmental lobby than the number of Republicans that defected on climate change votes. Oil and gas money was coded from $0 to $15,000 in $5,000 increments. In other words, $0 was coded as "0"; $5,000 was coded as "1"; $10,000 was coded as "2"; and $15,000 was coded as "3". The mean coded amount of oil and gas money was 1.602, meaning that the average Republican received between $5,000 and $10,000 from the oil and gas lobby.

My first hypothesis stated that when congruence existed between reelection considerations and agenda considerations, Republicans would not vote against the party. If this hypothesis were correct, the results would demonstrate that Republicans that represent conservative districts and are tied to the conservative policy agenda vote with the Republican Party on climate change policies. My equilibrium hypothesis was correct, as Republican members of the House did not vote in favor of climate change policy if they represented conservative constituents and received money from conservative interest groups.

The logistic regression model demonstrated a negative relationship for both Cook PVI and Presidential Voting, which made sense considering that I hypothesized that more conservative constituents would be less likely to cause party defection. The more conservative the districts, the less likely Republicans were to defect on climate change votes. The direction of the reelection variable relationships can be found in Figure 2, along with the significance levels.

Figure 2

	Overall
District Ideology	
Cook PVI	-.425** (.219)
Pres. Voting	-.022*** (.008)
Vulnerability	
% Victory	.004 (.008)
Unopposed	.076 (.469)
N	2,523
R2	0.17

Because both Vulnerability variables were not statistically significant, there can be no substantive discussion of their effect on party defection. The possible reasons for their lack of significance are described in the discussion section below. The District Ideology variables, however, had statistically significant impacts on party defection. Cook PVI was significant at the 0.05 level, so I am 95 percent certain that the relationship between Cook PVI and party defection was not spurious. Likewise, Presidential Voting was significant at the 0.01 level, which means that there is a 99 percent certainty that the presidential voting behavior of constituents has a real

effect on representatives' voting behavior. The ideology of constituents does in fact have a significant impact on Republican Party defection on climate change policy.

If my equilibrium hypothesis is correct, than agenda considerations should also have had a significant impact on party defection, meaning that House members that are aligned with the conservative agenda vote with the Republican Party on climate change. The agenda considerations results of the logistic regression model can be found in Figure 3.

Figure 3

	Overall
Interest group $	
Oil & Gas	-.253*** (.058)
Environment	2.54*** (.245)
Committees	
Energy	.036 (.259)
Resources	.530** (.248)
Science	-.232 (.266)
N	2,523
R2	0.17

Based on the direction of the agenda considerations relationships, my equilibrium hypothesis still stands correct. When Republicans receive money from the oil and gas lobby, a traditionally anti-climate change body, they are less likely to defect on climate change votes. The negative relationship between oil and gas money and party defection explains this. On the contrary, an increase in money from the pro-climate change environmental lobby increases the likelihood of

party defection. This is explained by the positive relationship between environmental interest group money and party defection. Both interest group money variables were significant at the 0.01 level, demonstrating an extremely strong relationship. I am therefore 99 percent certain that the relationship between interest group money and party defection is not spurious. Interestingly, membership on the Natural Resources committee had a significant relationship on party defection at the 0.05 level, while neither membership on the Energy committee nor on the Science committee had a significant effect on party defection. The discussion section below will attempt to explain these unintuitive results. Based on the model, membership on both the Natural Resources and Energy committees had a positive relationship with party defection – though only Natural Resources membership can be accepted as having a real effect – while membership on the Science committee had a negative effect. This means that members on the Science committee are less likely to vote in favor of climate change and science-based policy. While the relationship between Science committee membership and party defection was not statistically significant and therefore cannot be treated as real, it is interesting and poses questions about the nature of committee membership. This will be discussed briefly in the next section.

