A Dynamic Theory of Party Discipline, Legislator Roll-Call Voting & Electoral Accountability in the U.S. House

by

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ABSTRACT

A Dynamic Theory of Party Discipline, Legislator Roll-Call Voting & Electoral Accountability in the U.S. House

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The purpose of this dissertation is to explain observed rates of party unity on roll-call voting in the U.S. House, by determining the conditions under which Representatives cross-pressured between party and constituency choose to side with the latter. To help answer this question, I develop a dynamic model of party discipline, legislator vote choice and electoral feedback, and analyze it to develop insights about how partisan context and electoral threat condition the behavior of marginal legislators. I then test the model's predictions, both at the level of the party caucus and at the level of individual legislators. I find strong support for the idea that partisan context conditions the possible dispersion of party unity rates across a legislative caucus, but only mixed support for predictions regarding factors that may affect the responsiveness of individual legislator vote behavior to their own electoral security.

CHAPTER I

Introduction

1.1 Overview

Few phenomena in American politics have attracted as much interest from academic sources (Fiorina et al 2011; McCarty et al 2006) and the popular press (Brownstein 2007) than that of partisan polarization. Nowhere has this interest been more clear than in studies of legislator behavior in the U.S. House, with academic writers focusing on sources of this development located both inside and outside the chamber (see Rae [2007] for a review of the extensive literature on the topic). This separation in party behavior is especially evident when assessing the willingness of members to support the party line on key votes (e.g. those votes that pit majorities from each party against each other). That is, members can be increasingly relied upon to "fall in line" on the controversial votes that separate the parties.

Although party polarization is remarkable as a recent stylized fact in American politics, the longer history of American partisan competition shows that polarization has waxed and waned as outside political pressures and institutions of partisan legislative organization have changed (Gerring 2001, Han and Brady 2007, Jenkins et al 2004). There are both *structural*[1] and *institutional* factors contributing to the

[1]By structural factors, I am referring broadly to social or economic conditions and patterns of interaction that shape an individual's political incentives.

recent intensification of partisan polarization, and untangling them can be a difficult proposition. Still, the question can be usefully posed in the following way: to what extent does the electoral safety of legislators across a party's caucus contribute to the willingness of legislators to support the party line on conflictual roll-call votes, and thus to legislative polarization?

This question leads to a (nearly) equivalent question: when will legislators who are *cross-pressured* between party and constituency choose to side with the former, and when will they side with the latter? Answering this question requires a theory of how legislators respond to the signals that constituents give them – the most powerful of these being shifts in their margin of re-election. Reduced margins of re-election may reflect constituency displeasure with a legislator's voting record, and can compel a legislator to adjust her behavior accordingly, by reducing her willingness to support the party on visible roll-call votes (this could also be put the other way, in that legislators could be understood to feel freer to support their party on potentially controversial votes when their future electoral fortunes appear to be more secure, based on current returns).

The nature and strength of this adjustment relationship, though, is *mediated* through key partisan institutions in the legislature, which are designed (in part) precisely to help the party garner sufficient support on controversial roll-call votes to see their preferences put into action (or to obstruct the other party from seeing theirs put into action). The character of the party discipline regime encountered by an individual legislator is therefore critical to understanding how electoral accountability might function for members of the U.S. House.

1.2 The Project

This dissertation begins with the premise that, in the context of the U.S. House of Representatives, electoral pressures manifest themselves within the context of the two party system, and that a representative's degree of association with the party in legislative behavior serves as a crucial signal and marker for the translation of constituency preference into policy. This raises the possibility that the strength of a representative's observed party loyalty, and the resulting electoral change in response to such loyalty, may serve as a key conduit of electoral accountability in the American political system. However, since legislative parties organize their electoral and policy activities (at least in part) in order to help facilitate the re-election of their elected officials, it makes sense that parties may try to ameliorate any future electoral consequences that their members may experience for choosing to side with their party over their constituency on a particular issue or roll-call vote, thereby limiting the potential of this channel of electoral accountability.

In addition, since the nature of partisan legislative organization itself is also partly determined by electoral considerations, it's not immediately obvious *how* the legislative party might mediate the relationship between a constituency and its elected representative. For this reason, it is necessary to develop a *model* of partisan organization, legislative behavior and electoral accountability in which legislator adaptation to constituency feedback and party demands on their member legislators are *jointly determined*, based on the same external circumstances. The approach to the modeling of legislator decision-making that follows from this assumption is novel, in that it is explicitly *dynamic* – legislators adjust their behavior retrospectively, based on constituency feedback, in a way that is mediated by partisan institutions that organize legislative action within the House.

In this dissertation project, I develop such a model of party decision-making, legislator roll-call behavior and electoral accountability. I use this model to determine the conditions under which moderate legislators, cross-pressured between party and constituency, will defect from the party line so as to better ensure their electoral survival. The key insight from the model is that while sufficiently strong cross-pressure will induce defections from cross-pressured legislators, extremely strong pressure causes moderates to lose, regardless of their behavior. This finding focuses attention on the importance of the electoral survival of moderates to the generation of observed distributions of party unity rates in the U.S. House, and also on the key role that legislator tenure plays in attenuating electoral accountability.

I investigate the role that partisan context, especially preference heterogeneity within a party caucus, plays in generating observed distributions of party unity in the U.S. House. I find supporting evidence for the mediating role that partisan context plays in the connection between electoral security and party loyalty. I further investigate the relationship between electoral security and party loyalty at the individual level, focusing on the conditioning effect that intensity of cross-pressure and legislator tenure have on this connection. Again, I find support for conditioning effects of tenure and cross-pressure on the connection between electoral security and party loyalty. Similar results are found for conditioning effects of cross-pressure for the connection between a representative's party loyalty and the probability of a representative successfully securing re-election in the future.

1.3 Plan for the Dissertation

The body of the dissertation is organized as follows:

In Chapter 2, I provide a critical review of the scholarly literature on party polarization in American politics, partisan organization of the U.S. House, and the connection between legislator partisanship and electoral accountability. I show how insights from this literature help to motivate an explicit model of party organization, legislative behavior and electoral accountability in the U.S. House.

In Chapter 3, I motivate, conceptualize and formalize a dynamic model of party decision-making, legislator vote choice and electoral feedback. I begin by discussing the key features such a model should have. Next, I consider the key outcomes and quantities of interest. Finally, I propose a formal, mathematical version of the model, beginning with initial conditions, and proceeding to describe the constituent submodels for party leaders, legislators and voters.

In Chapter 4, I propose a strategy for model analysis and discuss how the structure of the model affects the approach used for collection and classification of model output. I then analyze results from model simulation runs, and draw inferences from them to motivate testable hypotheses about the connection between electoral security and party loyalty among members of the U.S. House. I find that the development of clusters of low-loyalty moderates, which drives observed dispersion in party unity rates across a party caucus, is most likely to occur when levels of cross-pressure are *moderate* – that is, high enough for moderates to *want* to defect, but low enough for moderates to *survive*, and develop their own ideological reputations. Thus, analysis of the connection between electoral security and party loyalty for legislators must consider both the partisan context in which legislators make decisions, and the factors that facilitate the electoral survival of cross-pressured legislators.

In Chapter 5, I characterize party-level (or "macro-level") distributions of party loyalty in the U.S. House, as a function of the broad electoral circumstances faced by the congressional party. First, some basic features of the distribution of party loyalty scores are considered, with special attention paid to the natural heteroskedasticity found in the relationship between electoral security and party loyalty. Next, I propose a framework for fitting vectors of observed party loyalty scores to the Beta distribution, in a way that permits the systematic study of moderate party defection as a coping structure for party-constituency cross-pressure. Finally, I test hypotheses generated by the model with respect to the values of fitted Beta parameters, especially the dispersion parameter, ϕ, as a function of electoral conditions and institutional change, finding mixed evidence for the hypotheses under consideration.

In Chapter 6, I take a closer look at individual legislators, investigating the connections between re-election margin and party unity rates, and between party unity rates and subsequent re-election probabilities, for U.S. House members. In particular, this analysis focuses on the conditioning effects that cross-pressure and legislator tenure have on each of these connections, and their implications for electoral accountability. Again, I find mixed evidence for the hypotheses under consideration.

In Chapter 7, I summarize my findings, and consider possible new directions for the research agenda built upon a dynamic perspective on electoral accountability.

CHAPTER II

Party Loyalty & Electoral Accountability in the U.S. House: Toward a Dynamic Theory

A great deal of scholarship exists on the subjects on party polarization, legislative organization, and electoral accountability in the U.S. House. The purpose of this chapter to review the existing literature on these subjects, with an eye toward motivating a dynamic model of party discipline, legislator behavior and electoral accountability in the U.S. House.

First, I consider the electoral roots of observed partisanship in the House, paying special attention to the ways in which parties serve to structure electoral competition. Then, I discuss how electoral responsiveness and accountability may be channeled through elite partisanship, with constituents holding representatives accountable to votes with their party that may run counter to constituent interests by revoking electoral security, and how representatives may respond to increased electoral insecurity by distancing themselves from their party. Next, I describe how the partisan legislative organization of the House serves the interests of party members, and how this phenomenon can potentially mediate the accountability relationship described above. Finally, I propose a dynamic model of partisan legislative organization, legislator vote behavior and electoral feedback, that can generate *conditions under which* moderates cross-pressured between party and constituency will respond to electoral threat by defecting from the party line on roll-call votes.

2.1 The Electoral Roots of Legislative Partisanship

Parties are widely understood to be central to the operation of American democracy (Schattschneider 1942), owing largely to the advantages associated with electioneering and legislating that come with party affiliation by ambitious office-seekers (Aldrich 2011). Because of this, political conflict is often expressed as partisan conflict, and policy positions are understood to involve greater or lesser association with the two major political parties. As evidence from the study of recent electoral polarization demonstrates, there are at least three ways in which parties help to structure political conflict in the electoral arena. First, parties may merely reflect changes in the structure and distribution of political preferences in the electorate. Second, parties may exert some control over how newly salient political issues are associated with (or diverge from) existing conflicts – a phenomenon variously studied as " conflict extension" or "issue evolution." Finally, parties provide important cues as to how partisan identifiers with undeveloped preferences on an issue, or preferences that conflict with those of their party, should form or adjust their preferences. In this section, I consider each of these factors in turn.

2.1.1 Structural Preference Divergence

The simplest explanation for why parties may be salient for political conflict is that they create and promote policy platforms that reflect concrete and enduring conflicts of interest in the electorate, and sensible combinations of issue positions. Variation in the strength of this relationship should then be tied to actual structural changes in the distribution of preferences and interests of the electorate. Put simply, the recent, apparent polarization in the behavior of elected representatives could simply reflect actual divergence in the interests and preferences of voters (Paulson 2007).

For instance, McCarty et al (2006) attribute variation in observed rates of political polarization in roll-call votes in the U.S. House and Senate to changing patterns of income inequality in the United States over time. Additionally, as Gerring (2001) and Brewer and Stonecash (2009) point out, sectional conflicts, urban/rural divides and conflicts between religious denominations have also structured partisan rifts from one era to the next, and determined how they change.

Additionally, since the US employs single-member district election systems for all of its federal offices,[1] the distribution of political preferences across constituencies can affect how parties translate preferences into policy platforms, as well. Explanations of the recent trend in electoral polarization have also related greater dissimilarity in the platforms of Republicans and Democrats to changes in how preferences and interests are distributed geographically, owing mainly to migration (Bishop 2009). An archetypal example of this is the ideological and partisan transformation of the Southern United States in the late 20th century, which owes a great deal to economic development and suburban growth (Shafer and Johnston 2006, Lassiter 2013, Kousser 2010). The development took a remarkably different (and more ideologically conservative) cast from the patterns of development seen previously in the North (Mellow 2008), and stimulated interstate migration by transforming the South into a place that was widely perceived to be more amenable to affordable family formation that the Northern metropolitan areas that migrants left behind (Hawley 2013).

2.1.2 Issue Cleavages & Partisan Alignments

The second way in which parties help to structure political conflict is by determining the ways in which issue cleavages are translated into party cleavages – this process emphasizes the role that elites such as party leaders, elected officials and activists play in expressing conflicts of interest through cleavages in the party system.

[1] With a few historical exceptions.

Elites can do this by bundling new political issues with their existing platforms, a process known as conflict extension (Schattschneider 1964). They can also do this by making a concerted attempt to assemble new elite coalitions in which issues that previously cross-cut against party divisions are made part of the major party divide, a process known as "issue evolution" (Carmines and Stimson 1989, Schofield and Miller 2007).

The relative important of conflict extension and issue evolution[2] varies across time and political context.[3] What each perspective shares is a focus on the way in which elites' political motivations determine how issues are translated into partisan conflict. Since voters are generally thought to lack the kind of ideological consistency (Converse 1964) that might constrain the way in which they systematically link issues in their minds, elites enjoy a substantial amount of leeway to suggest and promote potential alignments or dis-alignments between positions on distinct issue dimensions.

Subsequent to changes in elite position-taking, voters react by shifting their party affiliations based on the new partisan issue divides implied by the new platforms. A good example of this phenomenon lies in how racial issues were brought into line with the economic divides separating the Democratic and Republican parties in the mid-to-late 20th century (Carmines and Stimson 1989). In that case, Democrats took more uniformly liberal positions and Republicans took more uniformly conservative positions. Voters responded in a rational way to this development, by switching parties when their ideologies came into conflict with that of their original party (Stonecash 2003, Stonecash 2006, Reiter and Stonecash 2011). The net effect of this combination of issue dimensions in a partisan divide is to increase the total distance between their views (Brewer 2005, Layman et al 2005).

[2]Which is very similar to Schattschneider's (1964) concept of "conflict displacement", and can be understood as a theoretical grounding for work on party realignments (e.g. Sundquist 1983).

[3]For instance, see Layman and Carsey (2002) for a discussion on how recent evolution in the policy positions of Democrats and Republicans represents a conflict extension approach, rather than an issue evolution approach.

2.1.3 Partisan Cues & Sorting

Both the literature on structural polarization and the literature on elite issue manipulation share the presumption that voters have well-defined preferences. However, much of the literature on political behavior in the American context focuses on how parties actually affect the way that voters reason about political issues, including determining what issue positions to hold and what candidates or proposals to support. While many of these explanations can be understood to be cognitive (e.g. the perceptual screen as in Campbell et al [1960], or motivated reasoning models like Taber and Lodge [2006] or Druckman et al [2013]) or affective (see the social identity approach of Green et al [2002]), there also exists substantial evidence that parties also have an *informational* effect on voters' political evaluations, serving as *cue-givers*.

Since voters have a fairly good idea of what the parties generally stand for (Brewer 2010, Baumer and Gold 2010), it stands to reason that they can infer valuable information about the desirability of policy positions and/or candidate issue platforms based on their association with partisan labels. Bayesian approaches to party identification (Achen 1992, Gerber and Green 1998) and preference change (Gerber and Jackson 1993) operationalize this idea in the most formal and strict way, but more generally, informational theories of party influence have driven a major portion of scholarly work on the effect of parties on voter opinion and behavior. This has come mainly through the discussion of partisan labels and symbols as *cues* that guide an individual toward political conclusions consonant with their prior understanding of their attachments, identity and interests (Zaller 1992, Rahn 1993).

In the context of modern American politics, the study of cues has focused on the phenomenon of polarization among party elites, and how this may affect the preferences and behavior of voters. In particular, there has been a substantial focus on how elite polarization strengthens the informativeness of partisan cues, even in the absence of underlying preference change on the part of voters. The ideological sorting that took place in the mid-to-late 20th century, as conservative Southern Democrats shifted to the Republican party, and as liberal Northern Republicans moved to the Democrats (Reiter and Stonecash 2011) caused party labels to take on more clear and consistent values. This, in turn, caused voters to be more likely choose the "right" party for their ideology in a consistent fashion (Hetherington 2009, Levendusky 2010, Levendusky and Pope 2011).

2.2 Party Loyalty & Electoral Accountability: Staying In-Step with Constituents

By reflecting, structuring and sending cues about political conflicts, parties play a crucial role in determining the nature and shape of electoral competition. Since the general trend in recent decades has been towards increased polarization of issue positions between the two parties, the relevant scholarship in each case has been primarily oriented toward explaining why voters and/or elites may have increasingly divergent positions or interests. However, the more general point that can be inferred from the above discussion is that there is a connection between polarization at the level of elite behavior and the underlying preference structure of the masses – even if this connection is strongly mediated by elite interests and strategy.

Put differently, it is likely inevitable that electoral conflict in American politics is structured by parties that stake out diverging platforms on the issues. These party positions, through their roles in informing the electorate and in structuring the choices available to them, play a critical role in connecting public preference to the preferences of elected officials, and thus, into policy. So, polarized politics, in which elected Republicans line up in persistent conflict with elected Democrats, is in some way indicative of key structural, institutional and behavioral features of the American political system. More or less polarized parties must therefore reflect some underlying conditions that make polarization more or less likely. Such a line of argument implies that polarized behavior by individual legislators must be a response to the underlying electoral incentives faced by ambitious politicians. Party platforms represent key poles, in-between which the constant tug-of-war of political competition takes place, and voters exert their influence along the dimensions staked out by party platforms.

Of course, constituents can also respond to the behavior of legislators – if the party loyalty exhibited by a representative exceeds that which might be expected or desired by constituents, many may choose to punish those legislators for their relatively extreme partisan behavior. If this is true, then party loyalty and electoral response could serve as a crucial mechanism of *electoral accountability*, as suggested by Theriault (2005). This idea has an intuitive appeal – since parties structure political conflict, one of the major ways that an elected official can transmit valuable information to constituents is by being *more* or *less* strongly associated with a party. In the case of U.S. House members, parties often line up on the opposite sides of key roll-call votes – with most Republicans voting Yea, and most Democrats voting Nay, for example. The differential willingness of members to support the party line on these kinds of votes could thus serve a valuable purpose for a representative's constituents. Namely, the strength of a legislator's association with a party's agenda, as reflected by a legislator's willingness to support it on key votes, especially those that differentiate the parties ideologically, could serve as a lever of electoral accountability. In this way, legislators may be incentivized to *adjust their degree of party support upward or downward* based on electoral feedback from their constituents.

2.2.1 Party, Constituency and Electoral Responsiveness

Indeed, there exists substantial empirical evidence that electoral accountability functions as suggested above, in that legislators are often punished for developing records of party support that are "out-of-step" with the desires of their constituents. In this view, voters in a legislator's constituency punish them for actions that conflict with their interests or preferences. Since elections are the main means by which voters exert control over the behavior and composition of the legislature, it follows that this control would be expressed via diminished *margins* of re-election, and when legislators are sufficiently marginal, diminished *probability* of re-election. Canes-Wrone et al (2002, 2007) find that legislators amassing voting records too *ideologically* extreme for their tastes of their constituents are punished with diminished margins of safety upon seeking re-election. Work by Carson et al (2010, 2014) establishes a similar dynamic for party unity rates, indicating that legislators can face an electoral cost for supporting the party too often.

Importantly, the above-cited work by Carson et al (2010) also establishes that House members do *respond* to revocation of electoral safety with a greater rate of defections from the party line in the next Congress. It has always been difficult to determine the exact nature and extent of constituency influence on a legislator's party unity rate, owing to the fact that many legislators represent constituencies whose interests are actually well-represented by the party, making it difficult to infer a legislator's relative ideological standing in their constituency based on their relative ideological position within their party (Fiorina 1974). However, other literature on electoral responsiveness supports the idea that electoral considerations determine the degree to which legislators are willing to associate with their party. In particular, House members representing competitive districts demonstrate the most responsiveness to constituency opinion (Griffin 2006). Also, even relative to expectations, extreme legislators are more likely to support the party line on roll-call votes than moderates (Minozzi and Volden 2013). More broadly, there exists evidence that representatives are strategic in their use of party symbols in campaigns (Neiheiser and Neibler 2013), and that representatives elected from marginal districts are less likely to support messaging efforts from party leaders (Casas et al 2014). The general picture that emerges is one in which House members are sensitive to the electoral consequences of being closely associated with their party, and adjust their behavior so as to be more in line with the preferences of their district over those of their party.

2.3 Party Organization of the U.S. House

From the above discussion of the electoral roots of partisan legislative behavior, and the nature of legislator responsiveness to constituency preference, it is possible to assemble a vision of how electoral accountability might operate through the context of legislator association with the party. Parties structure electoral conflict, and a representative's degree of association carries strong information about how that representative's actions coincide with the interests of their constituents. Constituents may punish their representatives for being too closely associated with their party's agenda by revoking some degree of electoral security from them, and even successfully re-elected legislators may respond to their newly perilous electoral circumstances by distancing themselves from the party. In terms of roll-call votes, this should express itself in terms of the representative's willingness to support the party on key conflictual votes, which tend to pit one party against the other.

However, this story is complicated by the fact that parties also organize activity in the House, including roll-call votes, so as to control the process of legislating. Since this organization of the chamber is done, at least in part, to serve the interests of the party's contingent of elected officials (the party's legislative *caucus* in the House), the fact of partisan organization of the House raises the possibility that the actions of legislative parties (in particular, through their chosen leaders) might *mediate* the strength of the connection between constituency and legislator proposed above. To understand how this may happen, it is worthwhile to consider why legislators organize into parties, and what impact this may have on the observed behavior of the legislator.

In this section, I consider the electoral value of the party brand name, the incentives of legislators to protect the brand name by cartelizing control of the legislative process, and how preference disagreement between members may affect the character of the electoral and legislative function of party brands.

2.3.1 The Party as Brand-Name: Information, Signaling & Risk-Averse Electorates

As discussed above, party labels provide valuable informational cues to voters about the kinds of policies that an elected official may wish to implement. However, the informational content of the party label, or "brand-name", is not exogenously given – rather, it is the product of choices made by the candidates running for election under the banner of the party. The informativeness of the label comes from costly affiliation with the party (Snyder & Ting 2002, Ashworth and Bueno de Mesquita 2008) – the more tightly ideologically constrained a party is, the more valuable is the signal of affiliation with the party to voters attempting to discern the ideological orientation of candidates for office. Additionally, even without costly affiliation, if voters are risk-averse, then they will look more favorably on parties with lower ideological heterogeneity, holding all else equal (Grynaviski 2006, 2010). This implies that party leaders have an incentive to develop and maintain an informative brand name by keeping their party relatively ideologically homogenous, and thus polarized from the other party. This incentive applies both to party operations in reputational development in the electoral arena (Stonecash 2012), and in "valence" protection in the legislative arena (Butler and Powell 2014).

2.3.2 The Party as Cartel: Collective Action Problems & Institutional Solutions

Leaders also have a more concrete incentive to maintain tight togetherness among members – a disciplined party, when in the majority, can cartelize legislative organization and activity, ensuring that the resulting legislation produced by the chamber will serve the interests of the party members (Cox and McCubbins 2005, 2007). Leaders can do this by exerting control over the legislative agenda (Gailmard and Jenkins 2007, Stiglitz and Weingast 2013), utilitizing party leadership offices such as party whips to ensure that caucus members support the leaders' legislative proposals (Burden and Frisby 2005) and by arranging side payments for loyalty (e.g. financial support, as in Cann 2008), especially for those who are harmed by the party's activites (Jenkins and Monroe 2012). In fact, it is likely that such regimes will have to exert discipline on members to achieve their goals – the very nature of the collective action problem faced by legislators is that the degree of cooperation on legislative initiatives in the absence of party discipline is suboptimally low for party members. Individual legislators may have strong incentives to defect from supporting party initiatives when it is not in their electoral interests to do so, and leaders solve this problem by inducing cooperation among members, and attempting to compensate them for the costs they may bear from their cooperation.

2.3.3 Party Preference Agreement & Majoritarianism

Of course, if legislative parties organize to serve the interests of their members, then it stands to reason that strength of the impact of that organization will likely be affected by the degree of preference agreement present with the party's elected officials, as well as the nature of disagreement a party has with the other party in the chamber. The theory of conditional party government (Rohde 1991, Aldrich and Rohde 2001, Aldrich et al 2012) sums constituency-level concerns into a macro-level theory of party discipline discipline is described as a function of the distribution of preferences between and within parties in the legislature. Similar claims about the correlatedness of preferences being a key determinant of the nature of party organization of legislative activity are made by Diermeier and Vlaicu (2011). Alternatively, in his theory of equilibrium party government, Patty (2008) describes the selection of disciplinary regime as being determined by the net desire for discipline of the median discipline demander in the party caucus. In both the theory of conditional party government and the theory of equilibrium party government, the composition of the party caucus is theorized to be the key to determining the discipline level either by affecting the partys relative preference heterogeneity or by affecting the location of the partys center of gravity with respect to preferences over discipline levels.

2.4 Toward a Model of Dynamic Discipline Selection, Legislator Choice & Electoral Response

Generally speaking, legislative parties can be understood to produce a partisan brand-name that aids in electoral competitiveness by addressing uncertainty regarding a given candidate's issue positions. This brand-name is built and protected through leadership decisions that organize legislative institutions along partisan lines, using those institutions to produce a legislative record to which the party brand-name can be anchored. The electoral incentives of individual members may align more or less strongly with each other, raising the possibility that the character of legislative organization is epiphenomenal to underlying structure of interests between legislators.

The key takeaway from this discussion of party organization of legislative activity is this: since legislative parties serve the interests of ambitious politicians, it is not surprising that there are major connections between how parties organize a legislative chamber and the nature of the interests held by those ambitious politicians. Many of these considerations, especially the re-election imperative, are the same as those suggested to drive the relationship between constituency interests and legislator partisanship. However, party institutions in the legislature are designed precisely with the interests of re-election minded legislators at heart. So, to what extent does the party mediate the electoral connection? Or, put differently, *when* will legislators respond to cross-pressure between party and constituency by defecting from the party line on roll-call votes? To answer this question, it will be necessary to model party discipline regime selection *jointly* with legislator behavior and electoral feedback, as will be described below.

2.4.1 Theoretical and Empirical Issues with a Unified Theory of Party Discipline, Legislator Behavior & Electoral Accountability

While it may be intuitively attractive to connect internal and external factors contributing to observed patterns of party unity, it raises the issue of identification of the independent effects of each part in contributing to actual observations. The fact that the willingness of individual members to cede disciplinary authority to party leaders is often tied to the electoral incentives of the members has led many scholars to question whether or not the considerations of member motivations adds anything to an explanation of observed legislative polarization that electoral considerations alone could not provide (see especially Krehbiel 1998, 1999, 2000, 2003). Such criticisms fall most squarely on theories of party discipline that relate the ceding of disciplinary authority to the degree of intraparty agreement (and inter-party disagreement) over policy goals, such as the theory of conditional party government (Rohde 1991, Aldrich and Rohde 2001).

However, closer readings of theories of party unity in legislatures reveal a somewhat more nuanced story Rohde (1991, p. 171) characterizes external conditions as providing a "baseline" macro level of party unity, which is, in turn, augmented by disciplinary actions taken by party leaders. In a similar vein, Thierault (2008) considers the behavior of incumbent House members over the course of their careers, and finds that incumbents exhibit more party unity in their voting behavior as time goes on, a fact that one could plausibly attribute to increased electoral security for long-time incumbents. In both cases, internal motivations of members augment the story that could be told by considering their district's socioeconomic makeup, ideological profile, etc.

However, without an independent measure of district preference, uncontaminated by party effects, it becomes difficult to isolate empirically the independent effects of legislator party and district preference, respectively (McCarty et al 2001, Krehbiel 2003). Thus, an issue of observational equivalence remains, and neatly parallels to the theoretical objections to an independent party effect mentioned above. For instance, consider Krehbiel's (1991) "Majoritarian Postulate." The Majoritarian Postulate states that, "Objects of legislative choice in both the procedural and policy domains must be chosen by a majority of the legislature." In other words, power granted to parties within Congress cant be used to do things that a majority on the floor wouldnt agree with, as they would revoke that authority (or never grant it in the first place) if party leadership were to use that power in such a way. In this sense, party institutions are governed by a sort of "remote majoritarianism" (Krehbiel 1998), which makes them analytically and empirically superfluous in decision-making bodies that select their rules internally by majority rule.

While the partisan institutions in each chamber of the U.S. Congress are clearly endogenous at some level, it does not follow that they are epiphenomenal. After all, individual members may value an institution that can force them to vote against their true preferences, as such an institutions can also force co-partisans to do the same for bills which a legislator favors (as noted above, Cox and McCubbins (2007) explain the endowment of leadership with coercive power as solving just such a collective action problem.) While this possibility warrants consideration for a theoretical account, it lends little potential empirical leverage that could be used to disaggregate the effects on external and internal factors affecting observed party polarization.

However, there are three other principal issues with the remote majoritarianism argument, all of which point the way to a theoretical reorientation of the relationship between legislator and party, which can help to separate internal from external factors. First, the decision to endow party leaders with disciplinary power is done some time before the actual business of lawmaking. It would require remarkable foresight on the part of party members to know the particular choices they would have to make when cross-pressured between constituency and party. Therefore, it may not make sense to suppose that any unwanted exercise of party discipline upon a party member would be opposed, as this supposition requires the belief that the member would anticipate this action, and object to a discipline regime on those grounds, before the fact.[4]

Second, a Congressperson may not necessarily face punishment for voting the party line against the wishes of her constituents, as their constituents may not be made aware about her decision to do. So, if we assume legislators may refuse to give party leadership disciplinary authority so as to avoid being forced to vote against their constituents' wishes, we should remember that legislators might be able to "get away" with holding the party line, without facing electoral punishment for doing so. Additionally, if such punishment is to be brought down on a legislator, it is likely to be done after the fact, as the principal actors responsible for calling attention to legislator missteps are electoral challengers (Arnold 1990, Sulkin 2005). As discussed

[4]It may also imply that any objection by any member is sufficient to overturn a discipline regime. While majority party nominees for Speaker have gone through with virtual intra-party unanimity since the Civil War (Stewart 2000), floor votes on the Speakership occur after a candidate from the majority party emerges with a majority of support within said party. It's not clear that observed majority party unanimity of floor votes for Speaker reflects actual unanimity within the majority party caucus, due to a norm of procedural partisan loyalty that follows from ideological agreement. In this spirit, Green (2005) presents evidence that suggests that the inclusion of votes involving procedural partisan discord may overinflate measures of behavioral partisanship in Congress. The implication is that legislators may make a distinction between loyalty on procedural and substantive motions.

above, electoral feedback serves as one of the main factors connecting legislator and constituency feedback would be unnecessary if constituency desires could be accurately represented in all situations, at all times.

