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Schönenberger, Felix

Università della Svizzera Italiana

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Felix Schönenberger
Università della Svizzera italiana
felix.schoenenberger@usi.ch

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Abstract

Are politicians ideologically rigid, or do officeholders adjust policy strategically for electoral purposes? This paper sheds new light on this longstanding question by studying how U.S. House incumbents alter their roll call voting record prior to elections depending on their challenger's platform. Estimating non-incumbent candidates' policy positions using pre-primary transaction-level campaign finance data, I classify as extremist the more liberal (conservative) of the top-two candidates in Democratic (Republican) challenger primaries. Leveraging a regression discontinuity design, I exploit the quasi-random assignment of incumbents to moderate or extremist challengers by close primary elections of the incumbent's opponent party. I find that incumbents alter their roll-call voting record depending on their opponent's position, committing to a more moderate policy when running against an extremist compared to a counterfactual moderate challenger. Consistent with strategic responsiveness to electoral incentives, policy adjustment to challengers is confined to re-election seeking incumbents and to incumbents defending a seat in a competitive district. I provide suggestive evidence that incumbents' reaction to challengers is conditioned by the presence of third candidates, and reflects a trade-off between persuading swing voters at the center and mobilizing core supporters. Importantly, incumbents' adjustment is not driven by a valence advantage of moderate over extremist challengers but by incumbents' reaction to opponents' policy positions, suggesting strategic complementarity of policy platforms.

Keywords: Elections, Candidate Positions, Legislator Behavior, Polarization
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One of the principal reasons why opposition and political competition are essential to democratic politics is that they provide the mechanism through which democratic leaders are held to account.

— Ian Shapiro (2012), The Moral Foundations of Politics

1 Introduction

Electoral competition between candidates representing diverse political orientations is at the core of representative democracy, and its defining criterion for many economic and political theorists (e.g., Schumpeter, 1942; Downs, 1957; Dahl, 1971; Sartori, 1976). While most of the literature agrees on the central role of electoral competition in determining public policy in representative democracies, there are two fundamentally opposing views on the mechanism by which elections shape public policy and the role played by non-incumbent candidates. According to the perspective embodied in citizen-candidate models, the role of elections is limited to *political selection*: electoral turnover alters the composition of government and consequently implemented policy. On the other hand, the Downsian paradigm, in which candidates interdependently choose their policy platform, emphasizes officeholders' *electoral incentives* to strategically adjust enacted policies in response to the opponent's platform, creating the possibility for challengers to influence policy outcomes without winning the election.

In citizen-candidate models (Osborne and Slivinski, 1996; Besley and Coate, 1997), the scope for policy adjustment is limited because candidates cannot credibly commit to a policy platform distinct from their ideal. A central prediction of the citizen-candidate framework thus is *incumbent policy persistence*: politicians cannot strategically adjust their position, and once in office they implement their preferred policy throughout their term in office.[1] In this class of models, the challenger is simply a passive replacement for the incumbent, whose only decision, if any, is on whether to enter electoral competition or not. As incumbents are irresponsive to electoral incentives, challengers cannot affect public policy unless they succeed the incumbent so as to implement their own preferred policy.

In sharp contrast to this view stands the Downsian tradition, where candidates can credibly commit to policy platforms, and equilibrium policy is determined by candidates strategically adjusting their positions to voter preferences and to each other. The canonical Downs-Hotelling two-party model with full voter turnout (Hotelling, 1929; Downs, 1957) predicts office-motivated candidates to position themselves close to each other, and close to the median voter. From a

[1] Incumbent policy persistence remains an equilibrium outcome in dynamic citizen-candidate settings where voters observe incumbents' past actions in office and incumbents can build reputations by adopting policies more moderate than their ideal. Despite this important difference with respect to static formulations of the citizen-candidate model, they share its main prediction: once in office, incumbents maintain their policy position as voters attribute any deviation to extremist types which then are elected out of office (e.g., Duggan, 2000; Bernhardt et al., 2011; Van Weelden, 2013).

decision-theoretic viewpoint, an incumbent increases her chances for re-election by moving closer to her opponent. From a game-theoretic perspective, both candidates converge to the median voter's ideal and implement an identical policy. In reality, *full convergence* of policy platforms may not obtain if repositioning is costly, for instance, because candidates constrained by past positions taken in office or in prior elections and flip-flopping to the center undermines their credibility in the eyes of the electorate (Bernhardt and Ingerman, 1985; Enelow and Munger, 1993), or because candidates with "character" incur disutility when offering a platform that betrays their ideal (Kartik and McAfee, 2007). A more realistic interpretation of the Downsian convergence mechanism for the empirically relevant case where candidates inherit locations on opposite sides of the median, is that electoral competition among strategic candidates exerts pressure to adopt moderate policies, leading to *partial convergence* of policy platforms. In particular, when one candidate approaches the median from one side, it intensifies the pressure on the opponent candidate to move toward the median as well. On the other hand, when one candidate moves away from the median toward a polar position, the other candidate may parlay the resulting gain in electoral strength to a position closer to her ideal by moving in the opposite direction. Policy platforms thus emerge as *strategic substitutes*. Non-incumbent challengers can expect to affect public policy as incumbents are going to commit to a platform adjusted in the direction opposite of their rival's platform shift.

While the prediction that candidates strategically adapt their platform to each other's is unequivocal in models with credible commitment, the prediction of *strategic substitutability* is not. For example, policy-motivated candidates, who care not only about their own platform as in Kartik and McAfee (2007) but about the expected policy outcome including the policy the opponent would implement conditional on winning (Wittman, 1983; Calvert, 1985), may be more willing to compromise against a more extreme opponent. With policy motivation, *strategic complementarity* of policy platforms arises because risk-averse candidates are willing to trade some of the policy utility they would obtain conditional on winning against votes by moving to the center in order to prevent the victory of the extremist opponent who would implement policy far from the ideal of the compromising candidate. Strategic complementarity can also arise with candidates who face a trade-off between persuading swing voters at the center and mobilizing their core supporters at the extremes. While moderate platforms appeal to swing voters, moving too close to the opponent demobilizes core supporters who may refuse to turn out and abstain from voting due to indifference or alienation (Adams and Merrill, 2003; Bierbrauer et al., 2022), vote for third-party candidates (Palfrey, 1984; Weber, 1992; Callander and Wilson, 2007), or deny active and financial contributions to the incumbent's campaign (Aldrich, 1983). This trade-off creates an incentive to differentiate the platform when the opponent's is too similar, while taking more moderate positions if the opponent abandons swing voters on the middle ground. Finally, strategic complementarity can occur due to chase-and-evade incentives when one candidate has a non-policy "valence" advantage like quality or competence. The valence-advantaged candidate then has an interest in mimicking the weaker candidate's platform to deemphasize differences on the

policy dimension and intensify the salience of the valence dimension on which he is advantaged, whereas the weak candidate would therefore seek to evade the strong by hiding in the extremes of the policy space (e.g.,Aragonès and Palfrey, 2002; Aragonès and Xefteris, 2012).

Theoretical accounts yield markedly different predictions on whether and how candidates adjust their policy platform to each other and on the ability of non-incumbent candidates to influence public policy. This paper answers these questions empirically, shedding light on the crucial and hitherto understudied role of opposition candidates in ensuring responsive representation. Understanding whether or not incumbents strategically adjust policy to challengers is important beyond assessing the empirical relevance of the theoretical perspectives embodied in two large classes of formal models. The central notion of the Downsian paradigm that electoral competition constrains incumbents' policy is a key tenet of democratic accountability. In practice, the question of whether incumbents respond to electoral incentives has significant implications for constitutional design, particularly regarding institutions aimed at enhancing representation via selection at the expense of accountability (e.g., proportional elections, term limits). Similarly, the *direction* of policy adjustment is not only of interest to spatial theories of voting but more broadly speaks to a frequently raised concern that extremism on one side of the political spectrum breeds extremism on the other (e.g., Iyengar et al., 2012; Stone, 2020). If there is a feedback loop from policy divergence to partisanship, elite and voter polarization can be self-reinforcing and self-perpetuating over time (e.g., Callander and Carbajal, 2022; Diermeier and Li, 2023).

This paper provides evidence that, prior to general elections, U.S. House incumbents commit to new policy platforms by strategically adjusting their roll-call voting behavior in the direction to their opponent's position. Identifying the effect of opponents' on incumbent positions is challenging because candidate positions are jointly determined by preferences of the electorate and, if platform choice is strategic, interdependent. In addition, such analysis requires information on policy positions of non-incumbent candidates whose political orientation cannot be inferred from roll-call voting (Poole and Rosenthal, 1997) or House floor speeches (Gentzkow et al., 2019). To overcome this challenge, I follow an approach pioneered by Hall (2015) and use *pre-primary* transaction-level campaign finance data (1980-2018) to estimate the position of primary candidates on a liberal-conservative scale. Based on this estimate, I classify as extremist the more liberal (conservative) of the top-two candidates in Democratic (Republican) primaries, and the other primary candidate as moderate. Focusing on incumbents whose opponent party holds a competitive primary election with at least two candidates running for nomination, I use a regression discontinuity design to exploit as good as random assignment of incumbents to extremist or moderate challengers generated by close primaries. I thus compare the post-primary roll-call voting behavior of incumbents facing an extremist opponent in the general election to otherwise identical incumbents' post-primary voting record who defend their seat against a moderate challenger.

Crucially, I only consider post-primary roll calls held *prior* to general elections to isolate incumbents' differential response to extremist and moderate challengers from endogenous sample

selection. Since incumbents facing an extremist challenger are more likely to win their re-election bid (Hall, 2015), and because post-electoral roll call voting is only observable for election winners, it is not an option to use post-electoral roll calls to gauge incumbents' response. On the other hand, pre-election DW-NOMINATE scores (Poole and Rosenthal, 1997) that locate incumbents' roll-call voting on a liberal-conservative scale (from -1 indicating very liberal to +1 indicating very conservative) are fixed over a representative's term in office, and therefore not specific to the post-primary period but largely based on pre-primary roll calls. To overcome this difficulty, I estimate each incumbent's position — specific to the period between the opponent party's primary and the general election — as the agreement-rate weighted average of DW-NOMINATE scores of all other House members serving in the same Congress, whereby higher (lower) values of this estimate indicate increasing *roll call extremism* for Republicans (Democrats). As an alternative and more directly interpretable outcome, I use incumbents' *party loyalty* in voting on divisive issues, i.e., roll calls on which the majority of Republicans disagrees with the majority of Democrats.

Results for both outcomes tell a qualitatively consistent story. I find that incumbents facing an extremist challenger alter their roll-call voting record to commit to a more moderate position compared to incumbents running against a moderate challenger. Specifically, an extremist challenger causes a decrease in the incumbent's DW-NOMINATE-based estimate of *roll call extremism* by a 0.25 standard deviation. A simple back-of-the-envelope calculation that maps my estimate of *roll call extremism* back to actual DW-NOMINATE scores in the 117^{th} Congress (2021-2023) indicates that the implied shift approximately corresponds to half the within-party inter-quartile range of DW-NOMINATE scores in the U.S House of Representatives, or – alternatively – to the average distance between representatives and their own party's median. Concurrently, compared to incumbents running against a moderate challenger, incumbents facing an extremist are 6–8% more likely to deviate from party line and to vote in line with the majority of the opponent party.

The second part of the paper provides evidence that incumbents' adjustment to challengers is indeed part of an electoral strategy. Incumbents adjust their policy position in response to challengers only if they run for re-election, while retiring incumbents do not react to the nomination outcome of the opponent party's primary. This excludes non-strategic adaption by benevolent (and boundedly rational) incumbents who might misperceive the outcome of the opponent party's toss-up primary as signaling a shift in voter preferences. Consistent with incumbents responding to electoral incentives, I find that policy adjustment to opponents is confined to incumbents defending marginal seats, i.e., to incumbents who are electorally vulnerable and to districts where electoral returns to adjustment are substantial due to a significant portion of swing voters that could be swayed by policy shifts.

The last set of results investigates the possible mechanisms behind strategic complementarity of policy platforms. The pattern observed in the raw data suggests that incumbents take more moderate positions against extremists while differentiating their position from moderate challengers', indicating that incumbents do consider not only the votes they could win by moderating

but also the voters they could lose when offering a platform too close to the opponent's. Consistent with incumbents facing a trade-off between persuading swing voters at the center and mobilizing their core supporters, I find that the incumbent's reaction is stronger when the more moderate of the two potential challengers offers a platform close to the incumbent's. That is, the magnitude of the incumbent's response to a shift in their challenger's position is largest precisely in the case when incentives to differentiate from the moderate challenger are strongest, and the electoral returns to moderation against extremists are highest because the incumbent can attract middle-ground voters that have been abandoned by the opponent party nominating an extremist. I find suggestive evidence that incumbents' differential adjustment to moderate and extremist challengers is conditioned by the presence of third candidates. I also consider, but ultimately dismiss, policy motivation and valence-induced chase-and-evade incentives as alternative mechanisms. Importantly, I exclude that results are driven by a valence differential between moderate and extremist challengers, providing evidence that the moderates' valence advantage over extremists, if anything, biases estimates in the opposite direction of my main findings, which thus represent lower bounds on incumbents' reaction *to their opponent's platform*.

The findings of this paper directly speak to a longstanding empirical literature in economics and political science on candidate positioning. A large body of observational studies has investigated candidate convergence and policy responsiveness to voter preferences in the United States, generally reporting substantial divergence of candidate positions that are decreasing in district competitiveness, and small positive correlations between candidate positions and voter preferences (e.g., Ansolabehere et al., 2001; Burden, 2004). While consistent with the Downsian view of candidates adjusting positions strategically, this pattern is also consistent with strategic entry of citizen-candidates depending on the distribution of voter preferences.[2] Focusing on within-party changes between elections, Adams and Somer-Topcu (2009) show that positional shifts in party manifestos positively correlate with past shifts in rival parties' manifestos. However, with imperfect controls for public opinion, it is difficult to disentangle strategic adjustment to rival parties from shifts in voter preferences or changes in the economic environment. Le Pennec (2023) demonstrates that candidates in French two-round elections adjust their campaign messages in the second round, although not by taking more moderate policy positions but by advertising non-policy issues that deemphasize the policy dimension. Consistent with policy moderation, Burden (2001) shows that House representatives in the 102^{nd} Congress (1990-1992) exhibited a more moderate roll call voting record after primary elections than before, which may reflect agenda setting by party leadership rather than individual candidates strategically adjusting to their opponent's position.

Causal evidence on strategic position-taking is limited to party manifestos and campaign communication. In a cross-country study, Abou-Chadi and Krause (2020) demonstrate that past vic-

[2]The same applies to Catalinac (2018) who uses Japanese campaign manifestos to show that candidates in single-member districts tend to diverge less than in multi-member districts.

tories of right-wing parties lead mainstream parties to accommodate anti-immigrant positions in their party manifestos for subsequent elections. Most closely related to this paper is recent work by Di Tella et al. (2023) who use text analysis of French candidate manifestos and U.S. candidate webpages to locate candidates' campaign discourse along three dimensions: ideology, complexity, and topics discussed. Employing a regression discontinuity strategy similar to the one used in this paper, they test whether candidates strategically adjust their campaign communication to the position of the competitor who won the primary (or first-round election in France) by a narrow margin. While they find evidence for convergence in ideology and topics among French candidates, the convergence of U.S. candidates' campaign platforms seems limited to overall text similarity and complexity, with a small and statistically insignificant reduction in the ideological distance between candidates. As Di Tella et al. (2023) note, the finding of non-convergence of policy positions in the U.S. could be attributable either to the absence of positional adjustment in a highly polarized context, or due to the inability of their design, which focuses on the *distance* between candidate platforms, to detect positional adjustment in the same direction. My finding that policy platforms are strategic complements supports the latter interpretation. When candidates adjust their position in the same direction as their competitors, there is little scope for a change in the distance between their platforms. This paper complements the work of Di Tella et al. (2023) in various aspects. Using a different measure of opponent candidates' ideological position and incumbents' actual policy choices as an alternative outcome, this paper confirms the conclusion in Di Tella et al.'s (2023) that candidates strategically adjust their policy position to the opponent's, albeit with an important qualifier that they do not necessarily aim at getting closer to each other. While the focus on incumbents' voting records precludes drawing any inferences about the strategic positioning of non-incumbent candidates, the conclusions of this paper are not susceptible to objections that text similarity of campaign communication may be a natural consequence of candidates engaging with each other's positions rather than reflecting positional changes in response to the opponent's platform. Since it is not obvious that changes in advertised platforms translate into actual policy — the view that campaign promises are uninformative cheap talk is a key tenet of citizen-candidate models —, this paper's finding that incumbents' policy choices depend on their challengers' positions adds a substantively novel result.

Providing the first credibly causal effect of challenger positions on House incumbents' voting record, this paper further contributes to a growing empirical literature on the determinants of legislator behavior. Existing work has identified the influence of legislators' own ideology (Levitt, 1996), their party leadership (Canen et al., 2020), their core constituency (Mian et al., 2010), and even their daughters (Washington, 2008) and seat-neighbors (Harmon et al., 2019) on legislators' voting record. With opponent party challengers, this paper adds another key player in the political game and hitherto disregarded determinant of incumbent behavior. The most closely related work on legislator behavior is Lee et al. (2004) who also study the empirical relevance of the Downsian paradigm in the U.S. House of Representatives. Using a regression discontinuity design, they

exploit that a close victory of a Democratic candidate in the previous election generates electoral strength for the Democratic incumbent in the next election due to the incumbency advantage. They interpret the finding that incumbents do not change their position after the next election (in which they obtained a higher vote share due to the incumbency advantage) as evidence that electoral competition does not constrain incumbents' policy choices consistent with politicians' inability to commit to new policy platforms.[3] This paper's finding that U.S. House incumbents respond to electoral incentives sharply contrasts with this conclusion. Incumbents do commit to new policy platforms by strategically adjusting their voting behavior prior to elections, consistent with the Downsian paradigm and contrary to predictions of citizen-candidate models. To Mian et al.'s (2010) finding that U.S. House incumbents are responsive to their core constituency, this paper amends evidence that primary elections make incumbents accountable to core supporters of the *opponent* party, whose nomination decision determines the challenger and thereby affects incumbent's policy.

My findings also connect to an emergent literature studying the effects of candidate entry in two-round elections. Most closely related is Hall (2015) who demonstrates that extremists nominated in a toss-up primary get punished by general-election voters. Extremists get fewer votes and are less likely to win general elections for the U.S. House than moderate nominees, an effect largely attributable to extremists activating turnout of the opponent party more than the turnout of their base (Hall and Thompson, 2018). Complementing these analyses of the political demand side, this paper examines supply-side responses to extremist nominees. While Hall (2015) shows that extremists tilt the district's post-election roll-call voting record in the direction of the opponent party — i.e., becoming more liberal when Republicans nominate an extremist and more conservative when Democrats nominate an extremist — which is due to a selection effect because extremists are less likely to win, I discover an accountability effect working in the opposite direction. Sitting incumbents moderate their pre-election roll call voting record differentially more when running against an extremist. This moderating effect offers one possible solution to the puzzle of why primary elections do not increase (Hirano et al., 2010) and even *reduce* (Cintolesi, 2022) polarization of House members' voting record despite strong incentives to pander to their party's primary electorate. Primary voters' ability to pull the opponent party candidate's policy toward their ideal by nominating an extremist also hints at the existence of instrumental benefits to voting for outsider candidates with little chance of winning, suggesting that costs associated with expressive voting may be smaller than previously thought (Pons and Tricaud, 2018).

More generally, this paper relates to research studying campaigning and electoral strategies including the selection of candidates (Dal Bó et al., 2017), their decision to drop out (Lee, 2008; Anagol and Fujiwara, 2016), and to collude with candidates of similar orientations (Granzier et al., 2023). A large body of empirical work has documented persuasive and mobilizing effects of can-

[3] Another interpretation of this finding is that forward-looking incumbents with rational expectations strategically adjust their position after the first election because they anticipate their electoral advantage in the next election.

didates communicating their positions by door-to-door canvassing (Gerber and Green, 2000; Pons, 2018), direct mailings and phone calls (Kendall et al., 2015), television advertisement (Spenkuch and Toniatti, 2018), or social media (Petrova et al., 2021). This paper shows that actual policy-making is part of incumbent legislators' electoral strategy. While ample evidence that legislators' voting record is consequential for re-election strongly suggests that strategic incumbents *should* consider electoral ramifications of voting decisions (Canes-Wrone et al., 2002; Ansolabehere and Jones, 2010; Carson et al., 2010; Ansolabehere and Kuriwaki, 2022), I show that legislators *do* respond to electoral incentives and adjust their voting record accordingly. This paper thus also speaks to concerns that incumbent politicians strategically manipulate policy to retain office (e.g., Rogoff and Sibert, 1988; Levitt and Snyder, 1997). Given field-experimental evidence that voters are more likely to vote for candidates whose promises align with observed decisions (Cruz et al., 2024), incumbents' ability to credibly commit to new policy positions tailored to opponents by altering their voting record may constitute a source of the incumbency advantage that has yet been overlooked in the literature.

The remainder of the paper is structured as follows: Section 2 describes the setting, the data, and details the procedures for estimating candidate and incumbent positions. Section 3 presents the identification strategy and discusses its validity. Section 4 reports the main results and assesses the robustness thereof. Section 5 conducts heterogeneity analyses and discusses mechanisms behind the main findings. Section 6 concludes.

2 Empirical Setting and Data

2.1 U.S. House Elections

The House of Representatives is the lower chamber of the United States Congress. Its 435 members are elected in single-member districts by plurality or majority rule.[4] General elections are conducted biennially at the beginning of November during even-numbered years in a two-party system dominated by the liberal Democratic party and the conservative Republican party. With limited prospects for electoral success of third-party candidates, the outcome of general elections is ultimately decided by the competition between a Democratic and a Republican candidate.

