

ELECTIONS AND DIVISIVENESS: THEORY AND EVIDENCE

ABSTRACT. This paper provides a theoretical and empirical analysis of how politicians allocate their time across issues. When voters are uncertain about an incumbent’s preferences, there is a pervasive incentive to “posture” by spending too much time on divisive issues (which are more informative about a politician’s preferences) at the expense of time spent on common-values issues (which provide greater benefit to voters). Higher transparency over the politicians’ choices can exacerbate the distortions. These theoretical results motivate an empirical study of how Members of the U.S. Congress allocate time across issues in their floor speeches. We find that U.S. Senators spend more time on divisive issues when they are up for election, consistent with electorally induced posturing. In addition, we find that U.S. House Members spend more time on divisive issues in response to higher news transparency.

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“Most citizens want a secure country, a healthy economy, safe neighborhoods, good schools, affordable health care, and good roads, parks, and other infrastructure. These issues do get discussed, of course, but a disproportionate amount of attention goes to issues like abortion, gun control, the Pledge of Allegiance, medical marijuana, and other narrow issues that simply do not motivate the great majority of Americans.”

Fiorina et al. (2006, p. 202).

“Can’t we wait on the things that we’re going to yell at each other about and start on the things that we agree on?”

Austan Goolsbee, *Meet the Press*, August 7, 2011.

1. INTRODUCTION

As the above quotes illustrate, there is a widespread perception that the political process involves excessive amounts of time devoted to narrow and divisive issues. This raises the question of why politicians spend so much time on these issues and if, as sometimes argued (e.g., Hillygus and Shields 2014), the focus on divisive issues is a response to electoral pressures. We provide a theoretical and empirical analysis of the role of electoral pressures in driving divisive politics.

The first contribution of this paper is theoretical. We provide a positive theory of incumbent politicians’ allocation of time and resources across two policy issues. While the common-values issue is more important to the voters, voters are unsure of the politician’s preferences on the divisive issue. The politician has an incentive to over-provide effort on the divisive issue, at the expense of the common-values issue, to signal that she holds preferences that make her more attractive to the majority of voters. Moreover, this incentive to “posture” is stronger with higher transparency—that is, when voters have more information on the politician’s effort choices.

The second contribution is empirical. We construct a measure of divisive effort for Members of the U.S. Congress using the text of their floor speech. We then report two new empirical findings. First, we exploit variation in the time to re-election for U.S. Senators to demonstrate that Senators spend more time on divisive issues when elections are more imminent. Second, we exploit variation in news coverage based on the overlap between media markets and congressional districts to show that U.S. House Members spend more time on divisive issues when there is

greater transparency. These results are consistent with the theory and provide empirical evidence of the importance of electorally induced posturing.

This paper builds on a large theoretical literature on policy distortions due to electoral pressures. In pandering models (e.g., Canes-Wrone et al. 2001, Maskin and Tirole 2004), politicians take actions that signal competence or congruence with the electorate even if they know those policies are not in the voters' interest. This can lead politicians to take relatively extreme actions (e.g., Acemoglu et al. 2013, Fox and Stephenson 2015), or result in valuable information of politicians being lost (e.g., Canes-Wrone and Shotts 2007, Fox 2007, Morelli and Van Weelden 2013). The present paper breaks from the previous literature in its focus on the allocation of effort across different issues, rather than the choice on a single issue. This approach generates a novel prediction: electoral pressures will distort politician effort away from common-values issues toward divisive issues. That is, distortions in policymaking may result not from choices on a given issue, but rather from a misallocation of effort across issues toward those that are more divisive.¹ In turn, this prediction motivates a new empirical approach, as relative effort across issues cannot be measured with standard datasets on positions taken (e.g. roll call votes). Our political effort measure is a continuous metric of time allocated to divisive issues, constructed from congressional floor speech.

The logic of the model can be outlined as follows. An incumbent politician decides how to allocate effort across two issues, a common-values issue and a divisive one. Politicians and all voters share the same preference on the common-values issue. On the divisive issue, voter and politician preferences are heterogeneous. In the first stage of the game, voters observe the incumbent's effort allocation, draw inferences about her type, then vote on whether to re-elect her or not. Politicians are more likely to be re-elected if they are seen to have preferences that are aligned with the majority of the relevant electorate.

¹The theoretical literature on a politician's allocation of time across issues is relatively small. Colomer and Llavador (2011), Aragonés et al. (2015), and Dragu and Fan (2016) all assume fixed policies and analyze politicians' attempts to add salience to issues on which their party has a preexisting advantage. Dragu and Fan (2016) predict that in two-party elections only the minority party has an incentive to increase the salience of issues with high heterogeneity in opinions (sometimes even when the party does not have an expected advantage on that issue), something distinct from our results on incumbents' incentive to focus on divisive issues. More generally, there is a large literature in economics and political science stemming from Holmstrom and Milgrom (1991) on how agents allocate effort across tasks. This literature mainly focuses on competence-signaling rather than preferences-signaling however. To our knowledge, none of these papers consider the allocation of effort between divisive and common-values issues.

Voter uncertainty about politician preferences on divisive issues, coupled with the potential for policy disagreements in the next period, motivates politicians to try to signal that their policy preferences are aligned with their electorate. They do this by focusing effort on divisive rather than common-values issues. We refer to the excessive exertion of effort on divisive issues at the expense of common-values issues as *posturing*. Politicians posture because more highly divided preferences on an issue means greater uncertainty about their preferences, increasing the electoral value of signaling. We show that *even when* there exist very important common-values issues that everybody agrees should be solved first, incumbent politicians *over-provide* effort on divisive issues to signal their preferences. Hence, posturing may involve first-period effort allocations that are suboptimal for all voters, including those who agree with the actions taken on the divisive issue.² The incentive for the politician to signal her preferences is strongest when re-election concerns are paramount and the politician is most confident of where majority opinion will be when she comes up for re-election. As voter preferences may shift over time, this means that the strongest electoral pressures emerge when the next election is most imminent.