Finally, and most importantly, the mechanism by which individual legislator incentives are aggregated into a collective choice has strong consequences for the observable results of any model deriving from such a theory. As noted above, there exist at least two different theoretical approaches to party discipline regime selection mechanism those driven by caucus median preferences over discipline, and those driven by leadership's incentives to secure collective policy goals and maintain (or gain) majority status in the chamber. As will be elaborated upon in my modeling chapter, these mechanisms will contain implicit substantive claims about whose preferences are pivotal to leadership decision-making about disciplinary intensity. Taking these substantively important linkages into account will enable the development of model of discipline to identify party effects on behavior, and generate testable hypotheses about the nature of party effects on roll-call behavior and electoral feedback.

As mentioned above, these considerations suggest an approach to party polarization in which intervening party institutions are modeled *jointly* with electoral feedback to legislator behavior.

2.4.2 Moderates & Party-Constituency Cross-Pressure

Since parties can (roughly) be expected to pursue policy proposals to shift the status quo toward the preferential "center of gravity" within the party, there will always be "regulars" who represent constituencies with preferences that are more extreme than the party's policy proposals. While they are not necessarily rewarded for loyalty to the party's agenda, they will not be punished for it – empirically, at least half of the majority party caucus in the U.S. House support the party's agenda nearly all of the time. Thus, intra-caucus variation in party unity rates is driven by deviations among moderate legislators, who may experience punishment from vigilant constituents for supporting a party proposal that is not preferred by constituents to the status quo. However, the relative willingness of caucus members to support the party line on roll-call votes is also affected by the resources brought to bear by the party in pursuing its goals. These resources are also electorally valuable, and can be thought of as a performance bond[5] for ensuring loyalty of cross-pressed members (as in Patty 2008).

To determine the likelihood that moderate members will react to electoral vulnerability (as signaled by changes to re-election margin) by changing their party loyalty rate, one must determine the conditions under which the party will decide to pressure moderate members. One must also determine the likelihood that members will submit to this pressure, given their current electoral vulnerability and the resources on offer from the party. To assess these likelihoods, I propose a dynamic model of party discipline regime selection, in which the shifting electoral security of individual members affects both the willingness of leaders to discipline them, and their own willingness to subsequently comply with party pressure to support a party's proposed policy changes (given the selection of disciplinary intensity, and the electoral incentives faced by the legislator). Defection from the party line is understood to be a response to electoral insecurity on the part of moderate legislators, and should be especially acute when this electoral insecurity is not addressed by appropriate changes to the discipline regime.

2.4.3 Looking Ahead

The remainder of the dissertation project will proceed as follows. In Chapter 3, I will propose a dynamic model of party leader decision-making, legislator vote choice, and electoral feedback, with an eye toward elucidating the circumstances under which

[5]That is, resources held by leadership, and released in return for loyalty by legislators.

cross-pressured moderates defect from the party line on roll-call votes. In Chapter 4, I use simulation techniques to evaluate the model, determining the circumstances under which cross-pressured moderates can survive long enough to develop a more moderate reputation. In Chapter 5, I test the model's predictions in the aggregate, focusing on the distribution of party unity rates across an individual party caucus in each Congress as a function of electoral conditions faced by the party at that time. In Chapter 6, I test the model's predictions regarding individual legislator adaptation, with special focus on how tenure and cross-pressure mediate the electoral accountability relationship between legislators and their constituencies.

CHAPTER III

A Dynamic Model of Party Discipline, Legislator Behavior & Electoral Accountability

In the previous chapter, I discussed existing work on the electoral roots of legislative partisanship, and how endogenous legislative institutions mediate the connection between voter preference and legislator behavior. The discussion was structured with an eye toward motivating a dynamic model in which both of those relationships are developed simultaneously and endogenously. I also considered how such a view could help us explain the conditions under which cross-pressured moderates defect from the party line on key roll-call votes. In this chapter, I propose a dynamic model of party discipline, legislator vote choice and electoral feedback that can help determine the conditions under which legislators cross-pressured between party and constituency will side with the latter on roll-call votes. I begin by considering the key characteristics that such a model should have, and identify the key outcomes of interest and independent variables. I then introduce the conceptual basis of the model, splitting model play into three constituent submodels that each correspond to a decision-making environment for a single agent type in the model. I then proceed with a formal definition of the general model and the submodels, highlighting important features of each along the way.

3.1 Motivating the Model

As argued in the previous motivating chapter, explaining the strength of the relationship between voter feedback and legislator behavior requires explicitly fleshing out the electoral and legislative roles that the party plays in the legislator's career. Specifically, the party provides a brand name to which a legislator can anchor her career, and the maintenance of the collective good of the brand name requires that leaders hold resources in bond to assure an individual legislator's support for the party's legislative agenda. These basic facts help to clarify the ways in which the party mediates the relationship between the legislator and her constituents:

1. The party's reputation helps legislators appeal to risk-averse voters, even if (and perhaps because) that reputation is not located near the preferences of the district's median voter.

2. The party sometimes asks legislators to take difficult votes – votes in which the legislator may feel cross-pressured between her party and her constituency.

3. The party can, in exchange for the legislator's loyalty, help compensate her for her trouble by handing over distributive resources, that aid in securing re-election.

4. Finally, a legislator may choose defection from the party line, even if it means adding short-term uncertainty to her ideological reputation, and foregoing distributive benefits from the party, if it is helps to insulate her from negative electoral consequences from pursuing an agenda that is unpopular with her constituents. Over time, defection from the party line may mitigate uncertainty about a legislator's ideological reputation, if it is done consistently.

The last of the four items deserves special attention, as it will be one of the principal drivers of observed variance in party loyalty rates, both cross-sectionally (over the party caucus) and over time (for a given legislator, over the course of her career).

The main purpose of the dynamic model developed in this chapter is to determine the circumstances under which individual legislators receive negative electoral feedback for party support, and respond to that feedback by reducing their support for the party's legislative agenda. This relationship can differ under alternate assumptions about how the party operates, so appropriate specification of the individual legislator's incentives will require endogenous development of the mediating partisan environment. This environment can involve both the party's reputation (Snyder and Ting 2002) as forged by its policy proposals, and the extent to which the party holds distributive resources in bond to secure caucus-members' support on difficult roll-call votes (Patty 2008).

Thus, party discipline regimes, party reputations, legislative agendas and policy outcomes must be grown endogenously within the model, and local legislator responses will co-evolve with those environmental variables. These processes will be assumed to take place in an environment that has certain constant structural characteristics that are taken as given. These characteristics will then be operationalized as exogenous parameters, and the model will be assessed at a wide array of parameter values. This will facilitate the development of testable hypotheses about the character of legislator vote choice and responsiveness to constituency electoral feedback.

3.1.1 Key Features of the Model

The threads that have developed over the course of the preceding discussion can be distilled into a single dynamic model of party leader decision-making, legislator behavior and electoral response, which can in turn be broke into the three following relationships:

1. Leaders of each party choose a discipline regime, based on a weighted combina-

tion of the goals of majority maintenance and party preferences.

2. Legislators choose a rate of support for party positions on key, conflictual roll-call votes.

3. Voters update their evaluation of the ideological reputation of their legislators, and adjust their likelihoods of re-electing them accordingly.

Putting all three of these relationships in sequence has the effect of "closing the loop" of model play, and enables the analyst to situate legislator behavior in dynamic context. Dynamics matter, as they help to determine which model outcomes are stable over time, and which are transient. Of particular interest will be the configurations of model play that generate high cross-sectional variance in party unity rates – indicating the presence of cross-pressured moderates within a party caucus, who have chosen to defect from the party line. Determining the conditions under which this outcome can occur will be key to elucidating the relationship between polarization and electoral accountability.

3.1.2 What Will Not Be Modeled

There are at least a few considerations that are likely relevant to the modeling of legislator behavior and electoral feedback that are not under consideration in the present project.[1]

Agenda Formation While the theory thus far has focused on the positive agenda power of parties (e.g. their power to promote positive legislative action through the accumulation and selective re-granting of resources) the negative agenda powers exercised by leadership (which are usually assumed to not vary with party strength see Cox and McCubbins [2005]) may also have an impact on observed rates of party

[1]Though each may be promising ground for future extensions of the base model provided in this chapter.

loyalty. Such powers can affect the "denominator" in the unity rate equation by preventing votes on which a majority of the majority party is rolled. Under Poole and Rosenthals (2000) definition of party unity votes, such votes would qualify as party unity votes, if they were allowed to happen. Indeed, there is some evidence the nonrandom effects of negative agenda control do have an effect on measurable characteristics of legislator behavior (Clinton 2012, Crespin et al 2013).

However, because a complete strategic accounting of the issues involved with agenda formation by party elites would introduce substantial complication into the model, I have chosen to omit such considerations. Instead, agenda generation will be understood as controlled by a simple algorithm in which parties try to move the status quo some degree toward the preferred policies of the party's median legislator.

Majority & Minority Party Interaction, and Strategic Release More vexing is the second (and related) question of minority party strength and influence within the chamber. More specifically, if we assume that given a disciplinary intensity level, the resources appropriated to pursue the partys agenda are employed efficiently (e.g. employed to achieve passage of the bill within a simple majority, and not unnecessarily disciplining cross-pressured members to secure surplus votes,) then a theory of minority party support for the majority partys agenda is required. This logical requirement is bolstered by empirical findings that link majority party unity to minority party unity (Lebo et al 2007).

However, as will be shown in the next chapter, the demands of parsimony require simplifying leadership decision-making regarding disciplinary intensity to a straightforward function of electoral circumstances enjoyed by their members, as well as their prospects for taking/retaining majority control in subsequent time periods. So, party leaders will *not* be understood to be strategic in terms of releasing members from obligations to vote for the party line. My approach with regard to majority and minority parties will be to model each independently, assuming that they retain the ability to schedule roll-call votes in rough proportion to their share of seats in the legislature.

Party Asymmetry As McCarty et al (2006) point out, a large share of the total increase in polarization in the later parts of the 20th century can be attributed to the increasingly disciplined behavior of the Republican party. By their measures, the increasingly uniform conservatism of the Republican party is not paralleled in degree by increasingly uniform liberalism on the part of the Democratic party (despite the decline of moderate Southern Democrats through most of the period). Chen and Rodden's study (2013) of electoral geography provides at least one possible explanation for this – since Democrats tend to be clustered in densely populated urban areas, Republicans tend to be advantaged elsewhere. Importantly, this implies that Democrats need to compete and win in more ideologically hostile territories than do Republicans, ensuring that Democrats are elected from constituencies that represent a broader variety of policy preferences than are Republicans. This asymmetry in electoral bases may help to explain subsequent asymmetry in party polarization between the parties. However, for the sake of analytical simplicity in the model, district preference distributions will be understood to be symmetric.

3.2 Conceptual Strategy for the Modeling Project

Conceptually, the agent-based model of party discipline, legislator behavior and electoral feedback described and implemented here can be understood as constituting three distinct core functions – using the terminology of Railsback and Grimm (2011), these can be called **submodels**. Each of these submodels is assigned to an **agent**, which takes in information (in the form of selected aspects of the model environment at that time, known as the **state**) and produces output that alters the state going forward. These agent-submodel pairings are as follows:

- Party leaders, making decisions about the share of distributive resources available to the party that will be held in bond for legislator support on roll-call votes, given the electoral circumstances that their members face.
- Legislators, making decisions about the rate at which they will support the party position on roll-call votes, given their own electoral security, and given the party's decisions about discipline.
- Voters, making decisions about the probability with which they will re-elect incumbent legislators, given the behavior of their representative.

Taken together, these three submodels define the state of the play in the model in the next time step, $t + 1$ as a function of the state of the model in time t. In combination with stochastic perturbations to electoral conditions, this model can thus be understood as a Markov process, and the repeated application of the process can be understood to be a *Markov chain.* As a result, output from a model run can be analyzed as a Markov Chain Monte Carlo (MCMC) simulation that explores the state space of the model over time, in a way that is equivalent to characterizing the probability distribution of states, given a set of initial conditions (that is, the process is *ergodic*).[2]

3.3 The Model

The model described below simulates a process of party decision-making, legislator behavior and electoral feedback in a generic legislature with single-member districts (inspired by the U.S. House). Districts are represented by single voters, who have

[2]Ergodicity also requires that the process be aperiodic and positive recurrent. More is said on this in Appendix A.1.

ideal points in a one-dimensional policy space. Parties draw candidates from recruitment pools, and voters make choices over candidates probabilistically, based on the distribution of their possible positions.

Having been elected, legislators from each party form caucuses, and set legislative agendas that propose to move policy from the status quo toward the preferences of the party. Party leaders then choose a degree of party discipline, holding some portion of a pool of distributive goods in bond for adherence to the party's legislative agenda. Legislators subsequently choose the rate at which they will support the party's agenda on votes, and receive the appropriate percentage of resources back as a result.

Following this, new elections are held, and some percentage of incumbents run for re-election. Incumbents running for re-election compete against a new challenger drawn from the opposition party's recruitment pool, while running on their own perceived "brand", which voters update based on the legislator's voting record. A new legislature is elected, and the process of discipline selection and roll-call voting and electoral feedback begins anew.

The presentation of the model will begin with the initial setup. Then, each of three submodels will be discussed, in turn.

3.3.1 Initial Setup and First Elections

Consider a jurisdiction divided into N constituencies, indexed i, each of whom elects a single member to a legislature for that jurisdiction. Constituencies are represented by a single voter, and have preferences x_i, drawn from distribution $X_C \sim N(0, 1)$. Each seat in the legislature, indexed j, with $j = i$, is contested by each of two parties, indexed k, where $K = [D, R]$. Initially, all seats are open, and each parties select candidates from normal distributions unique to their party, so that party D draws from candidates from:

$$X_D \sim N(\mu_D, \sigma_D) \tag{3.1}$$

and party R draws from

$$X_R \sim N(\mu_R, \sigma_R) \tag{3.2}$$

.

For simplicity, set $\mu_R > 0$, and set $\mu_D = -\mu_R$, and set $\sigma_D = \sigma_R$. Thus, party recruitment pools are symmetric about the mean (0) of the constituency distribution.

Voters are aware of the nature of these recruitment pools, and have risk-averse preferences over policy, assigning a quadratic loss function to the policies of party k – that is,

$$U_i(x_j) = -(x_i - x_K)^2 \tag{3.3}$$

over the distance of the mean position of the party from their own.[3]

Voters make the choice between candidates from each party probabilistically, with respect to the magnitude of the difference in expected utilities from the candidates' preferences. For voter i with preferences x_i, the expected utility of a candidate x_ik is given by:

$$EU_i(x_k) = -x_i^2 + (2x_i)\mu_k + \mu k^2 - \sigma_k \tag{3.4}$$

so that the difference in expected utilities between draws of x_D and draws of x_R is given by:

[3]Note that voters are interested in only the preferences of their potential representatives, and later, in how the actions of an incumbent representative reflect on their preferences. They value policy outcomes directly, but they are not strategic with respect to those outcomes – e.g. they won't elect a relatively extreme legislator with the idea of moving the policy agenda in their direction.

$$\begin{aligned} Diff_i &= EU_i(x_R) - EU_i(x_D) \\ &= 2x_i(\mu_R - \mu_D) + (\mu_R^2 - \mu_D^2) + (\sigma_D^2 - \sigma_R^2). \end{aligned}$$

which, since $\mu_D = -\mu_R$, reduces to:

$$Diff_i = 2x_i(\mu_R - \mu_D) + (\sigma_D^2 - \sigma_R^2) \tag{3.5}$$

Rearranging the terms in this way helps show one important property of this calculation – the variance of party recruitment pools matters, due to the risk aversion of the voters. In this way, even a candidate that had mean position further away from the preferences of the district could be favored in an election against a closer competitor, if there were more certainty about that candidate's location.

Voters then make probabilistic vote choices, based on the difference in expected utilities, using the logistic function:

$$f_{i,0}(\cdot) = P(\text{Vote R})_i = \frac{1}{1 + e^{-Diff_i + \epsilon_{Nt} + \epsilon_{it}}} \tag{3.6}$$

where $Diff_i$ for voter i is calculated as above, and where $\epsilon_{Nt} \sim N(0, \sigma_{\epsilon_N})$ and $\epsilon_{it} \sim N(0, \sigma_{\epsilon_i})$ represent idiosyncratic factors affecting all national elections (e.g. a national "wave" in election outcomes), and each individual constituency, respectively.[4]

The intuition represented in $f_i(\cdot)$ is that there are diminishing marginal returns to having an extreme advantage or disadvantage in terms of the difference in expected utilities – once a candidate is, say, 99% likely to win, it is difficult for their chances to improve much beyond that. This formulation also has the advantage of providing an *underlying* probability of victory for the winning candidate – this can be interpreted

[4]Note that the inclusion of these error terms, drawn at each time t, imply that the model is stochastic in nature. This will be important for later characterization of the model as a stochastic process, specifically as a Markov process

as corresponding to a comfortable victory, a close election, or even an upset. This information about the likelihood of having been elected will be made available to the winning candidates, and will be used to help determine their subsequent behavior in the legislature.

3.3.2 Submodel A: Party Caucus and Leader Decision-Making

Once elections are completed, the winning candidates become legislators, and are assigned to *caucuses*, based on their party. Before leaders set discipline levels, the party must set an *agenda* for the time period. The caucus for party k in time t sets an agenda a_{kt}, according to the following rule:

$$a_{kt} = \theta(x_{KM,t}) + (1 - \theta)(x_{SQ,t}) \tag{3.7}$$

where θ is an exogenously-defined constant parameter representing the nature of policy demand or systemic agenda within the party's ranks outside the chamber. The status quo is initially set at zero, and is moved according to the success of legislation in the chamber at the time.[5] The completed legislative agenda will be constructed out of bills from each party's agenda, in proportion to their share of seats in the legislature.[6]

Having set the agendas for each party, leaders representing each party set the *performance bond* for their caucus members. This performance bond, denoted, $bond_{kt}$ is equivalent to the share of a fixed pool of distributive resources, which can aid legislators in securing re-election, whose total value is γ, that are contributed to the

[5] This conceptualization of policy change renders exogenous the role of the Senate and the President in the U.S. case – assume that the policy space in question represents something akin to what can plausibly be accomplished, given the preferences of outside veto players.

[6] It should be noted that both the formulation of policy goals and the composition of proposals forming the legislative agenda are simplified greatly here, so as to focus on the role of leadership in setting party strength – setting the nature of proposals from each party's leaders avoids the necessity of including strategic motives in the leader's decision-making, and gives the leader a single decision output to focus on, as will be described below.

party, and held in bond, until returned to members in proportion to their willingness to support the party's agenda on roll-call votes. Leaders make decisions about how to set the performance bond based on the observed probabilities of securing victory in two constituencies – the *party median* constituency (that is, the constituency that sits at the ideological median of the set of seats held by the party), and the *chamber median* constituency.[7]

Specifically, the function $g(\cdot)$ describes the leaders' latent propensity to apply discipline, and their subsequent decision-making, as follows:

$$Propensity_{kt}(\cdot) = \alpha_0 + \alpha_1(p_t(x_{KM})) + \alpha_2(p_t(x_{CM})) \tag{3.8}$$

.

where KM denotes the party median of party k, CM denotes the chamber median, and the α's are exogenously-defined constants. This propensity, in turn, is used to help define $bond_{kt} = g_{kt}(\cdot)$ as follows:

$$g_{kt}(\cdot) = \frac{1}{1 + e^{-Propensity_{kt}}} \tag{3.9}$$

The latent propensity to attach distributive goods to a performance bond is filtered through the logistic function, so that the output $bond_{kt} = g_{kt}(\cdot)$ is a proportion, corresponding to the percentage of party distributive resources held in bond.

The intuition about party leaders' decision-making encoded above is that they face conflicting incentives about whose interests to protect in guiding party actions in the legislature. On the one hand, majority status is generally understood to be preferable to minority status, and as such, responsiveness to one's party's chances at securing the chamber median seat (and with it, a chamber majority, in expectation) should

[7]Including each of these targets in the weighting of disciplinary intensity is similar to the conceptual formulation in Cox and McCubbins [2007] , but assumes that the leader's *own* electoral fortunes are secure, and therefore not included in the calculation.

matter greatly. On the other hand, leaders are also agents of their current party caucuses, and may feel more compelled to respond to the electoral needs of the party median. The value of α_1 describes the degree to which the party median's electoral conditions affect the leader's behavior, and the value of α_2 describes the degree to which the chamber median's electoral conditions affect the leader's behavior.

The difference between how the values of α_1 and α_2 affect leaders' decision-making can thus be understood, in the world of this model, to operationalize the difference between theories of partisan organization that emphasize the leader as responsible for advancing the policy preferences of the party caucus, and those that emphasize the leader as responsible for maintenance of majority status (cleaving to the chamber median as necessary to secure majority control). In contrast, α_0 is an intercept, and merely represents the baseline propensity of leaders to set performance bonds.

3.3.3 Submodel B: Legislator Vote Choice

Having set the parties' agendas, and determined the intensity with which each party will discipline its members to vote the party line (e.g. for their own agenda, and against the other party's agenda), it is up to individual legislators to determine how often they will support the party. Legislators will make this determination with respect to their own current electoral security, as well as the nature of the disciplinary regime chosen by the party leaders.

Specifically, the latent propensity of legislator j to support the party's agenda in time t given by the following equation:

$$propensity_{jt} = -\beta_{j0} + \beta_{j1} p_{it} + \beta_{j2} \gamma s_{kt} \tag{3.10}$$

where $\beta_i' s$ are permanent characteristics of the legislator, set at the *individual legislator's initial election to the chamber*, and are drawn from exponential distributions with known and constant parameters. For instance, $\beta_0 \sim Exp(\beta_0, \lambda_0) = \lambda_0 e^{-\lambda_0 \beta_0}$ The permissible values for the λ's are all positive, and all draws from these distributions are strictly positive by definition. More will be said on the actual values used for the λ's in Chapter 4.

The underlying propensity calculated above helps to define legislator j's loyalty rate, $l_{jt} = h_{jt}(\cdot)$ as follows:

$$h_{jt}(\cdot) = \frac{1}{1 + e^{-Propensity_{jt}}} \tag{3.11}$$

This logistic function yields a proportion $l_{jt} = h_{jt}(\cdot)$ as an output, which corresponds to the *rate* at which legislator j supports party agenda items in time t.

The intuition behind the legislator's decision-function is that each individual legislator weights her own electoral security, and the promises of benefits from the party in exchange for loyalty, differently, as well as having a different baseline propensity to support to party, independent of the particular circumstances of time t. Note that the legislator characteristics $(\beta_{j0}, \beta_{j1}, \beta_{j2})$ vary from one legislator to another – one key feature of the model is that these characteristics may play a key role in determining whether or not legislators are able to adapt to their circumstances well enough to secure their continued re-election. This implies that the *observed* characteristics of *successfully re-elected* legislators will likely be affected by the trajectory of model play. Thus, one major endogenous output of the model will be the *realized* level of responsiveness to electoral security for re-elected legislators. In this way, the model incorporates both of Theirault's (2005) conceptualizations of electoral feedback as "the power of the people", as it models both *adaptation* by individual legislators and *replacement* of individual legislators.

3.3.4 Submodel C: Electoral Response to Legislator Reputation

After legislators set their voting behavior, a new time step begins, and a new round of elections are held. These elections differ from the initial legislative elections, in that many of them will involve incumbent legislators, who will run on reputations that are altered by their behavior while in the legislature. Alternatively, incumbents retire with a positive probability ρ, in which case, open seat elections are held in the same fashion as in equation (3.6).

The reputations of legislators seeking re-election are updated, according to a voter weighting factor ϕ, and to their own chosen loyalty rate, l_{jt}. These weights update the mean and variance of voter placement of the legislator j from party k, such that:

$$\bar{\mu}_{j,t+1} = \phi[l_{jt}a_{kt} + (1-l)x_{sq}] + (1-\phi)\bar{\mu}_{j,t} \tag{3.12}$$

$$\bar{\sigma}_{j,t+1} = \phi[l_{jt}a_{kt}^2 + (1-l)x_{sq}^2 - (l_{jt}a_{kt} + (1-l_{jt}s))^2] + (1-\phi)\bar{\sigma}_{j,t} \tag{3.13}$$

The implication of the above equations is that, in voters' minds, the strength of the association of a legislator with her party's policy pursuits is mediated by her loyalty rate. This has two consequences for the legislator's ideological reputation – the first is that defections from supporting the party's agenda will have the effect of pulling the mean placement of the legislator more closely to the status quo policy, which is (almost certainly) more moderate than the party's agenda. The second is that defections from the party's agenda can introduce uncertainty in the legislator's ideological reputation – risk-averse voters may penalize them on net for this, depending on the value of variance of their reputation *vis a vis* the mean. Note that this penalty would be mitigated for a legislator that gains the reputation of *usually* bucking the party line on key votes – such a legislator could be understood to develop a reputation as a *maverick*, which would reduce uncertainty about their placement, even in the absence of consistent association of the party agenda.

Voters then weigh this reputation ($\bar{\mu}_{j,t+1}$, $\bar{\sigma}_{j,t+1}$) against a the prospect of a candidate drawn from the pool of the opposing party $\sim k$. At this point, the party also upholds its end of the loyalty bargain, and returns distributive resources to legislators in exchange for their realized loyalty rates. These resources can be understood as a block-grant of valence-boosting goods that help legislators secure re-election, independently of considerations of ideological reputation. Thus, the legislator's reputation and distributive bounty are taken to the re-election contest, where they are weighed against the value of a fresh draw from the opposing party's recruitment pool. For example, consider a Republican incumbent, running against a Democratic challenger – the latent electoral calculation, $Diff_{it}$ is computed:

$$Diff_i = 2x_i(\bar{\mu}_{j,t+1} - \mu_D) + (\bar{\mu}^2_{j,t+1} - \mu^2_D) + (\sigma^2_D - \bar{\sigma}^2_{j,t+1}) + (l_{jt}\gamma s_{kt}) \tag{3.14}$$

and is translated into a re-election probability via the logistic function. Thus,

$$f_{i,t+1}(\cdot) = \frac{1}{1 + e^{-Diff_i + \epsilon_{Nt} + \epsilon_{it}}} \tag{3.15}$$

.

of which the $f_0(\cdot)$ presented in equation (3.6) was a special case, corresponding to the initial situation in which legislators have no reputations or distributive resources of their own. As noted above, in situations where the incumbent has retired, open seat elections are held, again using equation (3.6) to determine the probabilities of victory for each side.

3.3.5 Summing Up

Qualitatively, this model can be understood as a stochastic electoral process, from which leadership decisions about disciplinary intensity and legislator choices about loyalty rates follow, and then feed back into the electoral calculations of representative voters. This understanding is depicted in Figure 3.1, situating functions $f_(\cdot)$, $g_(\cdot)$, and

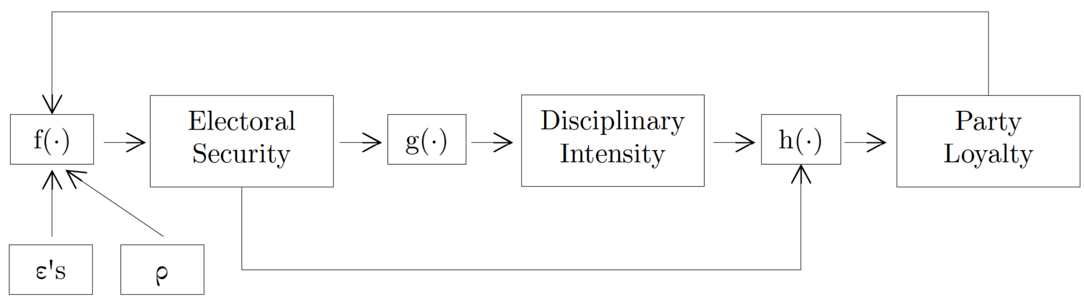
$h_{(\cdot)}$, in terms of the location in the sequence of model play. Importantly, these three functions jointly constitute a Markov process,[8] and can be evaluated using MCMC methods (Laver & Sargenti 2012).

In the next chapter, computational techniques will be used to simulate model play across a wide variety of parameter values. These results will then be analyzed, to help build up testable predictions about the relationship between electoral security and party loyalty for cross-pressured legislators.

[8]See Appendix A.1 for more on this subject.

Tables & Figures

Figure 3.1: Qualitative Diagram of Model Play.



Note the inclusion of stochastic elements (ϵ's and ρ).

CHAPTER IV

Simulating the Dynamic Model: Approach & Analysis

In Chapter 3, I proposed a dynamic model of party discipline selection, legislator decision-making and electoral response which was designed to generate observed relationships between electoral security and party loyalty, within the evolving context of partisan organization of the legislature. The purpose of this model is to help explain the conditions under which cross-pressured moderates may react to electoral threat by increasing their rate of defection from the party line of roll-call votes. More specifically, there are three questions that such a model should attempt to answer:

1. What factors can help explain the strength of the observed relationship between electoral security and party loyalty?

2. When will differing levels of electoral security result in dispersion of party unity scores across a party caucus? And, is this dispersion mainly driven by defections from the party line by cross-pressured moderates?