Each of the two predominant parties selects its nominee in partisan primary elections held 2-9 months in advance of the general election. The laws governing the timing and conduct of primary elections vary from state to state (see, e.g., Boatright, 2014). With a few exceptions,[5] all

[4] In most states, the winning candidate in general elections is determined by simple plurality. Exceptions are Georgia and Mississippi where a runoff is held if none of the candidates receives a majority in the first round. Maine and Alaska switched from simple plurality to ranked-choice voting in 2018 and 2020, respectively. My sample does not include any case with ranked choice voting as adopted only at the end of my sampling period (1982-2018) and primary elections for the two seats in Maine were not competitive in 2018, i.e., a single candidate ran for each party's nomination.

[5] Exceptions include non-partisan primaries in the states of Washington, Alaska, and California (from 2012 onward) where all candidates of both parties run in the same primary and the top candidates advance to the general election,

states require each party to hold separate primaries where voters choose the party's nominee by plurality or majority rule.[6] While in some states only registered party members are allowed to participate in the selection of their party's nominee (closed primaries), in others also unaffiliated voters (semi-closed primaries) or all voters (open primaries) are allowed to choose in which of the two parties' nomination process they participate, provided that they choose the same party for all elected offices at a given primary election day. In practice, however, the primary electorate tends to be composed of each party's core supporters regardless of formal regulations on the openness of the nomination process to non-partisan voters (see e.g., Hill, 2015; Sides et al., 2020).

2.2 Primary Elections Data

Data on primary elections are obtained from the *primary timing project* (Boatright et al., 2019). The dataset covers House primary election results for the period from 1978 to 2018 and provides context information on the date of the primary, district characteristics, and incumbency status of the contested seat. Focusing on competitive primaries with at least two candidates running for nomination, I use the vote shares of the top-two primary candidates to construct the assignment variable for the RD analysis. Precise information on primary election dates allows to estimate primary candidates' ideological positions relying exclusively on pre-primary campaign receipts avoiding endogeneity of campaign donations to primary election results, and to calculate outcome variables on incumbents' roll-call voting behavior separately before and after the opponent party's primary election.[7] Socio-demographic characteristics including lagged presidential vote shares are used for balancing tests and heterogeneity analyses depending on district competitiveness. To identify seats occupied by an incumbent of the opponent party who runs for re-election, I rely on Boatright et al.'s (2019) distinction between challenger primaries and open seat primaries. While my main analysis focuses on challenger primaries, i.e. primaries nominating a challenger to the opponent party's incumbent who reruns to defend her seat, I use "open seat primaries" to construct an auxiliary sample of primaries nominating a candidate for a seat currently occupied by an incumbent of the opponent party who does *not* seek re-election.

I supplement the data with hand-collected information on gender, race, and prior office experience of the top-two candidates in challenger primaries from the 1996 election cycle onward.[8]

regardless of their party affiliation. In these so-called "jungle primaries" it can happen that general elections candidates share the same party affiliation. I therefore exclude these observations from the sample. I also exclude Louisiana which, strictly speaking, does not hold primary elections and instead uses a top-two runoff system where all candidates regardless of party affiliation appear on the general election ballot with a runoff being held in case none of the candidates obtains a majority.

[6] In states with partisan primaries decided by majority rule, a runoff among the top-two candidates is triggered if no candidate reaches the majority of votes.

[7] In the case of primary runoffs, I use the vote shares and the date of the runoff election.

[8] I restrict attention to more recent years because my data collection strategy for non-incumbent candidates relies on internet sources, combining the systematic research on searchable databases of election campaigns and politicians (`ourcampaigns.com`, `politicalgraveyard.com`, `ballotedia.org`, `votesmart.org`, `bioguide.congress.gov`) with internet-wide Google searches that often lead to newspaper articles available online or links to candidate web-

Finally, I add an estimate of the top-two candidates' policy positions on the liberal-conservative dimension for both challenger and open seat primaries, as described below.

2.3 Estimating Primary Candidates' Policy Position from Campaign Contribution Data

Empirical research on the U.S. Congress conventionally uses DW-NOMINATE scores (Poole and Rosenthal, 1997) as an estimate of elected representatives' policy position on a liberal-conservative scale ranging from -1 (very liberal) to 1 (very conservative) on which incumbent legislators are placed according to their observed roll-call voting behavior. Corresponding estimates of the policy positions of non-incumbent candidates without a precedent roll-call voting record are harder to come by and must be inferred indirectly from candidate surveys (e.g., Ansolabehere et al., 2001; Burden, 2004), campaign communication (e.g., Catalinac, 2018; Le Pennec, 2023), or campaign contribution patterns (e.g., Bonica, 2014, 2018; Hall and Snyder, 2015). Yet, survey-based measures provide little to no coverage of primary losers. Applying text analysis to scale the content of candidates' webpages and other documents of campaign communication, as in Di Tella et al. (2023), is best suited to study how candidates shape each others' political discourse prior to election. This paper, however, focuses on how challenger positions affect incumbents' commitment to new policy positions by altering their voting behavior in terms of a DW-NOMINATE-based measure of *roll call extremism*, which makes estimates of challenger positions that are directly related to DW-NOMINATE preferable. Bonica (2018) uses supervised machine learning to predict DW-NOMINATE scores for non-incumbent candidates from campaign contributions. In simplified terms, these estimates reside on the intuition that more liberal candidates would receive more funding from donors who usually donate to incumbents with a relatively liberal voting record, while candidates whose funding originates from donors tending to contribute to more conservative legislators would also be more conservative. However, these readily available estimates of candidate positions also rely on post-primary, hence potentially endogenous, campaign contributions. The reliance on post-primary contributions could lead to biased estimates due to misclassification of moderate and extremist primary candidates if, for example, strategic donors (e.g., access-seeking interest groups) favor primary winners such that extremist nominees appear more moderate.

I, therefore, follow the approach of Hall and Snyder (2015), and use exclusively *pre-primary* campaign contributions to bridge roll-call-based DW-NOMINATE scalings from U.S. House incumbents to non-incumbent primary candidates via common donors. As other donation-based scalings, Hall-Snyder scores rely on the assumption that donors prefer donating to candidates with policy positions close to their own. While the underlying intuition is similar to computationally intensive donation-based scalings using machine learning techniques (e.g., Bonica, 2014, 2018), Hall-Snyder scores are straightforward to compute in two simple steps. First, incumbents'

pages which could be accessed via the Wayback Machine (`web.archive.org`)

DW-NOMINATE scores are mapped to their donors:

$$DonorScore_{j,-k} = \frac{\sum_{i \neq k} Contribution_{ij} Nominate_i}{\sum_{i \neq k} Contribution_{ij}}$$

where donor j's score is the contribution-weighted average DW-NOMINATE of all incumbents i donor j contributed to. To avoid feedback loops, I leave out contributions to the non-incumbent candidate k whose score we intend to estimate.[9] In a second step, donor scores are mapped to non-incumbent candidates:

$$CandidateScore_k = \frac{\sum_k Contribution_{jk} DonorScore_{j,-k}}{\sum_k Contribution_{jk}} \tag{1}$$

where candidate k's score is the contribution-weighted average donor score of all donors j that contributed to k.

I calculate Hall-Snyder scores using transaction-level campaign finance data for House election cycles between 1982 and 2018 from the Federal Election Commission as compiled and processed by Bonica (2021). I impose a few restrictions on the estimation procedure. First, I exclude several types of transactions that are not indicative for donor and candidate positions, including loans, refunds, transfer payments, and contributions against a candidate. Second, for each candidate k, I do not consider any transactions made after the candidates' primary election date in both steps of calculating k's candidate score. Third, I attenuate measurement error by excluding donors who contribute to fewer than 5 distinct candidates, and candidates that receive from fewer than 5 distinct donors. The threshold of 5 distinct donors and candidates reflects the trade-off between minimizing measurement error and maximizing sample size.[10] After retaining only competitive primary elections for which Hall-Snyder scores can be calculated for both top-two candidates under the aforementioned restrictions, I am able to match a total of 709 competitive primaries to seats currently held by incumbents from the opponent party, of which 490 rerun to defend their

[9] Given the small number of primary candidates with prior office experience in Congress, this restriction is redundant for most non-incumbent primary candidates. However, the condition is relevant for incumbents whose Hall-Snyder score I calculate for validation purposes and heterogeneity analyses.

[10] Higher thresholds are likely to reduce measurement error by including only candidates whose position is estimated based on larger amounts of information. Lower thresholds yield a larger and less selected set of candidates with less well-funded fringe candidates more likely to be included. In contrast to Hall (2015) who considers any type of competitive primary and uses a threshold of 10, I focus on challenger primaries only, which unavoidably reduces the sample. I therefore prefer a lower threshold, which yields a sample large enough to provide statistical power for meaningful heterogeneity analysis to explore mechanisms behind the main findings. In Appendix Tables A.1 and A.2, I show that the main results, albeit somewhat less precisely estimated, remain virtually identical when using Hall-Snyder scores based on a minimum threshold of 10 or 15 distinct candidates and donors. I also address concerns that measurement error in Hall-Snyder scores drives the results by showing robustness to excluding observations where the difference in primary candidates estimated position is small (see Appendix Figures A.1 and A.2).

seat and 219 end their term without seeking re-election.[11]

Being weighted averages of DW-NOMINATE scores, contribution-based Hall-Snyder scores are bounded between -1 and 1 with increasing values indicating more conservative candidates. It is then straightforward to infer the more extreme of the top-two primary candidates. For Republican primaries, I define the relative extremist as the more conservative candidate with a Hall-Snyder score closer to 1 and the candidate with the lower Hall-Snyder score as moderate, whereas for Democratic primaries I classify the more liberal candidate whose Hall-Snyder score is closer to -1 as extremist and the more conservative candidate with a higher Hall-Snyder score as moderate. Formally, for every primary candidate i whose strongest competitor in the primary election is j,

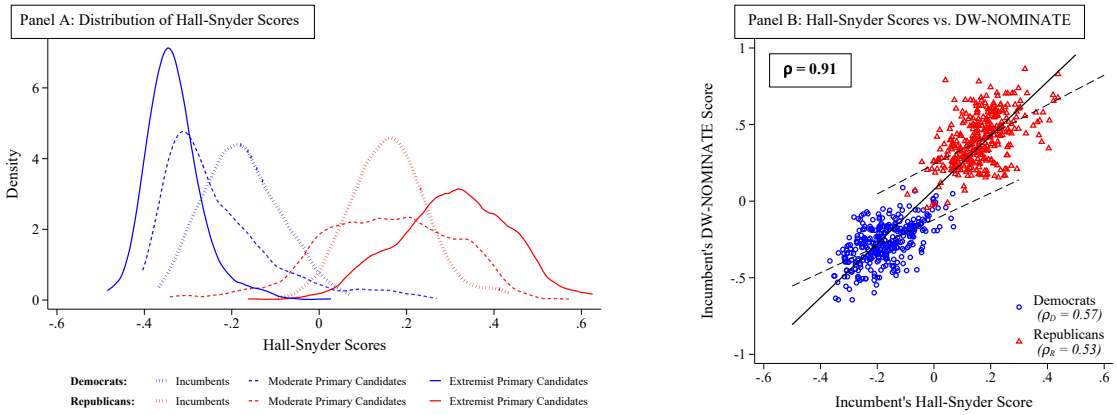
$$Extremist_{i(p)} = \begin{cases} 1 & \text{if } p = Republican \text{ and } CandidateScore_i > CandidateScore_j \\ & \text{or } p = Democrat \text{ and } CandidateScore_i < CandidateScore_j \\ 0 & \text{otherwise.} \end{cases}$$

Figure 1, Panel A presents density estimates for the sample distribution of Hall-Snyder scores by party, separately for moderate and extremist primary candidates, as well as for incumbents. As one would expect, estimated policy positions for members of the two parties generally fall on opposing sides of the center with Democrats concentrated on the liberal and Republicans on the conservative side of the political spectrum, while there is little overlap between parties. By construction, moderate primary candidates are closer to the center compared to co-partisan extremists. The within-party difference in means of Hall-Snyder scores between moderate and extremist challengers amounts to 0.15 for Republicans and 0.1 for Democrats. The average distance within primary is 0.12, which roughly corresponds to a 0.5 standard deviation shift in positions on the DW-NOMINATE scale in the 117^{th} Congress,[12] suggesting that extremist and moderate candidates run for nomination under meaningfully differentiated platforms. Based on Hall-Snyder scores, incumbent positions are estimated to be more centrist relative to non-incumbent candidates of the same party, which is in line with related evidence that incumbents tend to adopt more moderate policy positions than challengers (see e.g., Ansolabehere et al., 2001), but also consistent with incumbents just appearing more moderate because they receive more funding from non-ideological access-seeking interest groups.

[11] I exclude 6 incumbents who lost their own party's primary, 6 incumbents who won their primary but dropped out before the general election mostly due to death, health issues or other exogenous shocks (e.g., scandals), and one other incumbent who switched party during the congressional term.

[12] This relation results from the following back-of-the-envelope calculation: The average distance in Hall-Snyder scores within primary is 0.115, which translates to 0.581 standard deviation in Hall-Snyder scores among incumbents in my sample. For the incumbents in my sample, a 0.581 standard deviation in DW-NOMINATE scores translates into 0.222 points on the DW-NOMINATE scale, which corresponds to a 0.48 standard deviation in the DW-NOMINATE scores of House representatives in the 117^{th} Congress.

FIGURE 1: ESTIMATED CANDIDATE POSITIONS: HALL-SNYDER SCORES FOR INCUMBENT AND NON-INCUMBENT CANDIDATES



Notes: The Figure presents Hall-Snyder scores, as defined by equation 1. Panel A plots kernel densities of Hall-Snyder scores of Democrats (in blue) and Republicans (in red), separately for incumbents (dotted lines), moderate (dashed lines) and extremist (solid lines) primary candidates. The sample includes the top-two candidates of 709 competitive challenger primaries and 705 incumbents of the opponent party.[13] Panel B plots the incumbents' Hall-Snyder score against their DW-NOMINATE score and reports the raw correlation coefficent for the whole sample of 705 incumbents (ρ), and within-party correlation coefficients for Democrats (ρ_D) and Republicans (ρ_R). Lines represent the linear bivariate regression fit by party (dashed lines) or over the whole sample (solid lines).

While primary candidates' Hall-Snyder scores are central to my identification strategy, incumbents' Hall-Snyder scores are useful to validate donation-based estimates by comparing them with observed DW-NOMINATE scores based on the actual voting behavior of elected representatives. Figure 1, Panel B plots Hall-Snyder scores against DW-NOMINATE scores for all incumbents in my sample. The graph reveals a strongly positive relationship between DW-NOMINATE and Hall-Snyder scores with a correlation coefficient $\rho = 0.91$, suggesting that Hall-Snyder scores have high accuracy in predicting the policy positions candidates would take in House roll calls if they were in office. Also, within-party correlations ($\rho_D = 0.57$ for Democrats, $\rho_R = 0.52$ for Republicans) in my sample are highly similar to those in Hall and Snyder (2015). Clearly, Hall-Snyder scores estimate candidate positions with some error. Yet, the relatively strong correlations prevent systematic misclassification of extremists as moderates and vice-versa. Thus, while measurement error is highly unlikely to be systematic, remaining misclassifications induce classical measurement error leading to attenuation bias. I will therefore interpret my RD estimates as lower bounds on the true effect. This conclusion is supported by extensive robustness checks excluding observations where primary candidates' positions are estimated to be less distant from each other, and hence more susceptible to misclassification (see Appendix Figures A.1 and A.2).

[13] I miss Hall-Snyder scores for 4 incumbents due to missing campaign finance data in Bonica (2021).

2.4 Estimating House Incumbents' Policy Position from Roll Call Data

While DW-NOMINATE scores are a natural starting point to scale roll call voting positions on the liberal-conservative dimension, it is well known that DW-NOMINATE scores are time-invariant over a legislator's term. Yet, to address the question of whether and how incumbents alter their policy position in response to their challengers, I require an estimate specific to the period between primary and general elections. For this purpose, I construct a simple measure of incumbents' roll call extremism specific to the post-primary period, which is based on DW-NOMINATE and its underlying idea that legislators with a similar voting record should be located close to each other on the liberal-conservative scale.[14] Using individual roll-call voting records of U.S. House representatives between 1982 and 2018 from the voteview.com database (Lewis et al., 2022), I proceed in two steps. First, I calculate each incumbent i's *indirect DW-NOMINATE* as the agreement-rate weighted average of other incumbents $j \neq i$' s DW-NOMINATE:

$$\text{Indirect DW-NOMINATE}_i = \frac{\sum_{j \neq i} \alpha_{ij} \text{DW-NOMINATE}_j}{\sum_{j \neq i} \alpha_{ij}} \tag{2}$$

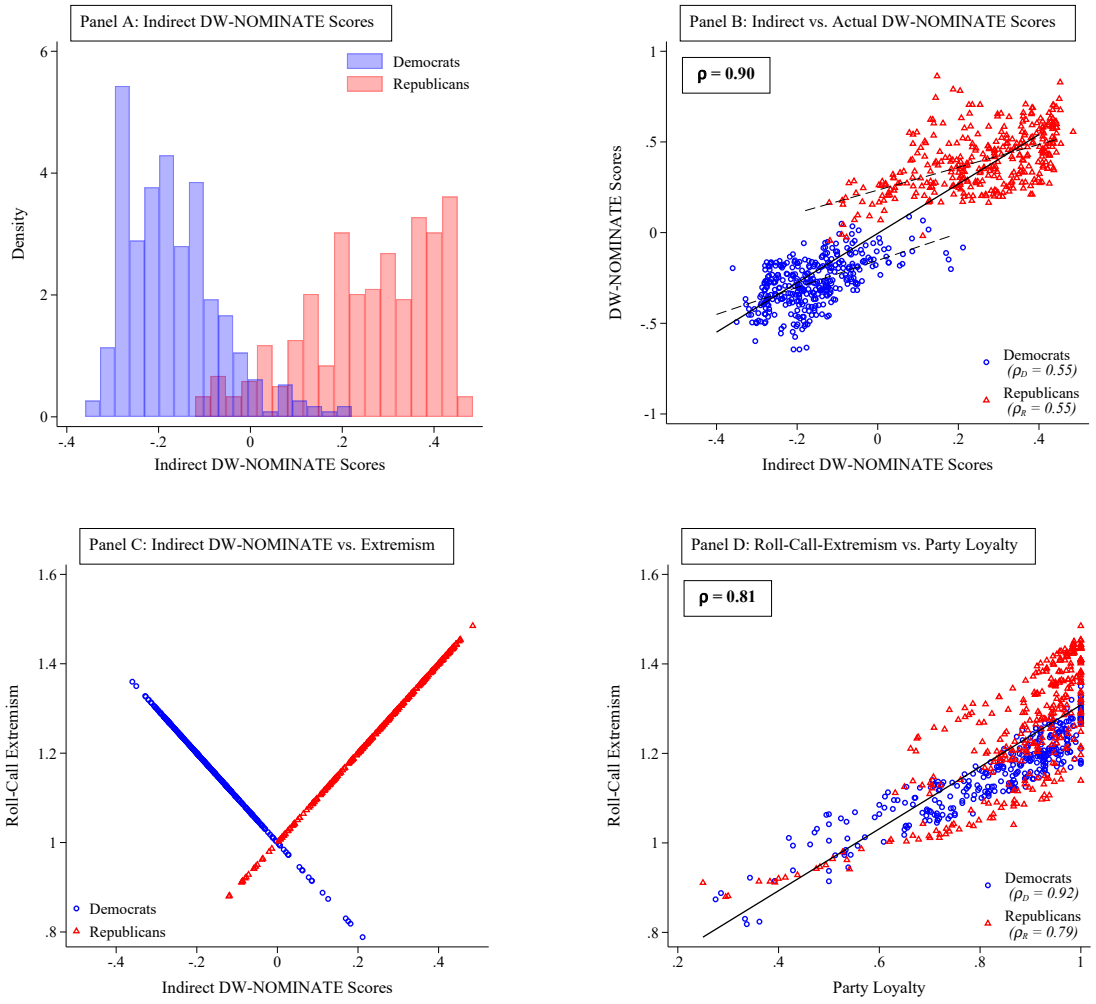
where α_{ij} is the agreement rate between Representative i and j, i.e., the share of roll calls for which both i and j vote for the same side.[15] For each incumbent in my sample, I calculate the *indirect DW-NOMINATE* separately for the periods before and after the opponent party's primary, excluding uninformative lopsided votes on which more than 90% of all House members agree. The pre-primary period includes the incumbent's roll calls in the current congressional term held prior to the opponent party's primary election, whereas the post-primary estimate includes all roll call votes held after the opponent party's primary election and no more than 120 days prior to the general election.[16]

[14] One could be tempted to using incumbents' Hall-Snyder scores as an estimate of their policy position. Yet, changes in the incumbents' Hall-Snyder score in response to the nomination of an extremist challenger likely reflect a recomposition of their donor pool rather than an adjustment of their policy position. For example, even an incumbent who does not adjust her policy position will likely receive a greater amount of campaign contributions from moderate donors when her opposing party nominates an extremist challenger.

[15] Formally $\alpha_{ij} = \frac{1}{n} \sum_{r=1}^{n} I(v_{ir} = v_{jr})$, where I is a dummy variable = 1 if $v_{ir} = v_{jr}$, and v_{kr} is a dummy variable taking the value 1 if representative $k \in \{i, j\}$ votes "yea", and 0 if k votes "nay" in roll call r.