With a sufficiently strong re-election motive, there is a pooling equilibrium in which all politicians posture by focusing on the divisive issue. This equilibrium not only involves distortions in the politician's behavior but, since all politicians take the same action, the voters don't learn anything from these distortions. This means that high levels of posturing also impede the ability of voters to learn about politicians and retain those with more aligned policy preferences. As such, high levels of posturing have unambiguously negative welfare consequences. These negative welfare consequences emerge not due to a misalignment of the positions taken on a given issue—when the re-election motive is strong politicians always pursue the majority-preferred position on any issue they address—but rather because important common-values issues are ignored at the expense of more divisive ones.

In the first part of the paper we assume that voters directly observe the effort allocation chosen by the incumbent politician. In the second part we ask what happens when voters cannot observe politicians' effort allocation but only the policy consequences that result. While there are several previous papers on transparency (e.g., Prat 2005, Fox 2007, Fox and Van Weelden 2012), we provide new results concerning the allocation of effort across issues.

²As has been discussed in the previous literature, electoral pressures can have both positive and negative effects on politician behavior, and there is often a friction between incentivizing politicians to implement desirable policies today and selecting candidates who will implement desirable policies in the future (e.g., Fearon 1999).

In our model, increased transparency can have ambiguous effects on politician behavior. Since the actions are more likely to be observed, transparency can increase the electoral benefit from socially inefficient posturing.³ And, by increasing posturing, higher transparency can actually *decrease* the amount voters learn about politicians from their effort choices. The intuition is that, as posturing is more advantageous when effort choices are more transparent, greater transparency increases the likelihood that the equilibrium involves pooling with all politicians engaging in maximal posturing. So, for appropriate parameters, transparency can be harmful *both* for policymaking in the current period and for selecting congruent politicians in the future.

These theoretical findings motivate the empirical analysis of posturing. We proxy for effort exerted across issues with the amount of speech dedicated to different issues on the House/Senate floor. Our measure of divisive speech is constructed from the frequency that politicians of different parties use particular language (Gentzkow and Shapiro 2010; Jensen et al. 2012). This measure is needed to capture how politicians allocate time across different types of issues, rather than just the positions taken in roll call votes. This is important because, though electoral pressures cause roll call votes to be more aligned with the electorate (e.g., Thomas 1985), looking only at the positions taken in roll call votes cannot capture the distortions in relative issue emphasis predicted by our model.

From the theory we expect effort on divisive issues to increase when the next election is more imminent. To test this empirically we use variation in the time to the next election that arises due to the staggered election cycle in the U.S. Senate. We find that when Senators are up for re-election, they allocate a greater fraction of their floor speech to divisive issues relative to earlier in their term. This result is consistent with electorally induced posturing.

In the second part of our empirical analysis we measure the effect of greater transparency on divisiveness. The theory has more caveats about the effect of transparency, but identifies conditions under which increased transparency can lead to increased divisiveness. To identify higher transparency empirically, we use the measure for news coverage of U.S. House members developed by Snyder and Stromberg (2010), which is based on the geographic overlap between media markets and congressional districts. Though less conclusive than the Senate analysis, we find evidence that House members engage in more divisive speech in response to higher

³Dan Rostenkowski, the longtime chairman of the House Ways and Means committee, shared this concern, arguing that “as much as people criticize the back room, the dark room, or the cigar or smoke-filled room, you get things done when you’re not acting” (Koeneman 2013).

news transparency. This result complements previous work on the benefits of transparency: for example, Snyder and Stromberg (2010) find that increased transparency increases politician effort, consistent with the predictions of models of accountability. Here we identify a potential downside in terms of how effort is divided across issues.

In sum, we provide a rationale for how electoral pressures and transparency can incentivize politicians to focus excessive effort on divisive issues and then present empirical evidence in support of that rationale. However, our empirical results should be of broader interest than as a test of our model of divisive politics. To the extent that an increased focus on divisive issues is socially harmful (e.g., Fiorina et al. 2006), our results provide important empirical verification for the argument that electoral pressures can induce distortions in policymaking. A large theoretical literature has explored the risks of socially harmful pandering, and the ways in which increased transparency can exacerbate these distortions (see Ashworth 2012 for an overview), but the empirical literature is much less developed.⁴ Our results provide an important step in understanding how electoral pressures can induce distortions from an empirical perspective.

The paper is organized as follows: Section 2 presents the model and section 3 analyzes the equilibrium. Section 4 extends the model to heterogeneous constituencies. Section 5 reports the empirics and section 6 concludes. An online appendix includes the proofs of the theoretical results and additional details on the empirical specification.

2. MODEL

We consider a two-period model in which a politician takes action to influence policy in each period, with an election between periods. In each period the incumbent politician has to decide how to allocate effort, or other scarce resources such as money or personnel, between two issues, A and B . Issue A is common-values and all voters agree on the preferred policy. Issue B is divisive and voters disagree about which policy they would like implemented.⁵ Changing the policy on either issue requires the incumbent to devote effort to that issue.

⁴Pandering is challenging to test empirically, given that its predictions concern the unobservable private information of policymakers. Canes-Wrone and Shotts (2004) and Rottinghaus (2006) however provide some evidence of pandering by showing that, consistent with these models, politicians are more responsive to public opinion on issues on which voters are more informed.

⁵For simplicity we describe A and B as separate issues, but they could just as well represent common-values and divisive policies on one issue area. For example, on taxes, A could reflect simplifying the U.S. tax code whereas B could reflect changing the amount of tax revenues collected.

On issue A , the politician allocates effort $w^A \in [0, 1]$; on issue B the politician chooses $w^B \in [-1, 1]$. The choice of w^B reflects both the amount of effort on issue B ($|w^B| \in [0, 1]$) as well as whether to spend the time she devotes to B on increasing ($w^B > 0$) or decreasing ($w^B < 0$) the policy in that dimension. We assume that the politician is constrained to choose $w^A + |w^B| \leq W$, where $W \in (0, 2)$ is her budget of time. We normalize the status quo policy to be 0 in each dimension, and assume that if effort w^A is exerted on issue A the policy will be $p^A = 1$ with probability w^A and 0 with probability $1 - w^A$. Similarly devoting effort $w^B \geq 0$ ($w^B < 0$) to issue B results in policy $p^B = 1$ ($p^B = -1$) with probability $|w^B|$ and $p^B = 0$ with probability $1 - |w^B|$.⁶

The parameter W is a measure of the power of the office the politician holds. When W is small, the politician's effort is unlikely to influence policy; when $W \approx 2$, it is possible for her to change policy in both dimensions with high probability; for intermediate values of W the politician faces a tradeoff where she can influence policy but may not be able to do everything she wants. W is likely to vary across institutional structures (e.g. the Prime Minister in a unicameral parliamentary system may have a higher W than the U.S. President) and across different offices in the same system (e.g. a Member of Congress or Parliament would have a lower W than the President or Prime Minister).