While a logistic regression model is valuable in explaining the direction and significance of relationships between multiple independent variables and a single dependent variable, it is less attractive when describing the real-world impact of the relationships. As a result, I utilized predictive probability coefficients to better explain the nature of these relationships in the real political world. A predictive probability coefficient demonstrates the probability of one independent variable causing the dependent variable, while holding all other independent variables constant. Additionally, predictive probability coefficients demonstrate the difference in effects based on the level of the independent variable. In other words, it compares the effect of

the independent variable on the dependent variable for different measures of the independent variable while holding all others constant.

For example, the predictive probability coefficient for Cook PVI at "0.1" – in other words, when the constituents are moderate – is .077 and the coefficient for Cook PVI at "0.9" – when the constituents are conservative – is .066. This means that when a Republican represents moderate constituents, and all other variables are controlled for, he or she has 7.7 percent probability of defecting on climate change votes. If however, that same Republican is representing conservative constituents, and all other variables are held constant, he or she has a 6.6 percent probability of defecting. This makes sense based on the negative relationship between Cook PVI and party defection: As constituents become more moderate, the likelihood that a Republican member of Congress defects on climate change increases. Figures 4 and 5 below demonstrate the predictive probability coefficients, keeping all other independent variables constant, for Cook PVI at the .1 and .9 levels.

Figure 4

Cook PVI	.1
Pres. Voting	19.38 (mean)
% Victory	65.23 (mean)
Unopposed	.04 (mean)
Oil & Gas	1.60 (mean)
Environment	.04 (mean)
Energy	.13 (mean)
Resources	.10 (mean)
Science	.10 (mean)

```
-----------------------------------------------------------------------------------
                              Delta-method
         |   Margin    Std. Err.    z      P>|z|    [95% Conf. Interval]
---------------+-------------------------------------------------------------------
```

```
_cons |  .0773143  .0064548  11.98  0.000   .0646632   .0899655
--------------------------------------------------------------------------------
```

Figure 5

Cook PVI	.9
Pres. Voting	19.38 (mean)
% Victory	65.23 (mean)
Unopposed	.04 (mean)
Oil & Gas	1.60 (mean)
Environment	.04 (mean)
Energy	.13 (mean)
Resources	.10 (mean)
Science	.10 (mean)

```
--------------------------------------------------------------------------------
                           Delta-method
        |  Margin   Std. Err.    z    P>|z|   [95% Conf. Interval]
--------+-----------------------------------------------------------------------
  _cons |  .0660236  .0059707  11.06  0.000   .0543211   .077726
--------------------------------------------------------------------------------
```

Figure 6 demonstrates the predictive probability coefficients for Cook PVI, Presidential Voting, Oil & Gas contributions, and Natural Resources committee membership. The full means tables and model results for the latter three variables can be found in Appendices B-D.

Figure 6

		Predictive Probability of Defection
Cook PVI		
.1	Moderate	7.7%
.9	Conservative	6.6%
Presidential Voting		
+5 Bush	Moderate	9.7%
+35 Bush	Conservative	5.1%

Oil & Gas $		
0	$0.00	10.4%
3	> $15,000	5.1%
Natural Resources		
0	Not a member	6.8%
1	Member	11.0%

As Figure 6 demonstrates, the real world significance of the relationships is high. When a district voted for Bush by five percentage points over Gore of Kerry, the Congressman or Congresswoman that represents that district has a 9.7 percent probability of defecting from the Republican Party on climate change. However, if the district voted for Bush by 35 percentage points, that same member of Congress has only a 5.1 percent probability of defecting. In other words, representing a moderate district, or one that votes very competitively between Republicans and Democrats, nearly doubles the probability of defecting on climate change votes compared to the probability when representing a overwhelmingly conservative district.

When a member of Congress receives no money from the oil and gas lobby, which is a traditionally anti-climate change body, he or she has over a 10 percent probability of defecting on climate change. However, if that same member receives a minimum of $15,000, he or she then has only a 5.1 percent probability of defecting. This is extremely important to note because $15,000 is a fraction of the amount raised in today's elections and campaigns. A minimum of only $15,000 from the oil and gas lobby halves the probability of defecting on climate change votes.