[16] I focus on the last 4 months leading up to the general election when the election campaign enters its crucial phase, i.e., when voters and the media are likely attentive to incumbents' voting behavior and their announcements of policy platforms. The threshold of 120 days also represents a compromise between the accuracy of estimates for individual incumbents and the comparability of estimates between incumbents. Using longer timeframes allows the inclusion of more post-primary roll calls for incumbents whose opponent's primary election takes place early in the election year. This improves the accuracy of their estimated indirect DW-NOMINATE score while hampering the comparability with incumbents whose post-primary votes are concentrated later in the electoral cycle. On the other hand, shorter timeframes enhance comparability among incumbents at the cost of imprecise estimates based on very few votes for all incumbents. Reassuringly, the choice of the 120-day threshold is inconsequential for my results, with point estimates highly similar for alternative thresholds ranging from 273 days (including all post-primary votes) to 45 days (imposing the same timeframe for all incumbents) prior to general elections (see Appendix Tables A.3 and A.4).

FIGURE 2: ESTIMATED INCUMBENT POSITIONS: INDIRECT DW-NOMINATE, ROLL-CALL EXTREMISM, AND PARTY LOYALTY



Notes: The Figure presents estimates of incumbents' post-primary roll-call voting position for Democrats (blue) and Republicans (red). Panel A depicts the sample distribution of *indirect DW-NOMINATE* scores as defined by equation 2. Panel B plots *indirect DW-NOMINATE* scores against actual DW-NOMINATE scores reporting correlation coefficients (ρ) with bivariate linear regression fits over all incumbents (solid line) and by party (dashed lines). Panel C relates *indirect DW-NOMINATE* scores to *roll call extremism* defined in equation 3. Panel D shows the correlation between *roll call extremism* and *party loyalty*, measured as the percent of divisive roll-call votes cast in party line. The sample consists of 709 incumbents whose opponent party conducts a competitive primary.

Figure 2, Panel A shows the sample distribution of the *indirect DW-NOMINATE* by party. Unsurprisingly, the *indirect DW-NOMINATE* typically places Democratic legislators on the liberal side of the political spectrum, while Republican representatives are situated on the conservative side with some overlap between parties at the center. As shown in Figure 2, Panel B, the *indirect DW-NOMINATE* strongly correlates with legislators' actual DW-NOMINATE ($\rho = 0.9$), which further corroborates the validity of the indirect DW-NOMINATE as an estimate of legislators'

roll-call voting positions.

To measure incumbents' *roll call extremism*, I follow the same logic as in the estimation of non-incumbent candidate positions. Using the fact that DW-NOMINATE scores are bounded between -1 (very liberal) and 1 (very conservative), I define *roll call extremism* as the distance of the incumbents' *indirect DW-NOMINATE* from the opponent party's theoretical extreme:[17]

$$\text{Roll Call Extremism}_{i(p)} = \begin{cases} |\text{Indirect DW-NOMINATE}_{i(p)} - (-1)| & \text{if } p = \text{Republican} \\ |\text{Indirect DW-NOMINATE}_{i(p)} - 1| & \text{if } p = \text{Democtrat} \end{cases} \tag{3}$$

Roll call extremism has a clear spatial interpretation. As shown in Figure 2, Panel C, a decrease in *roll call extremism* means that a Democratic (Republican) incumbent takes a more conservative (liberal) position, implying a move in the direction of the opponent party. While a qualitative interpretation of directional changes is immediate, the quantitative assessment of its magnitude is less straightforward. To ease interpretation, I standardize *roll call extremism* to have mean 0 and standard deviation 1. When reporting results below, I offer a more direct assessment of magnitudes based on a back-of-the-envelope calculation that relates standard deviations in *roll call extremism* to DW-NOMINATE scores of House representatives in the 117^{th} Congress. I additionally present the full set of results using an alternative, directly interpretable measure of roll call extremism: party loyalty in divisive roll calls on which the majority of Democrats disagrees with the majority of Republicans. Deviating from party line in divisive votes is arguably a strong and costly signal of platform moderation, as it requires the incumbent not only to take a stance against her own party but also in support of the other party. Indeed, both measures are highly correlated ($\rho = 0.81$) as shown in Figure 2, Panel D where *party loyalty*, defined as the percentage share of divisive votes cast in party line, is plotted against *roll call extremism*. Finally, to address concerns that levels of (standardized) *roll call extremism* and *party loyalty* may not be comparable across parties and congressional terms, my preferred specifications use differenced outcomes, thus focusing on within-incumbent changes in outcomes from the pre- to the post-primary period.

Additional information on incumbent characteristics beyond their voting record (gender, terms served, birth year) is also obtained from Lewis et al. (2022). I supplement that data with an indicator equal to 1 if an incumbent is "white", i.e., does not identify as a Black, Hispanic or Asian Pacific American according to the Office of the Historian of the U.S. House of Representatives,[18] and with data on House incumbents' local roots in the district they currently represent (Hunt, 2022).

[17] I deliberately depart from previous work that uses the absolute value of NOMINATE-based scalings to measure legislator extremity (e.g., Canes-Wrone et al., 2002; Fouirnaies and Hall, 2022) because taking the distance from the opposite extreme allows accommodating Representatives that cross the origin, i.e., Democrats with positive and Republicans with negative *indirect DW-NOMINATE* scores. I acknowledge that this introduces a small level difference hampering the comparability of *roll call extremism* across parties. However, in my preferred specifications, I use within-incumbent changes in *roll call extremism* effectively accounting for and eliminating level differences.

[18] see `https://history.house.gov/People/Search/`, accessed February 12, 2022.

3 Identification Strategy

3.1 Regression Discontinuity Design

Do incumbents commit to different policy positions by altering their roll-call voting behavior piror to elections in response to their opponent's platform? Answering this question empirically requires an identification strategy dealing with a twofold identification challenge. First, policy platforms of candidates appealing to the same electorate are jointly determined by unobserved voter preferences. Second, when strategic candidates choose a platform, they take into account their opponent's position, which implies interdependence of candidate positions inducing simultaneity bias. At a minimum, identification thus requires an exogenous shift in the opponent's position, which is i) orthogonal to voter preferences, and ii) independent from the incumbent candidate's current position.

Following Hall (2015), I use a sharp regression discontinuity design to leverage exogenous variation in challenger extremism generated by competitive toss-up primaries of the incumbent's opponent party. For competitive primaries where at least two candidates run for nomination, we have precise knowledge of the assignment mechanism that determines whether the incumbent runs against a relatively extreme or moderate challenger, i.e., whether a Democratic (Republican) incumbent runs against a more or less conservative Republican (liberal Democrat). The incumbent gets assigned to an extremist challenger if and only if the more extreme candidate gets a plurality of the vote in the opponent party's primary election. Assuming that agents have at best "imprecise control" (Lee and Lemieux, 2010) over the nomination outcome in close primary elections, I recover a local average treatment effect comparing post-primary roll-call voting behavior of otherwise identical incumbents who only differ in whether the more extreme of the two potential challengers won nomination by a narrow margin. Importantly, local randomization occurs at the district level, which – given single-member districts – coincides with the incumbent level. Thus, the design directly addresses the twofold identification challenge of i) simultaneity due to strategic candidates choosing their positions interdependently, and ii) omitted variable bias stemming from unobserved voter preferences that affect both candidates' policy stances.

Formally, I implement the design defining the treatment variable $T_{i(d)}$ as a dummy equal to 1 if the incumbent i's opponent party nominates the more extreme of the top-two candidates as the challenger for the incumbent's seat in district d, the assignment variable $X_{i(d)}$ as the extremist's top-two candidate vote share margin, normalized such that $T_{i(d)} = 1$ if $X_{i(d)} > 0$ and $T_{i(d)} = 0$ if $X_{i(d)} < 0$. I then evaluate the impact an extremist challenger has on the incumbent's roll-call voting position by estimating equations of the following form:

$$\Delta Y_{i(d)} = \alpha + \theta T_{i(d)} + \beta_1 X_{i(d)} + \beta_2 X_{i(d)} T_{i(d)} + [\beta_3 X_{i(d)}^2 + \beta_4 X_{i(d)}^2 T_{i(d)} + \boldsymbol{Z}_{i(d)}] + \epsilon_{i(d)} \tag{4}$$

where θ is the coefficient of interest representing the causal effect of an extremist challenger rela-

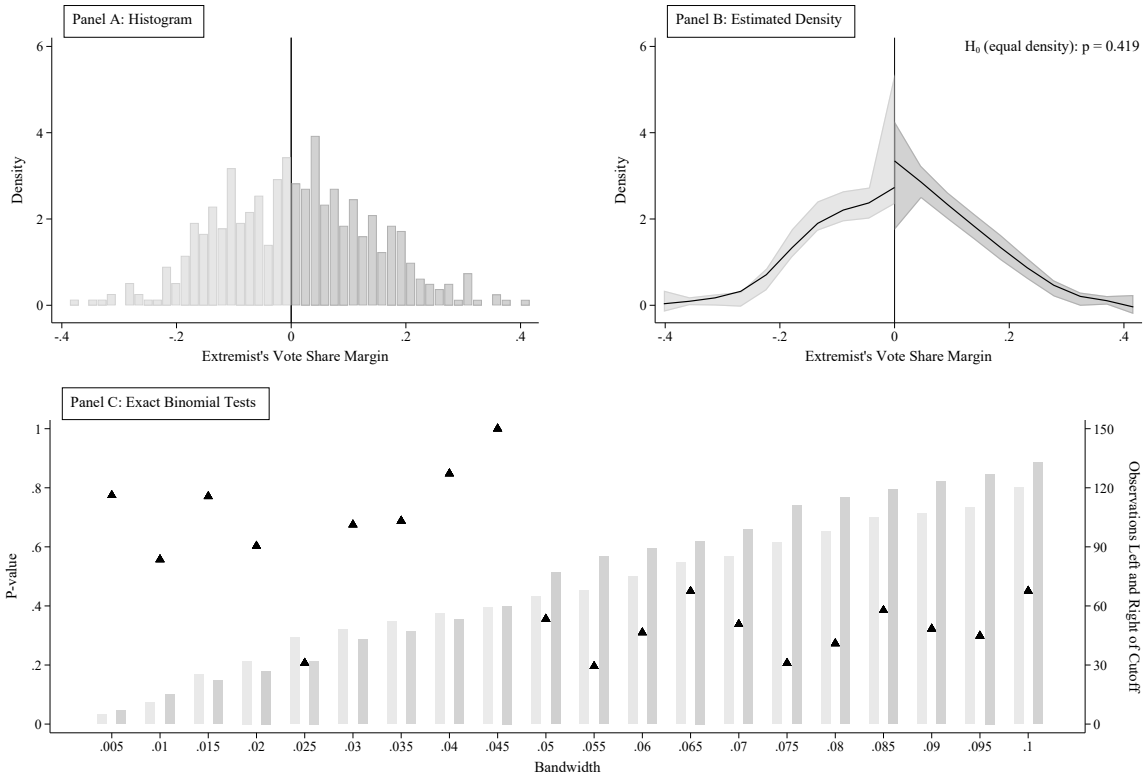
tive to a moderate challenger. The main outcome of interest $Y_{i(d)}$ is the incumbent's (standardized) *roll call extremism* or *party loyalty* as defined in Section 2.4. My preferred specifications use differences in post- and pre-primary outcomes in the spirit of reducing measurement error to obtain more precise estimates of θ. At the same time, this estimation strategy converts to a difference-in-discontinuities design. Unlike the traditional RDD, the difference-in-discontinuities design allows for level differences at the cutoff. Thus, θ is identified as a causal parameter under the weaker assumption that potential confounds do not vary differentially over time in the neighborhood of the cutoff (Grembi et al., 2016). Following Gelman and Imbens (2019), I fit local linear splines of the assignment variable on each side of the cutoff, but also probe robustness to second-order polynomials ($X^2_{i(d)}$) and to the inclusion of covariates ($\boldsymbol{Z}_{i(d)}$). For estimation, I follow Calonico et al. (2014) and Calonico et al. (2019), using a non-parametric approach with MSE-optimal bandwidths and reporting p-values based on bias-adjusted confidence intervals. In all specifications, I linearly downweight observations distant from the cutoff with a triangular kernel. Given repeated observations of the same incumbent over different election cycles, I cluster standard errors by House incumbent.

3.2 Checks on the Validity of the Identification Assumption

The coefficient θ in equation 4 identifies the causal effect of an extremist challenger on the incumbent's roll-call voting record under the assumption that agents have imprecise control over close primary election outcomes. This assumption would be violated if primary candidates or party elites were able to manipulate primary election results such that extremists and moderates systematically sort on different sides of the cutoff, or if incumbents correctly anticipated the outcome of close primaries and adjusted their position pre-emptively to favor the nomination of an electorally weaker opponent. Such manipulation is a priori extremely unlikely, as it would require precise information on the expected primary outcome and a concentrated effort just high enough to turn a narrow defeat into a narrow victory.[19] To check the plausibility of my identification assumption, I test two of its implications.

[19] For excellent discussions on the validity of close election regression discontinuity designs, see Lee (2008), Eggers et al. (2015), De la Cuesta and Imai (2016).

FIGURE 3: MANIPULATION TESTS FOR AGGREGATE SORTING



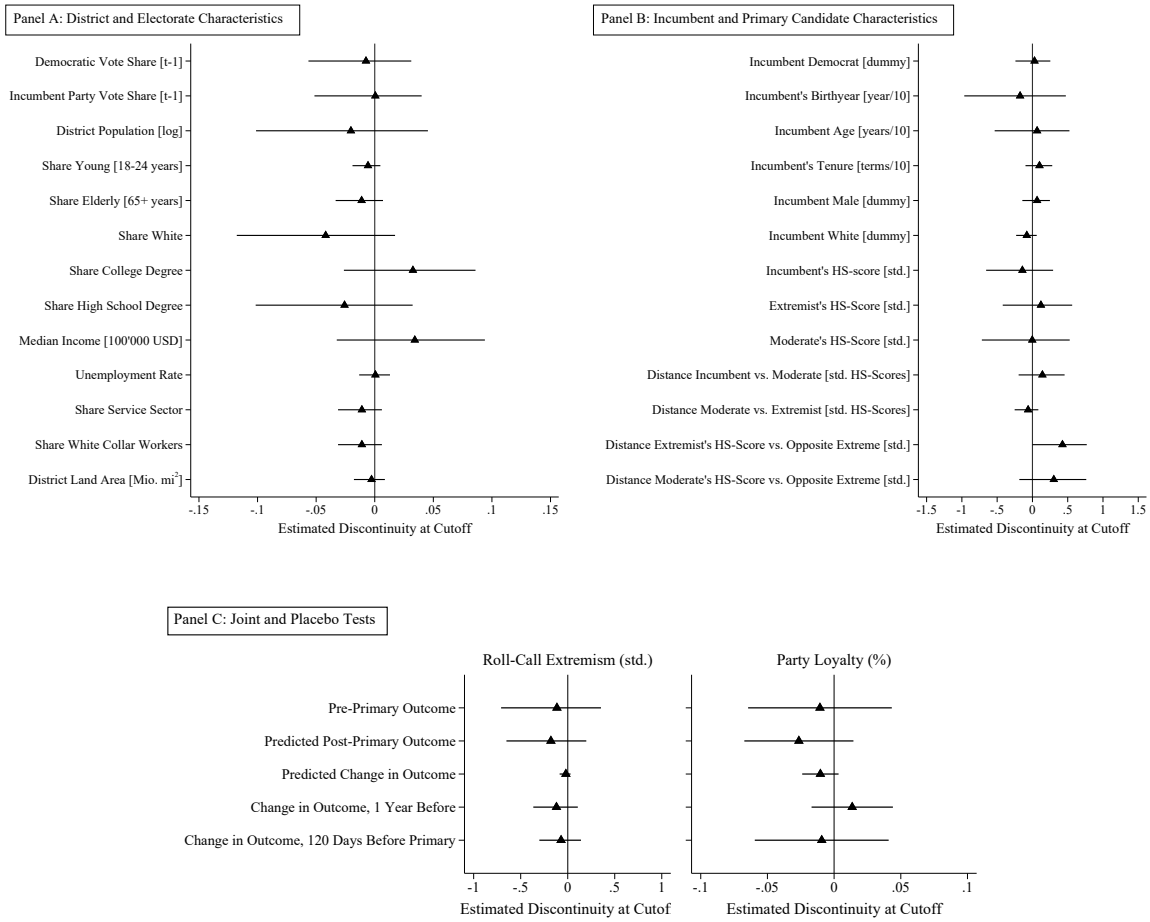
Notes: The Figure presents the sample distribution of the extremist's vote share margin for moderate (light grey) and extremist primary wins (dark grey) in Panel A. Panel B is a graphical representation of the density test in Cattaneo et al. (2020), plotting density estimates (solid lines) using local quadratic approximations and a triangular kernel along with bias-adjusted 95% confidence intervals (shaded areas). Panel C visualizes 20 finite sample exact binomial tests for different bandwidths (x-axis) around the cutoff, with the number of observations within the bandwidth that lie below (light grey bars) and above (dark grey bars) the cutoff, and p-values (black triangles) for exact binomial tests of the null hypothesis that the probability of an extremist primary victory is equal to 0.5. The sample is restricted to 490 competitive primary elections in districts represented by an opponent party incumbent who seeks re-election.

First, if extremists were differentially able to win close primary elections, one would expect "bunching" around the cutoff leading to a discontinuity in the distribution of the assignment variable. Figure 3, Panel A provides *prima facie* evidence against aggregate sorting, showing that the number of observations just below and just above the cutoff is very similar. Next, I verify that there is no discontinuity in the distribution at the cutoff by implementing formal test proposed in Cattaneo et al. (2020), which is a variant of the McCrary (2008) test with higher statistical power and robust bias-adjusted inference. I fail to reject the hypothesis of equal density of extremist and moderate primary victories at the cutoff ($p = 0.419$). Figure 3, Panel B provides a graphical representation of the density test, showing that estimated densities at the cutoff are near to each other, with 95% confidence intervals overlapping. Finally, I acknowledge the relatively small sample size and consider the possibility of being underpowered to reject the null of continuous density

at the cutoff. Following suggestions in Cattaneo et al. (2015) and Cattaneo et al. (2017), I therefore compute a series of finite sample exact binomial tests to check whether the number of close extremist primary wins and defeats within a pre-specified bandwidth is different from the number one would expect under a random sample of Bernoulli trials with probability 0.5 of landing on either side of the cutoff. Figure 3, Panel C plots the number of observations on each side of the cutoff and reports p-values (represented by triangles) for bandwidths ranging from 0.5% to 10% of the extremist's vote share margin. None of the 20 tests rejects the hypothesis that the frequency of extremist wins and defeats was generated by a Bernoulli experiment with probability 0.5, providing evidence against aggregate sorting and lending further empirical support to the conclusion that manipulation of the primary election results is highly unlikely to invalidate my identification assumption.

A second testable implication of my identification assumption is that observable confounders should be continuous at the cutoff. I thus conduct balancing tests by regressing pre-determined district and candidate characteristics on the righthand side of equation 4. Figure 4, Panel A presents the results for district-level covariates, plotting the point estimates along with robust 95% confidence intervals. Importantly, there is no discontinuity in voter preferences, as proxied by the vote share for the Democratic candidate in the preceding presidential election and by the presidential vote share for the incumbent's party. Both point estimates are small and statistically indistinguishable from zero. Similarly, there is no significant difference in 11 other socio-demographic and economic characteristics between districts at the cutoff. As one can see in Panel B, also the distributions of incumbent characteristics (party affiliation, birth cohort, age, tenure, gender, and race), candidate positions estimated with pre-primary Hall-Snyder scores are smooth around the cutoff, as are the pre-primary outcome variables (top-row in Panel C). One single exception is the distance of the extremist's Hall-Snyder score to the opposite extreme, which is borderline significant at the 5%-level. Given the large number of covariates (13 district characteristics, 13 candidate characteristics, 2 pre-primary outcomes, for a total of 28), this aligns with the expected number of false positives in statistical testing.

FIGURE 4: BALANCE TESTS AND PLACEBO CHECKS



Notes: The Figure presents results from balance checks on district- and electorate characteristics (Panel A), incumbent characteristics and estimated pre-primary candidate positions (Panel B), and placebo outcomes (Panel C). Point estimates (triangles) along with bias-adjusted robust 95% confidence intervals (spikes) accounting for clustering at the incumbent level from local-linear specifications of equation 4 with MSE-optimal bandwidth and triangular kernels. The sample is restricted to 490 races with re-election seeking incumbents whose opponent party holds a competitive primary.

More concerning is that some of the coefficients in Panel A and Panel B are imprecisely estimated with confidence intervals that cannot exclude substantively large discontinuities. To address this concern, I construct a joint test by regressing the post-primary outcome variables on all covariates listed in Panels A and B (omitting the distances between Hall-Snyder scores to avoid collinearity) and use the *predicted* outcomes as the dependent variable in equation 4. I follow an analogous procedure for the within-incumbent changes in post-primary outcomes with respect to the pre-primary period. As shown in Panel C, there is no significant discontinuity in predicted post-primary outcomes. In particular, the predicted change in outcomes at the cutoff is small and precisely estimated. Since my preferred specification of equation 4 uses changes in outcomes in

the spirit of a difference-in-discontinuity design which allows for level differences provided that observations near the cutoff follow a common trend, I finally assess the validity of this alternative identification assumption conducting two placebo tests. As a first falsification check, I consider the change in incumbents' roll call voting in the same calendar period but in the off-election year of the same congressional term that precedes the election year. For a second falsification exercise, I anticipate the primary election date by 120 days and thus examine changes in incumbents' voting records in the 4 months before the primary election with respect to the remainder of the term preceding this period. Reassuringly, I do not find a discontinuity for any of these two placebo outcomes (bottom rows in Panel C).