In addition to caring about policy, voters receive some additional payoff from having a politician who is high valence—someone who is an able administrator or whom they like personally. In each period, $t \in \{1, 2\}$, the stage game utility of voter i is

$$-\gamma|\theta_t - p_t^A| - (1 - \gamma)|x_i^B - p_t^B| + v_t^j,$$

where p_t^A and p_t^B are the policies implemented in period t , v_t^j is the valence of politician j who is in office in period t , θ_t and x_i^B are the preferred policies in each dimension for voter i , and $\gamma \in (0, 1)$ is the relative importance of the common-values issue. So $\theta_t \in \{0, 1\}$ reflects whether all voters prefer policy $p^A = 1$ or $p^A = 0$ in period t . Conversely, the voters may be type $x^B = -1$ or $x^B = 1$ reflecting their preferred policy in dimension B . To keep the analysis simple we assume that preferences in dimension B are independent of the state.

⁶We could allow politicians the option to decrease the policy in the A dimension as well, but this would be uninteresting as all voters and politicians have a common interest in p^A not decreasing. Moreover, while we assume that the mapping between effort and policy change is the same for both issues this is not necessary. We could allow this to be asymmetric—for example, assuming the probabilities of policy change are $\alpha^A w^A$ and $\alpha^B |w^B|$ respectively—and the results would still hold just with additional parameters and algebra.

In period 1 a strict majority of voters, $m_1 \in (1/2, 1)$, are type $x_i^B = 1$ and so prefer higher policies in the B dimension. The assumption that $m_1 \geq 1/2$ is without loss of generality, so the meaningful assumption is that the electorate is not perfectly divided on issue B ($m_1 \neq 1/2$). The fraction of type $x_i^B = 1$ voters in period 2 is m_2 which is uncertain when the first period effort choice is made. We assume $Pr(m_2 > 1/2) = 1 - \eta$ and $Pr(m_2 < 1/2) = \eta$, where $\eta \in [0, 1/2]$.

When $\eta > 0$ this means that there is a possibility that majority opinion on the divisive issue may flip before the next election, but $\eta < 1/2$ means the majority opinion is positively correlated across periods. The probability η of a reversal in majority opinion likely varies with the time to the next election: for example, if a Senator has to make an effort allocation decision between a common-values issue and a divisive issue early in her term, then there are more opportunities for a shift of majority preferences on the divisive issue (e.g. during the second half of the six year term) than if the allocation decision is made immediately before the next election. This means that η is decreasing in time to re-election. Thus, the model's prediction when η is high can be interpreted as the prediction when re-election is well in the future, whereas when η is low it can be interpreted as the prediction when the re-election decision is imminent. This will be important for deriving comparative statics that we test in our empirical analysis.

We assume that $\theta_1 = 1$ but the probability that $\theta_2 = 1$ is $q \in (0, 1)$. This means that in the first period voters prefer a new policy on A but, with some probability, they will be content with the status quo policy in the second period. Our analysis will focus on the behavior of politicians in the first period when they are electorally accountable and we assume that $\theta_1 = 1$ so voters would benefit from (appropriately directed) effort on two different tasks. This makes the politician's multi-task problem non-trivial. In the second period, because $q < 1$, different types choose different effort allocations with positive probability and the politician's type matters for voter-payoffs. That $q < 1$ captures the uncertainty about which issues will be important in the future and reflects the possibility the divisive issue could become a central dimension of conflict.

Finally, we assume that $\gamma \in (1/2, 1)$ and so all voters care more about issue A than issue B . This is not necessary for our results, but corresponds to the case where all players prefer effort to be spent on A , and so biases against effort focused on B . We focus on the case in which $\gamma > 1/2$ in order to provide a theory of why politicians may not address common-values issues *even if* they are more important.

Politicians are drawn from a (possibly proper) subset of the electorate and so, like the voters, the preferences of the politicians are homogenous on the A dimension and heterogenous on the

B dimension. We assume that fraction $m^P \in (1/2, 1)$ of the politicians are type $x^B = 1$ and that $1 - m^P$ are type $x^B = -1$. That is, we do not require the distribution of politician preferences to be the same as the voters but do assume a politician is more likely than not aligned with the majority of voters. This is likely the most relevant case given that politicians are voters themselves.⁷ The incumbent politician knows her own type, and voters update their beliefs based on observed incumbent behavior.

Politicians also differ in their valence, and we assume for simplicity that valence is normally distributed with mean 0 and variance $\sigma^2 > 0$ across politicians. The politician's valence is unknown to both the politician and voters initially, but is revealed to everyone when the politician is in office regardless of the effort choice. Valence is constant across periods, so at the time of the election voters know whether the incumbent is higher or lower valence than they can expect from a challenger. As the incumbent does not know her own valence in the initial period it cannot affect her effort choice, but it introduces additional randomness that smooths the re-election probability.

In addition to having preferences over policy, the politician receives a positive benefit ϕ from being in office. So the stage game utility of politician j if (p_t^A, p_t^B) is implemented is

$$\phi - \gamma|\theta_t - p_t^A| - (1 - \gamma)|x_j^B - p_t^B|,$$

if they are in office, and, if politician $k \neq j$ is in office,

$$-\gamma|\theta_t - p_t^A| - (1 - \gamma)|x_j^B - p_t^B| + v_t^k.$$

If out of office a politician is then identical to a voter with the same policy preferences, but in office she receives a benefit ϕ from holding office regardless of her own valence. The parameter ϕ could include monetary and non monetary rewards from being elected. For simplicity we assume that effort is not costly for the elected politician—the incentives to exert costly effort by incumbent politicians have been studied in the previous literature.