The Natural Resources committee membership also had a significant real-world impact on climate change voting behavior by Republicans. Members of the Natural Resources committee have an 11 percent probability of defecting on climate change votes, but non-

members only have a 6.8 percent probability. This is not intuitive when considering that it was the only committee that had significant effects on voting behavior, but it is a result that will be explored in the discussion section.

It is important to note how few Republicans vote for climate change at all. Only 9.7 percent of the Republicans in the data set defected on climate change policies, meaning that predictive probabilities around 10 percent are incredibly strong in demonstrating the causes of party defection. When all other variables are held constant, Presidential Voting, Oil & Gas money, and Natural Resources membership nearly explain all of the defectors, as all are close to 10 percent probabilities of defection and 10 percent of all Republicans vote in favor of climate change.

VI. Revisiting the Model of the Determinants of Party Defection

Based on the existent body of research, I hypothesized that congruence between reelection considerations and agenda considerations would cause party loyalty on climate change votes. The results of my model demonstrate that this is indeed the case: When Republicans in Congress represent conservative constituents and are aligned with the conservative agenda, they vote with the Republican Party. In this particular case, Republicans vote against climate change policy when their reelection considerations and agenda considerations align with the anti-climate change viewpoint.

The model seems opposite of my second and third hypotheses because agenda considerations overall had a more significant impact on party defection, specifically interest group money. I hypothesized that reelection considerations would better explain party defection than would agenda considerations, but on the surface it seems that the relationship is the other way around. However, interest group money should actually be considered as a reelection

consideration. Interest group money is channeled into reelection campaigns, which makes sense because members of Congress cannot enact interest groups' agenda priorities if they are not elected in the first place. In other words, interest group money, while related to the policy agenda, is actually a reelection consideration because its purpose is reelection first and then the agenda second. The oil and gas lobby and the environmental lobby, for instance, cannot influence the climate change policy agenda if they do not have members of Congress in office that believe in their views. This demonstrates that my reelection hypothesis is correct; when there is a lack of congruence between reelection and agenda considerations, reelection considerations have a much stronger influence on party defection than do agenda considerations. Interest group money and the beliefs of constituents have the largest impact on party defection, because members of Congress cannot enact or influence policy without first getting elected.

Interestingly, only constituents' ideology (and interest group money) had a significant effect on party defection, as there was no real relationship between vulnerability and defection. This is possibly a result of the control for election cycles and a data set including only members of the House. Because House members are up for reelection every cycle, vulnerability may have been too controlled to have an impact on defection. When members are up for reelection every cycle, distinct and major electoral vulnerability may be less existent. Further research should analyze the Senate in addition to the House in order to better measure the effects of electoral vulnerability on party defection. Additionally, in such a polarized political environment, especially on party-defining issues such as climate change, vulnerability measures should include primary vulnerability. While general election vulnerability is a valid variable, primary vulnerability may yield interesting results due to the factions within today's political parties.

Additionally, future research should examine a longer time period. While this model examined the Congresses during George W. Bush's presidency, it should be extended to include the 111th – 114th Congresses during Barack Obama's two terms. In this way, the model can study the effects of the presidential party on party defection by members of Congress. When the president is a member of the majority party on Congress, there may be a different effect on party defection than if the president is a member of the minority party in Congress. Vulnerability measures should continue to be explored in more depth to truly assess whether vulnerability has an effect on party defection on climate change policy.

Reelection considerations are not the only considerations that warrant further research and additional variables. Agenda considerations, when excluding interest group money, are fairly limited in this particular study. As a result, future research should continue to operationalize the perspectives, processes, and problems that shape the political agenda (Kingdon 1995). A major variable that should be analyzed is the personal background of members of Congress. Personal background can be measured using Bishin's (2006) FILTER score as well as the religious affiliation of members of Congress. FILTER scores are more useful in measuring background than DW-Nominate scores because they are not based on voting behavior. DW-NOMINATE scores are action-based, meaning they are determined based on members' votes. Because this model uses individual roll-call votes as the unit of analysis, it would not make sense to measure the effect of action-based ideology on party defection.