3. How do the answers to these questions help us generate predictions about the actual dispersion of party unity rates in the U.S. House, and about the attempts of representatives to use defection behavior as a way of insulting themselves from electoral threat?

Analysis of the model should be conducted with these questions in mind.

In this chapter, I conduct such an analysis. I begin by setting up a theoretical framework appropriate to the model proposed in Chapter 3, categorizing the variables in the model as key *exogenous parameters of interest*, *tuning parameters* and *endogenous variables*. I propose a simulation strategy that samples combinations of reasonable values for each *exogenous and tuning parameter*, and some correlation- and regression- based methods appropriate to analysis of the results from the sample. I then report on the results of the analysis, with a focus on explaining the conditions under which cross-pressured moderates end up defecting from their party in large numbers, thus causing high dispersion of party unity rates. I close with a discussion of the implications of the findings for empirical analysis of legislator response to electoral conditions in the U.S. House.

4.1 Setup & Conceptual Framework

Before beginning model analysis, it is first necessary to collect and categorize conceptually all the quantities at play in the model. Generally, these fall into two types – *exogenous parameters*, set at the beginning of model play and retaining their value throughout, and *endogenous variables*, which fluctuate over the time steps in model play, and jointly constitute the state of the model at a given time (as described in Appendix A.1).

Conceptualizing variables in this fashion helps structure the analysis of an agent-based model to render it analogous to the derivation of *comparative statics* of an equilibrium solution in an equation-based model. Having achieved convergence on a distribution of states, the covariance of endogenous output variables with exogenous input parameters can be assessed. Since not all exogenous parameters are of equal substantive interest, attention will be focused on a few of them, with the others being treated as *tuning parameters*, that can be alternately understood as paring the parameter space explored by the model to one that bears a reasonable resemblance to the actual relationship represented by the model, and as providing "robustness checks" for inferences drawn from the model.

4.1.1 Collecting Quantities

Having laid out a now-tripartite distinction between exogenous parameters of interest, tuning parameters, and endogenous variables, the equations from Chapter 3 can be mined to produce to following listings of each type of quantity in the model.

Exogenous Parameters of Interest

- Leadership Characteristics: $\alpha_0, \alpha_1, \alpha_2$
- Party Recruitment Pools: $\mu_D, \sigma_D, \mu_R, \sigma_R$

As described above, the first set of parameters to be collected are those exogenously-set parameters that have important substantive content. Specifically, leadership characteristics correspond to substantive claims about the nature of partisan organization of American legislatures, most notably the U.S. House. Second, the parameters defining the distribution of party candidates in the electorate correspond roughly to structural forces external to the chamber than may have an impact on the ideological uniformity and extremity of party nomination processes, and thus, on observed party cohesion.

Tuning Parameters

- Electoral Disturbances, $\sigma_{\epsilon,N}$ (national), $\sigma_{\epsilon,i}$ (district)
- Agenda Ambitiousness, θ
- Size of Distributive Resource Pool: γ

- Legislator Characteristics Distributions: $\lambda_0, \lambda_1, \lambda_2$
- Retirement Rate, ρ
- Voter Updating, ϕ

In contrast to the primary parameters of interest, these remaining exogenous parameters serve primarily as tuning parameters that help render the model useful as a tool for capturing complex real-world dynamics. Any of these parameters may be of further interest, and each could be analyzed for their own impact on model output. Additionally, each is needed to tell the *story* that is implicit in the characterization of model play above, in which voters and legislators co-adapt to each other's behavior. That said, it is necessary for the present study to limit detailed investigation to those exogenous parameters that speak more directly to concerns related to the partisan organizations of legislatures.

With this in mind, these remaining parameters will mainly be used to help pare down the parameter space to "reasonable" proportions, rendering the inferences drawn about the parameters of interest more sensible. This paring process will come at some loss of generality, but the total impact of the tuning parameters will be characterized thoroughly through uncertainty analysis, determining the degree of variance in outputs of interest which can be attributed to variation in the tuning parameters, and thus how robust the inferences drawn about the relationships between inputs of interest and outputs of interest might be to changes in each tuning parameter.

Endogenous Variables

- Probability District i Votes Republican, p_{it}
- Status Quo Policy = $x_{SQ,t}$
- Party Policy Agendas a_{kt}

- Share of Party Resources Held in Bond, s_{kt}
- Legislator Party Loyalty Rates, l_{jt}
- Characteristics of Re-elected legislators, $\beta_{j0}, \beta_{j1}, \beta_{j2}$

The endogenous variables mentioned above are the outputs of the model – of particular interests are the electoral security of individual members (the p_{it}'s) and the legislators' party loyalty rates (the l_{jt}'s). In each case, each step of the model will generate output for each district/legislator combination. Summarizing these data in a manageable way is not only important for practical reasons of quick inference, but also because the macro-level properties of party caucuses (e.g. the concentration of electorally-insecure and disloyal members) are key targets for explanation.

In addition to the endogenous variables mentioned above, which are directly involved in model play, a few other measures are collected, related to party turnover and volatility in party control of the legislature. Specifically, these are the *party balance of control* in the legislature, *the realized rate of retirement* and the *cumulative tenure* of sitting members of the legislature. With regard to the tenure measure, both means and standard deviations will be taken, as party turnover (and thus, electorally-induced variance in incumbent career duration), is likely to be concentrated in marginal electoral districts (i.e. most seats are likely to be "safe" for one party or the other).

Finally, one last measure is introduced, to help characterize the distribution of party unity rates across a party caucus. Specifically, the model will fit loyalty vectors across caucuses to *Beta distributions*, in addition to taking the typical moments like mean and standard deviation. This is because the Beta distribution is well-suited to characterize proportion data that "bunch" toward one end of a finite interval, while retaining the flexibility to detect other patterns (e.g. those with more central modes, or flatter and more uniform patterns of distribution).

More will be said about the properties of the Beta distribution in the next chapter, but the distribution is given by:

$$f(x; \alpha, \beta) = \frac{\Gamma(\alpha + \beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1-x)^{\beta-1} \tag{4.1}$$

.

The shape parameters α and β can be rearranged to produce a pairing of mean and dispersion parameters, denoted (μ, ϕ), where

$$\mu = \frac{\alpha}{\alpha + \beta}, \phi = \alpha + \beta \tag{4.2}$$

The value of the dispersion parameter, ϕ, is of particular importance, as it helps capture the "sharpness" of change in the distribution function around the mode of the distribution. This "sharpness" indicates the degree of dispersion in the loyalty rates between one part of the party caucus and another part of the party caucus, thus providing a very good heuristic for *differential willingness* of legislators to support the party line – potentially caused by defecting, cross-pressured moderates.

Examples of probability distribution functions for different values of $Beta(\alpha, \beta)$ are given in Figure 4.1. As can be seen, distributions with the same ratio of α to β have means in similar places, and modes in (roughly) similar places. As the value of $\phi = \alpha + \beta$, increases, the concentration of points around the mode intensifies, indicating a tighter clustering of party loyalties around the modal point. Greater levels of dispersion, associated with lower levels of ϕ, indicate the willingness of large swathes of the party caucus to vote with loyalty scores that differ greater from the mean or from the mode. Since scores are generally concentrated to one side of the distribution, as they are in each of the examples, this dispersion generally means that some subset of legislators are voting with the party less often. Thus, the value of ϕ is a good indicator of dispersion – *low levels of ϕ imply high levels of dispersion.*

4.1.2 Outcomes of Interest

As mentioned above, the main purpose of the model described is to generate conditions under which cross-pressured legislators decide to defect from supporting the party line on roll-call votes, thus causing dispersion in party loyalty rates across a caucus. As will be made clear in the next section, this can be understood in terms of three conditions being satisfied:

1. Moderate members are strongly *cross-pressured* between constituency and party – that is, they have large differences of preference from the center of their party, and are strongly pressured by the party disciplinary regime to support the party in pursuing its objectives.

2. Moderates choose to react to cross-pressure by siding with their constituents, and *defecting* from the party line on roll-call votes.

3. Moderates *survive* their re-election campaigns to continue casting votes at a low rate of party unity.

Each of these pieces of the story will be investigated throughout the analysis of simulation results, and will be integrated to draw inferences from the model as a whole. Of these three conditions, numbers 1 and 3 are of particular interest. Condition 1 is of interest, because it highlights the conditional nature of cross-pressure – depending on the configuration of electoral circumstances within a party, as well as the incentives faced by party leaders, the degree of cross-pressure faced by moderates may vary greatly. This reflects the importance of modeling party discipline regime selection *jointly* with legislator decision-making, as the former can have an important conditioning effect on the latter. Condition 3 is also of interest, because it highlights the importance of the *dynamic perspective* – members who engage in behaviors that are electorally disadvantageous are unlikely to be re-elected, which places a powerful filter on the kinds of outcomes that are theoretically sustainable. As will be seen below, the electoral feedback that is implicit in this dynamic setup will have important implications for the kinds of inferences that can be drawn about the vote behavior of cross-pressured moderates.

4.1.3 Key Independent Variables

From the discussion above, two key sets of independent variables can be isolated, which will be operationalized in the model as exogenous parameters. They are:

1. Preference distributions within the recruitment pools of each party.

2. The relative importance placed by leaders on securing majority status and serving the wishes of a majority of their own party (which may be in conflict, as in Cox and McCubbins 2007).

Both of these sets of variables are important, because they relate directly to the determination of the character of discipline regime enacted by each party at each point in time. These decisions by a legislator's party, combined with the preferences of a legislator's district, determines the extent of cross-pressure faced by an individual legislator. Thus, they will likely be important in explaining the observed connection between electoral security and party loyalty, and how that connection may vary from one legislator to another.

4.2 Strategy for Analysis

Having laid out the main questions to be addressed by the model, and having described the main types of parameters and variables at play in the model, a strategy for systematic exploration of the model must be set out. In general, the first goal will be to correlate realized values of endogenous variables from model play to the values of exogenous parameters, whose values are set at the beginning of each model run. The second goal will be to correlate the observed values of relevant endogenous variables to each other. This will be accomplished by simulating the model at different combinations of parameter values, running the model until "burn-in" is achieved, and then averaging observed values of the endogenous quantities of interest. Each run will thus constitute an entry in a dataset, and correlation- and regression-based methods can be used to connect variance in the run-average values of one quantity to the run-average values of another.

In this section, the averaging behavior described above is justified by discussing some useful properties of the model – especially the model's ergodicity. Then, a strategy for the sampling the parameter space is laid out, and some technical notes on implementation of the model are given.

4.2.1 The Markov Property, Ergodicity & Model Analysis

As mentioned briefly in Chapter 3, this model can be understood as a stochastic process, and one that has the Markov property, in that the transition probabilities from one point in the space of model play depend only on the previous state of the model. Additionally, the model is positive recurrent, meaning that it can move from point on the space of model play to any other point in any time step, with at least some positive probability.[1] Finally, the model is ergodic, which means that distribution of system behavior over time will be the same as the probability of behavior averaged over the state space of the system described the chain at *any given time.*

Intuitively, the importance of the ergodic property can perhaps best be characterized by what the model is *not.* The model is not path dependent since, like all Markov chains, it is memoryless – only the current state of the system matters to determining to future trajectory of the system. Additionally, the model has no absorbing states

[1]This, along with other key aspects of the Markovian nature of the model are discussed in Appendix A.1.

– because of the stochastic nature of the electoral response function, all possible outcomes have a positive probability of occurring (however small) in any time step of the model. Together, these paint a picture of a model that avoids the pitfalls of multiple equilibria that would complicate inductive assessment of the expected values of model output, given parameter inputs.

Moreover, these properties should bolster the "good behavior" of expected values of model output within a local environment of a point in the parameter space. This renders viable derivative- and regression-based methods of sensitivity analysis of model output, greatly simplifying the task of determining the relationships between inputs and outputs. It also bolsters the case for Monte Carlo sampling over the parameter space, as there is less need to do multiple runs at any given point in the parameter space to check for path dependence or multiple equilibria. This reduces the size of computational "experiments" to explore the parameter space by several orders of magnitude, and renders data analysis more manageable with conventional means.

As discussed by Marino et al (2008), uncertainty in the results from an agent-based model like the one under consideration can have two sources. The first is called *epistemic uncertainty*, and refers to uncertainty caused by variation in the input parameters. The second is called *aleatic uncertainty*, and refers to the uncertainty caused by stochastic components that are inherent to the model. As mentioned above, the purpose of designing the simulation under consideration as a Markov-Chain Monte Carlo process was to make sure that model output was "well-behaved" – by eliminating path dependence, and reducing model play to state dependence, the necessity of conducting multiple runs for a given set of parameter values was reduced. That is, the expected behavior of a given run of a model, averaged over time, should provide a good approximation of probability that the model would exhibit any given output in any given step.

Put differently, this implies that the *aleatic* uncertainty in the model is unlikely to have a substantively important effect on results from the set of simulation runs. Thus, we can be reasonably confident that observed uncertainty in model output is due is *epistemic* in nature.

4.2.2 Methods for Data Analysis

The suite of methods used for the analysis of data from computational simulations is sometimes referred to as global sensitivity analysis (Saltelli et al 2008). Global sensitivity analysis for the simulation results will be conducted through two main channels: partial rank-correlation coefficients and rank-fitted regression (as recommended by Marino et al 2008). Rank-based methods are used, since each of the mathematical relationships incorporated is filtered through some variant of the logistic function. This implies that while the expected relationship between an input and a related output will be monotonic, it will not be linear. Rank-based methods are robust to non-linearities in relationships, even in terms of partial correlation, provided that the inputs are independent from one another.

4.2.3 Sampling the Parameter Space

The approach of the following analysis is to establish minimum and maximum values for each parameter, as seems intuitive, to define each dimension of a parameter space, which is equivalent to the span of the dimensions. These values are displayed in Table 4.1. The model is run 10,000 times, and for each run, values for each parameter are chosen independently from a uniform distribution, bounded by the respective minimums and maximums given.

In some cases, it as difficult to develop an *a priori* justification for the bounds in question – ancillary experiments (not shown here) were used to determine which, if any, values for exogenous parameters had the effect of "breaking" the model. With this in mind, the values chosen should give a good accounting of the behavior of the model within reasonable segments of the parameter space.

4.2.4 Notes on Implementation

The model was coded in *Python 2.7*, and makes use of the *NumPy* and *SciPy* packages for data management and statistical support, respectively. There are three primary files involved with running a simulation – the main file is a model *class*, which is instantiated at different parameter values. Voters and legislators are also distinct classes, with a set of the former created once at the beginning of the run, and with the latter created as members win election and are subsequently replaced. Since there are only two party leaders, their decision-functions are hard-coded into the model class. Runs of the model class are executed for 1000 time steps, and model output is recorded for the final 500 steps. Difference-of-means tests (not reported) on key endogenous quantities were conducted to assess the quality of convergence, as suggested for MCMC processes in Gill (2002) .

4.3 Results

The goal of analyzing the simulation results is to assess variation in the strength of the relationship between electoral security and party loyalty. Of particular interest are factors and dynamics that can explain when party caucuses exhibit a great deal of dispersion in party loyalty, as this suggests that members who feel substantial electoral threat are defecting from the party line as a way of insulating themselves from being punished by constituents for being too closely associated with their party. To further consider this possibility, the intensity of party-constituency cross-pressure will also be assessed, with special attention paid to the impact that cross-pressure has on legislator defection behavior. Additionally, since the model is dynamic, the frequency and causes of legislator defeat will be considered, as will their implications for the observed rates of electoral security and party loyalty among the survivors.

The basic picture that will emerge from this analysis is that the *the endogenous determination of party discipline will explain the conditions under which cross-pressured moderates defect.* Under low levels of cross-pressure, moderates will feel little need to defect. Under moderate levels of cross-pressure will feel the need to defect and do so. Under high levels of cross-pressure, they will feel the need to defect but will fail to secure re-election.

4.3.1 Summary Statistics & Basic Correlations

Analysis of simulation results begins with a basic recounting of means and standard deviations of key endogenous variables, which are presented in Table 4.2. Since results are symmetric with respect to the parties, only the figures for Republicans are reported, with no loss of generality.[2] Legislators are re-elected with a mean probability of 74.6%, and with a mean probability of 81.2%, suggesting that there is a rightward skew in the distribution of re-election probabilities. Legislators vote with their party about 52.0% of the time, and averages measures of dispersion (standard deviation and ϕ) indicate that a fair amount of variation in loyalty exists on average. Also of note is the fact that observed legislator sensitivity characteristics all come in higher than 1, which was the mean value for each parameter, indicating that at least some selection based on legislator sensitivity is occurring in model play.

More important than absolute values of endogenous variables, though, is how they are related to exogenous parameters – this is especially useful as a validity check, to see if the model behaves in ways that seem sensible, given the underlying equations in play. Table 4.3 presents partial rank correlation coefficients for endogenous variables on exogenous parameters, and Tables 4.4 and 4.5 present the partial rank regression coefficients for the same set of outputs and inputs. Since the results from each method

[2] Investigation by the author indicates that the results are substantively identical for Democrats

tell the same basic story, the focus will be on Tables 4.4 and 4.5.

Of particular interest in Tables 4.4 and 4.5 are the exogenous parameters that are strong predictors of legislator re-election probabilities or legislator loyalty rates. As would be expected, mean Republican district extremity (listed as "Mean Rep. Dist. Pref." on the table) is positively associated with mean Republican re-election probability and negatively associated with the standard deviation in re-election probabilities – this indicates that favorable electoral territory for Republicans has the effect of making re-election more uniformally secure for Republicans. This doesn't translate into more uniform loyalty, though – while mean party loyalty is higher given more favorable electoral terrain, the variance in party loyalty also goes up, as indicated by the positive coefficient for Mean Republican Position on both the standard deviation of loyalty rate, and the negative coefficient in the equation for ϕ (since lower values of ϕ indicate more dispersion).

Variation in the favorability of electoral terrain ("SD Rep Dist. Pref.") is not significantly related to the mean or variance of party loyalty rates, indicating that something *endogenous* to model play must be driving observed distributions of party loyalty rates. This intuition is reinforced by the fact that the exogenous factors that contribute to the extent of possible discipline – the size of the resource pool ("Resource Max") and the willingness of leaders to increase discipline, given electoral security of the chamber median ("Mean Leader Parameter 1") and the party median ("Mean Leader Parameter 2) – are positively associated with mean disciplinary intensity and mean party loyalty, but also with the standard deviation of party loyalty. This suggests that party discipline may have the effect of increasing mean loyalty while also increasing dispersion of loyalty scores. More will be said on the effect of discipline regimes on creating cross-pressure for moderates below, but these findings would be consistent with the possibility that party discipline regimes enhance the loyalty of relatively extreme partisans while forcing defections from more moderate members.

The purpose of the remaining discussion will be to show how endogenously-derived discipline regimes can produce dispersion in party loyalty rates. First, the basic observed relationship between electoral security and party loyalty will be assessed. Then, the direct contributions of electoral security to party disciplinary intensity will be considered in more detail. Next, the modifying effect of disciplinary cross-pressure on the relationship between security and loyalty will be examined. The analysis will conclude with the role of cross-pressure in producing electoral turnover.

4.3.2 Party Loyalty As A Function of Electoral Security

Deeper analysis of the connections between endogenous model quantities begins with the two that are most important – electoral security and party loyalty. The two scatterplots in Figure 4.2 show the relationship between mean security and mean loyalty, and between the standard deviation of electoral security and dispersion in party loyalty scores (ϕ). While there exists a mild positive relationship between mean security and mean loyalty, no such positive relationship exists between variance in electoral security and dispersion in loyalty rates. This suggests that variation in the observed degree of electoral security enjoyed is not sufficient by itself to explain when a high degree of dispersion in loyalty rates will be observed.

These results are confirmed by partial-rank regression analysis, as shown in Table 4.6. In these equations, mean loyalty rate and mean ϕ fit are regressed on measures of observed re-election security, and a complement of exogenous controls (not all shown). Here, we can see that mean re-election probability actually is *negatively associated* with ϕ, suggesting that whatever causes increases in mean electoral security may be also causing increased dispersion in loyalty rates. Once again, the exogenous parameters responsible for discipline potential – resource maximum, and leader parameters 1 and 2 – are also negatively associated with ϕ. While the standard deviation of re-election probability is, *ceteris paribus*, associated with lower values of ϕ, the fitted values of ϕ are not, as shown in Figure 4.3.

Taken together, these results continue to suggest that an individual legislator's electoral considerations alone are not sufficient to explain when will see high dispersion in observed party loyalty rates. This makes sense, considering that a legislator's electoral conditions are not the only thing determining their choice of party unity rate – *party disciplinary regimes* mediate the legislators choices in this regard. In the next section, this mediating effect will be assessed by looking first at the role of electoral security in party disciplinary intensity, and then at the role of disciplinary intensity in producing observed patterns of loyalty rates, given electoral security distributions.

4.3.3 Party Discipline & Cross-Pressure: Effects on Observed Loyalty Dispersion

There are two steps to the process by which party discipline can have a mediating effect on the relationship between electoral security and party loyalty – first, electoral security values for party members play a role in determining the disciplinary intensity chosen by leaders, and second, disciplinary intensity affects the future electoral fortunes of members, conditional on how often they vote with the party (and thus, how much of the distributive resource bond they get back for use in re-election efforts). Starting with the former, Figure 4.4 illustrates the connections between mean and standard deviations in electoral security and mean party discipline levels. While mean electoral security is positively associated with higher mean levels of disciplinary intensity, the standard deviation of electoral security enjoyed by party members does not appear to be.

The results of a partial-rank regression analysis designed to determine the effect of electoral security on mean disciplinary intensity, reported in Table 4.7, tell a somewhat different story. As shown in column 1, both the mean and standard deviation in party discipline rates are positively associated with party disciplinary intensity.

One possible explanation for this is that the increases in electoral security that are responsible for higher disciplinary intensity are mainly being enjoyed by more secure members. If this were true, we would expect that the effect of leader parameter 2 (sensitivity to the security of the *party* median member) would be conditional on both mean and variance in electoral security, whereas the effect of leader parameter 1 (sensitivity to the security of the *chamber* median member) would not be. As shown by the coefficients on the interactive terms in equation 2, this is in fact the case. The marginal effects for mean electoral security and party discipline are plotted in Figure 4.5, to give an example of this difference. Considering that the model is dynamic, it is likely that at least some of this increase in electoral security for more extreme party members comes from *prior* compliance with the disciplinary regime – disciplinary intensity would appear to be a boon for extreme members, but not so much for moderate members.

So, do moderate members defect in response to the cross-pressure induced by more intense disciplinary regimes? More specifically, does disciplinary intensity modify the relationship between electoral insecurity and increased party loyalty? Table 4.8 estimates several equations designed to determine the nature of the relationship between party discipline and mean ϕ fit. The fullest specification, given in Equation 3, indicates that the interaction between mean discipline and variance in re-election probabilities (which we now know indicates the presence of cross-pressure moderates) has a negative effect on ϕ – indicating increased dispersion. However, the interaction between the square of mean discipline and variance in re-election probabilities has a positive effect on ϕ, indicating decreased dispersion.

The marginal effect of cross-pressure (e.g. variance in re-election probabilities) upon party loyalty dispersion (ϕ) is plotted in Figure 4.6. As can be seen, electoral threat has a *positive* effect of ϕ, indicating less dispersion in loyalty rates, at low and high levels of disciplinary intensity, but a *negative* effect at moderate rates.

4.3.4 Closing the Loop: Legislator Survival

The preceding results raise the question: why is the relationship between disciplinary intensity and party loyalty dispersion curvilinear? That is, why do we observe substantial numbers of cross-pressured moderates defecting at moderate levels of discipinary intensity, but not at high levels? There are at least two possible answers to this question: either high disciplinary rates are sufficient to induce compliance among moderate members and subsequently help them secure re-election *or* the cross-pressure faced at high disciplinary intensity is too strong, and moderates can't survive, thus getting eliminated from the simulation run. If the former is true, then the combination of high disciplinary intensity and electoral threat should enhance the chance of survival for incumbent legislators. If the latter is true, this combination should hurt the chances of survival for incumbent legislators.

Table 4.9 confirms that the latter explanation is right. Equations 1, 3 and 5 estimate the effects of the combination of electoral threat and disciplinary intensity on mean incumbent defeat rate, mean legislator tenure and the standard deviation of legislator tenure. The combination of the two factors is positively associated with defeat probability and negatively associated with mean legislator tenure. Importantly, this combination is also associated with increased variance in tenure for sitting legislators, indicating an uptick in recently elected legislators, resulting from more electoral churn. Figure 4.7 plots mean incumbent defeat rates and variation in accumulated tenure by both electoral threat and party discipline. In both cases, the safest quartile is low on both measures, and the least safe quartile is high on both measures.

Equations 2, 4 and 6 show the effect of ϕ on electoral turnover – in each case, lower values of ϕ are security enhancing, indicating that defection does work as an insulation/survival strategy *when moderates can get away with doing it.*

4.4 Discussion & Conclusions

The results of the model can be summarized as follows. Exogenous electoral circumstances are not sufficient to generate the observed dispersion in party loyalty rates that would signal increased moderate defections. The endogenous determination of party disciplinary intensity plays a key role in determining the loyalty behavior of moderate legislators – higher disciplinary intensity works primarily to the electoral benefit of loyal extremists within the party, while inducing defections from cross-pressured moderates (thus, observed dispersion in unity rats goes up). When disciplinary intensity is high enough, moderates can't survive their re-election campaigns, and so dispersion goes down due to their absence from the party caucus.[3]

Put differently, the picture of endogenous party discipline that emerges from the model is one that can be adequately characterized in three rough "output regimes" summarized in the following way:

1. A low discipline, low security variance regime. Legislators representing moderate districts feel relatively little electoral threat from supporting the party's agenda, and have no trouble supporting it. Resulting party loyalty dispersion rates are low.

2. A moderate discipline, moderate security variance regime. Legislators representing moderate districts feel some cross-pressure between their district and their party, as reflected in their more tenuous electoral circumstances. They desire to insulate themselves from the potential dangers of being associated with the party's agenda, and raise their defection rate on roll-call votes. Resulting party loyalty dispersion rates are high, since moderates survive by developing a reputation independent from the party's agenda.

[3]Theriault (2006) evaluates the extent to which a replacement dynamic can explain contemporary partisan polarization.

3. A high discipline, high security variance regime. Legislators representing moderate districts feel major cross-pressure between their district and their party, as reflected in their much more tenuous electoral circumstances. They desire to insulate themselves from the potential dangers of being associated with the party's agenda, but are unable to survive being tied to their party, regardless of their behavior. They are defeated at high rates, before they can develop an independent reputation. Resulting party loyalty dispersion rates are low – the surviving members are those that don't see much need to defect from the party line in order to safely secure re-election.

This third scenario is unlikely to actually obtain in the real world case of the U.S. House. (seeing as it would likely imply a substantial and constant amount of electoral turnover that is implausible in that case). But, it still tells us something important about the behavior of cross-pressured moderates – namely, that their *incentive* to defect is conditioned by the degree of cross-pressure that they experience and that their *capacity* to defect is conditioned by electoral survival.

So what does the model say about the conditions under which legislators representing moderate districts choose to adapt to electoral cross-pressure by defecting more often from the party line on roll-call votes? The answer given is that these legislators will defect when:

1. They feel the need to do so to preserve their own ideological reputation and electoral survival, **and**

2. They can survive long enough to do so.

In terms of the accountability of the legislator to her constituents, this can be explained with Theirault's (2005) framework – when *adaption* fails, *replacement* kicks in. The making of this particular inference about the observed rates of connection between electoral threat and deviation from the party line is made possible by the *dynamic* nature of the model, which takes into account electoral reaction to legislator behavior in determining what behaviors are likely to emerge from model play.

The first condition is largely a calculation that is likely to be determined in isolation, based on the legislators' own electoral relationship with their district. The latter condition, however, is the part that is mediated by the *composition* of their caucus. Note that the most dangerous time to represent a moderate district in the model is when discipline is high and security variance is low. Each suggests a situation in which the majority of one's own party is relatively electorally secure, as mean electoral security is positively related to both disciplinary intensity and variation in security rates. This secure portion of the party can push for a more extreme party agenda, and moderates will struggle to survive being associated with it.

There are at least two major testable implications that come from the results of this model. These are:

1. Observed degrees of dispersion in party loyalty rates are a phenomenon that is determined at the caucus level, by the divergence in interests between more and less secure members.

2. Moderates have the ability to insulate themselves from the effects of being associated with an unpopular agenda, but this ability is likely to be conditional upon intensity of cross-pressure, and upon their own tenure in the legislature.

The latter implication is somewhat less obvious from model results, but it does follow from the discussion of electoral turnover. Moderate legislators have to be able to survive long-enough to establish a consistent pattern of defection associated with holding more moderate views. High rates of defection are a liability for less well-tenured members, as they increase uncertainty about the legislator's preferences. Thus, tenure should have a mitigating role in the relationship between electoral security and party loyalty – longer-tenured members are proven ideological commodities who have less need to respond sharply to electoral conditions as a result.

Chapter 5 will discuss the way in which party composition affects observed dispersion in party unity rates in the U.S. House. Chapter 6 will briefly discuss how cross-pressure and legislator tenure moderate the observed connections between electoral security and party loyalty, and between party loyalty and electoral survival, for individual House members.

4.4.1 Possible Issues & Extensions

As with any model, a few major trade-offs had to be made in order to isolate the key intra-party dynamics of interest. The first is in the exogenous imposition of a legislative agenda, which is determined by the agenda ambitiousness parameter. This was done in order to reduce party leader decision-making to single, endogenous quantity – the intensity of discipline, as operationalized by the share of party distributive resources held in bond for loyal performance on roll-call votes. It is entirely possible that a leader may choose to pursue a moderate agenda with all potential resources at hand, or may pursue an extreme agenda while committing very few resources to actually achieving it. Characterizing mean and variance of loyalty behavior over a two-dimensional space of simulated leadership choice would have been very difficult, though, and so the agenda was not conceptualized as an independent, "moving" piece of the model.