The game is repeated with discount factor $\delta \in (0, 1]$. After the first period voters update their beliefs about the type of the politician. As there are only two types these beliefs can be

⁷The assumption that a majority of politicians hold the same policy preferences as the majority of the period 1 voters plays no role in the mechanism we consider, but simplifies the equilibrium selection. If $m^P < 1/2$, then, because type 1 politicians would have more to lose from not securing re-election, it is possible, for some parameters, to support other equilibria in which there is additional costly signaling to convince the voters that the re-election motive is strong.

characterized by

$$\mu \equiv \Pr(x_j^B = 1),$$

the voters' beliefs that the incumbent is type 1. The timing is as follows.

- (1) In period 1 a politician is randomly selected to be in office for that period. The politician knows her own type, but voters only know the type distribution.
- (2) The politician decides how to allocate effort (w^A and w^B). Two subcases:
 - (a) The voters observe the effort decision—transparency case;
 - (b) Voters do not observe the effort decision—no transparency case.
- (3) The incumbent's valence v^j is realized and publicly observed. The politician's valence is constant across periods.
- (4) The policies are determined, with all players receiving their utilities for period 1. Voters observe p^A and p^B and update beliefs about the incumbent.
- (5) m_2 is realized and an election takes place by majority rule over whether or not to re-elect the incumbent. If the incumbent is not re-elected a random replacement is drawn.
- (6) θ_2 is realized, and the politician decides how to allocate effort in period 2.
- (7) The policy is realized with all players receiving their payoff for period 2.

Notice that we specify the game so that the status quo in period 2 is not affected by the outcome in period 1. This simplifies the algebra. It is also the natural assumption if new policy issues arise each period and preferences are correlated across the issues faced in different periods. Moreover, we demonstrate in the next subsection that assumptions about the second period status quo do not drive the results.

Finally, before proceeding to the analysis, note that we have assumed the election takes place by majority rule and abstracted from parties or the selection of candidates. However, an alternative application of our model is to primary elections. Suppose that, instead of a fear of losing the general election, the greatest threshold the incumbent must cross to be re-elected is to secure renomination by her party. If the incumbent wins the primary she will be re-elected in the general election with certainty, whereas if the incumbent is defeated in the primary a random draw from the same party replaces her on the ticket and wins the general election. While stark, this is a reasonable approximation to heavily gerrymandered districts, or in conservative states with possible tea party challenges. With this interpretation of our model, majority opinion reflects the majority within the primary electorate in the incumbent's party.

Table of Symbols

Symbol	Meaning
<i>Model Section</i>	
A	Common-values issue
B	Divisive issue
W	Politician's time budget
x_i^B	Preferred policy on divisive issue for voter i
m_t	Fraction of voters with $x_i^B = 1$ at period t
m^P	Fraction of type 1 politicians
w_t^A, w_t^B	Effort dedicated to issues A and B in period t
p_t^A, p_t^B	The resulting policy on issues A and B in period t
q	Probability that voter preference on common-values issue is constant in second period
v_t^j	Valence of elected politician j in period t
γ	Voter preference weight for common-values issue
η	Probability that majority preference on divisive issue changes in second period
θ_t	Voter preference on common-values issue in period t
σ^2	Variance of distribution of politician valence
ϕ	Office-holding benefit for politician
μ	Voter's updated belief that the incumbent is type 1.
<i>Empirical Section</i>	
E_{jt}	Election cohort of Senator j in period t
T_{jt}	Transparency measure for Congressman j in period t
X_{jt}	Control variables for district j in period t
Y_{jt}	Divisiveness of congressman speech
α_{jt}	District and year fixed-effects
β	Estimated coefficients on control variables
ϵ_{jt}	Error term in the estimating equations
ρ_E, ρ_T	Coefficients for election cohort (E) and transparency (T) on divisiveness

3. ANALYSIS

3.1. Politician Second Period Behavior and the Voters' Re-Election Decision. We now turn to analyzing the behavior in this game. We look for Perfect Bayesian Equilibria, restricting attention to equilibria in which all voters always hold the same beliefs about the politician's type. Our main focus will be on the behavior in the first period when the politician is electorally

accountable. In order to understand the politician's incentives in the first period, however, we must first understand which voter beliefs will make it more likely that the incumbent is re-elected. For this reason, we begin by solving for politician behavior in period 2. In period 2 the politician is unaccountable to voters and chooses the effort allocation that maximizes her policy payoff.

As $\gamma > 1/2$, all politicians and all voters care more about issue A than issue B . Hence, in the second period, the politician focuses first on addressing issue A if any change is desired on that issue ($\theta_2 = 1$). The politician will then spend any left over effort on the B dimension, with the type 1 politician exerting effort to implement $p^B = 1$ and the type -1 politician to implement $p^B = -1$. We then have the following lemma.

Lemma 1. *Politician Action in the Second Period*

In period $t = 2$,

- (1) *a politician of type 1 chooses $w^A = \min\{W, 1\}$ and $w^B = W - w^A$ when $\theta_2 = 1$, and $w^B = \min\{W, 1\}$ and $w^A = 0$ when $\theta_2 = 0$.*
- (2) *a politician of type -1 chooses $w^A = \min\{W, 1\}$ and $w^B = -(W - w^A)$ when $\theta_2 = 1$ and $w^B = -\min\{W, 1\}$ and $w^A = 0$ when $\theta_2 = 0$.*

Note that, as $\theta_2 = 0$ occurs with positive probability, the second period behavior of different types differs with positive probability regardless of W . The politician's type is then relevant to the voters: a voter's payoff is higher from re-electing an incumbent who shares the voter's policy preferences.

We next consider the voters' decision of whether or not to re-elect the incumbent. The expected second-period payoff to voters who are type $x^B = 1$ ($x^B = -1$) is increasing in the probability the politician is type 1 (type -1), and all voters benefit if the politician is higher valence. We assume that all voters vote for the candidate they prefer, and so will vote for the incumbent if, and only if, given her valence and the beliefs about her type, the expected payoff is higher than from a random challenger. To be re-elected the incumbent must receive at least half the votes. So she will be re-elected if and only if the majority type at the time of the election (which is type 1 with probability $1 - \eta > 1/2$) supports her re-election. As the type 1 voter's payoff is strictly increasing in μ , the voters' belief the incumbent is type 1, so too is the incumbent's re-election probability.

Lemma 2. Voter Behavior

The incumbent's re-election probability is strictly increasing in μ , and equal to $1/2$ when $\mu = m^P$.