Overall, the extensive set of validity checks supports the credibility of my identification strategy. There is no sorting around the cutoff and covariates are balanced. In particular, the continuity of voter preferences and incumbents' pre-primary roll call voting positions suggests that my design effectively deals with the twofold identification challenge that candidate positions are interdependent and codetermined by voter preferences. Moreover, the absence of divergent pre-trends at the cutoff lends support to the difference-in-discontinuity strategy, which removes any imbalance in time-invariant confounds. Evidence that my results do not change upon the inclusion of covariates will further affirm this conclusion.

3.3 Compensating Differentials and Challenger Valence

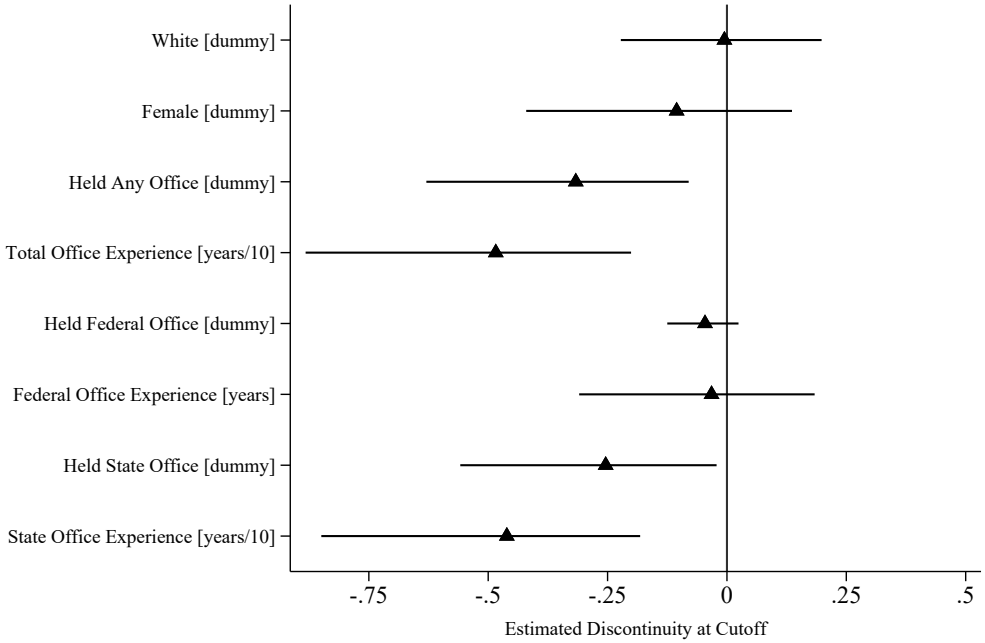
Under the stated assumption that agents have imprecise control over primary results, my design identifies the causal effect of an extremist challenger on incumbents' roll call voting record, evaluated against a counterfactual moderate challenger. However, it is worth noting that without further assumptions, my design does *not* isolate the effect of the extremist's *policy platform* compared to the moderate's. Extremists and moderates likely differ on non-policy characteristics that are valued by voters, commonly referred to as candidate "valence" (Stokes, 1963), which can include race or gender by which voters discriminate, or competence, campaigning skill, or any other source of popularity that confer an exogenous advantage to a candidate.

Drawing on formal spatial models of electoral competition that incorporate a valence dimension, one may suspect lower-valence candidates to adopt more extreme platforms because they have an interest in making the policy dimension more salient with respect to the valence-dimension on which they are weak (e.g., Aragonès and Palfrey, 2002; Aragonès and Xefteris, 2012).[20] Even if valence and platform extremism are *unconditionally* uncorrelated, they supposedly are correlated in close elections due to compensating differentials (Gagliarducci and Paserman, 2012; Marshall, 2022). If primary voters tend to favor the extremist's platform because it is closer to the partisan primary electorate's ideal, then the moderate needs a compensating advantage on the non-policy dimension to end up in a close primary election. Given the largely partisan composition of the

[20] See also Hummel, 2013, and Grofman et al., 2019 for applications specific to primaries.

primary electorate in the U.S. (see e.g., Hill, 2015; Sides et al., 2020) and evidence indicating that moderate candidates are more likely to lose in primary elections (Brady et al., 2007; Hall and Snyder, 2015), one might thus expect that narrowly nominated moderate challengers have a valence advantage over extremists who barely won nomination in an otherwise comparable district.

FIGURE 5: NON-POLICY CHARACTERISTICS OF EXTREMIST COMPARED TO MODERATE BARE PRIMARY WINNERS



Notes: The Figure presents results from estimating local-linear specifications of equation 4 using MSE-optimal bandwidths and triangular kernels with the primary winner's race, gender and prior office experience as dependent variables. *White* is a dummy equal to 1 if the nominee is not Black, Asian or Hispanic. *Female* is a dummy equal to 1 if the challenger is a woman. *Held Any Office* is a dummy equal to 1 if the challenger has ever held federal or state-level elected office prior to the primary election. *Total Office Exprience* measures the duration of prior office experience in decades. *Held Federal Office*, *Federal Office Exprience*, *Held State Office*, and *State Office Exprience* are analogous measures restricting attention either to federal office or state office, respectively. Triangles depict point estimates and spikes represent bias-adjusted robust 95% confidence intervals accounting for clustering at the incumbent level. For limited data availability on prior office experience in earlier years, the sample is restricted to 391 competitive primaries with re-election seeking opponent party incumbents from the 1996 election cycle onward.

To characterize the compound nature of the treatment, I estimate equation 4 with the primary winner's race, gender and prior office experience as dependent variables, whereby I follow common practice in the literature and consider prior office experience as a proxy for valence.[21] As

[21] If voters select on valence, prior officeholders are not only of higher "innate" quality, but they can also acquire competence through legislative experience (Padró i Miquel and Snyder Jr., 2006). Many if not most sources of valence advantages identified in the literature have been linked to officeholding (see Groseclose, 2001). Beyond the incum-

shown in Figure 5, extremist close primary winners do not differ from barely nominated moderates by race or gender. However, they differ in valence proxied by prior office experience, as expected. Closely nominated moderate challengers are 31.6 percentage points more likely to have held any federal or state-level elected office before nomination than extremist bare primary winners. At the extensive margin, moderates' accumulated office experience exceeds that of extremists by approximately 5 years. Interestingly, this difference in prior officeholding is driven by moderates' higher state-legislative experience, with federal office experience being similar across extremists and moderate challengers at the cutoff.

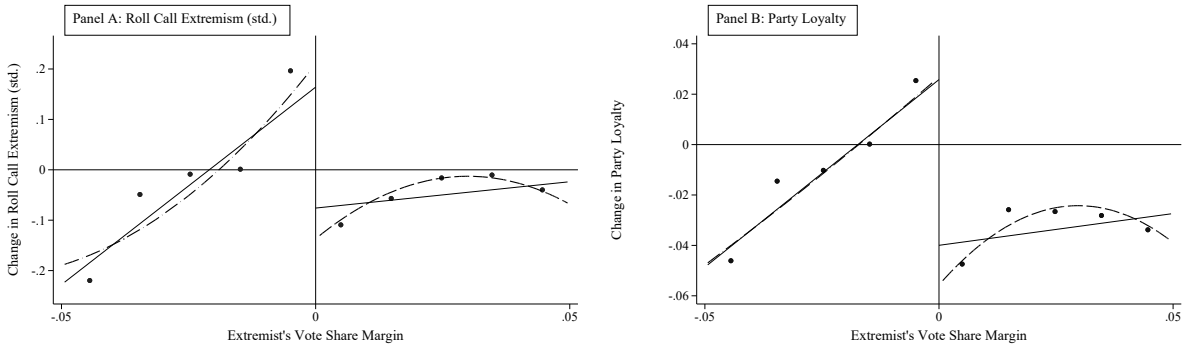
At a baseline, my RD design thus identifies the causal effect of an extremist challenger, which should not be interpreted as the effect of extremist policy platforms alone, but as the compound effect of extremists' policy position and lower valence. This subtle distinction is of little relevance for answering the main question of this paper whether or not incumbents strategically adjust policy differentially to more extreme opponents. Yet, understanding whether incumbents react to their challenger's policy or their valence is important to understand the mechanism behind strategic adjustment. When discussing mechanisms in section 5.2, I provide evidence that the valence differential between extremists and moderates is not the driver of the adjustment we see in the main results but tends to work in the opposite direction, suggesting that the causal effect of an extremist *challenger* likely represents an *underestimate* of the effect of extremist *platforms*.

4 Main Results

I now turn to the presentation of the main results on how incumbents change their post-primary policy position in response to extremist and moderate challengers with respect to the pre-primary period. Figure 4 presents *prima facie* evidence that the changes in (standardized) *roll call extremism* (Panel A) and *party loyalty* (Panel B) jump at the cutoff. Incumbents quasi-randomly assigned to an extremist tend to adopt a more moderate position and are less likely to vote in party line compared to incumbents facing a barely nominated moderate. Intriguingly, this differential effect is driven by adjustments on both sides of the cutoff, i.e., by incumbents taking more moderate positions when facing an extremist, as well as incumbents differentiating themselves from moderate challengers by taking more extreme positions.

bency status itself (Lee, 2008), examples include name recognition and media presence (Prior, 2006), campaign funding (Fouirnaies and Hall, 2014), popularity due to constituency services and pork barrel spending (Levitt and Snyder, 1997), credibility and reputations for integrity and competence on account of a verifiable track record (Bernhardt and Ingerman, 1985; McCurley and Mondak, 1995), and the deterrence of high-quality competitors (Levitt and Wolfram, 1997). Concordantly, Kawai and Sunada (2022) structurally estimate the valence of candidates for the U.S. House and find that incumbents score substantively higher on the valence dimension.

FIGURE 6: INCUMBENTS' ADJUSTMENT TO EXTREMIST AND MODERATE CHALLENGERS



Notes: The Figure plots local means of the change in incumbents' standardized *roll call extremism* (Panel A) and the change in *party loyalty* (Panel B) between the pre-primary and the post-primary period. Local averages (dots) are calculated within equal-spaced 1-percentage-point-wide bins of the extremist's primary vote share margin (x-axis). Local-linear (solid lines) and local-quadratic (dashed lines) fits on each side of the cutoff are calculated using uniform kernel weights. The sample is restricted to 142 re-election seeking incumbents whose challenger won nomination by a margin less than 5% of the top-two primary candidate vote share.

Table 1 complements the graphical evidence with formal estimates of an extremist challenger's effect on the incumbents' (standardized) *roll call extremism*, with results from local linear specifications of equation 4 presented in Panel A and local quadratic specifications in Panel B. Estimated effects on pre-primary *roll call extremism* are small and statistically insignificant (Column 1) and turn into more precisely estimated zeros upon the inclusion of covariates (Column 2). The impact of an extremist challenger on incumbents' post-primary *roll call extremism* is negative and large, albeit imprecisely estimated (Columns 3 and 4). In the spirit of reducing measurement error in the outcome variable, I next consider the within-incumbent change *roll call extremism* from the pre-primary to the post-primary period. The implied decrease in *roll call extremism* by 0.23 (local linear) or 0.31 standard deviations (local quadratic specification) in response to an extremist challenger is of the same order of magnitude as the corresponding effects on post-primary levels of *roll call extremism*, but is now precisely estimated and significant at the 5% level (Column 5). Importantly, the magnitude of coefficients is unaffected when controlling for covariates (Column 6) and for the pre-primary base level of *roll call extremism* (Column 7) although this leads to smaller standard errors and significance at the 1% level.[22]

[22]Included covariates are all district and electorate characteristics listed in Figure 4, Panel A, as well as all incumbent and candidate characteristics listed in Figure 4, Panel B, except for the distance in Hall-Snyder scores between candidates, which would be collinear with the included Hall-Snyder scores of the incumbent and primary candidates. Note that the inclusion of covariates reduces the sample size by 11 observations. From Boatright et al. (2019) I inherit missing information on previous presidential election vote shares, and for 8 districts I am not able to supplement this information because of redistricting. For 4 incumbents, Hall-Snyder scores cannot be computed because of missing campaign finance data in Bonica (2021).

TABLE 1: THE EFFECT OF AN EXTREMIST CHALLENGER ON INCUMBENTS' (STANDARDIZED) ROLL CALL EXTREMISM

	Before Primary		After Primary		Change (After - Before Primary)		
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	-0.114	-0.029	-0.280	-0.162	-0.227**	-0.228***	-0.226***
	(0.239)	(0.136)	(0.273)	(0.170)	(0.106)	(0.088)	(0.088)
	[0.585]	[0.922]	[0.288]	[0.293]	[0.021]	[0.006]	[0.006]
MSE-optimal Bandwidth	0.121	0.120	0.099	0.087	0.064	0.059	0.060
Effective Observations	302	294	246	218	169	162	162
Control Mean	-0.119	-0.121	-0.129	-0.135	-0.015	-0.014	-0.014
PANEL B: LOCAL QUADRATIC							
	-0.075	0.021	-0.315	-0.203	-0.306**	-0.331***	-0.330***
	(0.353)	(0.237)	(0.314)	(0.202)	(0.125)	(0.111)	(0.111)
	[0.941]	[0.864]	[0.319]	[0.317]	[0.018]	[0.004]	[0.004]
MSE-Optimal Bandwidth	0.117	0.090	0.157	0.143	0.092	0.079	0.080
Effective Observations	297	223	370	337	234	206	208
Control Mean	-0.122	-0.134	-0.085	-0.095	-0.015	-0.018	-0.017
Observations	490	479	490	479	490	479	479
Covariates	N	Y	N	Y	N	Y	Y
Outcome Before Primary	-	-	N	N	N	N	Y

Notes: The Table reports estimated effects of extremist challengers on incumbents' *roll call extremism* from local polynomial estimation of equation 4, fitting separate polynomials of order 1 (Panel A) or order 2 (Panel B) on each side of the cutoff. The outcome variable is the incumbent's standardized *roll call extremism* prior to the opponent party's primary (Columns 1 and 2), standardized post-primary *roll call extremism* in the 120 days before the general election (Columns 3 and 4), difference in standardized *roll call extremism* between the post- and pre-primary period (Columns 5–7). Columns 2, 4, 6, and 7 adjust for all covariates listed in Figure 4, Panels A and B, exluding the distance between candidates' Hall-Snyder scores; Column 7 additionaly controls for the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. Effective Observations is the number of observations within the MSE-optimal bandwidth. Control Mean reports the outcome mean within the MSE-optimal bandwidth below the cutoff. The sample is restricted to re-election seeking incumbents. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

An extremist thus causes the incumbent to adopt a 0.23 to 0.31 standard deviations more moderate position compared to an incumbent facing a moderate challenger. How large are these effects? To give an interpretation of the magnitudes, I propose a simple back-of-the-envelope calculation that maps a 0.25 standard deviation change in my DW-NOMINATE-based measure of *roll call extremism* to actual DW-NOMINATE scores in the 117^{th} Congress (2021-2023). In my sample of re-election seeking incumbents, a 0.25 standard deviation in the actual DW-NOMINATE score corresponds to 0.096 points on the DW-NOMINATE scale that ranges from -1 (very liberal) to + 1 (very conservative). In the House of Representatives of the 117^{th} Congress, 0.096 points on the DW-NOMINATE scale correspond to 5% of the distance between the most liberal Democrat and the most conservative Republican, or 10% of the distance between the Democratic the Republican party leaders, to roughly one-half of the within-party interquartile ranges, or to approximately the average distance between representatives and their own party's median.[23]

[23] More exactly, 0.096 points on the DW-NOMINATE scale correspond to 45.5% of the Republican interquartile range and 61.9% of Democratic interquartile range, and to 89.6% of the average distance between representatives and their own party's median.

TABLE 2: THE EFFECT OF AN EXTREMIST CHALLENGER ON INCUMBENTS' PARTY LOYALTY

	Before Primary		After Primary		Change (After - Before Primary)		
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	-0.011	0.002	-0.061	-0.046	-0.060**	-0.053***	-0.054***
	(0.027)	(0.024)	(0.042)	(0.034)	(0.027)	(0.021)	(0.021)
	[0.719]	[0.899]	[0.133]	[0.157]	[0.023]	[0.009]	[0.007]
MSE-Optimal Bandwidth	0.097	0.088	0.085	0.084	0.074	0.071	0.071
Effective Observations	242	219	224	218	202	184	184
Control Mean	0.864	0.866	0.845	0.845	-0.023	-0.024	-0.024
PANEL B: LOCAL QUADRATIC							
	-0.001	0.017	-0.079*	-0.053	-0.071**	-0.072**	-0.074**
	(0.035)	(0.035)	(0.048)	(0.040)	(0.031)	(0.028)	(0.028)
	[0.973]	[0.603]	[0.096]	[0.180]	[0.029]	[0.015]	[0.011]
MSERD-Optimal Bandwidth	0.118	0.095	0.141	0.144	0.111	0.093	0.093
Effective Observations	297	231	340	338	279	229	230
Control Mean	0.869	0.865	0.855	0.857	-0.020	-0.021	-0.021
Observations	490	479	490	479	490	479	479
Covariates	N	Y	N	Y	N	Y	Y
Outcome Before Primary	-	-	N	N	N	N	Y

Notes: The Table reports estimated effects of extremist challengers on incumbents' *party loyalty*, in percent of divisive roll calls cast in party line, from local polynomial estimation of equation 4, fitting separate polynomials of order 1 (Panel A) or order 2 (Panel B) on each side of the cutoff. The outcome variable is the incumbent's *party loyalty* prior to the opponent party's primary (Columns 1 and 2), post-primary *party loyalty* in the 120 days before the general election (columns 3 and 4), difference in *party loyalty* between the post- and pre-primary period (Columns 5–7). Columns 2, 4, 6, and 7 adjust for all covariates listed in Figure 4, Panels A and B, exluding the distance between candidates' Hall-Snyder scores; Column 7 additionaly controls for the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. Effective Observations is the number of observations within the MSE-optimal bandwidth. Control Mean reports the outcome mean within the MSE-optimal bandwidth below the cutoff. The sample is restricted to re-election seeking incumbents. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

Next, I examine extremist challengers' effect on incumbents' *party loyalty*. Results presented in Table 2 reveal a pattern highly similar to the previous results on *roll call extremism*. There is zero difference in incumbents' party-line voting before the opponent party's primary election (Columns 1 and 2), reassuring that incumbents did not adopt differential positions before learning the nomination of an extremist challenger. After the primary, incumbents facing an extremist are 5 – 7 percentage points less likely to vote in party line than incumbents whose opponent party narrowly nominated a moderate (Columns 3 and 4). When considering within-incumbent differences between the post- and pre-primary period, these effects are significant at least at the 5% level, whereby the size of the estimated impact remains the same as for post-primary levels of *party loyalty* and robust to controlling for covariates and pre-primary outcome levels (Columns 5 – 7). Evaluated at the control mean of 85% at the left of the cutoff, the jump by 5 – 7 percentage points implies a decrease in party loyalty by around 6 – 8%, which seems small but is due to an overall high party loyalty in the U.S. House. In my sample, however, this corresponds to one-third of a standard deviation, or, in the 117^{th} Congress, to a shift from the 15^{th} to the 85^{th} percentile.

Evidence for both *roll call extremism* and *party loyalty* tells a qualitatively consistent story. Incumbents react to an extremist challenger by moderating their roll-call voting record differentially

more than they would if facing a more moderate challenger. These results are robust to alternative RD-specifications with higher-order polynomials (Appendix Table A.5), different kernels (Appendix Tables A.6 and A.7), and a wide range of bandwidths (Appendix Figures A.3 and A.4). I also probe robustness to alternative thresholds of the minimum number of donations for the inclusion of donors and candidates in the estimation of primary candidates' Hall-Snyder score (Appendix Tables A.1 and A.2), and consider different time windows preceding the general election when calculating the outcome variables (Appendix Tables A.3 and A.4). Finally, I address concerns of measurement error in Hall-Snyder scores that might lead to misclassification of moderate and extremist primary candidates by re-estimating equation 4 on ever smaller subsamples that successively exclude the 5 percentiles with the smallest distance between primary candidates Hall-Snyder scores, i.e., those observations where misclassification is most likely to occur. Results are remarkably stable and, if anything, effects tend to grow in magnitude with higher distance between primary candidates' estimated positions, consistent with classical measurement error in the treatment variable leading to attenuation bias (Appendix Figures A.1 and A.2).

Overall, there is highly robust evidence that an extremist challenger causes incumbents to adopt positions more moderate than they would against more moderate challengers. This pattern of adjustment is inconsistent with both, the prediction of incumbent policy persistence in citizen-candidate models, and with strategic behavior prescribed by the canonical Downsian convergence mechanism where more moderate opponents exert pressure on the opposite candidate to moderate as well. I now turn to heterogeneity analyses, in which I first provide evidence that incumbents' reaction is indeed part of an electoral strategy, and second, explore possible mechanisms behind this pattern suggesting strategic complementarity of policy platforms.

5 Heterogeneity Analysis and Discussion of Mechanisms

5.1 The Role of Electoral Incentives and Strategic Behavior

5.1.1 Political Ambition and the Role of Re-election Concerns

The leading hypothesis of this paper is that incumbents strategically commit to an adjusted platform in response to their opponent's position. The finding that incumbents differentially adapt their positions after learning whether they are going to face a moderate or extreme challenger is consistent with strategic adjustment to the opponent.