Additionally, the ideological space considered in the model is unidimensional. Considering that much of the disagreement with parties may occur along secondary ideological dimensions (e.g. McCarty et al 2006, focusing on bimetallism and racial issues), it may be a consequential decision to omit the possibility of cross-partisan roll-call coalition-making (with the concomitant lowering of party loyalty scores that would follow from such votes). However, since the focus of the model was on party discipline levels, and party discipline tends to compress observed issue spaces to a single-dimensional space, anyway (see Rohde et al 2005, Kalmoe n.d.) this was deemed an unnecessary complication for the present study. The possibility of considering the viability of a second ideological dimension as being a proxy for party power or homogeneity shouldn't be ruled out, though – because of this, a multidimensional extension of the model may yield some interesting results.

Finally, the model assumes symmetry in the expected means and variances in party recruitment pools and in the underlying preferences of Congressional districts. This assumption may not stand up to empirical scrutiny, and it may be of consequence to the results of the simulation, as it's not clear how sensitive the behavior of one party is to the electoral conditions of the other, and vice versa. Since the model of roll-call behavior generation does not involve any strategic considerations, I have ruled out the possibility that one party's loyalty rates may be conditional upon the others (which is important to some stories of observed loyalty rates, see Lebo et al 2007.) fleshing out both the basis of party recruitment pools and the structural asymmetry in the party's bases of electoral support may help to explain some of the differences in resulting inter- and intra-party dynamics across parties and over time.

Tables & Figures

Table 4.1: Exogenous Parameter Values Included in Experiment.

Parameter	Symbol	Minimum	Maximum
Mean Democratic Candidate Position	μ_D	-2	0
St. Dev. Democratic Candidate Position	σ_D	0	1
Mean Republican Candidate Position	μ_R	0	2
St. Dev. Republican Candidate Position	σ_R	0	1
Resource Max	γ	0	1
Agenda Ambition	θ	0	1
Voter Updating	λ	0	1
Retirement Rate	ρ	0	.2
St. Dev. National Electoral Shocks	$\sigma(\epsilon_{Nt})$	0	1
St. Dev. District-Specific Shocks	$\sigma(\epsilon_{it})$	0	1
Leader Parameters	$A = (\alpha_0, \alpha_1, \alpha_2)$	0.5	1.5
Legislator Parameters	$B = (\beta_0, \beta_1, \beta_2)$	0.5	1.5

Table 4.2: Summary Statistics for Model Output, Republicans Only, Averages of Model Run-Averages (Last 500 Steps)

Statistic	Mean	St. Dev.	Min	Max
Electoral Security				
Mean Re-Election Probability	.746	.071	.421	.948
SE Re-Election Probability	.235	.054	.056	.409
Median Re-Election Probability	.812	.089	.387	.997
Party Decision-Making				
Party Agenda	.309	.256	$-.227$	1.612
Disciplinary Intensity	.574	.097	.308	.823
Legislator Behavior & Characteristics				
Mean Loyalty Rate	.520	.078	.297	.793
SE Loyalty Rate	.228	.026	.154	.336
Mean β_0	1.114	.331	.494	2.233
SE β_0	1.081	.337	.514	2.480
Mean β_1	1.193	.356	.592	2.499
SE β_1	1.149	.346	.494	2.739
Mean β_2	1.175	.354	.566	2.382
SE β_2	1.141	.351	.544	2.675
Turnover/Tenure Measures				
Mean % Inc. Running	90.899	.189	90.184	91.660
Mean % Inc. Defeated	25.603	8.483	2.740	49.896
Mean Tenure	50.737	42.437	1.695	178.648
Var Tenure	23.143	23.428	1.310	185.353
Beta Fit Statistics				
Mean Estimated α	1.988	.691	.712	9.931
Mean Estimated β	1.820	.629	.632	5.212
Mean Estimated ϕ	3.767	1.153	1.455	10.300

Table 4.3: Partial-Rank Correlation Coefficients by Key Model Inputs & Outputs

Input	Mean Re-Election Probability	SE Re-Election Probability	Mean Disciplinary Intensity	Mean Loyalty Rate	SE Loyalty Rate	Mean α Fit	Mean β Fit	Mean ϕ Fit
Mean Dem. Position	.372	-.579	-.074	-.258	-.021	-.069	.060	-.015
	(.009)	(.009)	(.009)	(.010)	.010)	(.011)	(.011)	(.011)
SD Dem. Position	.436	-.062	.224	.024	.019	-.001	-.027	-.006
	(.008)	(.012)	(.010)	(.010)	(.010)	(.010)	(.010)	(.010)
Mean Rep. Position	.823	-.239	.495	.067	.067	-.045	-.082	-.039
	(.004)	(.010)	(.008)	(.009)	(.008)	(.011)	(.010)	(.011)
Mean Dem. Position	-.004	.009	.018	-.008	-.009	-.010	-.003	-.010
	(.010)	(.011)	(.010)	(.009)	(.010)	().010)	(.009)	(.011)
Resource Max.	.019	.013	.027	.515	.150	-.003	-.283	-.097
	(.011)	(.009)	(.009)	(.011)	(.009)	(.009)	(.011)	(.009)
Mean Leader Par. 0	-.003	.010	-.955	-.129	-.032	.003	.062	.011
	(.011)	(.010)	(.001)	(.010)	(.011)	(.011)	(.010)	(.010)
Mean Leader Par. 1	.005	.003	.839	.047	.012	-.009	-.014	-.003
	(.009)	(.009)	(.004)	(.010) (	.010)	(.010)	(.009)	(.009)
Mean Leader Par. 2	.013	-.008	.931	.082	.017	-.001	-.048	-.018
	(.009)	(.010)	(.002)	(.011)	(.010)	(.011)	(.009)	(.010)

Table 4.4: Partial-Rank Regression Coefficients for Key Model Outputs

Input	Mean Re-Election Probability	SD Re-Election Probability	Mean Disciplinary Intensity	Mean Loyalty Rate	SD Loyalty Rate
Mean Dem. Dist. Pref.	.025***	−.075***	−.003***	−.027***	−.002***
	(.001)	(.0005)	(.0003)	(.0005)	(.0002)
SD Dem. Dist. Pref.	.060***	−.018***	.017***	.005***	.003***
	(.001)	(.001)	(.001)	(.001)	(.0004)
Mean Rep. Dist. Pref.	.086***	−.031***	.020***	.007***	.004***
	(.001)	(.0005)	(.0003)	(.0005)	(.0002)
SD Rep. Dist. Pref.	−.0003	−.001	.0003	−.0002	−.0001
	(.001)	(.001)	(.001)	(.001)	(.0004)
Resource Max.	.003**	.001	.001**	.113***	.017***
	(.001)	(.001)	(.001)	(.001)	(.0004)
Mean Leader Parameter 0	−.001	−.001	−.237***	−.023***	−.004***
	(.001)	(.001)	(.001)	(.001)	(.0004)
Mean Leader Parameter 1	−.001	.002*	.117***	.011***	.002***
	(.001)	(.001)	(.001)	(.001)	(.0004)
Mean Leader Parameter 2	.002	−.001	.193***	.017***	.002***
	(.001)	(.001)	(.001)	(.001)	(.0004)
Constant	.636***	.214***	.471***	.428***	.336***
	(.004)	(.003)	(.002)	(.003)	(.001)
Observations	9,900	7,336	9,900	8,923	7,412
Robust R^2	.676	.736	.925	.811	.772
Reduction in Dispersion	1375.4***	1361.7***	8088.8***	2545.2***	1668.8***

*p<0.1; **p<0.05; ***p<0.01

Table 4.5: Partial-Rank Regression Coefficients for Key Model Outputs (cont'd)

Input	Mean α Fit	Mean β Fit	Mean ϕ Fit
Mean Dem. Dist. Pref.	$-.071^{***}$	$.130^{***}$	$.058^{***}$
	(.005)	(.006)	(.011)
SD Dem. Dist. Pref.	$-.058^{***}$	$-.074^{***}$	$-.122^{***}$
	(.010)	(.011)	(.021)
Mean Rep. Dist. Pref.	$-.076^{***}$	$-.119^{***}$	$-.195^{***}$
	(.005)	(.006)	(.011)
SD Rep. Dist. Pref.	$-.015$	.002	$-.021$
	(.010)	(.011)	(.021)
Resource Max.	$-.008$	$-.829^{***}$	$-.824^{***}$
	(.010)	(.011)	(.022)
Mean Leader Parameter 0	$.034^{***}$	$.192^{***}$	$.225^{***}$
	(.010)	(.011)	(.021)
Mean Leader Parameter 1	$-.015$	$-.091^{***}$	$-.095^{***}$
	(.010)	(.011)	(.021)
Mean Leader Parameter 2	$-.007$	$-.124^{***}$	$-.125^{***}$
	(.010)	(.011)	(.021)
Constant	$-.724^{***}$	$-.048$	$-.744^{***}$
	(.029)	(.032)	(.061)
Observations	7,801	7,654	6,060
Robust R^2	.824	.718	.755
Reduction in Dispersion	2423.6^{***}	1298.7^{***}	1247.4^{***}

$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 4.6: Mean Loyalty and Loyalty Dispersion as a Function of Electoral Security (Partial Rank-Regression Coefficients)

	Mean Loyalty Rate	Mean ϕ Fit
Mean Re-Election Prob.	.244***	−3.076***
	(.008)	(.199)
SD Re-Election Prob.	.142***	−1.176***
	(.012)	(.305)
Mean Dem. Position	−.022***	.057**
	(.001)	(.026)
SD Dem. Position	−.009***	.022
	(.001)	(.027)
Mean Rep. Position	−.011***	.050**
	(.001)	(.021)
SD Rep. Position	−.0003	−.031
	(.001)	(.024)
Resource Max.	.113***	−.823***
	(.001)	(.024)
Mean Leader Parameter 0	−.023***	.227***
	(.001)	(.024)
Mean Leader Parameter 1	.011***	−.111***
	(.001)	(.024)
Mean Leader Parameter 2	.017***	−.117***
	(.001)	(.024)
Constant	.248***	1.384***
	(.007)	(.167)
Robust R^2	.828	.768
Reduction in Dispersion	1879.6***	874.1***

*p<0.1; **p<0.05; ***p<0.01

Table 4.7: Disciplinary Intensity as Function of Electoral Security, Partial-Rank Regression Coefficients

	Mean Disciplinary Intensity	
	(1)	(2)
Mean Re-Election Prob.	.334***	.056***
	(.003)	(.007)
SD Re-Election Prob.	.148***	.024***
	(.004)	(.009)
Mean Leader Parameter 0	−.237***	−.238***
	(.0003)	(.0003)
Mean Leader Parameter 1	.118***	.122***
	(.0003)	(.004)
Mean Leader Parameter 2	.193***	−.048***
	(.0003)	(.004)
Leader Parameter 1 * Mean Re-Election		−.004
		(.004)
Leaser Parameter 1 * SD Re-Election		−.0004
		(.006)
Leader Parameter 2 * Mean Re-Election		.284***
		(.004)
Leader Parameter 2 * SD Re-Election		.114***
		(.006)
Constant	.226***	.465***
	(.002)	(.006)
Robust R^2	.957	.967
Reduction in Dispersion	9764.9***	10267.3***

*p< 0.1; **p<0.05; ***p<0.01

Table 4.8: Mean ϕ Fit as Function of Electoral Security and Party Discipline, Partial-Rank Regression Coefficients

	Mean ϕ Fit		
	(1)	(2)	(3)
Mean Re-Election Prob.	-4.508		-14.764^{*}
	(5.748)		(7.760)
SD Re-Election Prob.		-12.852	24.803^{**}
		(9.612)	(10.973)
Mean Discipline	-14.047	-14.747^{*}	-57.685^{**}
	(15.602)	(8.255)	(27.059)
Mean Discipline^2	12.667	11.110	47.722^{**}
	(13.948)	(7.201)	(24.172)
Mean Discipline * Mean Re-Election Prob.	12.903		45.161
	(20.774)		(28.154)
Mean Discipline^2 * Mean Re-Election Prob.	-12.555		-38.282
	(18.465)		(25.130)
Mean Discipline * SD Re-Election Prob.		44.028	-81.203^{**}
		(34.215)	(39.183)
Mean Discipline^2 * SD Re-Election Prob.		-34.606	65.942^{*}
		(29.925)	(34.400)
Constant	8.358^{*}	8.114^{***}	22.007^{***}
	(4.290)	(2.326)	(7.453)
Robust R^2	.814	.910	.921
Reduction in Dispersion	8721.1^{***}	9489.8^{***}	$10097.^{***}8$

*p<0.1; **p<0.05; ***p<0.01

Note: all exogenous parameters included, but not reported.

Table 4.9: Effects of Party Discipline & Electoral Threat on Realized Electoral Turnover, Partial-Rank Regression Coefficients

	Dependent variable:					
	Mean Incumb. Defeat Rate		Mean Legislator Tenure		SD Legislator Tenure	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean Party Discipline	−200.864***		279.647***		−558.206***	
	(4.350)		(14.855)		(20.817)	
SD Re-Election Prob.	−105.236***		99.237***		−174.261***	
	(5.973)		(9.361)		(13.170)	
Mean Party Discipline * SD Re-Election Prob.	92.883***		−65.828**		58.254**	
	(9.994)		(23.268)		24.493	
Mean ϕ Fit		1.082***		−3.211***		−7.182***
		(.138)		(.552)		(.772)
Constant	140.125***	33.731***	−121.594***	−7.841***	−249.350***	−22.803***
	(2.249)	(.664)	(7.431)	(2.683)	(10.471)	(3.750)
Robust R^2	.662	.575	.607	.552	.629	.577
Reduction in Dispersion	797.0***	511.4***	477.6***	359.3***	540.8***	408.5***

*p<0.1; **p<0.05; ***p<0.01

Note: All exogenous parameters included in estimation, but nor reported.

Figure 4.1: Examples of PDFs and CDFs for $Beta(\alpha, \beta)$

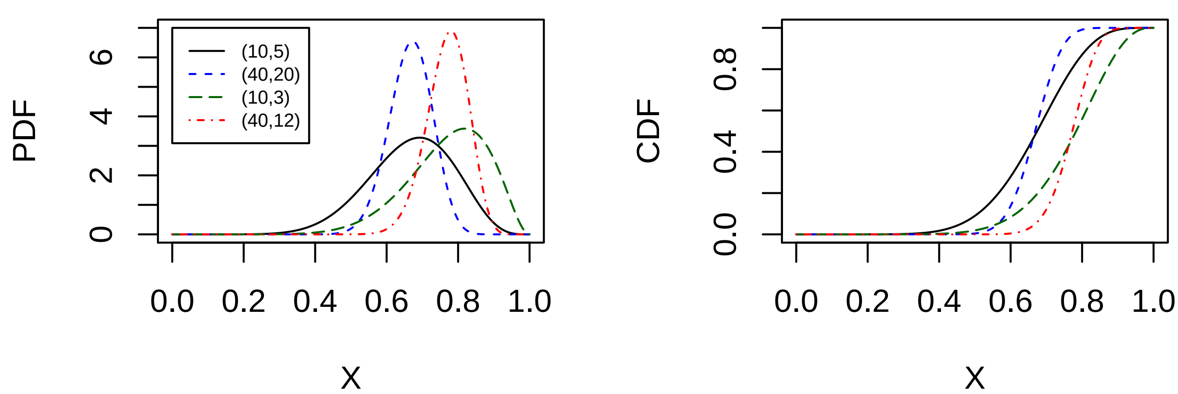


Figure 4.2: Relationship between Electoral Security and Party Loyalty

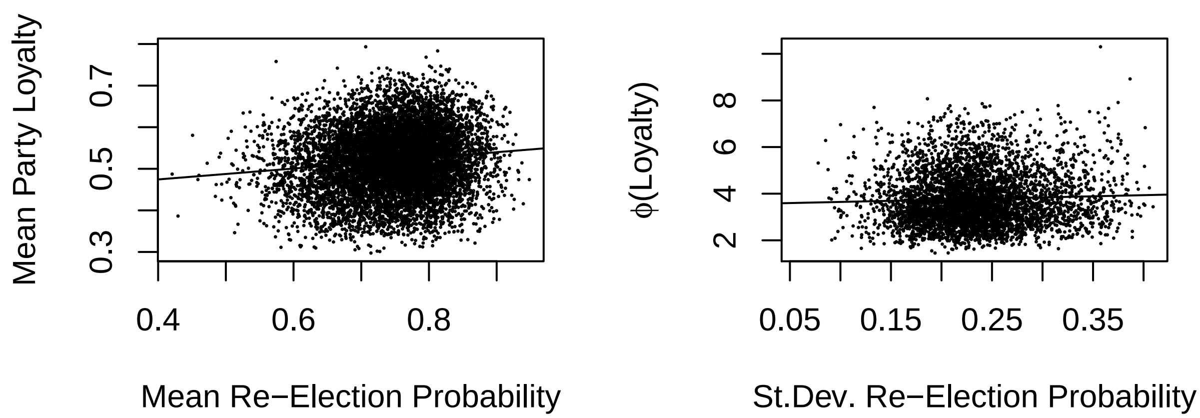


Figure 4.3: Effect of Divergent Electoral Securities on Fitted Values of Mean ϕ

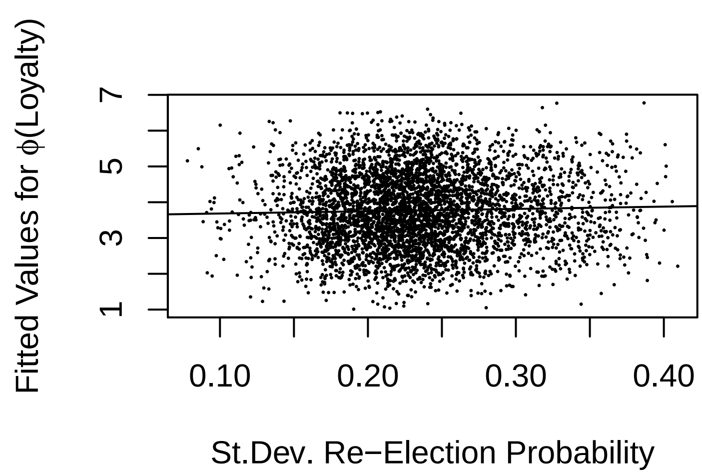


Figure 4.4: Party Discipline as a Function of Mean & Variation in Electoral Security

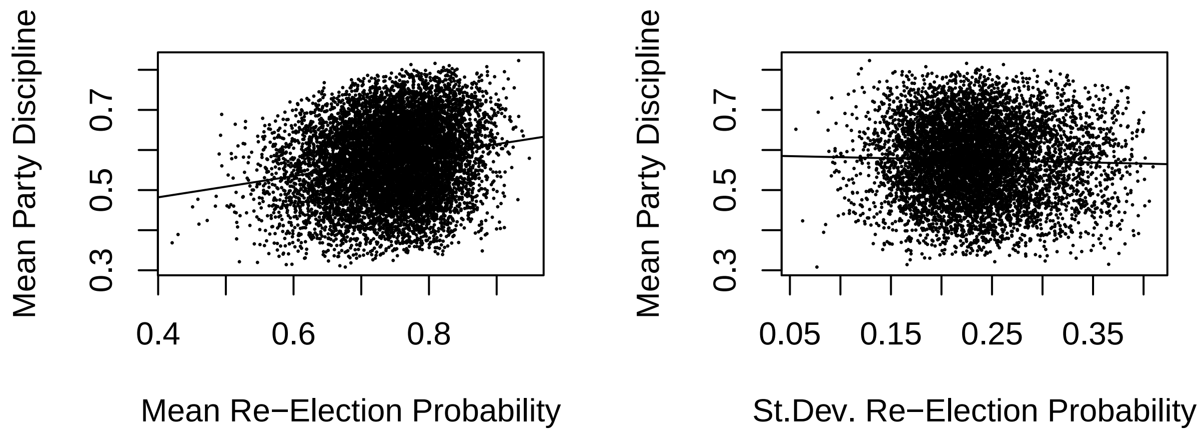


Figure 4.5: Modifying Effects of Leadership Characteristics on Relationship between Electoral Security & Party Discipline

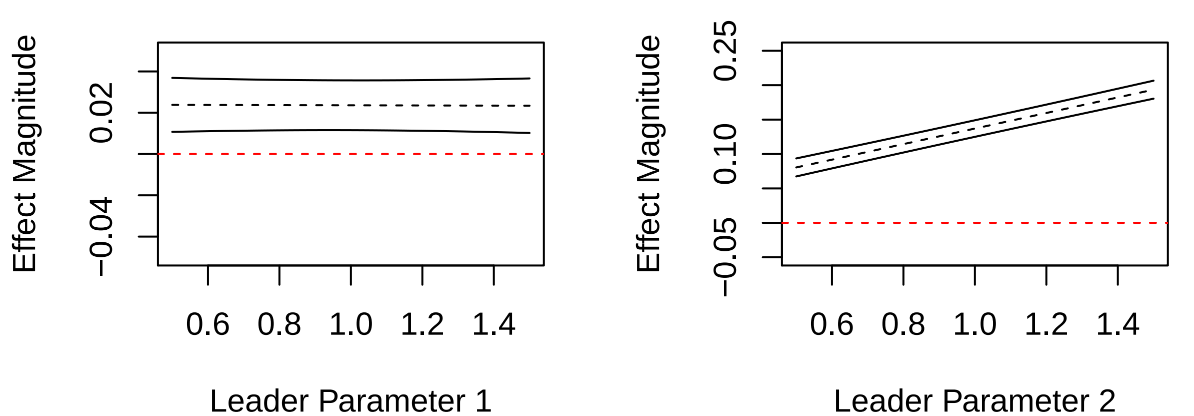


Figure 4.6: Magnitude of Effect of Electoral Threat on ϕ Fit, as Modified by Party Discipline

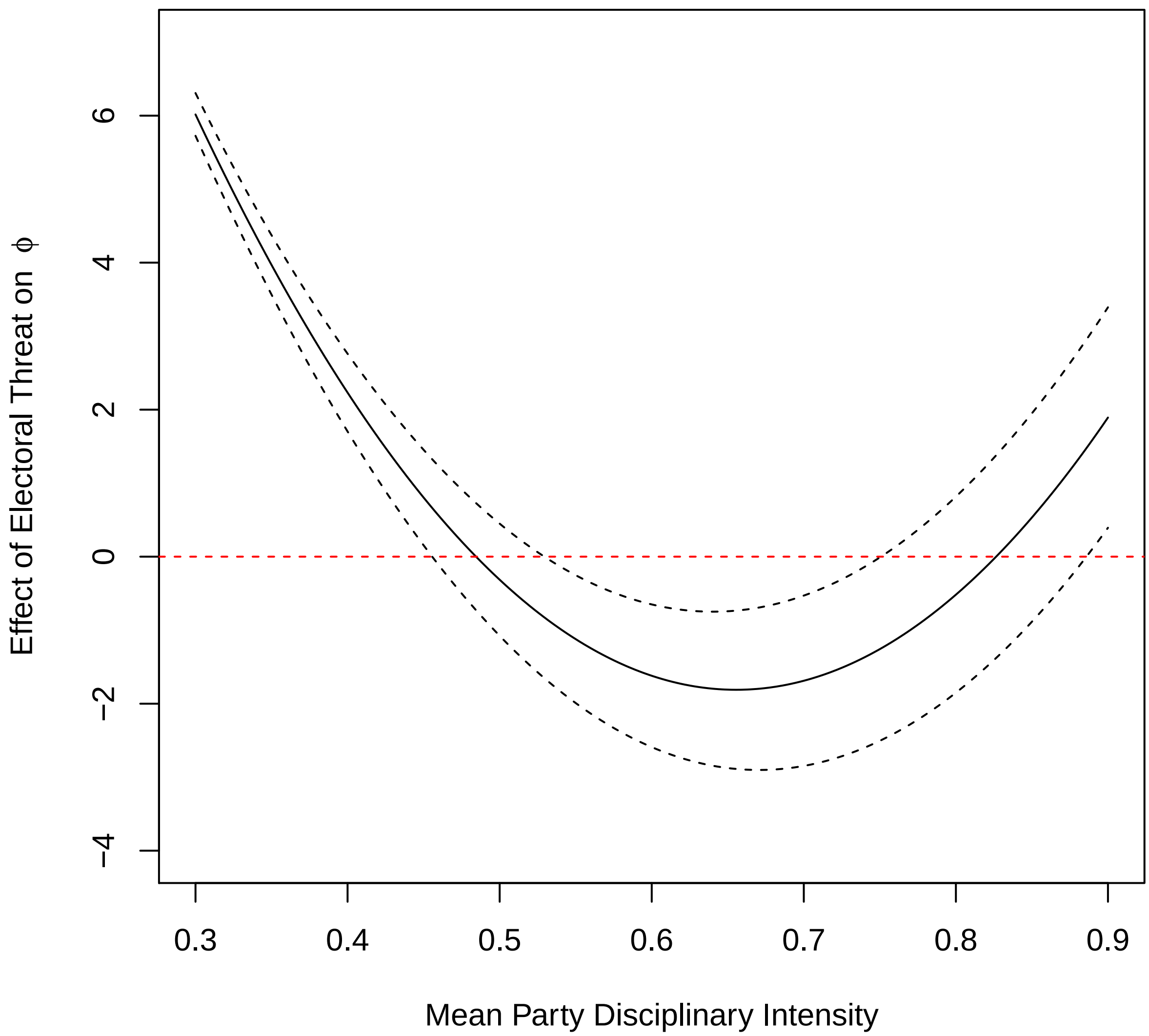
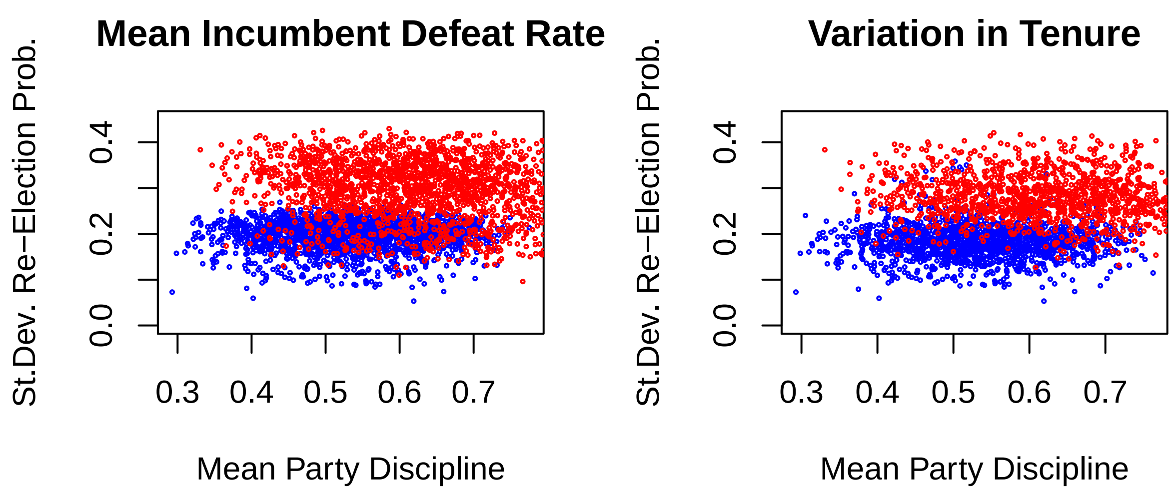


Figure 4.7: Electoral Turnover as Function of Discipline and Electoral Threat (Blue = Safest Quartile, Red = Least Safe Quartile)



CHAPTER V

Characterizing Loyalty Distributions Across Party Caucuses in the U.S. House

5.1 Introduction

The results from simulation experiments involving the computational model of party discipline and electoral adaptation, as described in Chapter 3, provide a basis for the systematic investigation of empirical trends in the connection between electoral security and party loyalty in the U.S. House. Of particular interest is the finding that cross-pressure of moderates is the key to explaining differential patterns of dispersion in party loyalty scores. As stated in the modeling chapter, the intuition behind this finding is threefold.

- Legislators must feel electoral threat from supporting the party line on roll-call votes, in the form of reduced margins of re-election.
- The costs of supporting the party-line must be high enough to cause the legislator to defect from the party line and forego the benefits associated with supporting the party line.
- The legislator must survive in the electoral arena after having done so. This may involve the cultivation of an alternative (and more moderate) legislative

reputation over the course of her career.

Empirical assessment of how the partisan context (e.g. the intensity of cross-pressure, and the relative merits of supporting the party line, conditional on largely unseen incentives to do so) affects legislator behavior is inherently difficult. In particular, evaluating the above intuitions will be tricky, as the third item involves a dynamic component – referencing the legislator's career and electoral survival. Legislators who make choices that cause them to fail to secure re-election do not continue to appear in the data set. The approach that will be taken in evaluating the veracity of the conclusions drawn from the model will be to first investigate the nature of the partisan and institutional context, by looking at distributions of party unity rates at the party caucus level (e.g. at every party-Congress combination) and then by assessing differential rates of adaptation for individual legislators both cross-sectionally in different contexts, and over the course of their careers. This chapter will focus on the former, characterizing rates of dispersion of party unity scores as a function of preference heterogeneity within party caucuses, and Chapter 6 will proceed with the individual-level analysis of legislator behavior. In particular, the analysis in this chapter will be centered around the estimation of Beta regression models of party unity that permit the simultaneous estimation of legislator adaptation and unity dispersion, while accommodating the natural skew and heteroskedasticity of values in the data set.