From [Lemma 2](#) we see that an incumbent politician benefits electorally from being perceived as type 1.⁸ We now turn to analyzing the first period effort choice, first with transparent effort, then in the case in which only the outcome is observable. We consider the actions the incumbent politician will take in the first period in order to signal that she is type 1.

3.2. Equilibrium with Observable Effort Choices. We first analyze the case with transparent effort—when voters observe (w^A, w^B) as well as (p^A, p^B) . As the incumbent benefits from convincing the voters she is type 1 the first period is a signaling game. This means that there can be many equilibria, especially when re-election concerns are paramount (ϕ is high), depending on voters' off-path beliefs. However, applying criterion D1 from Cho and Kreps (1987) generates a unique equilibrium prediction, up to the beliefs at certain off-path information sets. Criterion D1 simply says that, if the voters see an out of equilibrium effort allocation, they should believe it was taken by the type of politician who would have an incentive to choose that allocation for the least restrictive set of beliefs. A formal definition is included in Appendix A. As is standard in this literature we focus on equilibria satisfying D1 and refer to them simply as an equilibrium.

We now solve for equilibrium behavior in the first period, at which point the incumbent chooses effort to influence the first period policy as well as her probability of being re-elected. From a policy perspective the greatest return to effort is on policy A , but, as we established in [Lemma 2](#), her re-election probability increases in the voters' belief she is type 1. The incumbent can signal that she is type 1 by engaging in effort that is comparatively less costly for a type 1 politician than a type -1 politician: by diverting effort from issue A to issue B .

Type 1 politicians receive higher utility from increasing p^B than type -1 politicians, so it is relatively less costly for a type 1 politician to choose $w^B > 0$. There is one caveat however. As politicians care about the policy implemented after leaving office, a politician has a greater incentive to secure re-election if her replacement is less likely to be the same type. So, if ϕ is very low and m^P is close to one, a majority politician receives little benefit from re-election,

⁸[Lemma 2](#) would still hold if the status quo in the second period is endogenous to the first period policy. When $\theta_2 = 0$ type 1 politicians are incentivized to exert effort to increase the policy in the B dimension, and type -1 to decrease it. Regardless of the status quo at least one of those alternatives is feasible and so majority-type voters receive a higher expected payoff from majority-type politicians. The subsequent results on first period behavior would then go through fundamentally unchanged with different assumptions about the second period status quo.

and so has less incentive to posture even though it is comparatively less costly. However, when ϕ is not too small—greater than some non-negative level $\hat{\phi}$ —the benefits from re-election are large enough that type 1 politicians have a greater incentive to posture. How much effort will be diverted to issue B depends on the degree of office motivation.

When ϕ is low (but greater than $\hat{\phi}$) politicians are more concerned with the policy implemented in the current period than with securing re-election, so both types focus the bulk of their energies on issue A . However the type 1 politician can separate themselves by placing strictly positive effort on B . As the type 1 politician has a strictly greater incentive to increase w^B than the type -1 politician, criterion D1 requires that if w^B is greater than the equilibrium level the voters infer that the incumbent is type 1 with certainty. This generates a discrete jump in the re-election probability relative to when voters are unsure of her type, so in equilibrium the politician's type must be fully revealed by her effort choice. In a **separating equilibrium**, type -1 chooses $w^A = \min\{W, 1\}$ and $w^B = -(W - w^A)$ and type 1 chooses $w^B > 0$ and $w^A = W - w^B$ with voters perfectly learning the incumbent's type.

Now consider the case in which ϕ is high, and so the primary concern of politicians is to secure re-election. Then, although type 1 politicians have an incentive to try to separate by putting additional effort on issue B , a type -1 politician is no longer willing to reduce her re-election probability by focusing effort on her preferred policy and revealing herself to be type -1 . As the type -1 politician always has an incentive to mimic type 1, and the type 1 politician always has an incentive to try to separate by increasing w^B , the only possible equilibrium is pooling with all politicians choosing $w^B = \min\{W, 1\}$, the maximal effort on issue B . We refer to this pooling equilibrium as a **posturing equilibrium**.

Finally note that, by [Lemma 2](#), emphasizing B in a separating equilibrium results in re-election with a higher probability than in a pooling equilibrium. For intermediate levels of office-motivation, then, it is not possible to have an equilibrium that is either separating, as the type -1 politician would have an incentive to mimic type 1, or pooling, as the type -1 politician would not be incentivized to posture. For this range of parameters the equilibrium is **partially-pooling**. In a partial-pooling equilibrium the type 1 politician's behavior is the same as in a posturing equilibrium, and the type -1 politician randomizes between her behavior in a separating and a posturing equilibrium.

The above discussion leads to the following equilibrium characterization.

Proposition 1. Characterization of Equilibrium

There exists $\hat{\phi}(W) \geq 0$ such that, when $\phi > \hat{\phi}(W)$, there is a unique equilibrium up to the beliefs at off-path information sets. Assume $\phi > \hat{\phi}(W)$. Then there exist $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ such that the unique equilibrium is

- (1) separating if $\phi \leq \bar{\phi}(\sigma, \eta, W)$.
- (2) partially-pooling if $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$.
- (3) posturing if $\phi \geq \phi^*(\sigma, \eta, W)$.

[Proposition 1](#) characterizes the equilibrium behavior and the resulting inefficiencies.⁹ As $\gamma > 1/2$, all voters and politicians agree that issue A is more important and would receive a greater utility benefit from effort spent on A than B. So, in the first period, if $w^A < \min\{W, 1\}$, as happens for many parameter values, a pareto dominated effort allocation is chosen. When, as in part (3), strong office motivation leads to a posturing equilibrium, the effect is particularly pronounced. Not only is there the largest possible distortion of effort away from issue A, but this distortion is driven by the incentives for politicians to signal to voters. However, since both types posture, voters don't learn anything about the incumbent politician from this socially wasteful signaling. A posturing equilibrium is then unambiguously worse than a separating equilibrium as it generates lower voter welfare in both periods.

[Proposition 1](#) provides an explanation for why politicians would exert so much effort on divisive issues of marginal importance. Politicians can use these issues as a costly signal that they are aligned with the majority; a politician who fails to work on the divisive issue, even if she works instead on issues that benefit voters more, will be perceived as non-congruent on the divisive issue. There is greater posturing by politicians when office motivation is stronger. Note however that the only time any politician works toward a policy opposed to the majority's preferences is when office motivation is low. So stronger office motivation makes the positions taken on a given issue more aligned with majority opinion but, at the same time, creates a distortion in terms of excessive emphasis on more divisive issues.