Yet, there are other interpretations consistent with this result. Rather than being part of an electoral strategy, incumbents' reaction to extremist challengers may reflect non-strategic motives such as updated beliefs about voter preferences or issue uptake from challengers. Since preferences of partisan primary voters are highly unrepresentative of the districts' general electorate and my RD estimates are based on primary elections where the extremist and the moderate candidates were equally popular by design, one would expect rational incumbents to recognize that

nomination outcomes of toss-up primaries are uninformative about voter preferences in their district. Boundedly rational incumbents, however, may misperceive nomination outcomes as shifts in voter preferences and benevolently adjust policy choices to represent their constituency's interests better. Another possibility is that extremist and moderate challengers bring up different issues, which grow popular during the general election campaign and are therefore taken up by benevolent incumbents.

TABLE 3: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON INCUMBENTS' ELECTORAL AMBITION

	Incumbent Seeking Re-election				Incumbent not Seeking Re-election			
PANEL A: EFFECT ON Δ ROLL-CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.227**	-0.228**	-0.303**	-0.302**	-0.010	0.021	-0.041	-0.019
	(0.105)	(0.105)	(0.124)	(0.124)	(0.169)	(0.170)	(0.258)	(0.264)
	[0.021]	[0.021]	[0.019]	[0.019]	[0.828]	[0.953]	[0.856]	[0.921]
MSE-Optimal Bandwidth	0.064	0.064	0.092	0.093	0.098	0.095	0.119	0.114
Effective Observations	169	169	234	235	112	107	129	123
Control Mean	-0.032	-0.032	-0.040	-0.040	0.128	0.121	0.119	0.112
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.060**	-0.062**	-0.071**	-0.073**	0.012	0.013	0.021	0.023
	(0.027)	(0.026)	(0.031)	(0.031)	(0.030)	(0.029)	(0.043)	(0.042)
	[0.023]	[0.018]	[0.029]	[0.025]	[0.543]	[0.491]	[0.725]	[0.680]
MSE-Optimal Bandwidth	0.074	0.071	0.111	0.105	0.125	0.133	0.117	0.118
Effective Observations	202	185	279	266	131	138	127	128
Control Mean	-0.013	-0.012	-0.013	-0.014	0.011	0.011	0.010	0.010
Observations	490	490	490	490	219	219	219	219
Polynomial	1	1	2	2	1	1	2	2
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on the changes in the incumbent's standardized *roll call extremism* (Panel A) and *party loyalty* (Panel B) in the post-primary period with respect to the pre-primary period, separately for incumbents who seek re-election (Columns 1 – 4) and incumbents who do not seek re-election (Columns 5 – 8). Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for the level of the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

To separate these alternative explanations from strategic motives, I explore the role of electoral incentives by re-estimating equation 4 on an auxiliary sample of incumbents who do not run for re-election and are by definition not concerned with strategic motives. Table 3 reports the estimated discontinuities for retiring incumbents in Columns 5 – 8, and for comparison represents the main results on the sample of re-election seeking incumbents in Columns 1 – 4.[24] The estimated effects of an extremist challenger on changes in *roll call extremism* and *party loyalty* for retiring incumbents are statistically indistinguishable from zero. Although too imprecisely estimated to rule out small effects, coefficients for retiring incumbents are several orders of magnitude smaller than those for

[24]Note that the estimates in Panel A, Columns 1 and 3 do not exactly match the corresponding estimates in Table 1 because here *roll call extremism* is standardized over the whole sample including retiring incumbents to ensure comparability of coefficients across the two subsamples.

re-election seeking incumbents, or have the opposite sign in case of *party loyalty*.

I thus reject the hypothesis that updated beliefs about voter preferences or issue uptake by benevolent incumbents explain the results. Rather, the effects of extremist challengers being confined to re-election seeking incumbents indicates that incumbents' differential reaction to extremist challengers is part of an electoral strategy.

5.1.2 Seat Marginality and the Role of Electoral Competition

Having shown that incumbents' response to challengers is conditioned by the presence of electoral incentives, I now evaluate how the degree of electoral competitiveness shapes incumbents' response. Electoral incentives are more binding for incumbents whose chances of winning re-election are ex-ante smaller. Thus, if incumbents strategically adjust their position aiming for an electoral advantage, one would expect stronger reactions from electorally vulnerable incumbents.

To test this hypothesis, I proxy the incumbent's ex-ante electoral strength by the district's two-party vote share for the incumbent party's candidate in the preceding presidential election. I then define a district as "marginal" when the incumbent's electoral strength is below the sample median (presidential two-party vote share between 17% and 53.5%), and as "safe" when the incumbent's electoral strength exceeds the sample median (between 53.5% and 87.5%).[25] Results obtained from re-estimating equation 4 on the two subsamples of incumbents holding marginal and safe districts are presented in Table 4. In Columns 1 – 4, one can see that indeed incumbents strongly react to a more extreme challenger when they defend a marginal seat. Estimated coefficients are highly significant and of almost double the magnitude compared to the corresponding baseline results on the pooled sample in section 4. This is true for both the change in *roll call extremism* (Panel A) and the change in *party loyalty* (Panel B) with respect to the pre-primary period, and holds across specifications with and without covariate adjustment for the pre-primary outcome and different polynomial orders. For incumbents holding a safe seat, on the other hand, the nomination of an extremist rather than a moderate challenger has no discernible impact on roll-call voting behavior. All coefficients in Columns 5 – 8 are economically and statistically indistinguishable from zero.

[25] It is worth noting that electorally vulnerable incumbents defending a marginal seat still stand fairly high chances of winning re-election. Their expected two-party vote share in the general election, as predicted from their lagged presidential two-party vote share by a linear regression, ranges from 42% to 55% compared to 55%-69% in safe districts.

TABLE 4: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON DISTRICT COMPETITIVENESS

	Marginal Districts				Safe Districts			
PANEL A: EFFECT ON Δ ROLL CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.372***	-0.387***	-0.537***	-0.548***	-0.004	-0.006	0.009	0.009
	(0.153)	(0.153)	(0.190)	(0.189)	(0.115)	(0.114)	(0.130)	(0.136)
	[0.008]	[0.006]	[0.006]	[0.005]	[0.857]	[0.804]	[0.838]	[0.858]
MSE-Optimal Bandwidth	0.068	0.066	0.087	0.086	0.081	0.086	0.091	0.097
Effective Observations	101	100	121	121	95	99	104	108
Control Mean	0.010	0.019	0.015	0.015	-0.036	-0.028	-0.031	-0.030
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.101***	-0.103***	-0.137***	-0.137***	-0.019	-0.010	-0.009	-0.012
	(0.039)	(0.039)	(0.048)	(0.049)	(0.029)	(0.026)	(0.036)	(0.029)
	[0.006]	[0.006]	[0.006]	[0.007]	[0.575]	[0.750]	[0.932]	[0.631]
MSE-Optimal Bandwidth	0.072	0.069	0.090	0.088	0.097	0.084	0.123	0.141
Effective Observations	107	101	124	122	106	98	141	157
Control Mean	-0.017	-0.017	-0.019	-0.019	-0.008	-0.008	-0.004	0.001
Polynomial	1	1	2	2	1	1	2	2
Observations	241	241	241	241	241	241	241	241
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on the changes in the incumbent's standardized *roll call extremism* (Panel A) and *party loyalty* (Panel B) in the post-primary period with respect to the pre-primary period, separately for marginal districts (Columns 1 – 4) and safe districts (Columns 5 – 8). A district is defined as marginal if the vote share of the incumbent's party in the prior presidential election is above the sample median of 53.5%. Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for the level of the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. The sample is restricted to re-election seeking incumbents. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

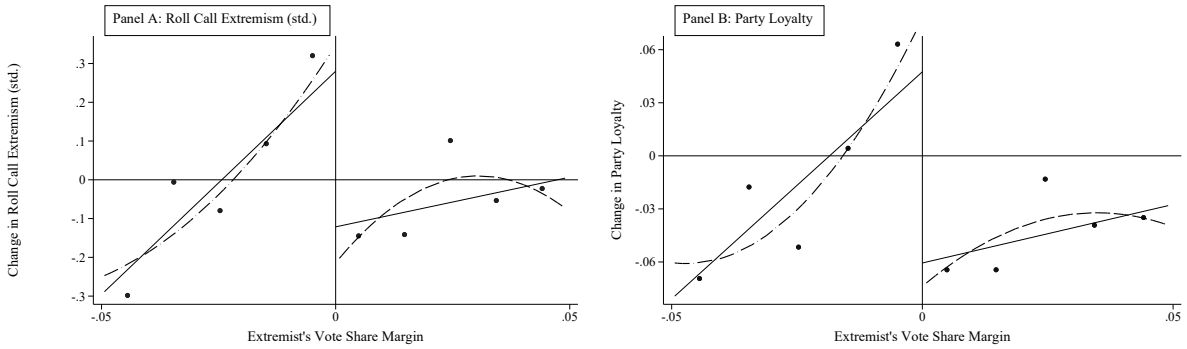
Incumbents not only react differentially more upon learning their challenger's position when they are electorally vulnerable, but adjustment is confined to competitive districts.[26] Incumbents holding safe seats do not take advantage of the opportunity to adjust their platform to their opponent, suggesting that policy adjustment is subject to constraints. Unconditional vote-maximizing behavior thus inadequately describes the pattern observed in the data. Rather than blindly following the challenger, incumbents seem to adjust strategically, carefully trading off electoral returns from platform adjustment with its cost.

One interpretation is that incumbents opportunistically commit to a new position only when electoral returns to platform adjustment are high enough. Incumbents in marginal districts are not only electorally disadvantaged compared to incumbents defending a safe seat, but they also compete in a less partisan environment. By definition, marginal districts are districts that elected House incumbents from one party but greatly supported the opponent party in the last presidential elections. Marginal districts thus have a larger proportion of swing voters that can be swayed by policy, implying higher returns to platform adjustment, and fiercer competition on the policy dimension.

[26] In Appendix Tables A.8 and A.9, I split the sample into quartiles of incumbent electoral strength and find qualitatively similar results: Effects of an extremist challenger are strongest when incumbents are weakest, i.e., largest in the lowest quartile, smaller in the second quartile, and absent in the upper two quartiles.

In line with this interpretation, I find that the close nomination of an extremist as opposed to a more moderate challenger affects general election vote shares only in marginal districts, increasing the incumbent's vote share margin by 8 percentage points from a baseline of around 5 percentage points, whereas the nomination outcome of close challenger primaries has no discernible impact on general elections in safe districts (see Appendix Table A.10).[27] Furthermore, there is indication that competitiveness on the policy dimension is indeed fiercer in marginal than in safe districts. The distance between positions (as estimated by Hall-Snyder scores) of the incumbent and the more moderate of the two potential challengers is by a statistically significant 0.3 standard deviation ($p = 0.001$) smaller in marginal compared to safe districts, suggesting that in marginal districts they more likely appeal to similar groups of voters at the center of the political spectrum.

FIGURE 7: INCUMBENTS' ADJUSTMENT TO EXTREMIST AND MODERATE CHALLENGERS IN MARGINAL DISTRICTS



Notes: The Figure plots local means of the change in incumbents' standardized *roll call extremism* (Panel A) and the change in *party loyalty* (Panel B) between the pre-primary and the post-primary period. Local averages (dots) are calculated within equal-spaced 1-percentage-point-wide bins of the extremist's primary vote share margin (x-axis). Local-linear (solid lines) and local-quadratic (dashed lines) fits on each side of the cutoff are calculated using uniform kernel weights. The sample is restricted to 142 re-election seeking incumbents in marginal districts whose challenger won nomination by a margin less than 5% of the top-two primary candidate vote share.

Yet, higher electoral returns due to the presence of swing voters provide only a partial explanation of the pattern we see in Figure 7. If the rival party abandons the center by nominating an extremist, the incumbent clearly has an incentive to moderate to win over swing voters. This accounts for incumbents moderating *differentially* more when running against extremists, but it does not explain why at least part of this differential effect comes from incumbents taking more extreme positions vis-à-vis a moderate challenger. I now turn to the exploration of possible mechanisms

[27] This confirms that Hall's (2015) general result also holds for my sample of challenger primaries: The nomination of extremists hurts their party's prospects to win elections. Interestingly, however, Hall finds that the extremist's effect on general election vote shares is negligible if the district is safe for the extremist's *own* party, while I find no effect when the district is safe for the incumbent, i.e., the extremist's *opponent* party.

behind this pattern.

5.2 Mechanisms Behind Strategic Complementarity

5.2.1 Platform Proximity and the Role of Core Supporters and Third-Party Candidates

Why do incumbents moderate when running against an extremist challenger, but differentiate their platform from moderate challengers' position? One possible answer is that incumbents face a trade-off between persuading swing voters and mobilizing their core supporters. By moving toward her opponent, the incumbent appeals to swing voters and increases the number of voters that prefer her policy over the platform offered by her rival, but at the same time she demobilizes her core supporters. If she offers a platform too close to her opponent's, the incumbent's core supporters may refuse to turn out and abstain from voting due to indifference or alienation (Adams and Merrill, 2003; Bierbrauer et al., 2022), vote for third-party candidates (Palfrey, 1984; Weber, 1992; Callander and Wilson, 2007), or deny active and financial contributions to the incumbent's campaign (Aldrich, 1983).

The balance in this trade-off is skewed the most toward a mobilization strategy when the incumbent competes against a moderate challenger with a proximate platform. A moderate challenger with a platform similar to the incumbent's severely limits the scope of moderation on the persuasive margin,[28] and demobilizes the incumbent's core supporters more than a moderate challenger with a distant platform. On the flip side, an extremist challenger is more likely to shift the balance toward a persuasion strategy when he won nomination against a moderate with a platform close to the incumbent's, in which case the incumbent's core supporters get mobilized and the swing voters abandoned by the opponent party can be targeted by the incumbent.[29]

Thus, a testable implication of this mechanism is that incumbents should adjust more when the more moderate the two potential challengers offers a platform similar to the incumbent's, i.e., when there is more need to differentiate vis-à-vis the moderate challenger and there are higher returns to moderation against an extremist challenger. To test this hypothesis, I rely on Hall-Snyder scores to estimate the distance between policy positions of the incumbent and of the more moderate of the two potential challengers. I then split the sample by the median distance in cases where the incumbent and the moderate have "proximate" platforms (below median distance) and "distant" platforms (above median distance). Next, I estimate equation 4 on these two subsamples, whereby I restrict attention to incumbents defending marginal seats.

[28] In particular if voters have preferences not only over policy but also prefer to vote for the party they identify with, moderate voters that identify with the incumbent's opponent party likely vote for the moderate opponent even if the incumbent's platform is somewhat closer to their ideal than her opponent's.

[29] Downs (1957, pp.117-118) made a similar argument noting that "[t]he possibility that parties will be kept from converging ideologically in a two-party system depends upon the refusal of extremist voters to support either party if both become alike—not identical, but merely similar. [...] At exactly what point this leakage checks the convergence of A and B depends upon how many extremists each loses by moving towards the center compared with how many moderates it gains thereby."

TABLE 5: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON DEPENDING ON INCUMBENTS' PROXIMITY TO THE MODERATE POTENTIAL CHALLENGER

	Proximate Platforms				Distant Platforms			
PANEL A: EFFECT ON Δ ROLL CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.539**	-0.531***	-0.670**	-0.661**	-0.189	-0.174	-0.268	-0.248
	(0.222)	(0.195)	(0.295)	(0.282)	(0.237)	(0.233)	(0.301)	(0.296)
	[0.013]	[0.006]	[0.032]	[0.029]	[0.334]	[0.376]	[0.406]	[0.443]
MSE-Optimal Bandwidth	0.051	0.051	0.076	0.076	0.082	0.082	0.100	0.100
Effective Observations	48	48	65	64	50	50	57	56
Control Mean	0.072	0.072	0.053	0.047	-0.024	-0.024	-0.062	-0.062
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.122***	-0.126***	-0.167**	-0.166**	-0.045	-0.055	-0.091	-0.080
	(0.044)	(0.045)	(0.076)	(0.075)	(0.051)	(0.062)	(0.082)	(0.080)
	[0.005]	[0.006]	[0.047]	[0.048]	[0.426]	[0.309]	[0.245]	[0.277]
MSE-Optimal Bandwidth	0.058	0.056	0.070	0.070	0.135	0.093	0.103	0.107
Effective Observations	51	48	58	58	73	54	57	59
Control Mean	-0.004	-0.002	-0.012	-0.012	-0.022	-0.025	-0.032	-0.031
Polynomial	1	1	2	2	1	1	2	2
Observations	135	135	135	135	106	106	106	106
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on the changes in the incumbent's standardized *roll call extremism* (Panel A) and *party loyalty* (Panel B) in the post-primary period with respect to the pre-primary period, separately for the cases when the moderate potential challenger has a position close (Columns 1 – 4) or distant to the incumbent's (Columns 5 – 8). Platforms of the incumbent and moderate potential challenger are defined a proximate if the distance between the incumbent's and the moderate's Hall-Snyder score is below the sample median. Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for the level of the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. The sample is restricted to incumbents seeking re-election in marginal districts. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

Results are presented in Table 5. One can see that the nomination of an extremist challenger causes a decrease in the incumbent's *roll call extremism* by approximately 0.5 standard deviations (Panel A, Column 1) when platforms are proximate, an effect more than twice as large compared to the case where the incumbent and the moderate offer distant platforms (Panel A, Column 5). This result is robust to controlling for the pre-primary level of *roll call extremism* (Panel A, Columns 2 and 6), to including second-order polynomials of the assignment variable (Panel A, Columns 3 and 7), or both (Panel A, Columns 4 and 8). The pattern is highly similar for *party loyalty* as an alternative measure of incumbent extremism (Panel B).

Although the difference in effects between proximate and distant platforms falls short of statistical significance, the difference in magnitudes is highly suggestive and consistent with incumbents striking a balance between platform differentiation to secure their base and platform moderation to persuade swing voters. Importantly, I do not find any differential effect depending on platform proximity in safe districts, where incumbents' strong partisan advantage likely dissolves the trade-off between targeting core supporters and swing voters (see Appendix Table A.11).

Whether this trade-off arises because of endogenous participation, the threat of losing voters to third-party candidates, or a combination thereof is hard to discern. Consistent with third candidates playing a role in shaping incumbents' differential response to extremist and moder-

ate main-party challengers, I find that incumbents adjust their position only when third candidates are present in the general election. Focusing on marginal districts, Table 6 presents results from estimating equation 4 separately on a subsample restricted to general election races in with only the two Republican and Democratic candidates compete against each other, and on the complementary subsample including the majority of observations where at least one-third candidate gets a non-zero vote share. One can see that the effect of an extremist challenger on incumbents' *roll call extremism* (Panel A) and *party loyalty* (Panel B) are large, negative and statistically significant if third candidates are present (Columns 1 – 4) but close to zero for two-candidate elections (Columns 5 – 8).

TABLE 6: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON THE PRESENCE OF THIRD CANDIDATES

	Other Candidates Present				Two Candidates Only			
PANEL A: EFFECT ON Δ ROLL-CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.522***	-0.573***	-0.681***	-0.703***	0.072	0.162	-0.198	-0.023
	(0.184)	(0.188)	(0.223)	(0.220)	(0.189)	(0.202)	(0.382)	(0.371)
	[0.003]	[0.002]	[0.003]	[0.002]	[0.862]	[0.634]	[0.602]	[0.897]
MSE-Optimal Bandwidth	0.067	0.061	0.091	0.089	0.069	0.071	0.072	0.073
Effective Observations	76	68	96	93	25	26	27	27
Control Mean	0.00	0.04	0.01	0.01	0.03	0.03	0.01	0.01
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.109**	-0.114***	-0.148**	-0.151***	-0.036	-0.019	-0.108	-0.069
	(0.045)	(0.046)	(0.056)	(0.056)	(0.050)	(0.056)	(0.091)	(0.092)
	[0.011]	[0.009]	[0.010]	[0.009]	[0.495]	[0.710]	[0.267]	[0.451]
MSE-Optimal Bandwidth	0.092	0.084	0.100	0.098	0.060	0.058	0.074	0.075
Effective Observations	96	92	102	102	24	24	27	27
Control Mean	-0.03	-0.02	-0.03	-0.03	-0.00	-0.00	-0.01	-0.01
Polynomial Order	1	1	2	2	1	1	2	2
Observations	183	183	183	183	58	58	58	58
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on the changes in the incumbent's standardized *roll call extremism* (Panel A) and *party loyalty* (Panel B) in the post-primary period with respect to the pre-primary period, separately for the cases where third candidates are present (Columns 1 – 4) or only the incumbent and her main party opponent compete in the general election (Columns 5 – 8). Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for the level of the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. The sample is restricted to incumbents seeking re-election in marginal districts. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

Consistent with the notion that the Downsian convergence mechanism breaks down with the entry of third candidates, the presence of third candidates conditions the incumbents' differential response to main-party challengers. I caveat that the above evidence is correlational and should be interpreted with caution, as the entry decision of third-party candidates is likely endogenous to main-party candidates' position. In fact, the close nomination of an extremist challenger in marginal districts increases the probability that at least one other candidate is present by over 30 percentage points (see Appendix Table A.10). Evidence that extremists cause third-candidate entry

and that the incumbents' response seems to be conditioned by the presence of third candidates, strongly suggests that third candidates play a crucial role in mediating incumbents' differential response to extremist and moderate challengers.

5.2.2 Local Roots and the Role of Policy Motivation

Another interpretation of the result that incumbents' reaction to challengers is confined to marginal districts could be that policy-motivated candidates adjust "as necessary", i.e., that they compromise with their own ideal only if electoral pressure to do so is high enough. Indeed, the observation that they take more moderate positions when facing an extremist challenger is consistent with the idea that policy-motivated incumbents moderate in order to prevent the extremist from winning.