Interest group money should also be investigated further. The model demonstrated that a minimum of $15,000 has a significant impact on party defection, but it did not analyze the impact of varying levels about $15,000. Is there a difference in defection probability when a member receives $15,000 compared to, for instance, $50,000? What about $100,000? Campaigns

raise millions of dollars from interest groups, so further research should seek to demonstrate the level at which voting behavior is directly swayed by special interest money. The oil and gas lobby has much larger financial resources than the environmental lobby, so it would be fruitful to investigate how much leeway interest groups have in swaying voting behavior.

Additional research on committee membership and party defection will be both valuable and warranted. The Natural Resource committee relationship did not make intuitive sense at first, but upon further research is better understood and poses interesting questions about the policy perspectives that shape the agenda. The Natural Resource committee has jurisdiction over most federal waterways and lands, which are primarily found in the Western and Southwestern United States and along the Atlantic Seaboard. Howe et al. (2015) demonstrate that the areas in which Americans are most likely to believe in climate change are the Western and Southwestern United States and the Atlantic Seaboard, so it in fact makes sense that the Republican members of the Natural Resources committee are more likely to defect from the party on climate change policy. Committee membership is also self-selected, so it is interesting to note that the Republicans that are more likely to defect on climate change may be choosing to join the Natural Resources committee together. The Science committee, meanwhile, may be comprised of the opposite type of Republican. Though the relationship between Science membership and defection in this study was not significant, the negative relationship was interesting. Members of the Science committee were less likely to believe in the science of climate change. This may be similar to the Natural Resources phenomenon; anti-climate change Republicans may choose to join the Science committee en masse in order to fight climate change policy coming to the committee and to the floor. Further research should approach this possible relationship in Congress.

VII. Concluding the Theory and its Implications

The model of the determinants of party defection is both interesting because of its results and because of the implications on American politics. Interest group money has the largest effect on party defection among Republicans, and while this study looked only at climate change policy, it can easily be applied to a variety of polarized policy issues. If interest group money has the largest impact on voting behavior, it raises a fundamental question about American democracy. On one hand, it can be argued that money in politics has stripped American voters of their influence on Congressional voting behavior and policymaking. In other words, electoral vulnerability does not relate to constituent beliefs but to the money and influence of special interest groups. On the other hand, it can also be argued it benefits voters when interest groups that wield incredible financial resources have a stronger influence on voting behavior. In this way, interest groups represent the American electorate but utilize their resources to better influence policies that positively help voters.

This study also continues to demonstrate the extreme polarization in current American politics. On party-defining issues such as climate change, it is extremely rare for members of Congress to vote against their own party. It seems that personal beliefs no longer matter, because the party is above all else. This is not necessarily an evil, but merely a fact that coalitions drive voting behavior and a lack of consensus is no longer remedied by compromise. Political actors are perhaps both unitary and non-unitary, as they may be solely driven by reelection but also influenced by complex policy perspectives, processes, and problems. It benefits American politics to continue these types of in-depth studies in order to better understand Congressional decision-making, and further research should build off this study over a longer period of time and utilize a wider array of consideration variables.

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Appendix A

```
--------------------------------------------------------------------------------
              |                Robust
   Defection  |    Coef.    Std. Err.      z     P>|z|    [95% Conf. Interval]
--------------+-----------------------------------------------------------------
      CookPVI |  -.4250744   .2191993    1.94    0.052   -.0045483    .8546972
      Victory |   .0041174   .0089895    0.46    0.647   -.0135017    .0217364
    Unopposed |   .0765129   .4695281    0.16    0.871   -.8437453    .996771
   PresVoting |  -.0227702   .0084724   -2.69    0.007   -.0393759   -.0061645
       Energy |   .0364618   .2596316    0.14    0.888   -.4724068    .5453303
    Resources |   .5307419   .248278     2.14    0.033    .044126    1.017358
      Science |  -.2326534   .266604    -0.87    0.383   -.7551877    .2898809
       OilGas |  -.2535562   .0587672   -4.31    0.000   -.3687379   -.1383745
      Environ |   2.544247   .2456494   10.36    0.000    2.062783    3.025711
        _cons |  -2.256876   .5910649   -3.82    0.000   -3.415342   -1.09841
--------------------------------------------------------------------------------
```