We now consider how the cutoffs $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ vary with the parameters. As it is only possible to support a separating equilibrium when $\phi \leq \bar{\phi}(\sigma, \eta, W)$, and a posturing equilibrium when $\phi \geq \phi^*(\sigma, \eta, W)$, $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ are indices of how likely (in a

⁹See Proposition A1 in Appendix B for additional details and the proof. It is possible that a separating or partially-pooling equilibrium requires lower office motivation than $\hat{\phi}(W)$. This can only occur when $W \approx 2$ and $\gamma \approx 1$ and for such parameters cases (1) and (2) of [Proposition 1](#) are vacuous. Proposition A1 provides details.

world of random parameter values) it is to have an equilibrium without pervasive posturing. When η increases (i.e., the next election is further away), posturing is less likely because voter beliefs have less impact on the re-election probability. An analogous effect is caused by an increase in σ , the importance of valence. The effect of W , the institutional authority parameter, is instead non monotonic. To state this comparative static we define $\bar{\phi}_0(\eta, W) \equiv \lim_{\sigma \rightarrow 0} \bar{\phi}(\sigma, \eta, W)$ and $\phi_0^*(\eta, W) \equiv \lim_{\sigma \rightarrow 0} \phi^*(\sigma, \eta, W)$ as the limit of the cutoffs as valence heterogeneity disappears.

Proposition 2. *Comparative Statics*

- (1) $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ are both increasing in η and σ .
- (2) $\bar{\phi}_0(\eta, W)$ and $\phi_0^*(\eta, W)$ are strictly increasing in W when $W < 1$ and strictly decreasing when $W > 1$.

Part (2) of [Proposition 2](#) shows that, when valence shocks are small, $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ are non-monotonic in W . If W is small, it is difficult to support a separating equilibrium. Since politicians' effort choices are unlikely to influence policy, they have a greater incentive to choose the allocation most likely to get them re-elected—so all incumbents focus on B .¹⁰ As W increases, effort choices are more likely to have policy consequences, so the incentive for the politician to allocate effort to her preferred policy increases. However, if W is greater than 1, further increases in W make it more difficult to support a separating equilibrium. This is because, when W is large, politicians are capable of getting both $p^A = 1$ and $p^B = 1$ with high probability. As the greatest cost of effort on B is if it comes at the expense of effort that could be spent on A , the costs of posturing are lower when W is large. When $W = 1$ the policy consequences are starkest and so the equilibrium is separating for the widest range of parameters.

3.3. First Period Behavior with Unobservable Effort Choices. We now consider the incentives when effort is not transparent. That is, we assume the voters can observe only the outcomes (p^A and p^B) but not the effort allocations (w^A and w^B).¹¹ As this setting falls outside the scope of standard refinements such as criterion D1, we do not apply such refinements to select among equilibria here. Instead we focus on the case in which ϕ is large, so the dominant concern is to secure re-election. Then, if the politician's effort allocation were transparent, the

¹⁰Fox and Stephenson (2011) identify a similar effect. They present a model in which judicial review, by insulating politicians from their policy choices, can increase electoral induced distortions.

¹¹An alternative form of non-transparency, observing w^A and w^B but not p^A and p^B would be uninteresting. Conditional on observing the effort allocation, the policy outcomes are purely random, and so voters would not update based on them.

result would be a posturing equilibrium in which both types focus effort on issue B . We focus on the class of Perfect Bayesian Equilibria in which the type 1 politician's action is the same as in the transparency model.

The effect of transparency depends critically on W . When the effort allocation is transparent, if the voters observe any effort allocation other than that chosen by type 1, they know with certainty that the politician deviated, and so is type -1 . With non-transparency a deviation (may) not be observed with certainty. Consequently, parameter values that admit a posturing equilibrium with transparent effort will not necessarily generate the same behavior when effort choices are non-transparent. When $W < 1$ we have the following result.

Proposition 3. *Transparency Can Increase Effort and First Period Welfare*

There cannot exist a posturing equilibrium when $W < 1$. When ϕ is sufficiently large there exists a unique pure strategy equilibrium in which the type 1 politician chooses $w^B = W$. In this equilibrium the type -1 politician chooses $w^A = 0$ and $w^B \in (0, W)$.

When effort is non-transparent and $W < 1$ there cannot be a posturing equilibrium. If both types chose the same effort allocation then, regardless of the realized outcome $p^B \in \{0, 1\}$, voters would not update about the politician. Because the type -1 politician strictly prefers $p^B = 0$ to $p^B = 1$ from a policy perspective, but the re-election probability would be the same, she would have an incentive to deviate and choose $w^A = w^B = 0$ rather than $w^B = W$. So we can rule out a posturing equilibrium. Further, the type -1 politician cannot choose $w^A > 0$ or $w^B < 0$ in equilibrium. This is because, if the type 1 politician chooses $w^B = W$, $p^A = 1$ and $p^B = -1$ never occur if the politician is type 1 and so would reveal the politician as type -1 with certainty. As the politician would not be willing to reveal this when re-election concerns are paramount, the equilibrium must involve the type -1 politician choosing $w^A = 0$ and $w^B \in (0, W)$; w^B is uniquely determined so that the re-election probabilities after $p^B = 0$ and $p^B = 1$ make a type -1 politician indifferent between those outcomes.

Proposition 3 characterizes the unique pure-strategy equilibrium in which type 1 politicians focus on B when $W < 1$ and the re-election motive is strong. In essence, the type -1 politician cannot work towards a different goal than the type 1 politician without revealing her type; however, because she is personally opposed the policy change she doesn't work as hard. The lack of transparency then creates further welfare losses in the first period. Not only will no politician

exert effort on A but type -1 politicians exert less than full effort pursuing $p^B = 1$, the majority preferred policy on the divisive issue.

As such, transparency over the effort allocation is beneficial for first period welfare when $W < 1$. However, this transparency impedes the selection of type 1 politicians since we have a pooling equilibrium when effort is transparent but, when effort is non-transparent, the voters update based on the policy outcome, p^B . That transparency can involve tradeoffs between the incentives in the current period and selection for the future is well known, but the typical tradeoff is that transparency can be bad for incentives but good for sorting. Here we find the opposite.