5.2 Characterizing Hypotheses

The predictions generated by the computational model fall into two categories. The first, related to an individual legislator's propensity to respond to electoral threat, is relatively trivial and implied in a straightforward manner by the specification of the legislator's reaction function. That is, legislators choose to side with the party less often, all else equal, when their margins of re-election are lowered. The idea is that support for the party's agenda can be costly for legislators representing districts with policy preferences that conflict with those enshrined in the party's agenda. The contribution of the model was to show that *all else is not equal* for legislators facing differing average levels of cross-pressure. As legislators are pressured more (less) strongly into supporting a more (less) dangerous agenda, they initially respond by defecting more (less) often from the party line on roll-call votes. However, a sufficiently strong party discipline regime basically puts cross-pressured moderates in an impossible position – regardless of their behavior, they are unable to survive in the electoral arena when faced with a partisan and institutional context that gives them no good options.

The mediating effect of partisan pressure and institutions in the model is mainly assessed through a dispersion parameter, ϕ, which results from fitting observed party unity rates to a Beta distribution. Thus, there is analytical separation between the sensitivity of individual legislators' responses to electoral threat, and what kinds of dispersion are possible under the partisan legislative conditions the legislator faces. While legislators should always be more likely to defect from the party line when facing increased electoral peril from doing so, it is important to characterize the extent to which this is possible through the dispersion rate. What is needed, then, is a way of estimating dispersion as an essential aspect in fitting variation in party unity rates to variation in electoral security. The purpose of this chapter is to propose just such a model, based on a beta regression framework, which allows for the *simultaneous* estimation of the relationship between electoral security and party unity and the relationship between indicators of cross-pressure and dispersion implicit in the generating distribution of unity scores.

Restating the above, there are two hypotheses under consideration in this chapter:

1. Party unity scores exhibited by individual legislators should be positively related

to their previous margins of election/re-election.

2. The observed degree of dispersion in party unity scores should be related to preference heterogeneity within the parties.

To investigate these hypotheses, data on legislator behavior and legislative election returns are needed, as well as ancillary data on constituency preferences.

5.3 Data

The time period under study for this project begins with the first Congress elected after the end of Reconstruction of the Southern United States following the Civil War, in 1878 (this corresponds to the 46th Congress). The period ends with the most recent completed Congress – this was the 112th Congress, which was elected in 2010, and met from 2011 to 2013.

A number of data sources were utilized in the construction of the dataset for this project. Return data on elections to the U.S. House comes from the Constituency-Level Elections Archive (CLEA).[1] For each electoral constituency included in the CLEA data, the winner and highest-placing challenger (if any) were identified. The re-election margin was the size of the difference between the top two finishers,[2] divided by the total votes garnered by the top two finishers – thus, it runs from a minimum value of just above 0, to a maximum value of just under 1 (or 1, in the case of winners who faced no challengers).[3]

[1]The data used were those from the December 2013 release. This release was missing a few elections, which were included in the next release, but these omissions were independently detected and included by the author. Auxiliary data sources for missing data and consistency checks include Dubin's (1998) guide to U.S Congressional Elections for elections prior to 1920, and the House clerk's official reports for data after 1920 (see references for link.)

[2]Candidates running under more than one party's label (as in the case of modern-era fusion-candidacies in New York or Connecticut, or early 20th-century fusion-candidacies in Pennsylvania or California) had their votes under *all* labels tallied up, and were assigned a party membership based upon the label under which they received the most votes.

[3]For technical purposes, this score was adjusted at the high end, so that any candidate winning with a share of more than 99.9 percent of the vote was adjusted to winning with 99.9 percent of the

House roll-call data comes from Poole's *Voteview* archives, which collect all roll-call votes for each individual member of each Congress, along with other important information about each individual Congressperson's term (e.g. how they secured office,[4] and what party they affiliated with).[5]

Party unity scores for individual members meeting the criteria were calculated as follows. First, all roll-call votes in each Congress were analyzed to determine which votes featured a majority of Democrats voting on the opposite side of a majority of Republicans. Second, on that subset of roll-call votes, individual members' voting records were analyzed to determine whether or not they voted in the same way as a majority of their co-partisans. Thus, each individual roll-call vote choice on this subset of votes can be understood as a "vote with one's party" or a "vote against one's party." A party unity score for legislator i in Congress t was calculated according to the following formula:

$$unity_{it} = \frac{\text{votes with party} + 1}{\text{votes with party} + \text{votes against party} + 2} \tag{5.1}$$

The added constants to the numerator and denominator of the above expression are a form of *penalization* suitable for dependent variables that run in a range from 0 to 1. They insure that the no values of the fraction will actually equal exactly 0 or 1. This is mainly an issue for individuals elected to earlier Congresses, where roll-call votes were less frequent, especially those only serving partial terms before resignation, illness or death.

Additional data were also collected for the purposes of trying to characterize preference heterogeneity within the Congressional parties. The first is simply a region

vote. The bias introduced by this adjustment is minimal, and is only assessed upon individuals that were unchallenged, or whose nearest competitor was actually a compilation of "other" or "scattering" votes.

[4]Ambiguous cases were cross-checked against available biographical resources, as needed – especially the biographical directory maintained by the House Clerk (location in references)

[5]Details on cases included in the data set are included in Appendix A.2.

indicator for "Southern" legislators, where Southern is defined as the eleven states of the former Confederacy. The second is a measure of population density by Congressional district, intended to capture conflict between legislators represent rural and urban districts, respectively. The sources for data on the area of Congressional districts are GIS shapefiles for U.S. House districts, compiled by Lewis et al (2013).[6] The third is Democratic presidential vote by Congressional district. The advantage of this measure is that is speaks directly to the partisan predilections of the district, in a way that does not involve evaluations of the legislator. The disadvantage of this measure is that it is not generally available for a very broad period of time – Jacobson's (2010) data on presidential vote by Congressional district begin with the 1952 elections.[7]

5.3.1 Naive Analyses of Electoral Adaptation

Tables 5.1 and 5.2 contain OLS estimates for the nature of legislator adaptation to electoral threat. In particular observed party unity scores for a legislator are regressed on the natural log of re-election margin. Table 5.1 shows the results from the simplest possible model – one without fixed effects for Congresses. Contrary to expectation, in this simple model, margin of re-election is negatively and significantly associated with party unity rate for both Republicans and the full sample of Democrats (Northern Democrats, when split out, exhibit the expected positive relationship, while Southern Democrats do not). Table 5.2 re-estimates this relationship with fixed-effects for each Congress included, but the results remain the same.

Figure 5.1 helps somewhat to explain this puzzling result – it presents scatterplots

[6] The methods used for translating shapefile data into population density estimates is described in more detail in Appendix A.2.

[7] As far as I can tell, publically available versions of these data only run through 2004. Scores for elections from 2008 were supplemented with data from the Cook Political Report. Additionally, these data have the disadvantage of not being available for Congressional elections in which new districts were created, but no presidential election has yet been held – this applies to the 1962, 1982 and 2002 House elections. These years are omitted from the data.

of re-election margin and party unity rates for Democratic and Republican legislators for the entire data set. In each case, while there appears to be a mild positive relationship between re-election margin and party unity for most values of re-election margin, there also exist a set of legislators facing no opposition or paltry opposition in seeking re-election, These legislators tend to exhibit a wide array of unity behaviors, and as such generally mitigate against a finding of a positive relationship between re-election margin and party unity. Because of this, they remain included in the data set, so as to render the hypothesis tests more conservative.

More generally, there is another important takeaway from the scatterplot of Figure 5.1 – the relationship between re-election margin and party unity is clearly heteroskedastic. The institutional and partisan context of heteroskedasticity can be seen in Figure 5.2. These tables plot p-values for White's test for heteroskedasticity for Democratic and Republican caucuses over time. Many of the caucuses show evidence of heteroskedasticity in the relationship between electoral security and party loyalty, while others do not. This variation in the realized incidence of heteroskedasticity suggests that it is something worth modeling directly. Additionally, as a purely mathematical phenomenon, it makes sense for marginal members to exhibit more variance than secure ones, as secure members already cluster up near maximal unity scores. Thus, the relationship between electoral security and party loyalty has both the theoretical potential and the natural inclination toward displaying heteroskedasticity. Because of the fact that this heteroskedasticity is not a nuisance, but a feature of the actual processes in question at work, it makes sense to choose a method for analysis that naturally reflects and accommodates heteroskedasticity.

Additionally and relatedly, it's not clear what the implicit generating distribution of party unity scores should be, *a priori*. As can be seen in Figure 5.1, party unity scores generally tend to cluster toward the high end of the possible range of scores, with averages and medians in party unity scores across caucuses always well above .5, and generally above .75. Additionally, the typical assumption of normality in the distribution of party unity scores is particularly ill-suited for proportions, like party unity, as the normal distribution is unbounded. Fits of the normal distribution will, by necessity, place positive likelihood on the observation of party unity outcomes that are impossible by construction, and these impossible outcomes will likely be correlated with independent variables of interest (e.g. the likely outcome will be to assign impossibly-high unities to relatively secure members). Typically, the problem of bounds would be corrected by applying a logistic transform to the underlying propensity toward unity, which would here be interpretable as a proportion, rather than a probability. But, the logistic function is symmetric in its assignment of likelihoods about .5, and this is also inappropriate.

5.3.2 The Beta Distribution

The probability distribution that will be used to model party loyalty rates is the Beta distribution. This distribution has support on a bounded interval – in this case, the unit interval $[0, 1]$ – and is thus more suitable for modeling rates and percentages than more familiar probability distributions with continuous support over unbounded distributions, like the normal distribution. The Beta distribution is given by:

$$f(x; \alpha, \beta) = \frac{\Gamma(\alpha + \beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1 - x)^{\beta-1} \tag{5.2}$$

with shape parameters $\alpha, \beta > 0$. The first term of the equation (a fraction expressed in terms of a ratio of Gamma functions) is a normalization constant. While, strictly speaking, α and β can take on any positive values, for our purposes, the only values under consideration will be $\alpha > 1$ and $\beta > 1$. These restrictions assure that the Beta probability distribution function will be unimodal. Some examples of the Beta distribution function were given previously in Figure 4.1.

Alternative Parameterization The mean of the Beta distribution is given by:

$$\mu = E[X] = \frac{\alpha}{\alpha + \beta} \tag{5.3}$$

Following Ferrari and Cribari-Neto (2004), this implies that, with the addition of a precision parameter, $\phi = \alpha + \beta$, the probability distribution function for the Beta distribution can be rewritten in terms of μ and ϕ as follows:

$$f(x; \alpha, \beta) = \frac{\Gamma(\phi)}{\Gamma(\mu\phi)\Gamma((1-\mu)\phi)} x^{\mu\phi - 1}(1-x)^{(1-\mu)\phi - 1} \tag{5.4}$$

Carrying the parameter value restrictions forward, $0 < \mu < 1$ and $\phi > 2$. The values of μ are intuitive, as the mean of a set of percentages must lie between 0 and 1. The values of ϕ are somewhat less intuitive – they are a measure of dispersion, but dispersion is greater at lower values of ϕ. One important property of this dispersion parameter is that, unlike the standard deviation of a normal distribution, ϕ does not restrict observations to expected symmetry about the mean. This lack of a restriction is valuable, as the mean of party loyalty rates (both in the model, and in the data) is generally much greater than 0.5, and the nature of the dispersion about the mean is generally asymmetric.

5.3.3 Testing Beta vs. Normal Distributions

The Beta distribution does in fact provide a better fit to party unity distributions than does the normal distribution. Figure 5.3 presents the results of Clarke's (2007) test for non-nested hypotheses, for each party-Congress combination.[8] Figure 5.3 demonstrates that we can reject the null hypothesis of equal fit in favor of the Beta

[8]Clarke's test uses as a null hypothesis the assumption that each hypothesis in question is an equally-good fit to the data, as measured by the likelihood assigned to each data point, given the estimated model parameters. In the models are equally-good, then each data point will be have a higher likelihood under each fit with probability of one-half. Thus, for a data set of a given size, the null hypothesis to test against is a binomial distribution with that many observations, and .5 probability.

alternative in the vast majority of Democratic and Republican caucuses.

Interestingly, the exceptions to this rule, where the normal distribution provide a better fit to observed distributions of unity scores than does the Beta distribution, are informative. Specifically, in both the Democratic and Republican parties, the superior fit of the Beta distribution is least well-supported in the period between about 1890 and 1920. This was a time in which parties were split by the ascendant political forces of progressivism and populism (Gerring 2001, McCarty et al 2006.), in which the lines of conflict largely broke down along regional lines (in the Democratic party) and rural-urban lines (in the Republican party). This split is uniquely visible when applying Clarke's test to Northern Democratic legislators and Southern Democratic legislators. In the period in question, Southern Democrats outnumbered Northern Democrats, and the party's agenda catered to the Southerners – as a result, Northern Democrats' party loyalties were generally depressed toward the middle of the distribution, making the normal distribution a (relatively) better fit. As the Democratic party's power base shifts northward over the course of the 20th century (Milikis 1993), it is Southerners who are increasingly alienated by the party's agenda, and lower their loyalties as a result.

The fitted values for Beta distribution parameters for each Democratic and Republican caucus, respectively, are shown in Figures 5.5 and 5.6. In each case, the fit is plotted onto a two-dimensional axis with each dimension representing a parameter from the alternative parameterization (ϕ,μ) described above. Data points represent a single caucus (e.g. a single party-Congress combination), and are color-coded by historical era for context. Black points correspond to the period from the end of Reconstruction, through the era of Reed's Rules, to the revolt against Speaker Cannon in 1910. Blue points represent the period between 1910 and the Legislative Reorganization Act of 1946. Green points represent the "Textbook Congress" from 1946 to 1972. Everything from the post-Watergate-reform Congress of 1974 to the present day is colored in red.

The progression of the values corresponds roughly to what we would expect from a qualitative understanding of the evolution of partisan institutions and electoral alignments in Congress. Pairs of values (ϕ, μ) are roughly dispersed along an arc. Starting with a high-mean-discipline, low-dispersion era after Reconstruction and until the revolt against Cannon, party unity rates steadily become more dispersed, and lower on average. This is consistent with a hegemonic, regionally-divided Democratic party that was home to a great deal of ideological diversity – Southern Democrats had both the incentive, and especially during the Textbook Congress era, the institutional capacity to resist voting with their party when cross-pressured. As the Northern, liberal wing of the Democratic party ascends to preeminence within the party, especially after the 1964 Civil Rights Act, the Democratic party becomes more dispersed – this is consistent with the basic narrative coming out of the computational model from Chapter 4, as Southern legislators depress their loyalty scores to insulate themselves from the potential electoral dangers of being associated with the national Democratic party's increasingly liberal agenda. Eventually, after the pro-party reforms of the post-Watergate era, Southern Democrats are no longer able to hold these seats, and are replaced by conservative Republicans. Thus, the dispersion within the Democratic party declines, and mean party discipline among the remaining members decreases.

On the Republican side, the data follow a somewhat similar pattern. The Republicans start as a party divided between dominant conservative regulars in the Northeast and a progressive/populist wing in the Midwest and West. After the New Deal, remaining Northeastern Republicans became more moderate, and Midwestern/Western became more conservative, with the latter increasingly having a numerical advantage. The dwindling of the now-liberal Northeastern wing of the party coincides with the realignment of conservative Southern constituencies to the Republican party following the Civil Rights era and the Great Society, resulting a more homogeneously conservative and disciplined Republican party.

5.4 Modeling Individual Behavior & Group-Level Dispersion: A Beta Regression Approach

The story presented in the previous section is far from rigorous – what is really needed to characterize the partisan-institutional mediation of the connection between electoral security and party unity is a way to actually link observable markers of preference to dispersion and observable markers of electoral threat to mean loyalty. Such a method is provided for the case of Beta-distributed dependent variables like the one under study – the method of Beta regression (Vasconcellos and Cribari-Neto 2005, Ferrari and Cribari-Neto 2004.) In the Beta regression framework, it is possible to simultaneously fit the value of the dispersion parameter generating observations of a dependent variable that is Beta-distributed, and fit the marginal effect of an independent variable on said dependent variable, given the dispersion.

More specifically, following Ferrari and Cribari-Neto's (2004) notation, the model is laid out as follows. For a set of dependent variable values $y_i \sim B(\mu_i, \phi)$, the Beta regression model can be expressed as:

$$g(\mu_i) = \eta_i = x_i^T \beta \tag{5.5}$$

Intuitively, this describes a set of equations in which a set of coefficients (β) is estimated to produce raw predicted values, which are then filtered through a link function $g()$, to produce final predicted values, denoted η_i. The link function can be anything that takes values on the entire real line.[9]

As presented, the model assumes a constant dispersion ϕ across all observations – in other words, a single predicted value of ϕ is fitted for all observations.. This assump-

[9]For the purpose of the present analysis, it will be a logit-link function.

tion can be weakened to produce an extension, referred to as a variable-dispersion model. In the variable-dispersion model, values of ϕ_i are estimated simultaneously, with respect to each observation with values of μ_i. Thus, the twin equations to be estimated can be expressed as:

$$g_1(\mu_i) = \eta_{1i} = x_i^T \beta \tag{5.6}$$

$$g_2(\phi_i) = \eta_{2i} = z_i^T \gamma \tag{5.7}$$

where β and γ are vectors of regression coefficients, x_i and z_i are sets of regressors, and η_{1i} and η_{2i} are linear predictors of μ_i and ϕ_i, respectively. Since the model is heteroskedastic, Pearson residuals are calculated and reported to assess the significance of coefficient values. Estimates from both the constant-dispersion and variable-dispersion models can be conveniently calculated using the *betareg* package (Cribari-Neto and Zeilis 2009) available for *R 3.1*.

In terms of the hypotheses under consideration here, the x_i's are the electoral security[10] enjoyed by individual legislators, as captured in both the linear and quadratic expressions, which will be used to predict individual mean party unity levels. The z_i's are the indicators of preference heterogeneity (region and population density) used to predict dispersion. Results for each set of regressors will be reported as appropriate.

5.5 Results

The presentation of results proceeds as follows. First, to evaluate the first hypothesis, a fixed-dispersion Beta regression model will be considered, followed by a variable-dispersion model that only considers fixed effects by Congress for each party grouping. After that, to test the second hypothesis (and provide additional tests for

[10]Technically, they are the natural log of the margin of re-election plus 1.

the first), a full variable-dispersion Beta regression model will be introduced, in which indicators of party preference heterogeneity are included as part of the model for the dispersion parameter ϕ. Empirical analysis will conclude with some additional attention given to shifts in the values of estimated coefficients for the Beta regressions over time, as well additional explorations into the behavior of Republican legislators.

5.5.1 Fixed Dispersion Models & Basic Variable-Dispersion Models

The first Beta regression estimate is the fixed dispersion model, as described in the previous section. For each partisan grouping, the natural log of re-election margin is used as an independent variable for μ, and a constant value for ϕ is estimated. Table 5.3 shows the results for these estimated equations. As the first row shows, re-election margin has a strongly significant and positive effect on party unity rates for Democratic legislators across the sample. For Republicans, however, there is a negative effect of re-election margin on party unity, although it is not significant. Partitioning the Democrats shows that Northern Democrats are driving the observed positive effect – there is very strong evidence of a positive relationship between electoral security and party loyalty for Northern Democrats, while Southern Democrats show a smaller but significant negative effect of re-election margin on party loyalty.

Next, a simple variable-dispersion model is introduced, in which the only variables used to model dispersion are fixed effects for each Congress – the idea being that such a model could help control for strategic considerations introduced by factors like majority party size (Lebo et al. 2007) The results of estimates for this model are reported in Table 5.4. Unfortunately, the first hypothesis performs less well in this specification. While Northern Democrats continue to show a strong positive and significant effect of re-election margin on party unity, Southern Democrats still show a negative and significant effect. Meanwhile, Republicans continue to exhibit a negative relationship between re-election margin and party unity, and it is now strongly statistically significant.

5.5.2 Modeling Dispersion Directly

Tests of the second hypothesis begin with the introduction of measures of preference heterogeneity to the variable-dispersion Beta regression model. At this point, some clarifications should be made about the expected values of the coefficients. Recall that smaller values of ϕ represent more dispersion in party unity scores. As a result:

1. The dummy variable for *South* should have a negative coefficient for Democrats, and a positive one for Republicans. The reason for this is that Southern Democrats elected to Congress more frequently occupied a cross-pressured position in the time period covered by aggregate data set than did non-Southern Democrats, while the opposite is true for Republicans.[11]

2. The coefficient for population density should be positive for Democrats and negative for Republicans, by similar reasoning as above.

3. Finally, the coefficient on Democratic presidential vote should be positive for Democrats, and negative for Republicans.

Table 5.5 shows results for variable-dispersion Beta regressions over the entire data set, with Congress-specific fixed effects, population density and a South dummy included in the model for ϕ. The results are as expected for the South dummy variable – the coefficient for Democrats is negative and strongly significant, and the coefficient for Republicans is positively and strongly significant. The results are mixed for the population density variable – Republicans show the expected negative coefficient on density, and the effect is strongly significant. However, Democrats also have a negative

[11] The appropriateness of these claims about cross-pressure can change over time, which will be addressed by the structural change analysis to follow.

and a strongly significant coefficient on population density, contrary to expectations. Some of this effect may be explained by regional differences in population density, since both regional partitions of the Democratic data show positive estimates of the effect of density on ϕ, though neither is statistically significant at any conventional level. The results for the first hypothesis remain substantially unchanged from Table 5.4.

Table 5.6 reports the results for the same variable-dispersion Beta regression model, but with the inclusion of Democratic presidential vote as an independent variable explaining dispersion (so the data set starts after 1952). Interestingly, the test of the hypothesis for Democratic presidential vote gets mixed results – Republicans have the expected negative and significant coefficient, indicating that the presence of more-strongly Democratic districts increases disperse in party unity rates. However, Democrats exhibit the opposite relationship from that expected – Democratic presidential vote has a negative and significant effect on ϕ, indicating that the presence of more-strongly Democratic districts increases dispersion of Democratic party loyalty scores. When split by region, Northern Democrats behave in line with expectations, showing a positive and significant coefficient for Democratic presidential vote, while an even larger negative effect is returned for Southern Democrats.

Also of note from Table 5.6 is how the estimated coefficients for some of the variables from Table 5.5 change, due to the inclusion of Democratic presidential vote and the restriction of the time period to more recent years. In particular, the effect of re-election margin on party unity is now negative and significant for the pooled Democratic sample, although it remains consistent with expectations (positive and significant) for Northern Democrats. Republicans, on the other hand, now show the expected relationship between electoral security and party loyalty, with a positive and significant coefficient estimate for re-election margin. In addition, population density now has the expected positive and significant effect on values of ϕ for Northern

Democrats, while Southern Democrats still show a significant, negative effect.

5.5.3 Beta Regression Coefficients over Time: A Structural Change Approach

One possible reason for some of the surprising, mixed results from the above analysis is that observations are being pooled from over vast period of time. In particular, the relevance of some of the coefficients may change markedly over the time period covered by the data set. While it's not practical to exhaustively list and test the expected fluctuations in coefficient values over the entire time period, it would be worthwhile to be able to characterize general trends of change in these coefficients, to see if they line up with our intuitions about partisan change in the House over the time period.

To characterize how Beta regression coefficient estimates change over time, I take an empirical M-fluctuations approach to structural change (Zeilis 2005, Zeilis et al 2010). This approach calculates a series of moving-averages for coefficient estimates to try and determine whether or not there is substantial variance in the estimates from one point in time to another. The null hypothesis under consideration in such an approach is that there are no changes in the underlying model over time – fluctuations outside of error bound indicate that the underlying values for the coefficient have, in fact, changed in a significant way. Such results are best interpreted visually – plots for these processes can be generated using the *strucchange* package in *R 3.1* (Zeilis et al 2001).

Figure 5.7 shows the results from Democrats and Figure 5.8 shows the results from Republicans. The idea behind interpreting these results is that fluctuations that go "out-of-bounds" (that is, outside the two red lines that sit on either side of zero) indicate that a reliable shift in the underlying coefficients has occurred. In this sense the red-lines can be thought of as confidence bounds that allow us to reject the null hypothesis of no change. The bounds depicted in the figure represent an effect significant at $\alpha = .05$.

In the case of Democrats, there are a few interesting findings. First, electoral security appears to have an increasing effect on party loyalty rates from about 1900 to 1950, followed by the a decreasing effect from about 1960 to the present day. The increasing trend may reflect the gradual regional diversification of the House Democratic caucus over that time period, as Democrats increasingly represented competitive Northern urban and suburban districts. On the other hand, the later period of decline corresponds to a period of growing dominance of urban areas by Democrats, where general elections are often uncompetitive, and thus may not serve as crucial signals of electoral threat for legislators. Over nearly the entire time period, the effect of density on ϕ increases, indicating that the role of dense districts in reducing dispersion increased over time. Lastly, the coefficient for the effect of the South dummy variable on ϕ actually shows a positive trend from 1920 to the 1960s, but shows a significant negative trend the mid-1960s to the mid-200s. This likely reflects the once-strong, and then increasingly marginal, position of Southern Democrats within the House Democratic caucus.

In the case of Republicans, there are also few trends worth mentioning. The first is that from the New Deal era until the present day, there has been a persistent negative trend in the relationship between re-election margin and party unity for Republicans. This coincides neatly with the gradual withdrawl of Republicans from competitive urban and suburban districts in the Northeast where moderate Republicans once flourished. Oddly, the effect of population density on ϕ actually increases throughout much of the time period, indicating that density increasingly contributes to tighter distributions of party unity rates. While this seems immediately counterintuitive to the modern reader, it should be remembered that many rural Republicans from the earlier parts of the era in question had very strongly Progressive and reformist tendencies that often put them odds with conservative Republicans (more will be said on the shifting nature of these intra-party divides below). Lastly, the sudden positive shift in the coefficient value for South from about the mid-1970s to the present day indicates the dramatic nature of the effect of the secular, Southern realignment to the Republican party – the influx of Southerners to the GOP coincided with a drastic reduction in dispersion in party unity rates.

5.5.4 A Closer Look at Republicans

Before ending the analysis, it would be worthwhile to take a somewhat closer look at the nature of the relationship between re-election margin and party unity for Republicans over the time period. In particular, it would be valuable to see whether partitioning the Republican sample, in a way that was standard for the Democratic sample throughout this analysis might shed some light on why Republicans often exhibit no relationship or a negative relationship between re-election margin and party unity.

In the case of the Democrats, there is a perisistent and salient regional division that conditions our expectations about the applicability of the theory. The Democratic party in the South was a very different party from that of the North for much of the time period in question, often running uncontested candidates who, once elected, voted against their party quite frequently (at least in the 20th century). No such division of that magnitude immediately springs to mind for Republicans, but there is some evidence that different regional splits have played a role in explaining intra-party division within the Republican party (Gerring 2001, Brewer and Stonecash 2008). Specifically, as Reiter and Stonecash (2010) point out, different regional splits operated within the Republican party in the pre-New-Deal and post-New-Deal era. In the former (up until 1938), conservative Northeasterners dominated the party, while more moderate and Progressive agrarian wings hailed from the West and Midwest. In the latter (from about 1939 on), the remaining Northeast wing was greatly diminished in numbers and became more liberal, and the balance of power within the party shifted toward increasingly conservative Republicans in the Midwest and West (and eventually, the South and Sun Belt.)

Table 5.7 conducts a variable-dispersion Beta regression analysis with a partitioned Republican sample, the first column presents estimates for 1878-1938, and the second column presents estimates for 1939-2012. Importantly, the Republican show the same negative and signficant relationship between re-election margin and party loyalty for the earlier time period, but not for the later time period. For 1939-2012, Republicans actually show a positive estimated effect for the coefficient for re-election margin on party unity, and while the effect is not significant at conventional levels, it's close to significance ($p < .11$). Tables 5.8 and 5.9 break out each era by region – instead of the North/South dichotomy used for Democrats, a four-region partition scheme is used. As Table 5.8 shows, the observed negative effects on re-election margin on party unity for Republicans from 1878-1938 is driven by Republicans outside the Northeast. These Republicans were often agrarian populists or Progressives – such Republicans were frequently re-elected by very large margins, but were an awkward fit in the conservative, Northeast-dominated Republican party of the time. In this sense, they occupied a similar space in the Republican party that Southern Democrats did in the Democratic Party. By contrast, the positive effect of re-election margin on party unity rate for Republicans from 1939-2012 is driven by the entry of Southern (and, to a lesser extent, Western) conservatives.

5.6 Discussion

As indicated in the previous section, each of the hypotheses received mixed support. The first hypothesis, which was of a positive and significant relationship between re-election margin and party unity rate for individual House members, found solid support among Northern Democrats, but was decisively rejected among Southern Democrats (who actually showed a negative and significant effect in almost all cases.) The support for the first hypothesis among Republicans in the data set was spotty and conditional at best, and significant *negative* effects of re-election margin were found in some specifications.

In the case of the second hypothesis, results were again mixed. While the South dummy variable had significant effects for each party (and the effects were in the expected direction, with a negative effect on ϕ for Democrats and a positive effect on ϕ for Republicans), the same was not true for population density or for Democratic presidential vote. While population density and Democratic presidential vote had the expected, significant effects for Republicans, neither had the expected effects for Democrats, generally speaking.

It's worth considering why these mixed results obtain – at least two potential explanations come to mind. The first explanation is that the inclusion of legislators who won uncontested elections may be skewing the results – ancillary analyses by the author suggest that this is not the case.[12]

The second possibility reflects a somewhat deeper, theoretical issue. Namely, the story of parties implicit in this dissertation assumes that the primary tension is between marginal moderates and a core of secure, loyal partisans, which obscures some familiar dynamics about intra-party *factional* conflict (diSalvo 2012). This seems like a likely candidate, as factional splits do seem like intuitive explanations for many of the ancillary findings discussed above (especially with regard to the North/South split in the Democratic party, and the Northeast/non-Northeast split in the Republican party). Relatedly, both the computational model of party discipline

[12]To be more specific, excluding the uncontested cases diminished the statistical significance of some "wrong-signed" effects, but it never flips the sign to the expected direction. By contrast, significant results in support of the hypotheses all survive and are generally strengthened – again, note that the inclusion of uncontested legislators was intended to make the tests of the hypotheses more conservative in nature.

in play, and the empirical specifications above, implicitly assume unidimensionality in the relevant policy space. The factional conflicts in question can be understood to be contested over dimensions that are secondary to the primary economic dimensions that explain roll-call votes in the U.S. House (i.e. racial issues in the Democratic party, and monetary/rural-urban issues in the Republican party, see McCarty et al 2008). More will be said on these considerations in the conclusion to the project, but these definitely seem like fruitful ideas for future research.