Appendix B

```
        PresVoting       =           5
        CookPVI          =    .3012287 (mean)
        Victory          =    65.23379 (mean)
        Unopposed        =    .0439952 (mean)
        Energy           =    .1315894 (mean)
        Resources        =     .104241 (mean)
        Science          =    .1014665 (mean)
        OilGas           =    1.602061 (mean)
        Environ          =    .0408244 (mean)
```

```
--------------------------------------------------------------------------------
              |              Delta-method
              |    Margin    Std. Err.      z     P>|z|    [95% Conf. Interval]
--------------+-----------------------------------------------------------------
        _cons |   .0965156   .0120599    8.00    0.000    .0728786    .1201525
--------------------------------------------------------------------------------
```

```
        PresVoting       =          35
        CookPVI          =    .3012287 (mean)
        Victory          =    65.23379 (mean)
        Unopposed        =    .0439952 (mean)
        Energy           =    .1315894 (mean)
        Resources        =     .104241 (mean)
        Science          =    .1014665 (mean)
        OilGas           =    1.602061 (mean)
        Environ          =    .0408244 (mean)
```

```
--------------------------------------------------------------------------------
              |              Delta-method
              |    Margin    Std. Err.      z     P>|z|    [95% Conf. Interval]
--------------+-----------------------------------------------------------------
        _cons |   .0511902   .0080051    6.39    0.000    .0355004     .06688
--------------------------------------------------------------------------------
```

Appendix C

```
        OilGas           =           0
        CookPVI          =    .3012287 (mean)
        Victory          =    65.23379 (mean)
```

```
Unopposed          =      .0439952 (mean)
PresVoting         =      19.37614 (mean)
Energy             =      .1315894 (mean)
Resources          =       .104241 (mean)
Science            =      .1014665 (mean)
Environ            =      .0408244 (mean)
```

```
------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .1036148   .0103676     9.99   0.000     .0832947    .123935
------------------------------------------------------------------------------
```

```
OilGas             =             3
CookPVI            =      .3012287 (mean)
Victory            =      65.23379 (mean)
Unopposed          =      .0439952 (mean)
PresVoting         =      19.37614 (mean)
Energy             =      .1315894 (mean)
Resources          =       .104241 (mean)
Science            =      .1014665 (mean)
Environ            =      .0408244 (mean)
```

```
------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .0512535   .0062366     8.22   0.000       .03903    .0634769
------------------------------------------------------------------------------
```

Appendix D

```
Resources          =             0
CookPVI            =      .3012287 (mean)
Victory            =      65.23379 (mean)
Unopposed          =      .0439952 (mean)
PresVoting         =      19.37614 (mean)
Energy             =      .1315894 (mean)
Science            =      .1014665 (mean)
OilGas             =      1.602061 (mean)
Environ            =      .0408244 (mean)
```

```
------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .0679112   .0057315    11.85   0.000     .0566776    .0791448
------------------------------------------------------------------------------
```

```
Resources          =             1
CookPVI            =      .3012287 (mean)
Victory            =      65.23379 (mean)
Unopposed          =      .0439952 (mean)
PresVoting         =      19.37614 (mean)
Energy             =      .1315894 (mean)
Science            =      .1014665 (mean)
OilGas             =      1.602061 (mean)
Environ            =      .0408244 (mean)
```

```
-----------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
       _cons |    .110221    .0220461    5.00   0.000     .0670116    .1534305
-----------------------------------------------------------------------------
```