While transparency has ambiguous effects on welfare when W is low, a sharper and unambiguous result holds when $W > 1$. To support a posturing equilibrium with transparency, we need only check that the politician does not have an incentive to deviate to her most preferred effort allocation and reveal herself to be type -1 with certainty. Hence we can support a posturing equilibrium if and only if the policy gain from this deviation is not enough to justify the corresponding decrease in her re-election probability. When the effort allocation is non-transparent, the type -1 politician still has this deviation available, but she has other potential deviations as well. In particular, she could deviate to choose $w^A = 1$ and $w^B = W - 1$, and voters will only realize she deviated if $p^B \neq 1$. Greater office motivation is necessary to prevent this deviation than a deviation to her most preferred effort allocation. As the type -1 politician reduces her effort on B from $w^B = 1$ she will initially transfer this effort on her main policy goal: securing $p^A = 1$. Once she has ensured this with certainty, however, by setting $w^A = 1$, further decreases in w^B give less policy benefit but the same re-election cost. So it is more difficult to support a posturing equilibrium with non-transparency. We get the following proposition.

Proposition 4. *Transparency Can Increase Posturing*

When $W > 1$ and effort is non-transparent:

- (1) *The minimum office motivation necessary for a posturing equilibrium to exist is strictly higher than $\phi^*(\sigma, \eta, W)$.*
- (2) *There exists an open interval of ϕ greater than $\phi^*(\sigma, \eta, W)$ such that an equilibrium exists in which the type 1 politician chooses $w^B = 1, w^A = W - 1$ and type -1 randomizes between $w^A = 1, w^B = W - 1$ and $w^B = 1, w^A = W - 1$.*

When ϕ is sufficiently large the benefits from holding office are great enough that no politician would want to risk $p^B = 0$ and likely electoral defeat. Hence, regardless of the transparency

regime, politicians pool with maximal effort on issue B and voters cannot update about them. In contrast, for intermediate office motivation, the welfare implications of non-transparency are unambiguous for the majority in both periods. Type -1 politicians place more effort on A , which gives a higher payoff to everyone in the first period. Further, because $p^A = 1$ is more likely, and $p^B = 1$ is less likely, when the politician is type -1 , voters learn about the politician's type. Hence, non-transparency over actions is beneficial in this range, both in terms of the first period action, and in terms of selecting a politician aligned with the majority in the future.¹² As non-transparency decreases the reputational benefit from posturing, this breaks the posturing equilibrium, leading to more efficient politician effort choices and more voter learning.

So we have shown that, when $W > 1$, making effort allocations transparent can increase posturing by elected officials *and* decrease the amount voters can learn from this behavior. For example, it is likely that the advent of cable news caused politicians to focus more time on trivialities and polarizing debates; similarly, we may worry that if cabinet meetings were televised, or the minutes were publicly released, concern about signaling popular preferences would distract members from working to advance the most important goals.¹³ While our model considers only one dimension of policymaking, and only one of many ways transparency can affect the policymaking process, our results speak to this concern, while also demonstrating that voters may actually learn less when these debates are more transparent.

4. EXTENSION: POSTURING AND POLARIZATION

So far we have considered only the decision of a single incumbent, and found that both types posture by focusing effort on the majority position on the divisive issue. Of course, different politicians are accountable to different constituencies, with Republicans typically elected in conservative districts and Democrats elected in liberal ones. As the majority position on divisive issues varies across districts, politicians in different districts have an incentive to signal that they are on different sides of the divisive issue. We consider this possibility now. While elections across multiple districts can interact in subtle and interesting ways analyzed elsewhere (e.g.,

¹²Prat (2005) also finds that transparency can be harmful both in terms of the first period action and selection but for a very different reason. Prat (2005) finds that increased transparency can increase the risk of "conformism" whereby the politician would be unwilling to take an action that goes against the voters' prior.

¹³Kaiser's (2013) account of the passage of the Dodd-Frank act bears this out. He argues that televising the debate made it very difficult to focus on the important parts of banking regulation.

Krasa and Polborn 2015, Mattozzi and Snowberg 2015) we abstract from these interactions to keep the analysis as simple as possible.

We interpret type $x_j = -1$ as the Democrat position and $x_j = 1$ as the Republican position. There are Republican districts and Democrat districts. In Republican districts the fraction of voters and incumbents of type $x_j = 1$, m_1 and m^P respectively, are greater than $1/2$, whereas in the Democratic districts both are less than $1/2$. All citizens in all districts agree on the common-values issue and the majority position in a district is reversed before the next election with probability $\eta \in [0, 1/2)$. The following result is immediate from [Proposition 1](#) and [Proposition 2](#).¹⁴

Proposition 5. *Posturing with Heterogeneous Districts*

Under transparency when $\phi \geq \phi^(\sigma, \eta, W)$, an incumbent of either type in a Republican district chooses $w^B = \min\{W, 1\}$ and $w^A = W - w^B$, and an incumbent of either type in a Democrat district chooses $w^B = -\min\{W, 1\}$ and $w^A = W + w^B$, in the first period. Furthermore $\phi^*(\sigma, \eta, W)$ is decreasing in η .*

[Proposition 5](#) then predicts that when incumbents represent different constituencies, with different views on the divisive issue, Republicans and Democrats will focus on pushing the policies on contentious issues in opposite directions. While many concerns have been expressed about the polarization of American politics (e.g., Fiorina et al. 2006, McCarty et al. 2006), our results suggest that one concern may be that it distracts politicians from common-values issues. If different politicians are posturing to different constituencies, Republicans and Democrats will focus their attention on pursuing diametrically opposed goals on the issues on which voters disagree, ignoring important common-values issues in the process. It is the focus on diametrically opposed goals for Republicans and Democrats that we test empirically in the next section.

5. EMPIRICAL EVIDENCE OF POLITICAL POSTURING

This section reports an empirical investigation of political posturing motivated by the theoretical results described in the previous sections. Our approach is to construct a measure of political posturing among U.S. Congress Members by analyzing the divisiveness of their floor speech.