Tables & Figures

Table 5.1: OLS Estimates of the Effect of Re-Election Margin on Party Unity Rates

	Party Unity Rate			
	All Democrats	*Northern Democrats*	*Southern Democrats*	Republicans
Ln(Margin)	$-.004^{***}$	$.024^{***}$	$-.009^{***}$	$-.008^{***}$
	(.001)	(.001)	(.003)	(.001)
Constant	$.832^{***}$	$.791^{***}$	$.807^{***}$	$.866^{***}$
	(.004)	(.003)	(.010)	(.003)
Observations	14,542	9,041	5,501	12,340
R^2	.001	.035	.001	.003
Adjusted R^2	.001	.035	.001	.003
Residual Std. Error	.151	.117	.185	.124
F Statistic	10.229^{***}	329.324^{***}	8.257^{***}	34.194^{***}

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 5.2: OLS Estimates of the Effect of Re-Election Margin on Party Unity Rates, with Congress-Specific Fixed Effects (Not Reported)

	Party Unity Rate			
	All Democrats	*Northern Democrats*	*Southern Democrats*	Republicans
Ln(Margin)	$-.002^{*}$	$.010^{***}$	$-.0003$	$-.004^{***}$
	(.001)	(.001)	(.002)	(.001)
Constant	$.862^{***}$	$.810^{***}$	$.890^{***}$	$.916^{***}$
	(.012)	(.012)	(.018)	(.010)
Observations	14,542	9,041	5,501	12,340
R^2	.151	.271	.515	.233
Adjusted R^2	.147	.266	.509	.229
Residual Std. Error	.140	.102	.129	.109
F Statistic	38.425^{***}	49.908^{***}	86.008^{***}	55.609^{***}

Note: *p<0.1; **p<0.05; ***p<0.01

Table 5.3: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Constant ϕ

	Party Unity Rate			
	All Democrats	*Northern Democrats*	*Southern Democrats*	Republicans
Mean				
Ln(Margin)	.029***	.201***	-.043***	-.013
	(.007)	(.008)	(.015)	(.008)
Constant	1.409***	1.236***	1.349***	1.724***
	(.020)	(.021)	(.050)	(.020)
Precision (ϕ)				
Constant	6.678***	9.730***	5.092***	9.458***
	(.077)	(.145)	(.094)	(.121)
Observations	14,542	9,041	5,501	12,340
R^2	.001	.067	.002	.0002
Log Likelihood	10781.3	8733.0	2,910.7	11,605.3
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 5.4: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Congress-Specific Fixed Effects on ϕ (not reported)

	Party Unity Rate			
	All Democrats	*Northern Democrats*	*Southern Democrats*	Republicans
Mean				
Ln(Margin)	.044***	.139***	-.036***	-.033***
	(.006)	(.007)	(.013)	(.007)
Constant	1.377***	1.314***	1.602***	1.789***
	(.017)	(.020)	(.043)	(.018)
Precision (ϕ)				
Constant	2.547***	2.668***	2.571***	2.699***
	(.112)	(.153)	(.167)	(.116)
Observations	14,542	9,041	5,501	12,340
R^2	.001	.067	.002	.0002
Log Likelihood	12028.0	9263.5	3611.0	12,216.1S
Note:		*p<0.1; **p<0.05; ***p<0.01		

Table 5.5: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Congress-Specific Fixed Effects and Model for ϕ)

	Party Unity Rate			
	All Democrats	*Northern Democrats*	*Southern Democrats*	Republicans
Mean				
Ln(Margin)	.029***	.141***	-.036***	−.033***
	(.006)	(.008)	(.013)	(.007)
Constant	1.430***	1.312***	1.607***	1.791***
	(.017)	(.020)	(.043)	(.018)
Precision (ϕ)				
Ln(Density)	-.025***	.002	.028	-.051***
	(.005)	(.005)	(.018)	(.006)
South	-.405***			.141***
	(.025)			(.040)
Constant	2.834***	2.656***	2.495***	2.927***
	(.115)	(.155)	(.175)	(.119)
Observations	14,542	9,041	5,501	12,340
R^2	.001	.067	.002	.0002
Log Likelihood	12151.6	9263.6	3612.2	12256.8
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 5.6: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Model for ϕ with District Presidentiall Vote (1953-2012)

	Party Unity Rate			
	All Democrats	*Northern Democrats*	*Southern Democrats*	Republicans
Mean				
Ln(Margin)	-.030**	.223***	-.023	.055***
	(.012)	(.013)	(.022)	(.014)
Constant	1.601***	1.337***	.772***	1.371***
	(.034)	(.035)	(.074)	(.035)
Precision (ϕ)				
Pres. Vote	-.579***	.532**	-.689**	-.763**
	(.150)	(.205)	(.266)	(.266)
Ln(Density)	-.004	.080***	-.142***	-.080***
	(.008)	(.009)	(.023)	(.011)
South	-.734***			.051
	(.036)			(.046)
Constant	3.323***	2.254***	3.496***	3.531***
	(.120)	(.156)	(.200)	(.140)
Observations	14,542	9,041	5,501	12,340
R^2	.001	.059	.005	.005
Log Likelihood	4800.4	5239.7	691.2	4211.9

Note: *p<0.1; **p<0.05; ***p<0.01

Table 5.7: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Congress-Specific Fixed Effects and Model for ϕ, Republicans Only

	Party Unity Rate	
	1878-1938	1939-2012
Mean		
Ln(Margin)	-.045***	.018
	(.010)	(.011)
Constant	1.965***	1.557***
	(.023)	(.029)
Precision (ϕ)		
Ln(Density)	.012	-.050***
	(.009)	(.009)
Northeast	.100**	-.414***
	(.041)	(.041)
South	.209***	.012
	(.071)	(.045)
West	.120	.002
	(.070)	(.046)
Constant	2.927***	2.837***
	(.125)	(.110)
Observations	5315	6834
R^2	.004	.003
Log Likelihood	6386.0	5951.3
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 5.8: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Congress-Specific Fixed Effects and Model for ϕ, Republicans Only, By Region (1878-1938)

	Party Unity Rate			
	Northeast	Midwest	South	West
Mean				
Ln(Margin)	.001	-.112***	-.076***	-.095***
	(.015)	(.015)	(.028)	(.027)
Constant	2.211***	1.985***	1.744***	3.268***
	(.036)	(.035)	(.057)	(.066)
Precision (ϕ)				
Ln(Density)	-.061***	.030	.035***	-.070***
	(.014)	(.018)	(.043)	(.027)
Constant	4.125***	2.677***	2.783***	3.268***
	(.180)	(.193)	(.787)	(.606)
Observations	2191	2315	409	437
R^2	.0001	.040	.013	.017
Log Likelihood	3347.6	2481.5	478.8	516.8

Note: *p<0.1; **p<0.05; ***p<0.01

Table 5.9: Beta Regression Results for Effect of Re-Election Margin on Party Unity Rate, Congress-Specific Fixed Effects and Model for ϕ, Republicans Only, By Region (1939-2012)

	Party Unity Rate			
	Northeast	Midwest	South	West
Mean				
Ln(Margin)	-.007	-.058***	.054***	.038
	(.023)	(.020)	(.004)	(.025)
Constant	1.188***	1.767***	1.988***	1.688***
	(.057)	(.049)	(.051)	(.063)
Precision (ϕ)				
Ln(Density)	-.038**	.014	-.031	-.088***
	(.018)	(.019)	(.026)	(.016)
Constant	1.945***	2.335***	3.839***	2.829***
	(.183)	(.169)	(.619)	(.366)
Observations	1836	2365	1549	1238
R^2	.0006	.002	.016	.006
Log Likelihood	1005.6	2300.3	2168.0	1321.9
Note:		*p<0.1; **p<0.05; ***p<0.01		

Figure 5.1: Scatterplots of Re-Election Margin and Party Unity

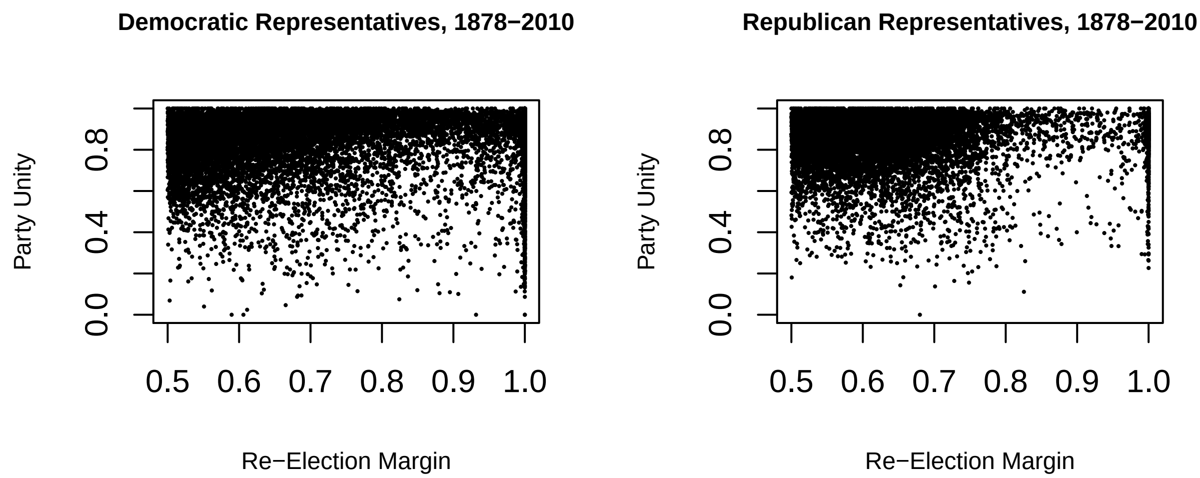


Figure 5.2: P-Values for White's Test or Heteroskedasticity, Effect of Re-Election Margin on Party Unity Rate

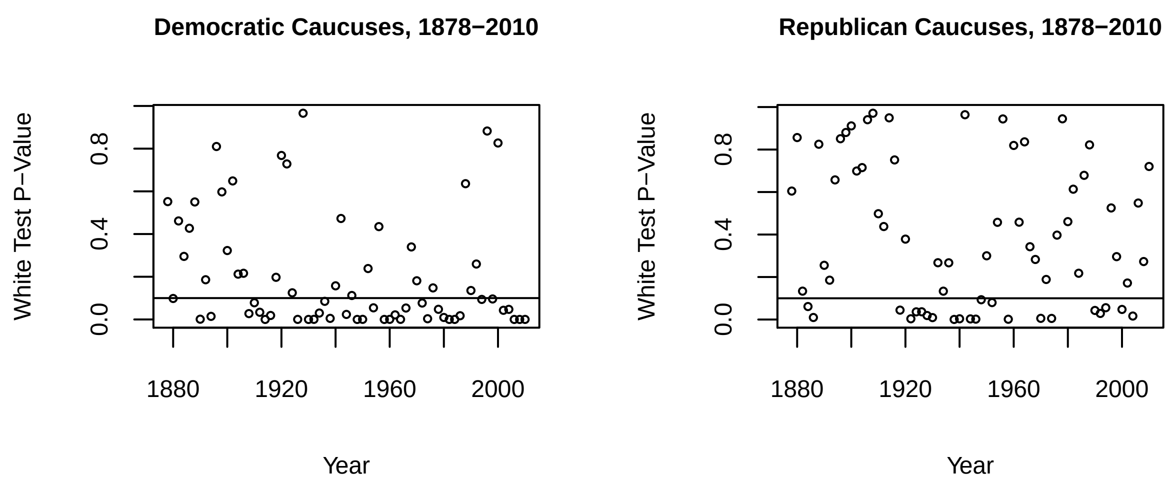


Figure 5.3: P-Values for Clark's Test of Non-Nested Models – Rejecting Null Hypothesis of Equal Fit between Beta and Normal Distributions, in Favor of the Beta

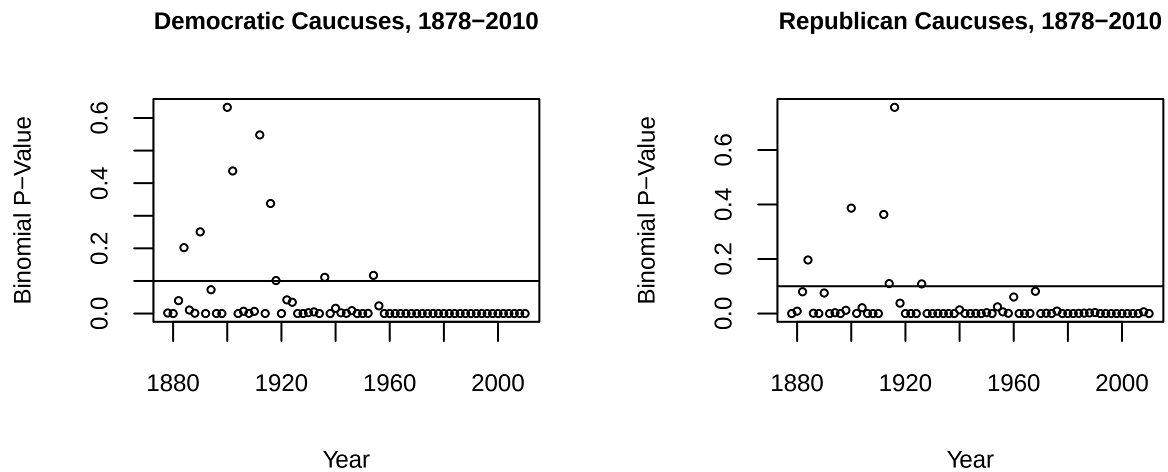


Figure 5.4: P-Values for Clark's Test of Non-Nested Models – Rejecting Null Hypothesis of Equal Fit between Beta and Normal Distributions, in Favor of the Beta

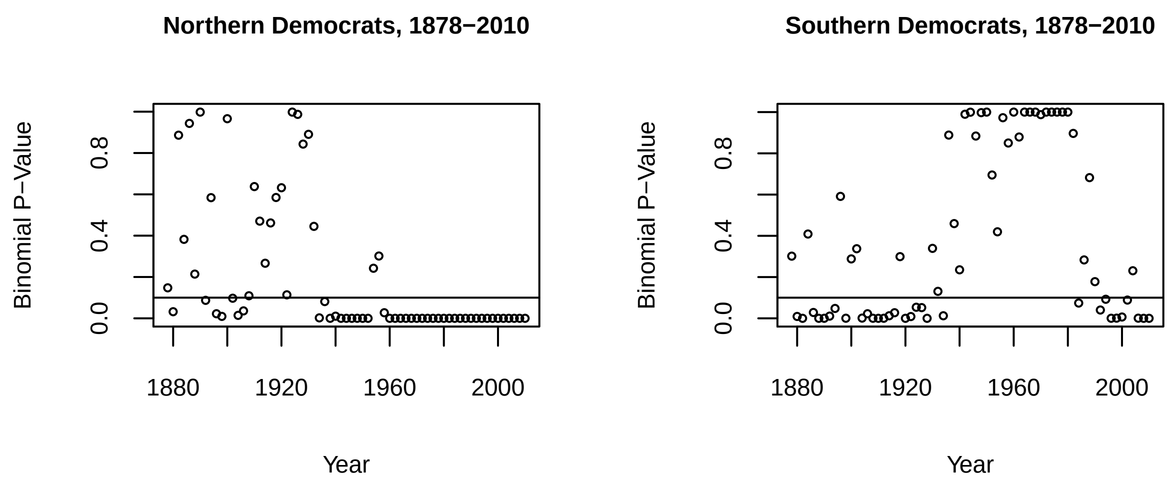


Figure 5.5: Beta Distribution Fits, Democratic Party (chronologically, black to blue to green to red)

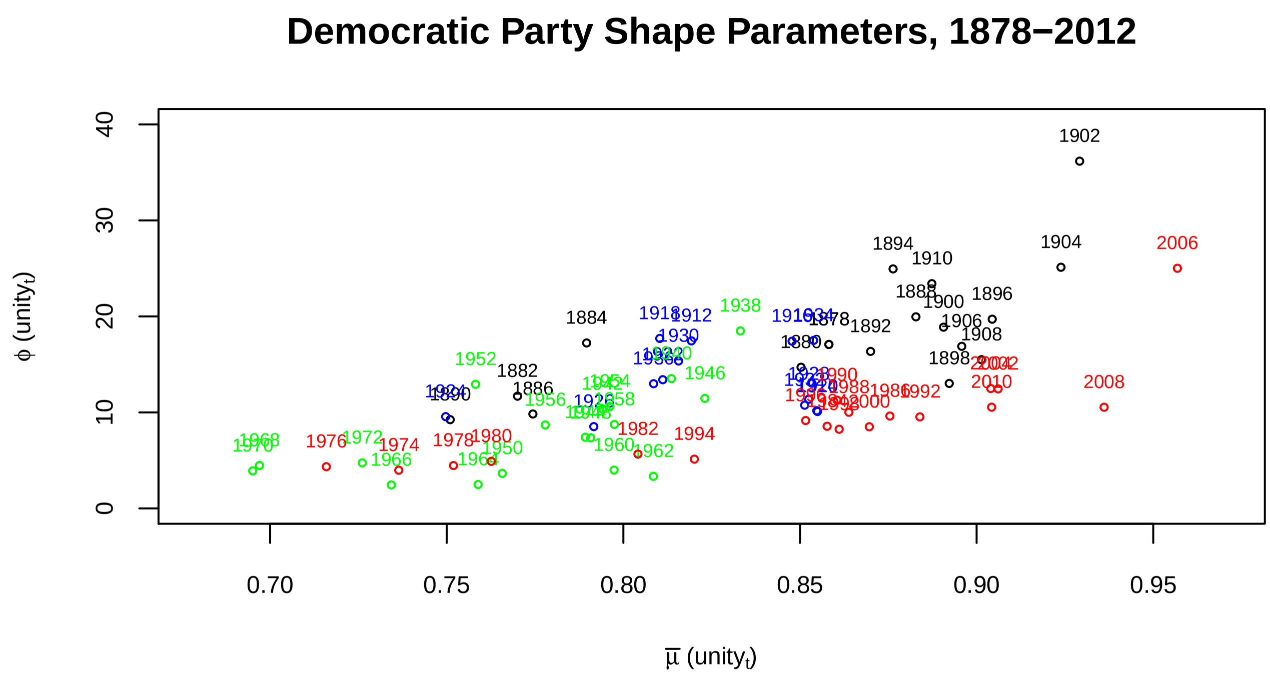


Figure 5.6: Beta Distribution Fits, Republican Party (chronologically, black to blue to green to red)

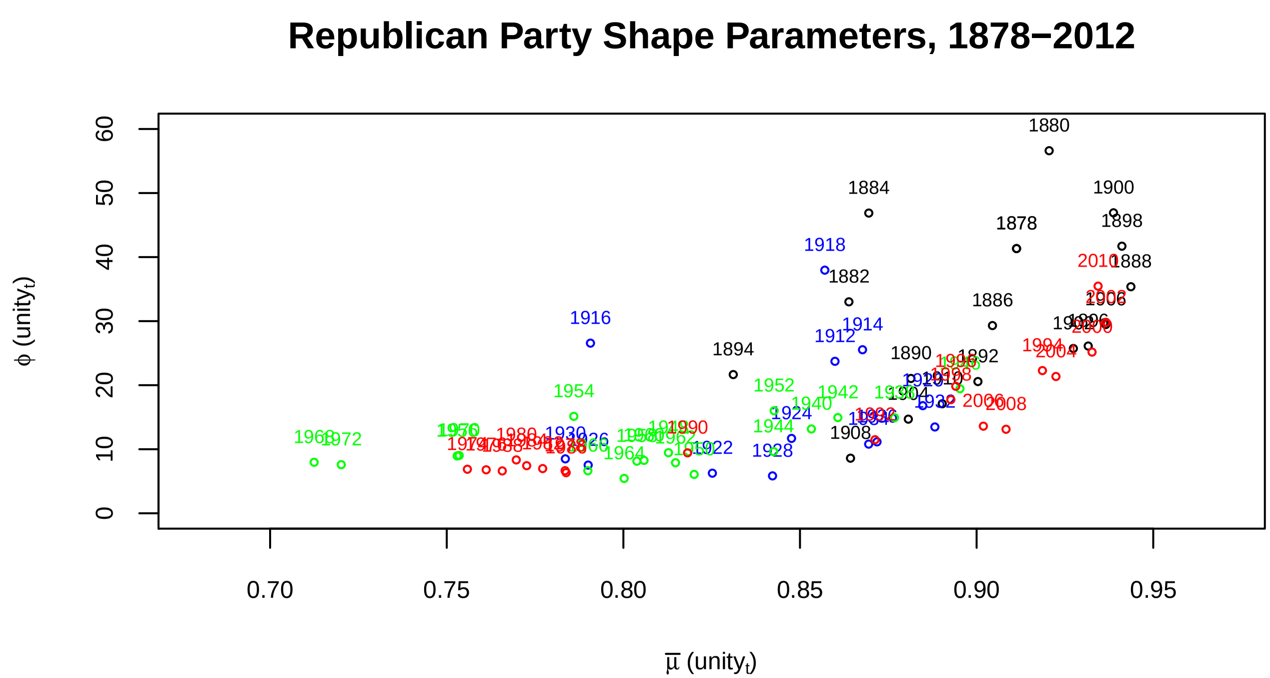


Figure 5.7: Structural Change Estimates for Beta Regression Coefficients over Time, Democrats

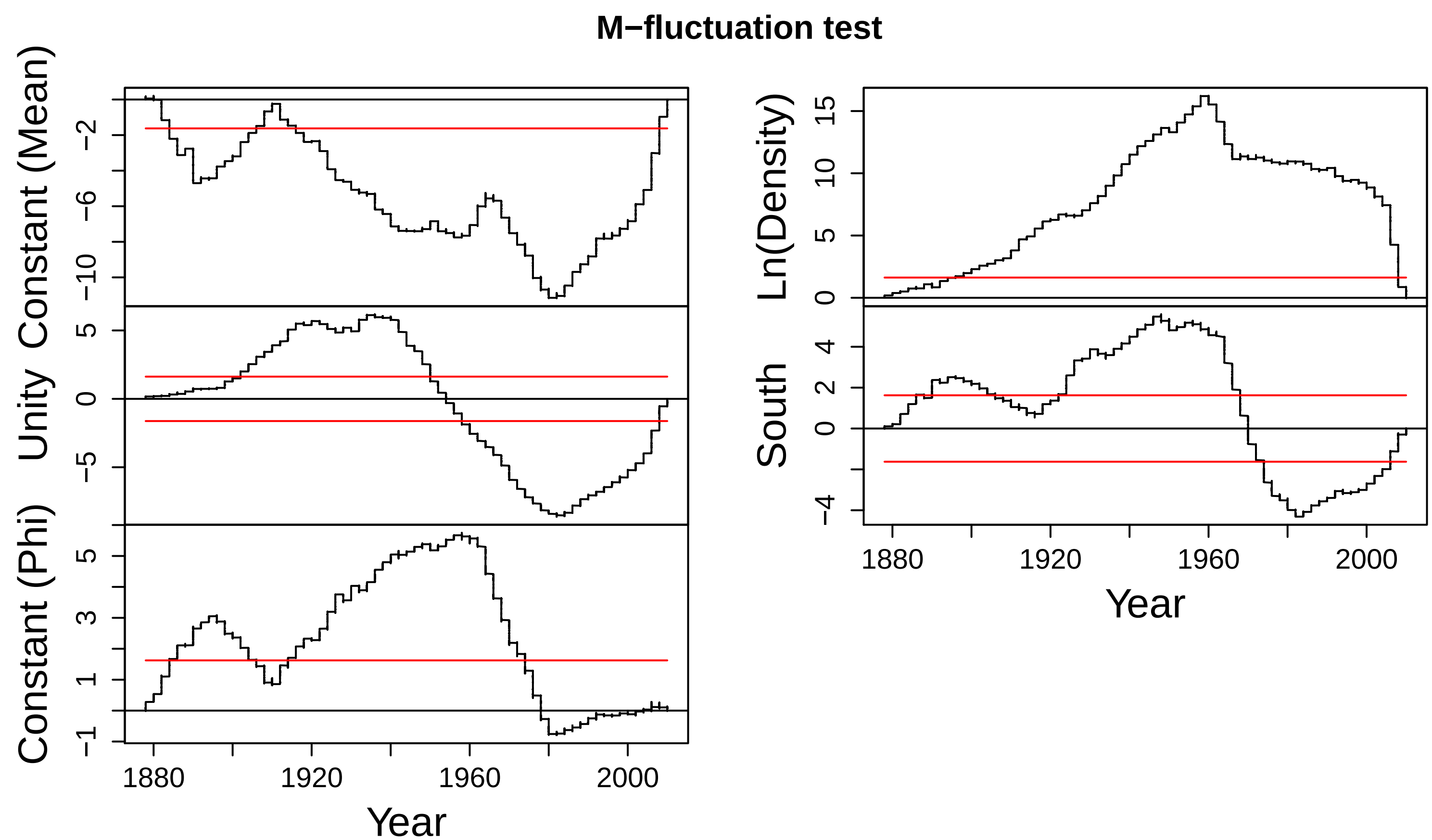
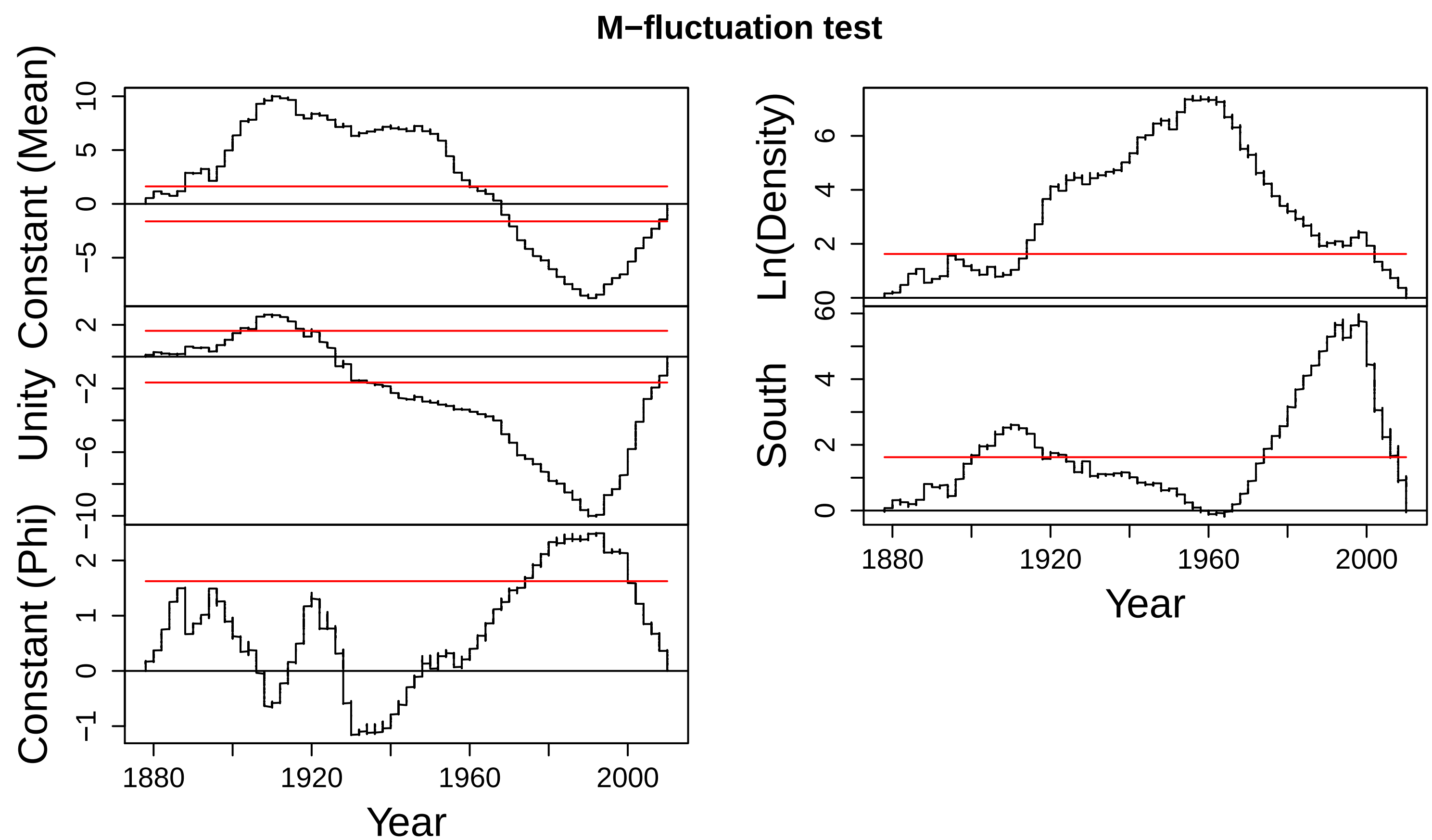


Figure 5.8: Structural Change Estimates for Beta Regression Coefficients over time, Republicans



CHAPTER VI

The Survival of Cross-Pressured Moderates

In Chapter 4, results from the computational model of party discipline, legislator behavior and electoral feedback were used to generate intuitions about the mediating effect of party-constituency cross-pressure, and the observed degree of responsiveness to electoral signals by cross-pressured moderates. However, as was mentioned at the end of Chapter 4, to fully assess the nature of the relationship between cross-pressure intensity and moderate behavior, some attention needs to be paid to the dynamic aspects of the model. Specifically, in the results from the modeling project, the lower degree of defections observed among cross-pressured moderates at *high* levels of party discipline (thus producing the curvilinear relationship) was driven by rates of moderate defeats in subsequent elections. Regardless of the behavioral predilections of the moderate legislator, in the kind of the environment that produces strong party-constituency cross-pressure, it's difficult for moderate legislators to survive.