However, this mechanism is hard to reconcile with the result that incumbents adjust their platform differentially more when the opponent's platform is proximate. Remember that policy-motivated incumbents do not (only) care about winning the election per se, but also about the policy that is going to be implemented by the elected candidate, whereby they recognize that candidates with more moderate platforms have a higher probability of winning (e.g., Wittman, 1983; Calvert, 1985; Alesina, 1988). For policy-motivated incumbents, a more extreme opponent has therefore two ambiguous effects. On the one hand, an extremist opponent increases the incumbent's chances of winning given her current position, thus relaxing her re-election constraint and giving her leeway to adopt policies closer to her ideal without decreasing her chances of victory. On the other hand, the victory of a more extreme opponent would inflict greater disutility on the incumbent, which may induce her to adopt a more moderate position in order to prevent the extremist from winning the election. Thus, policy motivation to account for the finding that incumbents take more moderate positions vis-à-vis extremist challengers, would require the second effect to dominate. This is the case when incumbents are risk-averse, i.e., when they prefer a moderate policy with certainty to a gamble for a policy close to their ideal with the risk of losing to a platform far from their ideal. But if policy-motivated incumbents exhibit risk aversion, they are by definition characterized by concave utility functions defined over the policy space. Hence, anything else equal, one would expect incumbents to adjust their platform differentially more in reaction to shifts in ex-ante distant opponent platforms. Yet, results presented in Table 5 demonstrate the opposite, suggesting that policy-motivated incumbent's distaste for opponent extremists is not the mechanism behind their platform adjustment.

Another way to assess the empirical relevance of this mechanism resides in the observation that it requires incumbents to care about who is going represent "their" district. So, if incumbents' aversion to being represented by an opponent extremist drives positional adjustment, one would expect the reaction to extremist challengers to be more pronounced for incumbents who are locally rooted in their district. To test this hypothesis, I classify incumbents as locally rooted when they

are born in the district they currently represent and attended high school there.[30]

TABLE 7: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON DEPENDING ON INCUMBENTS' LOCAL ROOTS

	Incumbent Locally Rooted				Incumbent Not Locally Rooted			
PANEL A: EFFECT ON Δ ROLL CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.059	-0.106	0.030	-0.003	-0.503***	-0.480***	-0.952***	-0.936***
	(0.200)	(0.159)	(0.277)	(0.219)	(0.208)	(0.203)	(0.251)	(0.252)
	[0.839]	[0.627]	[0.811]	[0.872]	[0.006]	[0.008]	[0.000]	[0.000]
MSE-Optimal Bandwidth	0.079	0.077	0.091	0.097	0.075	0.075	0.083	0.083
Effective Observations	45	45	52	54	67	67	71	71
Control Mean	0.032	0.032	0.057	0.057	-0.005	-0.005	0.012	0.012
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.031	-0.038	0.001	-0.024	-0.107**	-0.112**	-0.219***	-0.223***
	(0.042)	(0.039)	(0.061)	(0.050)	(0.056)	(0.056)	(0.073)	(0.072)
	[0.605]	[0.523]	[0.870]	[0.805]	[0.039]	[0.030]	[0.002]	[0.002]
MSE-Optimal Bandwidth	0.075	0.078	0.081	0.115	0.097	0.093	0.090	0.090
Effective Observations	43	45	46	67	77	74	73	73
Control Mean	-0.010	-0.008	-0.008	-0.006	-0.033	-0.028	-0.028	-0.028
Polynomial	1	1	2	2	1	1	2	2
Observations	99	99	99	99	141	141	141	141
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on the changes in the incumbent's standardized *roll call extremism* (Panel A) and *party loyalty* (Panel B) in the post-primary period with respect to the pre-primary period, separately for the locally rooted incumbents (Columns 1 – 4) and incumbents without local roots (Columns 5 – 8). Incumbents are defined as locally rooted if they either were born or attended high school in the district they currently represent. Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for the level of the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. The sample is restricted to incumbents seeking re-election in marginal districts. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

Table 7 presents results from re-estimating equation 4 on the sub-samples of incumbents with and without local roots in marginal districts.[31] It is apparent that the nomination of an extremist challenger results in minimal to no positional adjustment among locally rooted incumbents (Columns 1 - 4), while incumbents whose hometown lies outside the district strongly react to their challengers' position (Columns 5 - 8). Although the size of point estimates for incumbents without local ties notably depends on the polynomial order of the assignment variable, the pattern is qualitatively robust across all specifications. Locally rooted incumbents who should suffer the most from an opponent extremist representing "their" district react differentially less to an extremist challenger compared to incumbents without local ties. This is once again the opposite of what one would expect if the mechanism behind platform adjustment was policy-motivated incumbents'

[30] Classifying incumbents depending on the city of residence would be problematic for two reasons. First, often the official residence of Members of Congress is Washington D.C., which does not exclude that they have local roots in the district they represent. Second, they can settle in the district they aim to represent for strategic purposes even if they do not have any local ties.

[31] I focus on marginal districts to which incumbents' strategic adjustment is confined. Pooling observations from marginal and safe districts produces qualitatively consistent results with locally rooted incumbents tending to exhibit relatively stronger reactions compared to incumbents without local roots (see Appendix Table A.12).

aversion to opponent extremists.

Given the combined evidence that incumbents' reaction is weaker to changes in ex-ante more distant platforms and stronger when they have weaker personal ties to the district they represent, it is hard to rationalize their strategic platform adjustment by policy motivation alone. To be sure, while this evidence rules out that incumbents' distaste for extreme opponents accounts for the observed pattern that incumbents take more moderate positions in response to extremists, it does not preclude that incumbents have a policy objective. If incumbents have "character" (Kartik and McAfee, 2007), they may not care intrinsically about the challenger's platform but experience disutility (e.g., a psychic cost) from implementing policies that contrast with their ideal. However, this alone cannot drive the pattern we observe in the data. Incumbents who do not care intrinsically about the challenger's platform but simply trade off their own ideal with a more moderate position that secures re-election should take differentially more extreme positions vis-à-vis extremist challengers because extremists relax their re-election constraint.

5.2.3 Prior Office Experience and the Role of Valence

Another possibility is that incumbents adjust their platform differentially to extremist challengers not because they offer more extreme platforms compared to moderates, but because extremists and moderates differ in electorally relevant characteristics other than policy. Such non-policy characteristics that are valued by voters and thus grant an advantage to the candidate are commonly referred to as "valence" (Stokes, 1963). The valence dimension includes observable partisan, racial and gender attributes by which voters may discriminate, but also encompasses unobservable characteristics like competence or campaigning skill, which makes it difficult to measure valence directly. Yet, many if not most sources of valence advantages identified in the literature have been linked to incumbency, examples including name recognition and media presence (Prior, 2006), campaign funding (Fouirnaies and Hall, 2014), popularity due to constituency services and pork barrel spending (Levitt and Snyder, 1997), credibility and reputations for integrity and competence on account of a verifiable track record (Bernhardt and Ingerman, 1985; McCurley and Mondak, 1995). Moreover, prior officeholders are not only of higher "innate" quality if voters select on valence, but they can also acquire competence through legislative experience (Padró i Miquel and Snyder Jr., 2006). Indeed, Kawai and Sunada, 2022 who estimate the valence of U.S. House candidates structurally show that incumbents score substantively higher on the valence dimension, consistent with political selection by valence. Since measuring the valence of primary candidates directly is impractical, I follow the standard approach in the empirical literature and interpret prior office experience as a proxy for valence.

Remember that barely nominated extremist challengers have significantly less office experience compared to barely nominated moderates, consistent with theoretical expectations that moderates need higher valence as a compensating differential to end up in close elections with extremists whose platform more likely aligns with the preferences of the primary electorate composed of

staunch partisans (see Section 3.3, Figure 5). Thus, if the opponent's valence has an independent impact on the incumbent's policy adjustment, my RD-estimates reflect the compound effect of a challenger with a more extreme platform and lower valence. What is still a valid estimate of the causal effect of an extremist challenger, understood as a bundle of extreme platforms and lower quality, may represent a biased estimate of the effect of challengers' policy platforms.

However, it is hard to sign the bias a priori considering that formal theory yields predictions in both directions. On the one hand, an increase in the incumbent's valence advantage, which increases her vote share given her policy position, makes moderation less necessary. Policymakers who find it costly to deviate from their own ideal (or their core supporters') can thus afford more extreme positions when running against a lower-valence challenger (Groseclose, 2001). Given that the overall effect of extremist challengers on incumbent extremism is negative and since extremists are of lower valence, this mechanism would induce bias in the opposite direction. Therefore, the RD-estimate would be an underestimate of the true effect of challenger platforms alone.

On the other hand, formal analysis has uncovered another mechanism by which a higher valence advantage can induce incumbents to moderate more. Specifically, introducing a valence dimension to the canonical Downsian model with vote-maximizing candidates who are uncertain about voter preferences leads to chase-and-evade incentives that are increasing in the size of a candidate's valence advantage. Since the valence-advantaged candidate benefits from raising the salience of the valence dimension relative to the policy dimension, the advantaged candidate has an incentive to mimic the disadvantaged candidate, while the disadvantaged candidate is encouraged to differentiate himself from the advantaged candidate by taking a more extreme position (Aragonès and Palfrey, 2002; Hummel, 2010; Aragonès and Xefteris, 2012). Results presented so far are consistent with valence-advantaged incumbents moderating differentially more against extremists not because of their platform but because of extremists' lower valence compared to moderates. Thus, if valence-induced chase-and-evade incentives are at work and increasing in the size of the valence advantage, the RD-estimate would be a downward biased estimate of the extremist platforms' true effect, with the true effect being closer to zero or even positive.

While I cannot fully disentangle challenger platforms from challenger valence, it is possible to gauge the sign of the bias induced by valence using potential challengers' prior office experience as a proxy for valence. To assess the sign of the bias, I divide the sample of marginal districts into two subsets: the first including only observations where *none* of the two potential challengers has any prior office experience at the federal or state level, the second including only observations where the moderate primary candidate has prior office experience and the extremist has not.[32] Evaluating equation 4 on the second subsample with experienced moderates and inexperienced extremists yields an RD-estimate of the compound effect of i) extremists' more extreme platform, ii) *and* extremists' lower valence to the extent that valence is captured by office experience. In

[32] I drop one single case in which the extremist is experienced and the moderate is not. Note that the sample is restricted to electoral cycles from 1996 onward because of data availability, see Section 2.2.

contrast, evaluating equation 4 on the subsample with both primary candidates inexperienced, the RD-estimate primarily reflects the impact of different challenger platforms, plus a residual valence differential uncorrelated with prior office experience. Provided that prior office experience accounts for a substantial part of unobservable valence, the comparison of the RD-estimates obtained from these subsets allows to gauge the sign of the bias valence induces on the estimated effect of challenger platforms. If an increasing valence advantage leads incumbents to adopt more extreme positions, one would expect larger negative discontinuities in the subsample with equally inexperienced primary candidates, consistent with valence inducing an upward bias. Conversely, larger negative discontinuities in the subsample including experienced moderates would be indicative for the presence of chase-and-evade incentives and a downward bias.

TABLE 8: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON POTENTIAL CHALLENGERS' PRIOR OFFICE EXPERIENCE

	All Primary Candidates Inexperienced				Moderate Candidate Experienced			
PANEL A: EFFECT ON Δ ROLL CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.327**	-0.415***	-0.553**	-0.710***	-0.098	-0.009	0.038	0.129
	(0.174)	(0.175)	(0.216)	(0.206)	(0.238)	(0.255)	(0.276)	(0.284)
	[0.039]	[0.007]	[0.011]	[0.001]	[0.887]	[0.809]	[0.730]	[0.507]
MSE-Optimal Bandwidth	0.068	0.067	0.082	0.081	0.064	0.064	0.080	0.081
Effective Observations	40	40	48	47	33	33	40	40
Control Mean	-0.024	-0.024	-0.017	-0.017	-0.014	-0.014	-0.020	-0.020
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.063*	-0.056*	-0.108**	-0.107**	-0.053	-0.048	-0.055	-0.047
	(0.036)	(0.035)	(0.041)	(0.041)	(0.057)	(0.060)	(0.067)	(0.070)
	[0.053]	[0.071]	[0.014]	[0.014]	[0.414]	[0.496]	[0.477]	[0.582]
MSE-Optimal Bandwidth	0.100	0.108	0.091	0.092	0.067	0.067	0.081	0.083
Effective Observations	58	65	51	51	34	34	40	41
Control Mean	-0.013	-0.013	-0.015	-0.015	-0.012	-0.012	-0.011	-0.014
Polynomial	1	1	2	2	1	1	2	2
Observations	112	112	112	112	70	70	70	70
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on the changes in the incumbent's standardized *roll call extremism* (Panel A) and *party loyalty* (Panel B) in the post-primary period with respect to the pre-primary period, separately for incumbents whose potential challengers are both inexperienced (Columns 1 – 4) and incumbents whose moderate potential challenger has held elected office at the state or federal level while the extremist has not (Columns 5 – 8). Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for the level of the pre-primary outcome. All regressions use MSE-optimal bandwidths and a triangular kernel. The sample is restricted to incumbents seeking re-election in marginal districts from the 1996 election cycle onward. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

Results reported in Table 8 provide evidence in favor of the former interpretation. An inexperienced extremist challenger significantly decreases incumbent's *roll call extremism* by over 0.3 standard deviations compared to an unexperienced moderate challenger (Panel A, Columns 1 - 4), with effect sizes comparable to coefficients estimated on the whole sample of marginal districts (Table 4, Panel A, Columns 1 - 4), suggesting that incumbents' *reaction to policy platforms* and not their response to valence differentials drives the result. In contrast, evaluated against a counter-

factual moderate challenger with prior office experience, an inexperienced extremist has no discernible impact on the incumbent's *roll call extremism* (Table 8, Panel A, Columns 5 - 8), consistent with incumbents exploiting an increasing valence advantage to adopt more extreme positions, which leads to an upward biased estimate of the true effect of challenger platforms. As for *party loyalty*, the pattern is qualitatively similar with effects tending to be larger among unexperienced potential challengers (Panel B, Columns 1 - 4) compared to the subsample where moderates have prior office experience (Panel B, Columns 5 - 8), although the contrast is less clear-cut.

The results of this heterogeneity analysis suggest that incumbents adjust their position in reaction to the challengers' *platform*, supporting the interpretation of policy platforms as *strategic complements*. Previously presented effects of extremist challengers on incumbent positions that do not account for the valence differential between moderates and extremists are, if anything, upward-biased estimates of the effect of challengers' policy platforms. Hence, they represent an underestimate of the challenger platform's true effect on the incumbent's position, with the true differential adjustment to extremists' *platform* likely being larger in magnitude and more negative because the valence differential tends to work in the opposite direction.

Finally, the evidence is inconsistent with chase-and-evade incentives as a mechanism driving the observed strategic complementarity of policy platforms. Although the idea that valence-advantaged incumbents mimick the policy position of a valence-disadvantaged opponent to underscore their advantage on the valence dimension is prima facie consistent with the baseline result that incumbents take more moderate positions against extremists, it contrasts with some pieces of evidence provided by the heterogeneity analyses. While mimicking behavior aligns with incumbents moderating *differentially* more against extremists, it is inconsistent with graphical evidence suggesting that part of the differential effect is due to incumbents differentiating their position from moderate challengers (see Figure 7). Moreover, formal theory of chase-and-evade incentives predicts that mimicking incentives are stronger when the valence advantage increases. Yet, an increase in the incumbent's valence advantage by the nomination of an inexperienced extremist, rather than an experienced moderate challenger, does not lead to a stronger reaction of the incumbent; if anything, it leads to a weaker reaction compared to the case where both potential challengers are inexperienced (see Table 8). Likewise, incumbents do not react in safe districts where they are advantaged the most, with a partisan advantage on top of the incumbency advantage (see Table 4). Neither do incumbents react to changes in their valence advantage as would be expected if chase-and-evade incentives were present, nor do the magnitude and the direction of adjustment correspond to levels of incumbents' valence advantage as predicted by formal theory. At least for the incumbents studied in this paper, chase-and-evade incentives are thus of little empirical relevance.

6 Concluding Remarks

Providing credibly causal evidence that incumbent politicians strategically alter implemented policy in response to opponent candidates' platforms, this paper sheds new light on the mechanisms by which electoral competition shapes public policy. Periodic elections are more than a pure selection mechanism that alters public policy by replacing incumbent candidates with challengers of a different political orientation. Representatives are not ideologically rigid citizen-candidates who, undeterred by electoral pressure, steadfastly adhere to their own convictions. Rather pragmatically, they take into account the electoral consequences of their decisions, and commit to new policy positions depending on their challenger's platform. The role of challengers is therefore not limited to replacing incumbent policy that is unpopular. Non-incumbent challengers affect public policy of elected officeholders. Provided that challengers' support in the electorate is large enough to constitute a credible threat to the incumbent's re-election bid, they can pull incumbents' policy toward the ideal of the opposition by taking more extreme positions.

This paper's finding that incumbents adjust their position, but only if they seek re-election in a competitive district supports the central notion of the Downsian paradigm that electoral competition constrains incumbent's policy, which is a key tenet of accountability in representative democracies. Providing evidence that incumbents are responsive to electoral incentives, and compromise to more moderate policies when competing against extremist challengers, this paper's results also offer lessons for constitutional design. In the U.S. context, efforts to enhance competition by depoliticizing the redistricting process may improve government responsiveness and reduce polarization in legislatures, whereas term limits that sacrifice accountability of incumbent legislators for higher electoral turnover may have the opposite effect.

While the finding that incumbents *do adjust* their position strategically to challengers is consistent with the Downsian paradigm, the *direction* of adjustment is inconsistent with strategic behavior underlying the convergence mechanism prescribed by the canonical Downsian two-party model with full voter turnout. Instead of converging toward the center, which would require incumbents to take more moderate positions in response to moderate challengers, incumbents take more moderate positions vis-à-vis extremist challengers. I provide evidence that this pattern of adjustment is driven by incumbents' reaction to challengers' policy positions and not by the valence advantage of moderate challengers over extremists, suggesting that policy platforms are strategic complements in the electoral game.

The exploration of mechanisms behind strategic complementarity of policy platforms indicates that candidates grapple with a trade-off between attracting swing voters in the center and mobilizing core supporters. In the strategic decision to adjust policy to challenger platforms, incumbents not only focus on voters they could persuade, but also consider votes they could lose with more moderate policy. Evidence suggests that incumbents' reaction to main party challengers is conditioned by the entry of third candidates. Uncovering how third candidates mediate strategic

position-taking between dominant candidates, I suspect, would be a promising avenue for further research.

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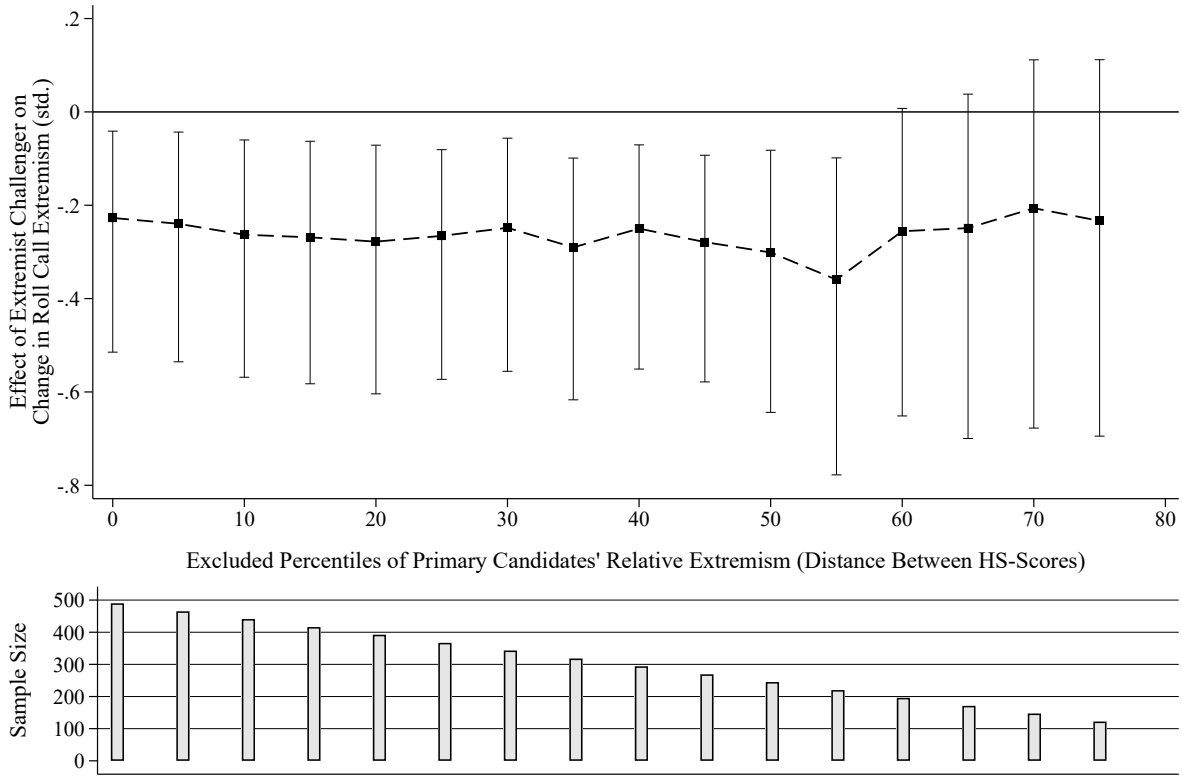
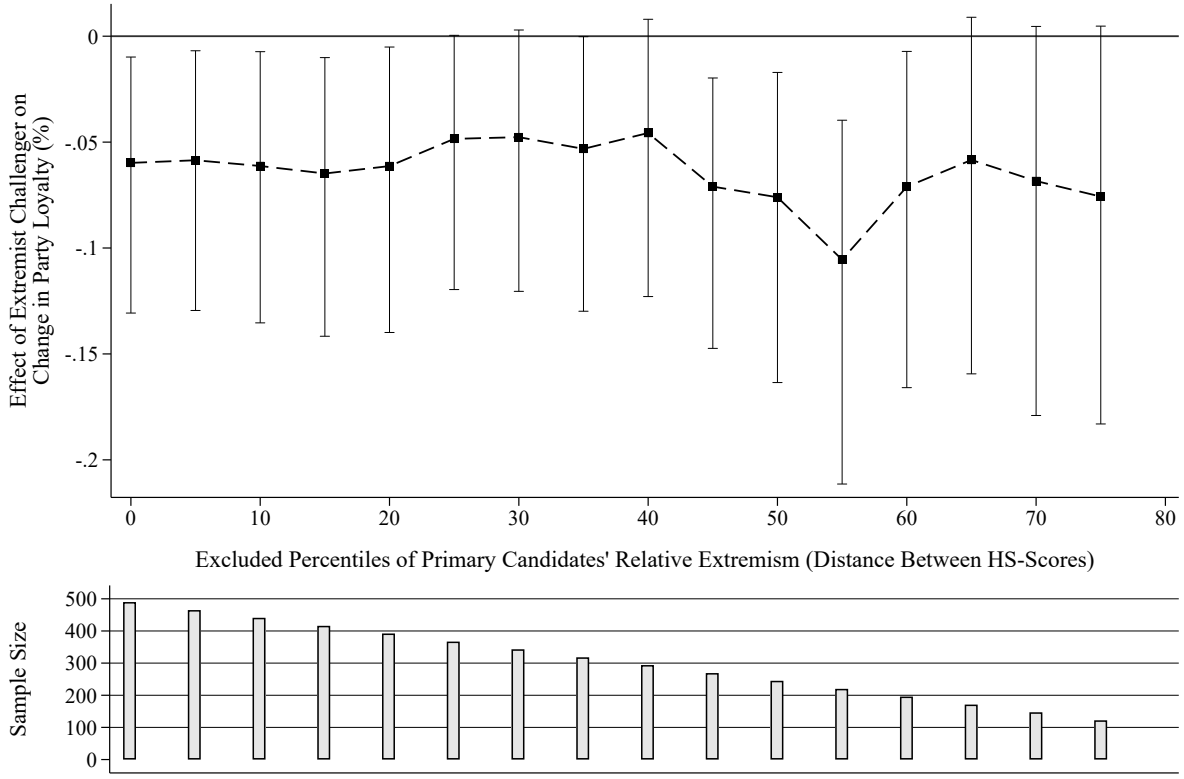
Appendix