At the "micro" level, this finding makes intuitive sense – moderates may choose to affiliate strongly with a party because of signal that it sends about their future behavior to risk-averse electorate. Like all legislators, moderates begin as unknown quantities, and have an incentive to support the party more than they otherwise might as a result. When the electoral costs for affiliating with a party become strong enough, moderates may have an incentive to develop an alternative ideological reputation, but this is not easily accomplished in short order, but only over the course of a career. Strong cross-pressure cuts those kinds of careers short before they can begin. The differential ability to properly develop a moderate partisan reputation should be mediated by the broader partisan context in which the legislator makes her decisions.

The purpose of this chapter is to take a closer look at individual responses to differential levels of electoral security with differing levels of party support on roll-call votes. Specifically, strong attention will be paid to the conditioning effects of cross-pressure and tenure on the connection between electoral security and party unity rates, and on the connection between party unity and subsequent electoral success or defeat.

6.1 Characterizing Hypotheses

From the above intuitive story, I derive two concrete hypotheses about the behavior of representatives in the U.S. House, with regard to the nature of the relationship between a representative's electoral security and their subsequent party support rates on roll-call votes. They are as follows:

1. The effect of a representative's re-election margin on her party unity scores should be conditional upon district preference, with legislators representing more competitive (or hostile) districts showing more sensitivity to re-election margin than those representing safe or favorable districts for a member of that party.

2. The effect of a representative's re-election margin on her party unity scores should be conditional upon legislator tenure, decreasing as legislators' careers progress.

These hypotheses follow directly from the micro-level factors that help to produce observed macro-level patterns in the computational model. Observed variation in party unity rates are mostly driven by moderates who are cross-pressured between party and constituency. A heightened degree of cross-pressure should intensify the incentive for moderates to defect from the party line, and moderates differ in the degree to which they feel cross-pressured (both between representatives in a given Congress and across a representative's career within a Congress). Thus, the degree of cross-pressure, as measured in terms of district preferences should have an amplifying effect on the role of re-election margin in determining subsequent behavior by the representative. That is, a representative would be more likely to utilize defection as an insulation strategy in a district that is less in line their party's preferences to begin with. Tenure should matter too, as longer-tenured legislators should have stronger individual ideological reputations, lessening the need to calibrate their association with the party in response to electoral signals.

In addition, I derive two concrete hypotheses about the probability of subsequent defeat of incumbent legislators, with regard to a representative's party unity behavior in a given Congress.

3. The effect of a representative's party unity scores on the probability of her subsequent electoral defeat should be conditional upon district preference, with defeat probabilities for legislators representing more competitive (or hostile) districts showing more sensitivity to party unity rates than do defeat probabilities for legislators representing safe or favorable districts for a member of that party.

4. The effect of a representative's party unity scores on the probability of her subsequent electoral defeat should be conditional upon legislator tenure, decreasing as legislators' careers progress.

Having investigated model predictions about legislator behavior in the shadow of party-constituency cross-pressure, the investigation of these hypotheses serves to "close the loop" by substantiating the importance of dynamic feedback in producing observed rates of party unity. Specifically, the insulation strategy of party defections should be most effective in staving off electoral defeat for a representative when cross-pressure is weaker, and when the representative has accumulated a longer tenure in the chamber.

6.2 Data

6.2.1 Data Sources

Since the analysis in this chapter is focused on the same legislative body, and over the same time period, as that in Chapter 4, many of the data sources from Chapter 4 are used again. These are: party unity rate, margins of victory for House members, district population density, the South dummy variable, and Democratic presidential vote within the representative's district. As before, the first four variables are available for the entire time period from the 46th Congress (elected in 1878) to the 112th Congress (elected in 2010) and Democratic presidential vote is available from 1952-on. Analyses will be conducted over the entire data set using the density and region variables as proxy for district preference, and over the reduced data set using the presidential vote data as a proxy for district preferences. Tenure is also introduced into the data set – this is just the number of terms already served by a individual representative by that time.

In addition to tenure, another new variable is introduced into the analysis in this chapter – subsequent re-election attempts, and success/defeat, of incumbent legislators. Incumbency status is not available in the main electoral sources for the project – though ICPSR ID codes and office occupancy data in the Voteview data do permit the automatic identification of *successfully re-elected* legislators. Data on incumbency status of candidates in House elections is provided by King (1992) and updated using Roll Call Magazine's "Casualty Lists" (specifically, the category for House members defeated in general elections) for defeated incumbents in more recent Congresses. These sources can thus be used to identify incumbent legislators who sought re-election, but were defeated. Together, this information is used to produce two variables for each representative-Congress entry:

- Did the legislator seek re-election, contesting a general election as a result?
- Did the legislator secure re-election?

Analysis of legislator re-election is then conditioned upon a legislator running in a general election for the U.S. House. This means that analyses seeking to explain probabilities of incumbent defeat omit both incumbents who did not seek re-election, and incumbents who did seek re-election but were not granted their party's nomination for the general election contest.

6.2.2 Exploratory Statistics on Party Unity, District Preference and Tenure

Before beginning with analysis, it would be worthwhile to consider some of the basic relationships between the key independent variables in the study. The top row in Figure 6.1 shows scatterplots for the natural log of population density and re-election margin for each major party. Population density and electoral outcomes don't show much of a correlation upon immediate inspection – this probably reflects the differing bases of power within the Democratic party throughout the time period covered in the sample (i.e. the transition from being a party based in rural, Southern districts to one based in urban, Northern districts). There does, on the other hand, appear to be a mild negative relationship between density and re-election margin for Republicans – this is also intuitive, as many of the less-loyal Republican House members have tended to come from the suburban/urban, liberal-to-moderate wing of the party from the mid-20th-century.

In a similar fashion, the relationship between party unity rates and population density comports with intuitions about variation in the composition of the major parties over the time period under study, as seen in the bottom row of Figure 6.1. Here, we can see strong variation in party loyalty rates (with even a component voting with the party less often than not) in less dense districts, with more consistently loyal behavior from those representing more densely-populated districts. Again, this could reflect the once-central, and then marginal, role of conservative Southern Democrats representing more rural districts. Interestingly, the plot for Republicans seems somewhat similar, in that there appears to be more variation in party unity scores in less densely populated districts than in more populous districts.

Figure 6.2 repeats the plots in Figure 6.1, but with a representative's tenure in the House on the x-axis, instead of district population density. These plots are somewhat difficult to read, in that tenure takes on discrete values that can condense the points being displayed, but there a still a few general takeaways from the information presented in them. First, for both Democrats and Republicans, there appears to be a mild negative relationship legislator tenure and re-election margins. This runs counter to the idea that incumbents go up a gradient of increasing electoral security as they progress in their careers. This apparent finding is especially interesting, considering that tenure tends to be associated with consistently higher levels of party unity, which is consistent with findings by Theriault (2005) on career-cycle effects upon party unity rates. Together, though, they do suggest an image of long-tenured legislators as being not especially sensitive to the constituency signals that shifts in re-election margin may reflect.

Figure 6.3 once again replicates the basic structure of the above plots, but with presidential vote by Congressional district as the variable on the x-axis. As with the previous two sets of figures, it's difficult to derive much insight from these plots, but a mild positive relationship appears to be on display for Democratic presidential vote by district and Congressional re-election margin for Democrats, and a mild negative one on display for Republicans. Once again, the variance in these relationships is interesting – much of the effect in each case seems to be driven by consistently high re-election margins in the most partisan districts, while districts that are more competitive at the presidential level see much more variance in party unity rates for both Democratic and Republican members. This makes some sense, recalling that at least part of the purpose of partisan legislative institutions is to help induce high rates of unity from legislators who might otherwise fear the electoral consequences from voting with the party more frequently. The variance in this behavior does suggest that the electoral accountability present in diminishing rates of unity for less partisan constituencies is not completely disrupted by partisan organization of electoral and legislative endeavors.

6.2.3 Estimation Strategy for Legislative Panel Data

Estimating an individual-level model of electoral security and party loyalty requires accounting for the fact that representatives serve in multiple Congresses (usually in sequence, but not always), and that the Congresses that they serve in are a relatively small share of all possible Congresses.[1] This implies that an unbalanced panel approach to the data is appropriate. A panel model with fixed effects for legislators is chosen – as noted by Carson et al (2010), the substitution of random effects by House representative for fixed-effects generally has little effect on the results.[2] The panel structure is also utilized for modeling the effect of party loyalty on subsequent electoral defeats for incumbents seeking re-election – the only modification is the inclusion of the logit link function for estimation of the binary dependent variable.[3]

[1] Even John Dingell, current House Dean and longest-ever-tenured House member, has served in only 28 of the 67 Congresses under study here.

[2] My own exploratory work with the data generally confirms this for the analysis presented here.

[3] Analysis is conducted in R 3.1, with the *plm* package used for estimation of equations with party loyalty as the dependent variable, and the *MASS* package used for estimation of equations with probability of incumbent defeat as the dependent variable.

6.3 Results

Before beginning with the discussion of the results, it would once again to be worthwhile to discuss the expected direction of the effects under investigation.

1. For Democrats, the conditioning effect of population density on the relationship between electoral security and party loyalty should be negative, and for Republicans it should be positive.

2. The conditioning effect of the South dummy on the relationship between electoral security and party loyalty should be positive for Democrats, and negative for Republicans.

3. Finally, the conditioning effects of Democratic presidential vote on the relationship between electoral security and party loyalty should be negative for Democrats and positive for Republicans.

Each of these directional expectations also holds for the conditioning effects of these contextual variables on the relationship between party loyalty and the probability of incumbent defeat. Additionally, the conditioning effects of legislator tenure on both the relationship between electoral security and party unity, as well as on the relationship between party unity and the probability of incumbent defeat, should all be negative for both parties.

6.3.1 Conditioning Effects on the Relationship between Electoral Security & Party Loyalty

Table 6.1 presents the results of linear panel model equations estimating the effect of re-election on party unity rates for Democrats. Equations 2 and 4 are of primary interest here, as they present the full interactive specification of the models, with region and density standing in for cross-pressure, and with Democratic presidential vote standing in for cross-pressure, respectively. The coefficients for the interactive terms test the hypotheses about conditioning effects – and the results are mixed. The coefficient on the interaction term between the South dummy and re-election is positive and significant, as expected. However, the coefficient on the interaction between density and re-election margin is negative and significant, the opposite of the expected direction. Additionally, the coefficient on the interaction between Democratic presidential vote is positive (though not significantly so), which also runs counter to expectations. Tenure, however, works as expected – its conditioning effect on the relationship between re-election margin and party unity rate is negative and significant, indicating that longer-tenured representatives exhibit less responsiveness to shifts in re-election margin than do shorter-tenured members.

The first row of Figure 6.4 plots marginal effects for the relationship between re-election margin and party unity, conditioned on each of these interactions (except for the South dummy). As can be seen, the marginal effect of re-election margin on party unity rate is significantly negative for most values of tenure, and is significantly positive for most values of population density.

Table 6.2 replicates the above analysis for Republicans. With the exception of the expected positive and significant coefficient on population density, no other hypotheses related to conditioning effects upon the relationship are supported by the data. The coefficient on the interaction between Democratic presidential vote and re-election margin has the correct sign, but is not significant at any conventional levels. The remaining coefficients on interactive terms are statistically insignificant, but are in the opposite direction from expectation. Marginal effects for Republicans are plotted in the second row of Figure 6.2 – no additional insights are forthcoming, though.

6.3.2 Conditioning Effects on the Relationship between Party Loyalty & Electoral Defeat

The second set of hypotheses – relating to the conditioning effects of cross-pressure and tenure on the relationship between a representative's party unity score and their subsequent probability of defeat – are investigated in Table 6.3. The first two columns show models estimated for Democratic representatives seeking re-election, and the second two columns show models estimated for Republicans seeking re-election. Again, of particular interest in each case are the coefficients on interaction terms in each equation. Once again, the results are mixed. The interaction between party unity rate and population density has the opposite-signed coefficients from that expected for each party, and the effect for Democrats is significant. The coefficient on the interaction term for South and party unity rate has the correct sign for each party, but neither effect is statistically significant. While Republicans show the expected positive and significant coefficient on the interaction between district Democratic presidential vote and party unity, Democrats *also* show a positive and significant coefficient, which runs counter to expectation. Finally, the hypothesis of a negative interactive effect of tenure on the relationship between an incumbent legislator's party unity rate and their subsequent defeat probability was rejected across the board – the coefficients for these interactive effects are all positive (though none are significantly so).

Marginal effects for party unity rate on probability of incumbent defeat (conditioned on population density, tenure and Democratic presidential votes) are plotted in Figure 6.5, with Democrats once again on the top row and Republicans on the bottom. Predictably, for both parties, the marginal effect of party unity rate on the probability of legislator defeat is only consistently positive across differing rates of Democratic presidential vote within the incumbent's district.

6.4 Discussion

As was the case in Chapter 4, results for the hypotheses under consideration were mixed. In the case of the first hypothesis, there existed some evidence that intensity of cross-pressure could affect legislator responsiveness to electoral security – in particular, in Southern Democrats being more responsive to shifts in re-election margin than their Northern counterparts. The second hypothesis, predicting a negative interactive effect for tenure on the relationship between electoral security and party unity, was strongly supported for Democrats, but not for Republicans.

The third hypothesis, predicting conditioning effects of cross-pressure on the relationship between a representative's party unity rate and their subsequent defeat probability was completed rejected for Democrats, and only partially supported for Republicans, who showed the expected conditioning effect of Democratic presidential vote on the relationship between party unity rate and incumbent defeat probability. Finally, the fourth hypothesis, predicting a negative effect of legislator tenure on the strength of the relationship between party unity rate and subsequent incumbent defeat probability, was rejected across the board.

Although these results are mixed, they are somewhat disappointing, with the notable exception of the negative effect of tenure on legislative responsiveness. This finding does suggest that longer-tenured representatives may have less need for responsiveness to shifts in re-election margin than do their shorter-tenured colleagues. While the present study can't confirm the conjectured mechanism for this from the computational model – namely, that longer-tenured moderates are more secure, since they have developed consistent reputations for moderation and their defections don't induce uncertainty about their preferences – this finding is consistent with such an explanation.

Many considerations may help to explain the mixed results found in the above analysis. One important consideration at play in investigating what electorallyendangered moderates may do to protect themselves is that those who are unsuccessful in doing so are removed from the data set. Explaining defeat probabilities helps to get at some of the selection issues that this may raise, but integrating this insight more broadly, for the refinement of hypotheses about legislator behavior and electoral accountability, is inherently difficult. Additionally, as mentioned in the discussion of the results in Chapter 5, the model from which the predictions are derived is inherently simplistic, and potentially omits other systematic factors that may help to explain observed patterns in legislator responsiveness to electoral threat, and in subsequent patterns in electoral accountability.[4] These factors may, themselves be related to quantities included in the model, and could be working at cross-purposes with the mechanisms under study. Finally, the data set cover a long time period, and many of the proposed relationships, especially with regard to factors that cause cross-pressure, may be incompletely summarized or oversimplified in the formulation of the hypotheses in question.

[4]One such mechanism could be the practice of partisan gerrymandering of House districts.

Tables & Figures

Table 6.1: Effect of Re-Election Margin on Party Unity Rates, Democratic House Members, 1878-2010 (with Fixed Effects for Individual Legislators)

	Dependent variable:			
	Party Unity Rate			
	(1)	(2)	(3)	(4)
Ln(Margin)	.010***	.003	.005***	.005
	(.001)	(.004)	(.002)	(.007)
Ln(Density)	.001	−.005*		
	(.002)	(.003)		
Dem. Pres. Vote			.276***	.222***
in District			(.016)	(.045)
Tenure	−.001	.007***	−.004	.003
	(.002)	(.002)	(.004)	(.005)
Ln(Margin) *		.002***		
* Ln(Density)		(.001)		
Ln(Margin) *		.009***		
South		(.003)		
Ln(Margin) *				.017
Pres. Vote				(.013)
Ln(Margin) *		−.002***		−.002***
Tenure		(.0003)		(.0004)
Observations	11,942	11,942	5,640	5,640
Individuals	2655	2655	1129	1129
R^2	.247	.253	.321	.326
Adjusted R^2	.190	.195	.255	.259
F Statistic	44.376***	43.851***	75.836***	72.367***

*p<0.1; **p<0.05; ***p<0.01

Note: Constant and South drop out due to legislator fixed-effects.

Table 6.2: Effect of Re-Election Margin on Party Unity Rates, Republican House Members, 1878-2010 (with Fixed Effects for Individual Legislators)

	Dependent variable:			
	Party Unity Rate			
	(1)	(2)	(3)	(4)
Ln(Margin)	$-.001$	$-.009^{***}$	$-.004^{**}$	$-.013^{*}$
	(.001)	(.003)	(.002)	(.007)
Ln(Density)	$-.002$	$-.005^{*}$		
	(.002)	(.003)		
Dem. Pres. Vote in District			$-.146^{***}$	$-.197^{***}$
			(.024)	(.045)
Tenure	$-.003$	$-.004^{*}$	.001	.0004
	(.002)	(.002)	(.004)	(.004)
Ln(Margin) * Ln(Density)		$.001^{**}$		
		(.001)		
Ln(Margin) * South		.0001		
		(.003)		
Ln(Margin) * Pres. Vote.				.020
				(.015)
Ln(Margin) * Tenure		.0003		.0001
		(.0003)		(.0004)
Observations	10,004	10,004	4,213	4,213
Individuals	2433	2433	1000	1000
R^2	.256	.257	.294	.295
Adjusted R^2	.192	.193	.223	.223
F Statistic	37.483^{***}	36.044^{***}	47.444^{***}	44.344^{***}

*p<0.1; **p<0.05; ***p<0.01

Note: Constant and South drop out due to legislator fixed-effects.

Table 6.3: Effect of Party Unity Rate on Probability Incumbent Defeat

	Dependent variable:			
	Prob. of Incumbent Defeat			
	Democrats		Republicans	
Party Unity Rate	.459	8.289***	.836	12.647***
	(.984)	(2.170)	(1.115)	(2.611)
Tenure	-.152	.250*	.457***	.660***
	(.100)	(.148)	(.077)	(.139)
Ln(Density)	.125		.174	
	(.117)		(.150)	
Presidential Vote		6.880***		-35.508***
		(3.489)		(5.740)
Party Unity Rate	.012	.153	.034	.253
* Tenure	(.119)	(.171)	(.090)	(.171)
Party Unity Rate	-.307**		.084	
* Ln(Density)	(.141)		(.172)	
Party Unity Rate	-.390		1.340	
* South	(.811)		(1.850)	
Party Unity Rate		13.488***		32.623***
* Pres. Vote		(4.094)		(6.927)
Observations	11942	5640	10004	4213
Groups	2655	1129	2433	1000

*p<0.1; **p<0.05; ***p<0.01

Note: Constant and South drop out due to legislator fixed-effects.

Figure 6.1: Re-Election Margin, Party Unity Rate, and Population Density, 1878-2010

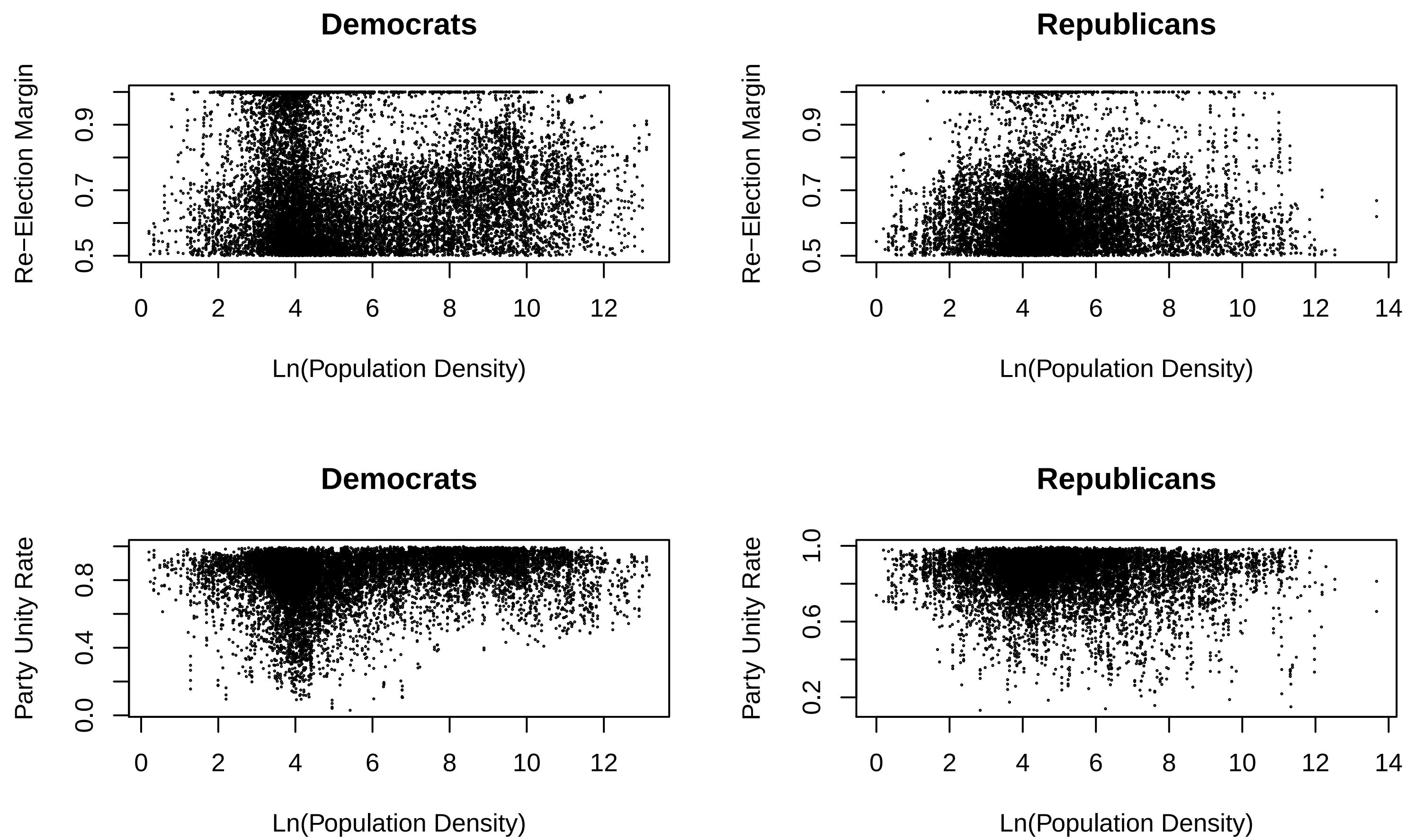


Figure 6.2: Re-Election Margin, Party Unity Rate, and Representative Tenure, 1878-2010

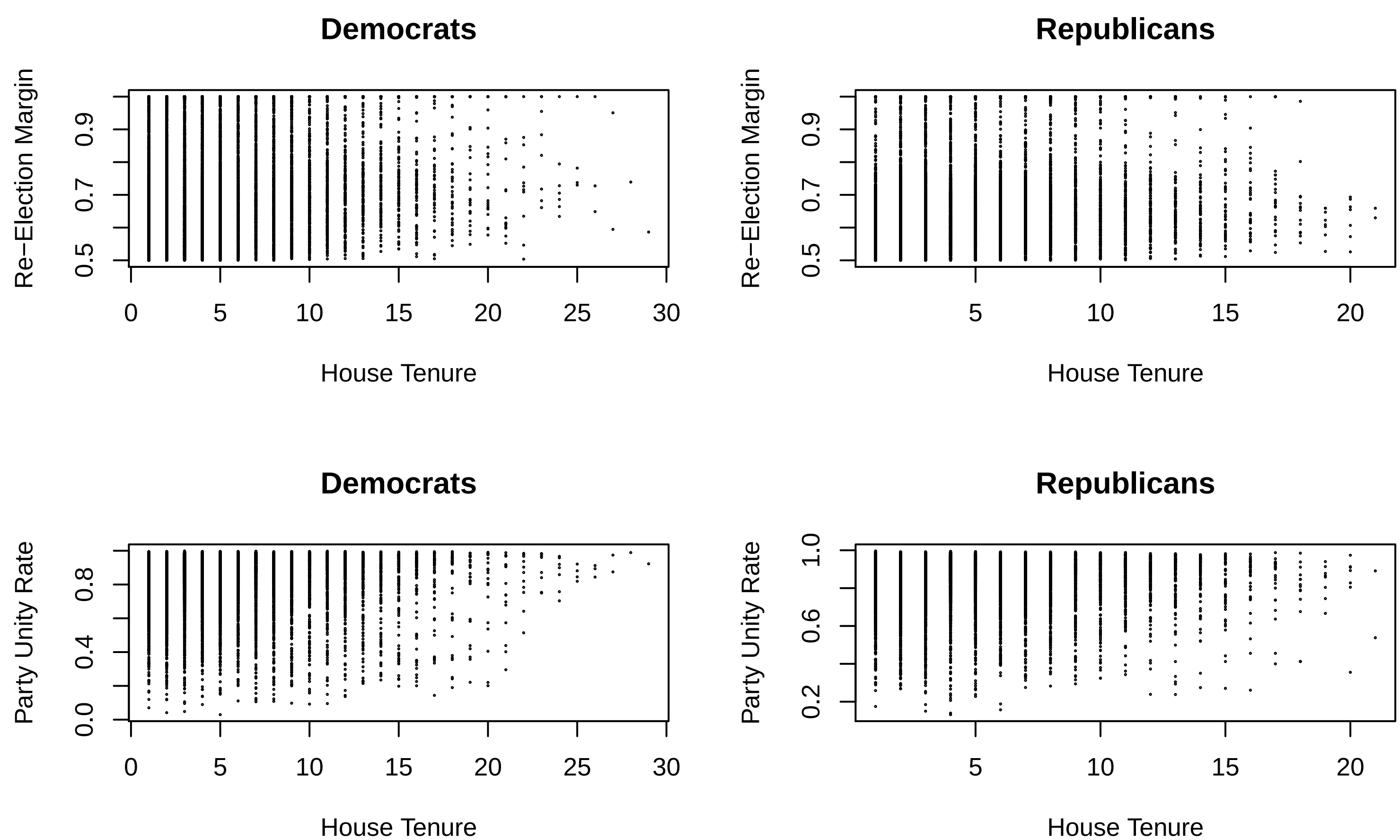


Figure 6.3: Re-Election Margin, Party Unity Rate and Presidential Vote by Congressional District, 1952-2010

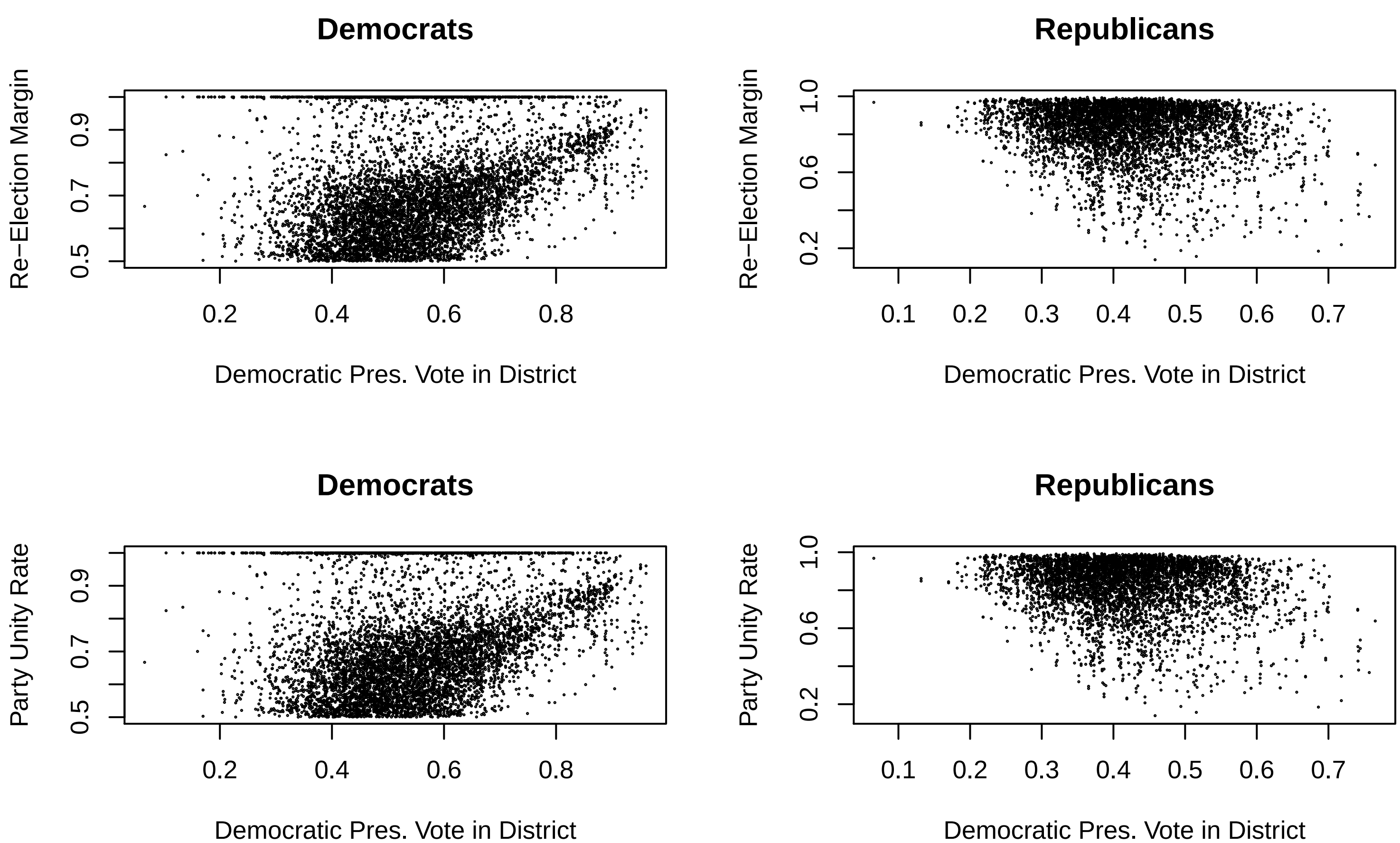


Figure 6.4: Marginal Effects of Re-Election Margin on Party Unity Rate, Conditioned on Tenure, Population Density, and Democratic Presidential Vote

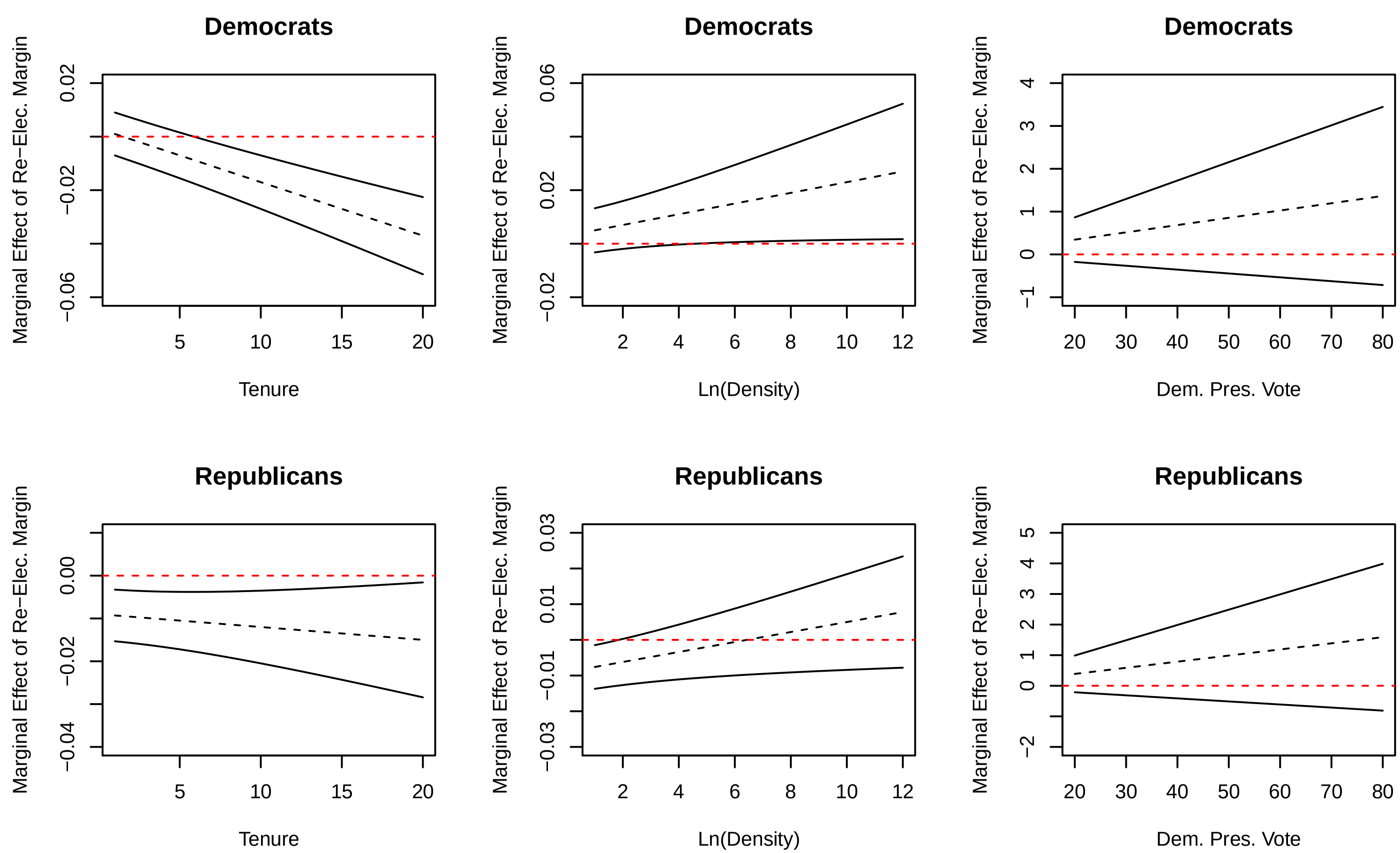
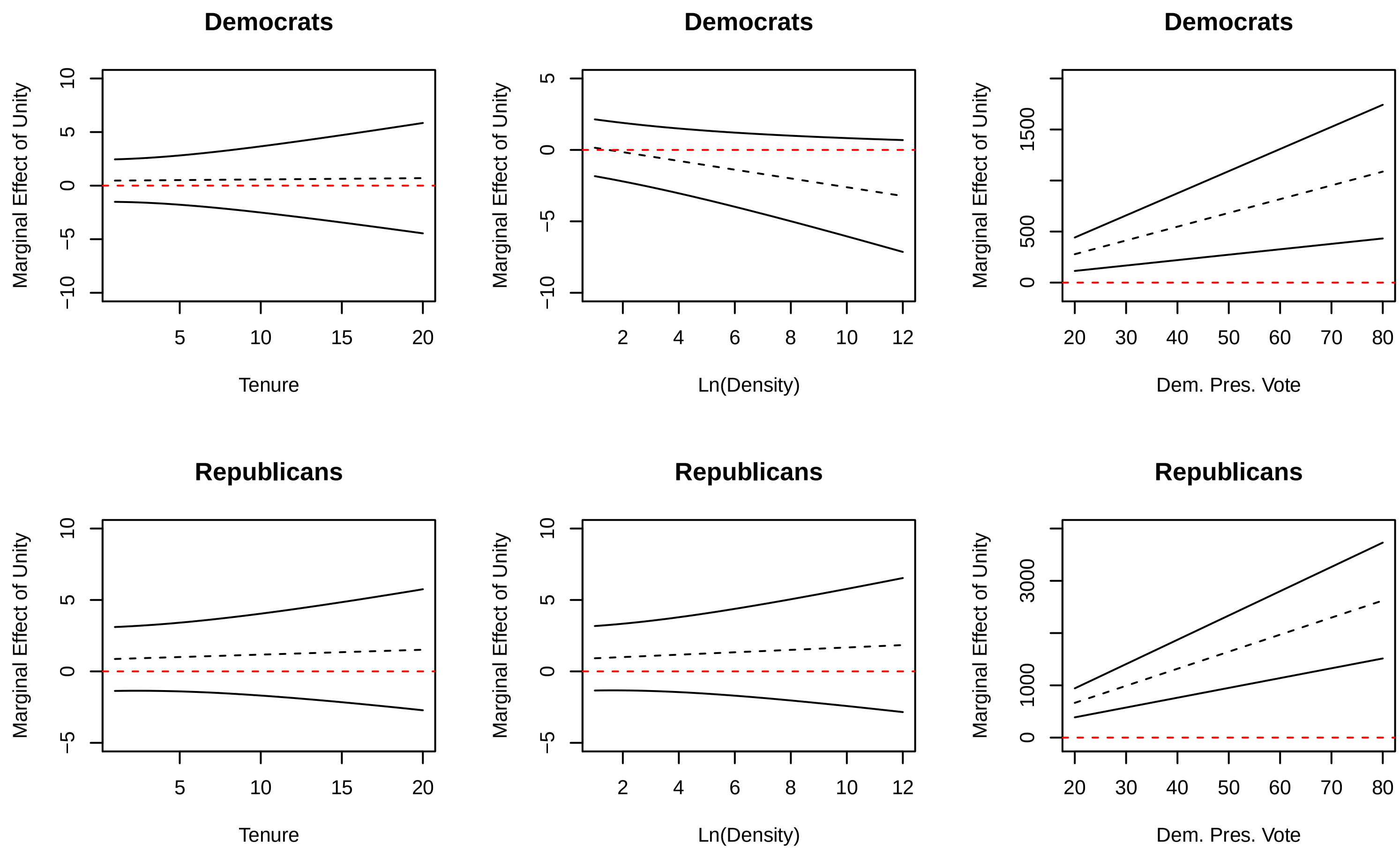


Figure 6.5: Marginal Effects of Party Unity Rate on Probability of Defeat, Conditioned on Tenure, Population Density, and Democratic Presidential Vote



CHAPTER VII

Conclusion

The purpose of this dissertation project was to motivate, develop and test the predictions from a dynamic model of party discipline, legislator vote choice and electoral response. Having done this in the preceding chapters, it would be worthwhile to step back from the details, and summarize the implications of the findings for future work on legislator behavior in particular, and on mechanisms of democratic accountability, in general.

I begin this chapter by summarizing the main contributions and findings of the research from the previous chapters, focusing both on the theoretical and empirical contributions of the project. I follow this discussion with a consideration of potential explanations for some weaknesses in the empirical results, and how they may point toward potentially fruitful extensions of the base model, and alternative approaches toward data analysis. I conclude with a consideration of how the dynamic perspective of the present project fits in with, and differs from, existing work on legislator behavior, party organization and democratic accountability in the U.S. House.

7.1 Theoretical Contributions

In Chapters 2 and 3, I motivated and developed a dynamic model of party discipline choice, legislator roll-call behavior and electoral feedback. In Chapter 4, I analyzed results from simulation experiments conducting using the model, with an eye toward showing how the dynamic perspective on the connection between party and legislator, and between legislator and constituent, could yield unique predictions about the willingness cross-pressured legislators to support the party line on key roll-call votes. There are two main theoretical contributions implicit in this approach. The first is that it is valuable to model party decisions about discipline and legislator choices about unity *jointly*, and as functions of the same external stimulus – the electoral security enjoyed by party members. As was argued in Chapter 2, parties exist to serve the interests of their members, and this necessitates modeling the choices of party leaders and individual legislators, respectively, jointly and explicitly.

For the purposes of the present study, party leadership decisions and individual legislator behavior were studied in the sequence implied by the model, focusing first on generated levels of party disciplinary intensity, and then how party disciplinary intensity interacted with legislators' individual electoral considerations to produce distributions of party loyalty rates. That is, the model framed the pathway from electoral security to party loyalty rates as an *interaction* between choices of the two different kinds of agents. Subsequent empirical tests followed in this spirit, jointly estimating the dispersion of party unity rates at the caucus level with individual legislator response to electoral pressure. It's worth noting that, while the exploration (and testing) of the model didn't explicitly focus on *differentiating* the two pathways by which electoral conditions could influence legislator behavior (e.g. party leaders looking at the security of members, and members looking at their own individual security), this is certainly possible to do within the model framework, and in a way that could potentially generate diverging empirical expectations about member-driven and leader-driven changes in observed party polarization.

The second theoretical contribution, which was of central importance to the present study, was the addition of the dynamic perspective to the understanding of the connection between electoral security and party loyalty for cross-pressured members. As discussed in Chapter 4, the finding of a curvilinear relationship between the intensity of party disciplinary efforts and the impact of electoral insecurity upon subsequent loyalty rates, highlighted the major contribution of the dynamic perspective – determining which patterns of electoral security and party loyalty were stable over time, and which were not. When faced with an especially acute conflict between party expectations and constituent desires, cross-pressured members were unable to survive long enough to develop a moderate reputation.

Thus, in the context of the model, the question of moderate survival is inherently dynamic, as it involves connecting behavior in one time period of the legislature to the composition of the legislature in the next time period, and situates *replacement* as an alternative channel of electoral accountability to *adaptation*, as suggested in Theriault's (2005) dichotomy. This finding also yielded additional testable implications about the relationship between legislator tenure and survival. This, in turn, helped to organize the focus of empirical tests of model predictions, first relating to the character of (ostensibly) stable model states (in Chapter 5), and then relating to the character of potential changes via the channel of legislator defeat (in Chapter 6). The dynamic perspective thus accommodated the development of a model in which both stability and change could occur, and by delineating the *conditions under which* each could occur, helped shape the subsequent generation of empirical tests of model predictions relating to stability and change, respectively.

7.2 Summary & Implications of Empirical Findings

The predictions generated by the computational model can be usefully organized into two sets of claims. The first set places the empirical estimation of individual legislator responsiveness in the context of party caucuses, which feature a degree of dispersion in loyalty rates that must be modeled simultaneously. The second set relates to the responsiveness and subsequent electoral survival of individual legislators, as conditioned by the intensity of party-constituency cross-pressure, and legislator tenure. The first set were investigated in Chapter 5, and the results were mixed. More specifically, the hypothesized positive relationship between electoral security and party loyalty for individual legislators found strong support among Northern Democrats, but was unsupported for Southern Democrats, and only found sporadic support among Republicans. Additionally, the hypothesized positive relationship between intra-party preference heterogeneity and dispersion in party unity rates found mixed support – the South dummy variable drove dispersion up for both parties, but the measures of population density and Democratic presidential vote only had the expected effect for Republican legislators.

The second set of predictions were investigated in Chapter 6, and again the results were mixed. The hypotheses in that chapter dealt with how the intensity of cross-pressure and legislative tenure could modify the relationship between electoral security and party loyalty for individual legislators, and the degree to which party loyalty influenced a legislators' subsequent probability of successfully securing re-election. For both the Democrats and Republicans, one of the cross-pressure indicators had the expected modifying effect on legislator responsiveness to electoral security, with Southern Democrats showing more responsiveness than Northern Democrats, and Republicans from densely populated districts showing more responsiveness than Republicans from less dense areas. Tenure also had the expected dampening effect on legislative responsiveness for Democrats, but not for Republicans. Cross-pressure had some conditioning effect on subsequent defeat probability for Republicans, with Republicans representing more heavily Democratic areas being more likely to face defeat for high rates of party loyalty than were Republicans from less heavily Democratic areas, but not expected relationship held for Democrats. Tenure did not have the expected dampening effect on the relationship between party loyalty and electoral survival for either party.

7.3 Issues & Extensions

While the mixed results do lend some support for the basic picture of party decision-making, legislator adaptation and electoral response proposed in the dynamic model, they also suggest that the model could be improved in ways that would further add to our understanding of the relationships between parties, legislators and voters. In particular, the following issues could be profitably addressed in future work within this research agenda – the role of party faction and the possibility of multidimensional political conflict, the role of intra-party politics in nomination politics and punishment behavior, further development of the agenda generation mechanism, and breaking up the data analysis across time periods.

The role of faction and multidimensionality

As was suggested in Chapter 5, it's worth considering the role that party factions may play in conditioning the behavior of individual legislators. In particular, regional differences within parties often play a key role in determining when the model's hypotheses find substantive support. One could potentially attribute this to the capacity for regional factions within the party to develop their own ideological reputations, which may align imperfectly with the general policy orientation of their national parties – this seems like to be the case with Southern Democrats throughout the period in question, as well as with Northeastern Republicans in the mid-to-late 20th century. These alternative anchors of partisan identity disrupt the essential mechanism of the accountability relationship posited by the model, which assumes that legislators may only distance themselves from the party by moderating along the single dimension of conflict produced by aggregating "party unity" votes. A multidimensional version of the model may be able to accommodate the concept of multiple "poles" of identification for each party, to which individual legislators may anchor themselves as fits their electoral needs. Additionally, accounting for regional differences in party organizations could allow for the possibility of recruiting candidates from pools with different ideological distributions, depending on their constituency.

Intra-party politics

As currently configured, the model features a very simple mechanism by which parties select challengers and open seat candidates for office – they are drawn at random from a national recruitment pool with fixed ideological characteristics. Such a perspective has the virtue of simplicity, but rules out the possibility of strategic recruitment of candidates, such as parties selecting candidates with known, moderate ideological characteristics in districts which differ ideologically from the party. Further, primary challenges to sitting legislators, and contested primaries within the party, are ruled out by assumption in the model.

What these restrictions share in common is the exclusion of any actors that may make decisions so as to secure the "best representative possible" given district characteristics – preventing strongly partisan candidates from running in moderate districts, and insisting upon partisan purity from representatives from uncompetitive districts.[1] This could be achieved via the addition of an additional actor – perhaps a party official or "activist," who is responsible for selecting candidates in a strategic manner, or for assigning the degree of punishment for disloyal members, conditional upon the ideological characteristics of their district. Including such an actor could help account for the possibility of relatively loyal members being punished for not being loyal enough, and could also account for the tolerance that may be shown to moderate members for towing the party line on a less frequent basis.

[1] This issue mirrors one face by party leaders, in their inability to selectively apply discipline to members, or strategically release moderates when their votes are not needed.

Agenda-generation mechanisms

As noted in Chapters 2 and 3, the mechanism by which the voting agenda within the dynamic model is generated is very simple – each party makes a series of proposals to move status quo policy closer to preferences of the median district represented by the party. This assumption removes the possibility of strategic action by party leaders, by removing any leverage that leaders would have over presentation of the party's goals, as well as over tactical considerations regardless policy proposals (e.g. offering the closest proposal to the party's preferred policy that stands a chance of being adopted). While this approach to the agenda-generation mechanism had the virtue of greatly simplifying decisions by party leaders (who only had to look at the electoral security of a subset of their members, and choose an intensity of discipline based on those security inputs), it also ignores important factors that likely impact the composition of the set of "party votes" in the House. These would include strategic censoring of party-splitting votes to avoid majority rolls (Cox and McCubbins 2007), the role of outside groups/factors in producing a "systemic agenda" of possible issues to address (Binder 2003), and in the role of technology in facilitating the collection of recorded votes on procedural issues (Roberts 2007).

At least in regard to the first two factors, it is possible to imagine additions to the model that could add realism to its predictions. Party leaders could be made more strategic, perhaps by allowing some simple input like net electoral security or majority size to condition their determination of the ideological character of the party agenda. Additionally, one could imagine the inclusion of agents outside the chamber (e.g., " policy demanders") who helped to endogenously determine the pool of distributive resources available for party leaders to hold in bond. The third issue is more difficult to broach theoretically, but could be addressed empirically by separately analyzing different sorts of party votes (e.g. final passage votes vs procedural votes.)

Breaking Up the Analysis

One last way in which the present project could be improved would be to divide the data set in question into historical eras, permitting a more targeted analysis of the dynamics of party loyalty and electoral accountability *within* particular historical contexts, and facilitating potentially informative comparisons *between* historical eras. The dynamic model developed for this project is necessarily generic and was tested over the longest period for which party organization of the chamber (Jenkins and Stewart 2013) and the "electoral connection" between individual legislators and their constituencies (Carson and Jenkins 2011) could be said to exist – that is, since the end of Reconstruction. This approach to testing has the advantage of breadth and generality, but also risks pooling together disparate eras in a way that may mask the relationships between electoral security and party loyalty that exist within each era. Further, this broad approach eliminates the possibility of determining *when* the model's predictions are most strongly supported, which could help to highlight the strengths and shortcomings of the core theoretical assumptions of the model.

While the present analysis does feature some capacity for historical discrimination, through the inclusion of analyses with independent variables that weren't available for the entire period (i.e. Democratic presidential vote), and allows for the analysis of *changes* in parameter values over time using structural change models, no systematic attempt was made to break up model data by time period. When the data *were* divided by time period – among Republicans before and after the mid-1930s – interesting differences between the eras emerged, reflecting the shifting preferential center of gravity within the party. This finding suggests that further subdivision of the data set into relevant historical eras may similarly shed some light on the shifting relationships between party, legislators and constituencies over time.

7.4 Relating the Dynamic Perspective to Existing Scholarship

Having summarized the theoretical and empirical contributions of the project, and having given consideration to potential additions and extensions to the model, it would be worthwhile to line up the present (and potential future) trajectory of this research agenda to existing work on legislator behavior and electoral accountability. Generally, the approach and the results in the current project are complementary to existing work, and suggest ways in which future work in the area could be improved. More specifically, it's worth considering the relevance of the work to existing studies of legislator responsiveness to electoral pressures, to the role of within-party preference agreement in partisan organization of the legislature, and to connection between party loyalty behavior and democratic accountability.

Legislator Responsiveness to Electoral Conditions

As was noted in Chapter 2, existing work on the behavior of House members shows that representatives are responsive to constituency influence, as expressed through the channel of changes to electoral security. Most directly, Carson et al (2010) establish that individuals do alter their rates of party support on roll-call votes in response to diminished electoral security. Further, there exists substantial evidence that this member responsiveness to electoral signals is most acute in competitive House districts (Griffin 2006), and that members representing the most competitive districts are more likely to distance themselves from party messaging efforts (Casas et al 2014). The findings of this project are generally complementary to the picture that emerges from these works, but suggests that the literature on legislator responsiveness could be improved by paying more attention to the context in which legislators make their decisions to respond or fail to respond to shifts in their electoral security. Specifically, attention should be paid to intra-party factors, like preference heterogeneity within the party caucus, in conditioning the distribution of individual party unity rates.

Further, the findings in the present study suggest that it may be profitable to look more closely at the role that a legislator's tenure in the chamber plays in determining both a legislator's absolute level of partisan support, and the degree to which legislators alter their level of party support with respect to changes in their electoral security. For instance, Theriault (2006) attributes a substantial portion of recent party polarization to adaptation by existing members (that is, they develop more extreme voting records as their careers go on), but does not attempt to explain the source of this change on the part of those members. Since incumbents generally enjoy greater electoral security as they progress in their careers, it would be worthwhile to determine whether legislators become more partisan as they progress owing to increased electoral security, or to some factor intrinsic to being longer-tenured – for instance, the development of a known ideological reputation that appeals to risk-averse voters.

Intra-party Preference Agreement and Conditional Party Government

The approach of the present project to modeling intra-party decision-making owes a great deal to the conditional party government perspective on legislative organization in the House (Rohde 1991, Aldrich and Rohde 2000). As discussed in Chapter 2, the conditional party government thesis attributes partisan polarization in House roll-call voting records to party disciplinary regimes, which are in turn linked to intra-party preference agreement, and to inter-party preference disagreement, in a given Congress. The contribution of this perspective to the present project is most evident in the conception of party discipline as a distinct influence on legislator behavior, apart from a baseline predilection to party loyalty felt by an individual legislator. While the model evaluated in this project does not directly link intra-party preference disagreement *per se* to disciplinary pressure, such links can grow (and vary in strength) endogenously in the computational model.

Interestingly, recall that in the model, moderate defection behaviors occur most strongly in the presence of party-constituency cross-pressure for moderate members (which could be understood to preference disagreement) *and* moderate party disciplinary intensity. This indicates that the model endogenously generates at least some separation between preference agreement and disciplinary intensity. This separation can likely be attributed to the nature of the decision function employed by party leaders – leaders weight the electoral security of the party median and chamber median in their decisions over disciplinary intensity, which may capture the role of preference disagreement only imperfectly. Still, the joint modeling of leaders' choice with regards to the electoral conditions faced by key caucus members, along with individual legislators' choices with regard to their own electoral conditions, opens up the possibility of being able to separate discipline-induced patterns in loyalty from preferentially-induced patterns in loyalty, which has been a persistent criticism of the conditional party government research program (Krehbiel 1998, 2003).

Democratic Accountability: The Connected Roles of Adaptation and Replacement

One of the major contributions of the dynamic perspective to the study of legislator responsiveness to electoral pressure is the way in which it connects Theriault's (2005) "two faces of democratic accountability" – adaptation and replacement. More specifically, a dynamic account of legislator adaptation (or inability to adapt) to electoral pressure allows for the simultaneous generation of predictions regarding stable model states (e.g. the degree of responsiveness exhibited by members who successfully seek re-election) and changes from one model state to another (as measured by legislators who fail to successful adapt to electoral pressure, and are subsequently replaced). The character of electoral feedback to excessively partisan behavior (Carson et al 2010) and excessively ideological behavior (Canes-Wrone 2002, 2007) has been investigated, demonstrating how electorates can make their displeasure with legislator behavior known, including through the possibility of denying incumbents re-election. As noted above, the capacity of legislators to adapt to electoral feedback has also been established in the literature.

The key contribution of the dynamic perspective to future literature on democratic accountability lies in *connecting* adaptation and replacement, and in conceiving of them as substitute pathways for responsiveness. More specifically, future studies of legislator adaptation must take into account the possibility that insufficiently adaptive legislators will not be present in future observations in a data set. Conversely, studies of electoral turnover and legislator replacement must consider the possibility that electoral feedback allows re-election-minded legislators to avoid their electoral reckoning by altering their behavior before the fact. Each of these caveats poses both a theoretical and an empirical challenge for future studies of legislator behavior and electoral response – challenges that suggest the continuing utility of modeling both processes as two sides of the same democratic coin.

APPENDICES

APPENDIX A

A.1 The Model as Ergodic Markov Chain

Consider the following endogenous quantities calculated during each time step t of model play:

- The vector $\mathbf{P}_t$ of Republican voting probabilities for each constituency i
- The vector $\mathbf{L}_t$ of party loyalty rates chosen by leach legislator j
- The agendas a_{kt} of each party k.
- The share of resources held in bond by each party, denoted $bond_{kt}$
- The status quo policy, $x_{SQ,t}$

Definition. The combination of endogenous variables denoted ($\mathbf{P}_t$, $\mathbf{L}_t$, a_{kt}, $bond_k$, $x_{SQ,t}$) constitute a **state space**, denoted s_t for time t.

Then, consider the three major functions in model play mentioned above:

- $\mathbf{P}_t = f(\mathbf{x}, \mu_D, \sigma_D, \mu_R, \sigma_D, \epsilon_{nt}, \epsilon_{it})$

- $bond_{kt} = g(\theta, \boldsymbol{\alpha}, p_{KM,t}, p_{CM,t})$, for $k \in [D, R]$,

- $\mathbf{L}_t = h(\mathbf{P}_t, bond_{kt})$

These formulas, in conjunction with the formula for determining party agendas, and the vote outcomes which determine policy changes, completely describe the transition from one state of the model to another. Since $f(\cdot)$ is stochastic, and since the re-election probabilities and election outcomes that flow from $f(\cdot)$ figure into the calculation of $g(\cdot)$, $h(\cdot)$, and the other quantities, each one of the formulas is similarly stochastic with respect to its status at the beginning of the time step.[1]

Observation. The stochastic processes applied to each element of s, jointly denoted for convenience as $m(\cdot)$, have the **Markov property**. That is, $s_{t+1} = m(s_t)$. Thus, the series of states defined by $s_{t+1} = m(s_t)$ are a Markov chain.

Since the properties of m do not change with time, the Markov chain can be called time–homogeneous, implying that it has a **stationary distribution**, whose characteristics depend only on the exogenous parameters of the model. More importantly, the model is stochastic with respect to electoral feedback, and the errors can thus propagate through leadership decision-making and legislator behavior, the model is both *positive recurrent* and **aperiodic**. In other words, since the model is stochastic, it can move from any point in the state space to any other point in the state space (including returning to the prior point in the state space) in any time period (including in a single step). This leads to the following observation:

Observation. As $m(\cdot)$ is aperiodic and positive recurrent, the Markov chain $s_{t+1} = m(s_t)$ is **ergodic**.

[1]Note that they are not *independently* stochastic – that is, there is no independent source of uncertainty driving, say, the choice of party discipline regime or the choice of legislator behavior. All uncertainty present in these relationships is inherited from the electoral disturbances and retirements.

This observation follows from the Markov ergodic theorem. For a Markov chain, ergodicity means that the unique stationarity distribution to which the chain converges will be equivalent to probability of being in the state space at any given time. In other words, the behavior of the Markov chain over time will be the same as the probability of behavior averaged over the state space of the system described the chain. This means that time averages of system behavior, given "burn-in" (i.e. achievement of the stationary distribution) will accurately characterize behavior of the system, in general.

A.2 Notes on Construction of the Data Set

Legislators Included

Individual members were only included in the analysis if they met the following conditions:

1. They were elected to Congress as the initial winner of a *general election* recounted in the CLEA data, and survived any applicable challenges.
2. They won said election running as a Democrat or Republican.
3. They cast more than 20 votes in the Congress to which they were elected.

Among those not included according to these criteria are:

1. Those elected to Congress on a third party ticket.
2. Those elected to Congress as a result of a *special election* to fill a vacancy caused by a resignation, illness or death.
3. Those who switched parties during their term (the votes before the switch are included.)

4. Those who won initial election to Congress, but subsequently lost their seat due to a successful contest of their election.

5. Those who won election to Congress after successfully contesting an election.

6. Those who failed to cast 20 votes in a particular Congress.

House District Shapefiles and Population Density Calculations

The sources for this data are GIS shapefiles for U.S. House districts, compiled by Lewis et al (2013). Shapefiles were used to estimate the approximate size of each congressional district, from the 46th Congress onward. States with single districts apportioned to them (or using at-large seats for all of their districts) had their population density calculated by taking their population at the most recent census, and divided by the size of the state in square miles. In states with multiple districts, each congressional district was assumed to have been assigned an equal proportion of the state's population, and this population was divided by the size of the district as determined from the shapefile. In the case of a mixed allocation of geographically-apportioned districts and statewide at-large districts (as was often the case in post-census elections in the early-to-mid-20th century), the at-large districts' densities were calculated in the same manner as at-large districts for small states (e.g. dividing the entire population by the entire square mileage of the state) and the apportioned districts' densities were calculated by dividing the population equally across the *apportioned* districts, and dividing by district size.

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