FIGURE A.1: EFFECT OF EXTREMIST CHALLENGER ON INCUMBENT'S ROLL CALL EXTREMISM DEPENDING ON RELATIVE EXTREMISM OF PRIMARY CANDIDATES



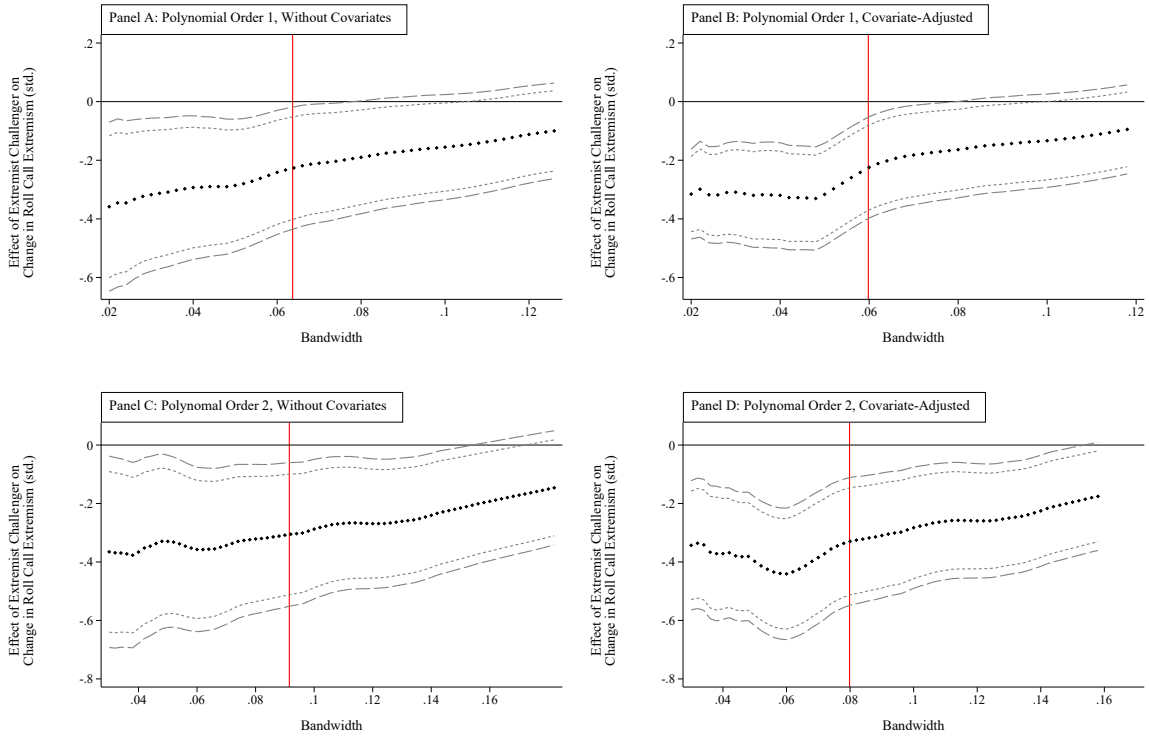
Notes: The Figure plots discontinuity estimates (triangles) of the effect of an extremist challenger on the incumbent's change in standardized *roll call extremism* between the pre-primary to the post-primary period along with bias-adjusted 95% confidence intervals (spikes) accounting for clustering at the incumbent-level. Estimates are obtained from local linear specifications of equation 4 with MSE-optimal bandwidths and triangular kernels. Estimates are based subsamples that successively exclude percentiles with the smallest distance between primary candidates' Hall-Snyder scores as indicated on the x-axis. The bottom panel indicates the size of the subsamples underlying each estimate.

FIGURE A.2: EFFECT OF EXTREMIST CHALLENGER IN INCUMBENT'S PARTY LOYALTY DEPENDING ON RELATIVE EXTREMISM OF PRIMARY CANDIDATES



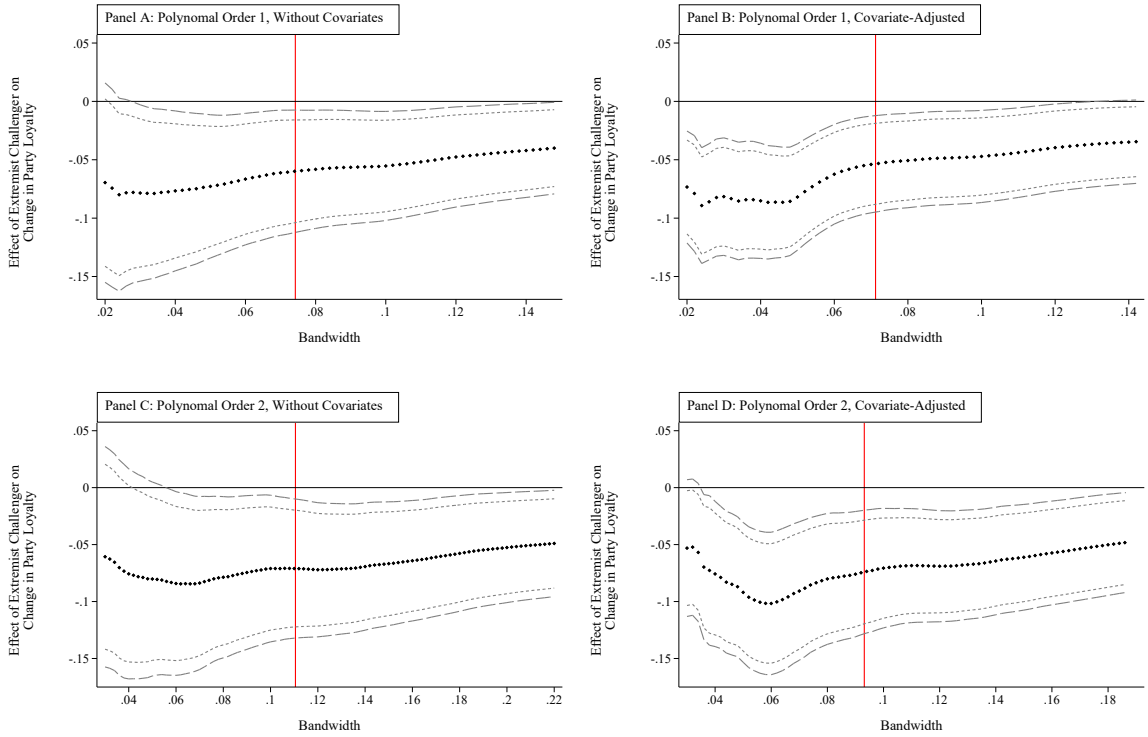
Notes: The Figure plots discontinuity estimates (triangles) of the effect of an extremist challenger on the incumbent's change in *party loyalty* between the pre-primary to the post-primary period along with bias-adjusted 95% confidence intervals (spikes) accounting for clustering at the incumbent-level. Estimates are obtained from local linear specifications of equation 4 with MSE-optimal bandwidths and triangular kernels. Estimates are based subsamples that successively exclude percentiles with the smallest distance between primary candidates' Hall-Snyder scores as indicated on the x-axis. The bottom panel indicates the size of the subsamples underlying each estimate.

FIGURE A.3: EFFECT OF EXTREMIST CHALLENGER ON INCUMBENT'S ROLL-CALL EXTREMISM DEPENDING ON DIFFERENT BANDWIDTHS



Notes: The Figure plots discontinuity estimates (black dots) of the effect of an extremist challenger on the incumbent's change in standardized *roll call extremism* between the pre-primary to the post-primary period for different bandwidths ranging from 0.02 to twice the optimal bandwidth for local linear specifications (Panels A and B) and from 0.03 to twice the optimal badwidth local quadratic specifications (Panels C and D) of equation 4. The MSE-optimal bandwidth is indicated with a red line. 95% (dashed grey lines) and 90% (dotted grey lines) confidence intervals accounting for clustering at the incumbent-level. Esimates in Panels C and D are adjusted for covariates listed in Figure 4, Panels A and B, exluding the distance between candidates' Hall-Snyder scores.

FIGURE A.4: EFFECT OF EXTREMIST CHALLENGER ON INCUMBENT'S PARTY LOYALTY DEPENDING ON DIFFERENT BANDWIDTHS



Notes: The Figure plots discontinuity estimates (black dots) of the effect of an extremist challenger on the incumbent's change in *party loyalty* between the pre-primary to the post-primary period for different bandwidths ranging from 0.02 to twice the optimal bandwidth for local linear specifications (Panels A and B) and from 0.03 to twice the optimal badwidth local quadratic specifications (Panels C and D) of equation 4. The MSE-optimal bandwidth is indicated with a red line. 95% (dashed grey lines) and 90% (dotted grey lines) confidence intervals accounting for clustering at the incumbent-level. Esimates in Panels C and D are adjusted for covariates listed in Figure 4, Panels A and B, exluding the distance between candidates' Hall-Snyder scores.

TABLE A.1: THE EFFECT OF AN EXTREMIST CHALLENGER ON THE CHANGE IN INCUMBENTS' (STANDARDIZED) ROLL CALL EXTREMISM AND PARTY LOYALTY: ROBUSTNESS TO HALL-SNYDER SCORES BASED ON MINIMUM THRESHOLD OF 10 TRANSACTIONS

	Δ Roll Call Extremism (std.)			Δ Party Loyalty (%)		
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)
	-0.190*	-0.178**	-0.178**	-0.053*	-0.057***	-0.058***
	(0.124)	(0.084)	(0.083)	(0.027)	(0.021)	(0.021)
	[0.089]	[0.038]	[0.036]	[0.052]	[0.006]	[0.007]
MSE-Optimal Bandwidth	0.070	0.062	0.062	0.088	0.070	0.069
Effective Observations	122	110	110	142	121	119
Control Mean	0.002	0.022	0.022	-0.012	-0.010	-0.010
PANEL B: LOCAL QUADRATIC						
	-0.254	-0.263**	-0.265**	-0.063*	-0.066**	-0.066**
	(0.150)	(0.109)	(0.110)	(0.033)	(0.027)	(0.027)
	[0.111]	[0.038]	[0.038]	[0.060]	[0.020]	[0.034]
MSE-Optimal Bandwidth	0.096	0.086	0.087	0.121	0.101	0.096
Effective Observations	146	140	140	179	153	144
Control Mean	0.009	0.011	0.011	-0.010	-0.009	-0.013
Observations	278	274	274	278	274	274
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Tables 1 and 2 to an alternative calculation of Hall-Snyder scores that excludes donors who donate to less than 10 distinct candidates and candidates who receive contributions from less than 15 distinct donors. The outcome variables are the changes in the incumbent's standardized *roll call extremism* (Columns 1 – 3) and *party loyalty* (Columns 4 – 6) in the post-primary period with respect to the pre-primary period. All other notes as under Tables 1 and 2. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.2: THE EFFECT OF AN EXTREMIST CHALLENGER ON THE CHANGE IN INCUMBENTS' (STANDARDIZED) ROLL CALL EXTREMISM AND PARTY LOYALTY: ROBUSTNESS TO HALL-SNYDER SCORES BASED ON MINIMUM THRESHOLD OF 15 TRANSACTIONS

	Δ Roll Call Extremism (std.)			Δ Party Loyalty (%)		
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)
	-0.246	-0.246**	-0.242**	-0.082**	-0.069***	-0.072**
	(0.161)	(0.098)	(0.100)	(0.034)	(0.025)	(0.025)
	[0.120]	[0.013]	[0.019]	[0.011]	[0.008]	[0.010]
MSE-Optimal Bandwidth	0.070	0.057	0.057	0.070	0.057	0.057
Effective Observations	82	71	71	82	71	71
Control Mean	-0.000	0.026	0.026	-0.016	-0.008	-0.008
PANEL B: LOCAL QUADRATIC						
	-0.287	-0.345**	-0.356**	-0.099**	-0.096***	-0.096**
	(0.196)	(0.115)	(0.120)	(0.042)	(0.032)	(0.033)
	[0.196]	[0.011]	[0.011]	[0.024]	[0.008]	[0.013]
MSE-Optimal Bandwidth	0.094	0.069	0.061	0.091	0.074	0.064
Effective Observations	92	79	72	92	83	74
Control Mean	0.005	-0.000	0.023	-0.018	-0.016	-0.010
Observations	170	166	166	170	166	166
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Tables 1 and 2 to an alternative calculation of Hall-Snyder scores that excludes donors who donate to less than 15 distinct candidates and candidates who receive contributions from less than 15 distinct donors. The outcome variables are the changes in the incumbent's standardized *roll call extremism* (Columns 1 – 3) and *party loyalty* (Columns 4 – 6) in the post-primary period with respect to the pre-primary period. All other notes as under Tables 1 and 2. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.3: THE EFFECT OF AN EXTREMIST CHALLENGER ON THE CHANGE IN INCUMBENTS' ROLL CALL EXTREMISM: ROBUSTNESS TO DIFFERENT TIME WINDOWS PRIOR TO GENERAL ELECTIONS

	Local Linear			Local Quadratic		
PANEL A: < 45 DAYS BEFORE GENERAL ELECTION	(1)	(2)	(3)	(4)	(5)	(6)
	-0.221	-0.209	-0.206	-0.196	-0.221	-0.214
	(0.143)	(0.136)	(0.135)	(0.186)	(0.170)	(0.192)
	[0.182]	[0.200]	[0.177]	[0.381]	[0.239]	[0.351]
MSE-Optimal Bandwidth	0.086	0.074	0.074	0.119	0.116	0.094
Effective Observations	196	172	173	260	249	199
Control Mean	0.046	0.040	0.042	0.067	0.070	0.044
PANEL B: < 60 DAYS BEFORE GENERAL ELECTION						
	-0.252**	-0.248**	-0.248**	-0.301**	-0.340**	-0.337**
	(0.106)	(0.104)	(0.103)	(0.132)	(0.137)	(0.135)
	[0.014]	[0.012]	[0.011]	[0.025]	[0.023]	[0.021]
MSE-Optimal Bandwidth	0.079	0.071	0.071	0.103	0.091	0.093
Effective Observations	210	183	183	260	227	229
Control Mean	-0.025	-0.026	-0.026	-0.007	-0.016	-0.016
PANEL C: < 90 DAYS BEFORE GENERAL ELECTION						
	-0.241**	-0.263***	-0.262***	-0.298**	-0.371***	-0.371***
	(0.106)	(0.101)	(0.100)	(0.129)	(0.128)	(0.127)
	[0.015]	[0.006]	[0.006]	[0.030]	[0.006]	[0.006]
MSE-Optimal Bandwidth	0.071	0.065	0.065	0.099	0.085	0.086
Effective Observations	185	172	173	247	218	218
Control Mean	-0.021	-0.024	-0.023	-0.013	-0.013	-0.013
PANEL D: < 120 DAYS BEFORE GENERAL ELECTION						
	-0.227**	-0.228***	-0.226***	-0.306**	-0.331***	-0.330***
	(0.106)	(0.088)	(0.088)	(0.125)	(0.111)	(0.111)
	[0.021]	[0.006]	[0.006]	[0.018]	[0.004]	[0.004]
MSE-Optimal Bandwidth	0.064	0.059	0.060	0.092	0.079	0.080
Effective Observations	169	162	162	234	206	208
Control Mean	-0.015	-0.014	-0.014	-0.015	-0.018	-0.017
PANEL E: < 150 DAYS BEFORE GENERAL ELECTION						
	-0.280***	-0.298***	-0.295***	-0.323**	-0.330***	-0.328***
	(0.111)	(0.090)	(0.090)	(0.125)	(0.112)	(0.112)
	[0.008]	[0.001]	[0.001]	[0.015]	[0.005]	[0.005]
MSE-Optimal Bandwidth	0.054	0.052	0.052	0.090	0.078	0.078
Effective Observations	152	145	146	230	206	206
Control Mean	-0.035	-0.035	-0.032	-0.020	-0.025	-0.025
PANEL F: < 180 DAYS BEFORE GENERAL ELECTION						
	-0.313***	-0.319***	-0.313***	-0.361***	-0.365***	-0.362***
	(0.116)	(0.095)	(0.095)	(0.131)	(0.118)	(0.117)
	[0.005]	[0.001]	[0.001]	[0.008]	[0.003]	[0.003]
MSE-Optimal Bandwidth	0.055	0.053	0.053	0.090	0.078	0.078
Effective Observations	152	147	148	230	206	206
Control Mean	-0.035	-0.029	-0.033	-0.017	-0.021	-0.021
PANEL G: ALL DAYS BEFORE GENERAL ELECTION						
	-0.268**	-0.267***	-0.263***	-0.319**	-0.313***	-0.312**
	(0.117)	(0.096)	(0.096)	(0.133)	(0.119)	(0.119)
	[0.016]	[0.003]	[0.004]	[0.022]	[0.010]	[0.010]
MSE-Optimal Bandwidth	0.055	0.053	0.054	0.091	0.079	0.079
Effective Observations	154	149	150	232	206	206
Control Mean	-0.029	-0.031	-0.032	-0.016	-0.018	-0.018
Observations	490	479	479	490	479	479
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Table 1 to estimates of incumbents' post-primary *roll call extremism* based on post-primary roll calls held in different time windows preceding the general election. Instead of focusing on post-primary roll calls held within the last 120 days prior to general elections, each panel considers alternative thresholds ranging from the last 45 days (which restricts attention to a uniform time window for all incumbents by considering only roll calls held after the latest of all primary elections in my sample) to 273 (i.e., which for every incumbent considers all post-primary roll calls, although they are be held in different time periods prior to general elections depending on the date of the opponent party's primary). Columns 1 – 3 report estimates from local linear, Columns 4 – 6 from local qaudratic specifications of of equation 4. The outcome variable is the change in the incumbent's standardized *roll call extremism* in the post-primary period with respect to the pre-primary period. All other notes as under Table 1. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.4: THE EFFECT OF AN EXTREMIST CHALLENGER ON THE CHANGE IN INCUMBENTS' PARTY LOYALTY: ROBUSTNESS TO DIFFERENT TIME WINDOWS PRIOR TO GENERAL ELECTIONS

	Local Linear			Local Quadratic		
PANEL A: < 45 DAYS BEFORE GENERAL ELECTION	(1)	(2)	(3)	(4)	(5)	(6)
	-0.074*	-0.065*	-0.064*	-0.083	-0.081**	-0.080*
	(0.038)	(0.033)	(0.033)	(0.046)	(0.039)	(0.039)
	[0.089]	[0.085]	[0.090]	[0.126]	[0.040]	[0.052]
MSE-Optimal Bandwidth	0.083	0.072	0.071	0.131	0.129	0.124
Effective Observations	191	165	157	275	268	259
Control Mean	-0.006	-0.008	-0.006	-0.005	-0.005	-0.005
PANEL B: < 60 DAYS BEFORE GENERAL ELECTION						
	-0.058*	-0.057**	-0.058**	-0.065*	-0.065**	-0.068**
	(0.028)	(0.025)	(0.024)	(0.032)	(0.030)	(0.029)
	[0.051]	[0.019]	[0.015]	[0.053]	[0.042]	[0.030]
MSE-Optimal Bandwidth	0.087	0.078	0.077	0.144	0.115	0.115
Effective Observations	224	206	204	347	283	286
Control Mean	-0.011	-0.010	-0.010	-0.008	-0.010	-0.009
PANEL C: < 90 DAYS BEFORE GENERAL ELECTION						
	-0.058**	-0.055**	-0.056**	-0.068*	-0.064*	-0.068**
	(0.029)	(0.025)	(0.024)	(0.033)	(0.031)	(0.030)
	[0.046]	[0.024]	[0.017]	[0.052]	[0.055]	[0.039]
MSE-Optimal Bandwidth	0.085	0.077	0.076	0.134	0.109	0.108
Effective Observations	224	203	200	323	271	267
Control Mean	-0.011	-0.011	-0.012	-0.008	-0.011	-0.011
PANEL D: < 120 DAYS BEFORE GENERAL ELECTION						
	-0.060**	-0.053***	-0.054***	-0.071**	-0.072**	-0.074**
	(0.027)	(0.021)	(0.021)	(0.031)	(0.028)	(0.028)
	[0.023]	[0.009]	[0.007]	[0.029]	[0.015]	[0.011]
MSE-Optimal Bandwidth	0.074	0.071	0.071	0.111	0.093	0.093
Effective Observations	202	184	184	279	229	230
Control Mean	-0.023	-0.024	-0.024	-0.020	-0.021	-0.021
PANEL E: < 150 DAYS BEFORE GENERAL ELECTION						
	-0.059**	-0.054***	-0.055***	-0.071**	-0.073***	-0.074***
	(0.026)	(0.020)	(0.020)	(0.030)	(0.026)	(0.026)
	[0.021]	[0.006]	[0.004]	[0.024]	[0.009]	[0.007]
MSE-Optimal Bandwidth	0.069	0.063	0.063	0.107	0.090	0.090
Effective Observations	183	167	166	272	224	224
Control Mean	-0.030	-0.026	-0.026	-0.027	-0.028	-0.028
PANEL F: < 180 DAYS BEFORE GENERAL ELECTION						
	-0.055**	-0.050**	-0.050**	-0.067**	-0.070**	-0.071**
	(0.026)	(0.021)	(0.021)	(0.030)	(0.026)	(0.026)
	[0.031]	[0.012]	[0.010]	[0.033]	[0.014]	[0.012]
MSE-Optimal Bandwidth	0.070	0.065	0.065	0.108	0.090	0.091
Effective Observations	185	171	172	273	225	228
Control Mean	-0.030	-0.030	-0.031	-0.029	-0.029	-0.029
PANEL G: ALL DAYS BEFORE GENERAL ELECTION						
	-0.049*	-0.043**	-0.043**	-0.060*	-0.063**	-0.064**
	(0.026)	(0.021)	(0.021)	(0.030)	(0.027)	(0.027)
	[0.052]	[0.030]	[0.027]	[0.053]	[0.024]	[0.022]
MSE-Optimal Bandwidth	0.070	0.064	0.064	0.106	0.090	0.091
Effective Observations	185	169	169	270	225	227
Control Mean	-0.028	-0.026	-0.026	-0.026	-0.026	-0.027
Observations	490	479	479	490	479	479
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Table 2 to estimates of incumbents' post-primary *party loyalty* based on post-primary roll calls held in different time windows preceding the general election. Instead of focusing on post-primary roll calls held within the last 120 days prior to general elections, each panel considers alternative thresholds ranging from the last 45 days (which restricts attention to a uniform time window for all incumbents by considering only roll calls held after the latest of all primary elections in my sample) to 273 (i.e., which for every incumbent considers all post-primary roll calls, although they are be held in different time periods prior to general elections depending on the date of the opponent party's primary). Columns 1 – 3 report estimates from local linear, Columns 4 – 6 from local qaudratic specifications of of equation 4. The outcome variable is the change in the incumbent's *party loyalty* in the post-primary period with respect to the pre-primary period. All other notes as under Table 2. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.5: THE EFFECTS OF AN EXTREMIST CHALLENGER ON THE CHANGE IN INCUMBENT'S (STANDARDIZED) ROLL CALL EXTREMISM AND PARTY LOYALTY: ROBUSTNESS TO HIGHER-ORDER POLYNOMIALS

	Δ Roll Call Extremism (std.)			Δ Party Loyalty (%)		
PANEL A: CUBIC POLYNOMIAL	(1)	(2)	(3)	(4)	(5)	(6)
	-0.321**	-0.365***	-0.364***	-0.079**	-0.076**	-0.080**
	(0.136)	(0.124)	(0.125)	(0.034)	(0.032)	(0.032)
	[0.029]	[0.007]	[0.007]	[0.028]	[0.030]	[0.022]
MSE-Optimal Bandwidth	0.129	0.113	0.113	0.160	0.131	0.131
Effective Observations	317	277	279	372	312	312
Control Mean	0.031	0.022	0.024	-0.009	-0.011	-0.011
PANEL B: QUARTIC POLYNOMIAL						
	-0.333**	-0.378***	-0.371***	-0.077*	-0.080**	-0.082**
	(0.149)	(0.130)	(0.131)	(0.042)	(0.034)	(0.036)
	[0.043]	[0.005]	[0.008]	[0.093]	[0.031]	[0.037]
MSE-Optimal Bandwidth	0.153	0.168	0.162	0.161	0.182	0.165
Effective Observations	365	375	368	375	399	371
Control Mean	0.026	0.028	0.027	-0.009	-0.011	-0.009
Observations	490	479	479	490	479	479
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Tables 1 and 2 to higher polynomial orders 3 (Panel A) and 4 (Panel B) of the assignment variable. The outcome variables are the changes in the incumbent's standardized *roll call extremism* (Columns 1 – 3) and *party loyalty* (Columns 4 – 6) in the post-primary period with respect to the pre-primary period. All other notes as under Tables 1 and 2. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.6: THE EFFECT OF AN EXTREMIST CHALLENGER ON THE CHANGE IN INCUMBENTS' (STANDARDIZED) ROLL CALL EXTREMISM: ROBUSTNESS TO ALTERNATIVE KERNEL WEIGHTS

	Epanechnikov Kernel			Uniform Kernel		
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)
	-0.216**	-0.222**	-0.219**	-0.174*	-0.148*	-0.151*
	(0.107)	(0.093)	(0.093)	(0.099)	(0.096)	(0.097)
	[0.029]	[0.010]	[0.011]	[0.064]	[0.071]	[0.069]
MSE-Optimal Bandwidth	0.062	0.058	0.059	0.068	0.057	0.057
Effective Observations	168	158	159	183	156	156
Control Mean	0.005	0.005	0.011	-0.010	0.002	0.002
PANEL B: LOCAL QUADRATIC						
	-0.298**	-0.312**	-0.310**	-0.305**	-0.279**	-0.232*
	(0.127)	(0.116)	(0.117)	(0.129)	(0.124)	(0.122)
	[0.023]	[0.011]	[0.012]	[0.013]	[0.036]	[0.071]
MSE-Optimal Bandwidth	0.090	0.080	0.080	0.078	0.071	0.072
Effective Observations	231	208	209	209	183	192
Control Mean	0.002	-0.003	-0.005	-0.005	-0.010	-0.018
Observations	490	479	479	490	479	479
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Table 1 to weights alternative to the triangular kernel, reporting estimates based on the Epanechnikov kernel (Columns 1 – 3) and the rectangular kernel (Columns 4 – 5). The outcome variable is the change in the incumbent's standardized *roll call extremism* in the post-primary period with respect to the pre-primary period. All other notes as under Table 1. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.7: THE EFFECT OF AN EXTREMIST CHALLENGER ON CHANGE INCUMBENTS' PARTY LOYALTY: ROBUSTNESS TO ALTERNATIVE KERNEL WEIGHTS

	Epanechnikov Kernel			Uniform Kernel		
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)
	-0.058**	-0.049**	-0.051**	-0.050**	-0.041**	-0.048**
	(0.027)	(0.022)	(0.022)	(0.028)	(0.024)	(0.023)
	[0.028]	[0.018]	[0.013]	[0.047]	[0.048]	[0.023]
MSE-Optimal Bandwidth	0.070	0.069	0.069	0.065	0.057	0.058
Effective Observations	185	181	181	175	156	157
Control Mean	-0.012	-0.012	-0.012	-0.010	-0.009	-0.009
PANEL B: LOCAL QUADRATIC						
	-0.069**	-0.066**	-0.070**	-0.065**	-0.067**	-0.066**
	(0.031)	(0.028)	(0.028)	(0.032)	(0.029)	(0.030)
	[0.029]	[0.025]	[0.017]	[0.049]	[0.022]	[0.027]
MSE-Optimal Bandwidth	0.109	0.095	0.095	0.094	0.082	0.078
Effective Observations	276	231	231	236	213	206
Control Mean	-0.013	-0.014	-0.014	-0.014	-0.012	-0.011
Observations	490	479	479	490	479	479
Covariates	N	Y	Y	N	Y	Y
Outcome Before Primary	N	N	Y	N	N	Y

Notes: The Table probes robustness of results reported in Table 2 to weights alternative to the triangular kernel, reporting estimates based on the Epanechnikov kernel (Columns 1 – 3) and the rectangular kernel (Columns 4 – 5). The outcome variable is the change in the incumbent's *party loyalty* in the post-primary period with respect to the pre-primary period. All other notes as under Table 2. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.8: THE EFFECT OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM DEPENDING ON DISTRICT COMPETITIVENESS BY QUARTILES OF INCUMBENT ELECTORAL STRENGTH

	Marginal District (1^{st} Quartile)		Marginal District (2^{nd} Quartile)		Safe District (3^{rd} Quartile)		Safe District (4^{th} Quartile)	
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.564**	-0.564**	-0.179	-0.171	0.011	0.004	-0.060	-0.054
	(0.260)	(0.272)	(0.210)	(0.212)	(0.178)	(0.167)	(0.184)	(0.189)
	[0.024]	[0.041]	[0.271]	[0.293]	[0.932]	[0.998]	[0.660]	[0.738]
MSERD-Optimal Bandwidth	0.073	0.067	0.070	0.071	0.081	0.106	0.078	0.074
Effective Observations	59	52	47	47	52	67	42	38
Control Mean	-0.013	-0.005	-0.010	-0.010	-0.002	0.005	-0.006	-0.013
PANEL B: LOCAL QUADRATIC								
	-0.675*	-0.665*	-0.323	-0.295	-0.031	0.058	-0.041	-0.048
	(0.329)	(0.324)	(0.259)	(0.253)	(0.198)	(0.214)	(0.258)	(0.258)
	[0.062]	[0.061]	[0.165]	[0.185]	[0.792]	[0.756]	[0.983]	[0.974]
MSE-Optimal Bandwidth	0.094	0.098	0.096	0.099	0.096	0.093	0.099	0.097
Effective Observations	66	67	61	66	57	57	48	48
Control Mean	0.002	-0.006	0.002	-0.001	-0.005	0.002	-0.006	-0.006
Observations	120	120	120	120	120	120	120	120
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table replicates results Table 4, Panel A with the sample split in quartiles of incumbent electoral strength as measured the vote share of the incumbent's party in the prior preidntial election. The outcome is the change in the incumbent's standardized *roll call extremism*. All other notes as under Table 4. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.9: THE EFFECT OF AN EXTREMIST CHALLENGER ON PARTY LOYALTY DEPENDING ON DISTRICT COMPETITIVENESS BY QUARTILES OF INCUMBENT ELECTORAL STRENGTH

	Marginal Districts (1^{st} Quartile)		Marginal Districts (2^{nd} Quartile)		Safe Districts (3^{rd} Quartile)		Safe Districts (4^{th} Quartile)	
PANEL A: LOCAL LINEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.168**	-0.177**	-0.034	-0.032	-0.020	-0.014	-0.031	-0.006
	(0.068)	(0.073)	(0.039)	(0.043)	(0.046)	(0.043)	(0.044)	(0.037)
	[0.012]	[0.020]	[0.271]	[0.340]	[0.747]	[0.798]	[0.548]	[0.892]
MSE-Optimal Bandwidth	0.069	0.056	0.075	0.073	0.089	0.081	0.106	0.074
Effective Observations	53	44	50	50	54	52	54	38
Control Mean	-0.012	-0.008	-0.013	-0.014	-0.013	-0.011	-0.014	-0.013
PANEL B: LOCAL QUADRATIC								
	-0.201**	-0.202**	-0.049	-0.049	-0.006	-0.019	-0.034	-0.018
	(0.085)	(0.085)	(0.046)	(0.053)	(0.076)	(0.068)	(0.049)	(0.040)
	[0.029]	[0.027]	[0.247]	[0.301]	[0.920]	[0.758]	[0.514]	[0.677]
MSE-Optimal Bandwidth	0.091	0.090	0.103	0.104	0.072	0.068	0.165	0.134
Effective Observations	66	66	67	68	48	46	87	71
Control Mean	-0.013	-0.014	-0.013	-0.013	-0.014	-0.012	-0.009	-0.011
Observations	120	120	120	120	120	120	120	120
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table replicates results Table 4, Panel B with the sample split in quartiles of incumbent electoral strength as measured the vote share of the incumbent's party in the prior preidntial election. The outcome is the change in the incumbent's *party loyalty*. All other notes as under Table 4. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.10: EFFECT OF EXTREMIST CHALLENGER ON GENERAL ELECTION OUTCOMES DEPENDING ON DISTRICT COMPETITIVENESS

	Marginal Districts				Safe Districts			
PANEL A: EFFECT ON INCUMBENT'S VOTE SHARE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	0.040*	0.042*	0.040	0.040	0.007	-0.014	0.000	-0.013
	(0.022)	(0.018)	(0.032)	(0.026)	(0.028)	(0.020)	(0.034)	(0.028)
	[0.086]	[0.074]	[0.317]	[0.170]	[0.995]	[0.697]	[0.974]	[0.833]
MSE-Optimal Bandwidth	0.111	0.058	0.107	0.083	0.078	0.059	0.122	0.087
Effective Observations	150	88	144	120	93	70	138	97
Control Mean	0.52	0.51	0.51	0.51	0.56	0.56	0.56	0.55
PANEL B: EFFECT ON CHALLENGER'S VOTE SHARE								
	-0.043*	-0.044**	-0.044	-0.044	-0.021	-0.006	-0.010	0.010
	(0.022)	(0.017)	(0.033)	(0.024)	(0.030)	(0.024)	(0.035)	(0.032)
	[0.066]	[0.044]	[0.281]	[0.132]	[0.709]	[0.925]	[0.971]	[0.778]
MSE-Optimal Bandwidth	0.108	0.067	0.102	0.098	0.078	0.061	0.128	0.096
Effective Observations	144	100	136	134	92	72	147	103
Control Mean	0.47	0.47	0.47	0.47	0.43	0.43	0.42	0.43
PANEL C: EFFECT ON INCUMBENT'S MARGIN								
	0.083*	0.081*	0.085	0.070	0.029	-0.007	0.004	-0.022
	(0.044)	(0.035)	(0.064)	(0.048)	(0.057)	(0.043)	(0.065)	(0.058)
	[0.072]	[0.074]	[0.285]	[0.264]	[0.839]	[0.825]	[0.866]	[0.815]
MSE-Optimal Bandwidth	0.109	0.062	0.105	0.094	0.077	0.061	0.131	0.091
Effective Observations	147	94	141	127	92	72	149	101
Control Mean	0.05	0.04	0.04	0.04	0.12	0.12	0.14	0.12
PANEL D: EFFECT ON PRESENCE OF THIRD CANDIDATES								
	0.326*	0.351***	0.389*	0.497***	-0.048	-0.036	-0.018	-0.034
	(0.167)	(0.138)	(0.211)	(0.176)	(0.226)	(0.180)	(0.266)	(0.259)
	[0.057]	[0.010]	[0.094]	[0.006]	[0.915]	[0.903]	[0.903]	[0.863]
MSE-Optimal Bandwidth	0.083	0.063	0.110	0.103	0.074	0.077	0.118	0.097
Effective Observations	118	94	149	139	88	91	135	105
Control Mean	0.73	0.69	0.74	0.73	0.75	0.75	0.75	0.78
PANEL E: EFFECT ON THIRD CANDIDATES' VOTE SHARE								
	0.003	0.012	0.004	0.017	0.017	0.023*	0.007	0.000
	(0.007)	(0.008)	(0.011)	(0.012)	(0.013)	(0.011)	(0.014)	(0.015)
	[0.634]	[0.174]	[0.783]	[0.195]	[0.267]	[0.080]	[0.804]	[0.639]
MSE-Optimal Bandwidth	0.127	0.056	0.121	0.086	0.114	0.075	0.104	0.078
Effective Observations	164	85	160	121	131	89	118	92
Control Mean	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Polynomial Order	1	1	2	2	1	1	2	2
Observations	241	241	241	241	241	238	241	238
Covariates	N	Y	N	Y	N	Y	N	Y

Notes: The Table presents estimated effects of extremist challengers on general election outcomes in marginal districts (Columns 1 – 4) and safe districts (Columns 5 – 8). A district is defined as marginal if the vote share of the incumbent's party in the prior presidential election is above the sample median of 53.5%. Outcome variables are the incumbent's vote share (Panel A), the vote share of the main opponent party candidate (Panel B), the incumbent's vote share margin with respect to the main party opponent (Panel C), a dummy equal to 1 if at least one candidate other than Rpublican or Democratic gets a non-zero vote share (Panel D), and the total vote share of all candidates other than Republicans or Democrats (Panel E). Local linear specifications of equation 4 are reported in Columns 1 – 2 and 5 – 6, local quadratic specifications in Columns 3 – 4 and 7 – 8. Even-numbered columns control for all covariates listed in Figure 4, Panels A and B, exluding the distance between candidates' Hall-Snyder scores. All regressions use MSE-optimal bandwidths and a triangular kernel. The sample is restricted to re-election seeking incumbents. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.11: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON DEPENDING ON INCUMBENTS' PROXIMITY TO THE MODERATE POTENTIAL CHALLENGER IN SAFE DISTRICTS

	Proximate Platforms				Distant Platforms			
PANEL A: Δ EFFECT ON ROLL CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	0.049	0.067	0.119	0.133	-0.052	-0.036	0.042	0.035
	(0.163)	(0.188)	(0.240)	(0.245)	(0.245)	(0.239)	(0.358)	(0.347)
	[0.701]	[0.629]	[0.601]	[0.519]	[0.941]	[0.916]	[0.724]	[0.758]
MSE-Optimal Bandwidth	0.127	0.089	0.112	0.107	0.063	0.067	0.081	0.083
Effective Observations	67	51	61	61	35	36	44	44
Control Mean	0.004	-0.003	-0.003	-0.003	-0.021	-0.032	-0.044	-0.044
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.015	-0.000	0.015	0.020	-0.014	-0.014	-0.001	0.008
	(0.036)	(0.035)	(0.047)	(0.046)	(0.062)	(0.058)	(0.074)	(0.089)
	[0.812]	[0.789]	[0.608]	[0.577]	[0.876]	[0.949]	[0.870]	[0.777]
MSE-Optimal Bandwidth	0.099	0.088	0.101	0.098	0.083	0.058	0.117	0.083
Effective Observations	56	51	58	54	44	34	70	44
Control Mean	-0.005	-0.005	-0.004	-0.007	-0.008	-0.004	-0.001	-0.008
Polynomial	1	1	2	2	1	1	2	2
Observations	104	104	104	104	134	134	134	134
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table replicates results for marginal districts presented in Table 5 for incumbents seeking re-election in safe districts. All other notes as under Table 5. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.

TABLE A.12: THE EFFECTS OF AN EXTREMIST CHALLENGER ON ROLL CALL EXTREMISM AND PARTY LOYALTY DEPENDING ON DEPENDING ON INCUMBENTS' LOCAL ROOTS: ALL DISTRICTS

	Incumbent Locally Rooted				Incumbent Not Locally Rooted			
PANEL A: EFFECT ON Δ ROLL CALL EXTREMISM (STD.)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.039	0.078	-0.027	-0.033	-0.274**	-0.397***	-0.364**	-0.555***
	(0.147)	(0.107)	(0.210)	(0.146)	(0.137)	(0.118)	(0.159)	(0.155)
	[0.859]	[0.467]	[0.929]	[0.754]	[0.026]	[0.001]	[0.021]	[0.001]
MSE-Optimal Bandwidth	0.075	0.058	0.082	0.105	0.067	0.060	0.099	0.076
Effective Observations	71	54	76	100	116	104	157	128
Control Mean	0.009	0.006	0.036	0.055	-0.010	0.007	-0.034	-0.024
PANEL B: EFFECT ON Δ PARTY LOYALTY								
	-0.072	-0.036	-0.073	-0.053	-0.048	-0.045*	-0.069	-0.088**
	(0.039)	(0.028)	(0.044)	(0.044)	(0.036)	(0.028)	(0.045)	(0.040)
	[0.121]	[0.333]	[0.122]	[0.337]	[0.134]	[0.073]	[0.106]	[0.034]
MSE-Optimal Bandwidth	0.085	0.072	0.134	0.091	0.074	0.085	0.106	0.080
Effective Observations	78	66	123	83	131	139	168	134
Control Mean	-0.004	-0.009	-0.005	-0.005	-0.016	-0.018	-0.018	-0.014
Polynomial	1	1	2	2	1	1	2	2
Observations	179	178	179	178	310	300	310	300
Covariates	N	Y	N	Y	N	Y	N	Y
Outcome Before Primary	N	Y	N	Y	N	Y	N	Y

Notes: The Table replicates results for marginal districts presented in Table 7 for the whole sample of re-election seeking incumbents. All other notes as under Table 7. Standard errors clustered by House incumbent in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust p-values based on bias-adjusted estimates in brackets.