Applying the model to Congress, we view each legislator as deciding to divide speaking time (W) between common-values issues (w^A) and divisive issues (w^B). Congressional floor speech

¹⁴For simplicity we state [Proposition 5](#) with transparent effort. When effort is non-transparent a similar result obtains, but the statement of incumbent behavior is more complicated when $W < 1$.

can be understood as effort to introduce legislation or influence the outcome of a vote, and such effort may or may not be successful. Our outcome variable for the empirical analysis is w^B/W , the fraction of divisive speech.¹⁵

We explore two questions derived from our theoretical framework. First, do stronger electoral concerns induce greater political posturing by incumbents? Second, do incumbents engage in more posturing when their actions are more transparent?

On the first question, our theory provides a clear testable hypothesis: We expect greater posturing when electoral concerns are stronger. [Proposition 5](#) suggests that in response to a more imminent election (i.e., η is lower), legislators in Republican states will focus on pushing the policy on the divisive issue in one direction, and legislators in Democratic states will focus on pushing it in the other direction. Our empirical approach is to use the staggered election cycle in the U.S. Senate as exogenous variation and measure the within-Senator change in divisiveness as the next election becomes more imminent.

On the second question, [Proposition 4](#) suggests that increased transparency will be associated with more divisive speech—although this prediction does depend on parameter values (moderately high office motivation and high W). In the empirical analysis, we examine the effect of transparency in the House of Representatives, exploiting variation in the overlap between Congressional districts and local media markets to generate an index of transparency. We then test whether House members engage in more divisive speech when the media coverage is stronger. If transparency is associated with greater divisiveness that would be consistent with our posturing model when office motivation and W are high.

5.1. Measuring Divisiveness. Our measure of political effort allocation is constructed from the material in the *Congressional Record* attributed to each legislator for the years 1973 through 2012. We designed the speech segmenting algorithm to include only floor speech (rather than other written materials read into the *Record*, for example bill text and the material in the Extensions of Remarks). We do this because we want our measure to reflect effort exerted by the member. We also drop the Speaker of the House, the Presiding Officer in the Senate, and non-voting members.¹⁶

¹⁵While our theoretical analysis focuses on the incentives to focus on divisive issues that are relatively unimportant, all else equal, an increased focus on low-importance divisive issues would also increase total divisive speech.

¹⁶The *Record* does not include the speech from committee hearings, so committee assignment should not be a significant source of omitted variable bias. Any effects on speech due to party influence should be uncorrelated with our treatment variables (the election schedule and the transparency measure).

Given that the theoretical model concerns policy actions (rather than speech), the link between the theory and empirics depends on the assumption that floor speech matters for policy. This is a matter of debate, with some scholars (e.g., Cohen 1999, Jacobs and Shapiro 2000) arguing that rhetoric is often unrelated to policy, and others (e.g., Maltzman and Siegelman 1996, Quinn et al. 2010) arguing that it correlates well with policymaking. Compared to other venues for political speech (e.g. press releases, campaign events), the Congressional floor is likely where speech and policy are most closely related. To the extent that legislators are defending their own votes, and persuading their colleagues to vote with them, floor speech measures the effort allocated across different votes and issues. Moreover, legislators use floor speeches to introduce legislation, as well as to explain and justify bills they introduced or co-sponsored. So, if speech tracks policy priorities (at least somewhat), then the divisiveness of speech proxies for the relative effort exerted across issues of different divisiveness.

The methods for constructing the speech data are described in detail in Appendix C. After selecting 3000 high-information phrases, we score each phrase k by session t on a metric $Divisiveness_{kt}$ based on Gentzkow and Shapiro (2010) and Jensen et al. (2012). This metric scores language as divisive if it is used more often by just one of the political parties, meaning that this language can serve as a signal of partisan policy emphasis. This method can be contrasted with the more traditional approach in political science that uses manual content analysis by human coders to measure policy (e.g., Lowe et al. 2011). While there are tradeoffs, our approach has the advantage of not requiring a number of subjective decisions about how different policies are coded.

To demonstrate the usefulness of the method, we report in Table 1 the most and least divisive phrases, where scores are averaged across sessions using the pooled data set. The divisive phrases are divided between those associated with Republicans and those associated with Democrats. The selected phrases follow our intuitions about the conservative and liberal policy focuses of each party. Take abortion-related phrases: For Republicans, we see ‘embryonic stem cell’ and ‘partial birth abortion;’ for Democrats, we see ‘late term abortion’ and ‘woman’s right (to) choose.’ We see a similar intuitive trend for taxes: the Republican list includes ‘capital gains tax,’ ‘largest tax increase,’ and ‘marriage tax penalty;’ the Democrat list includes ‘give tax break,’ ‘tax breaks (for the) wealthy,’ and ‘tax cuts (for the) wealthiest.’ In the list of least divisive language, meanwhile, we see innocuous phrases and references to common-values policies such as ‘federal highway administration,’ ‘homeland security appropriation,’ and ‘law enforcement

TABLE 1
Most and Least Divisive Phrases, 1973-2012

<u>Divisive Phrases Associated with Republicans</u>		
adult stem cell	health saving account	personal income tax
balanced budget constitution	income tax rate	right bear arm
billion barrel oil	iraq study group	small business owner
capital gain tax	largest tax increase	special interest group
center medicare medicaid	marginal tax rate	stand adjournment previous
embryonic stem cell	marriage tax penalty	stood trillion hundred
federal debt stood	medical saving account	tax increase history
federation independent business	national drug control	trade promotion authority
free enterprise system	national federation independent	trillion cubic foot
global war terror	oil natural gas	wage price control
gross national product	partial birth abortion	windfall profit tax
<u>Divisive Phrases Associated with Democrats</u>		
allocation current level	cut social security	prescription drug cost
billion trade deficit	distinguished republican leader	prescription drug plan
boehlert boehner bonilla	education health care	resolve committee union
child health insurance	give tax break	tax break wealthy
civil right movement	johnson sam jones	tax cut wealthiest
civil service discharged	late term abortion	tax cut wealthy
committee interior insular	managed care plan	test ban treaty
comprehensive test ban	martin luther king	trade deficit billion
conduct hearing entitled	minimum wage worker	veteran health care
cost prescription drug	nuclear arm race	victim domestic violence
credit card company	oversight government reform	woman right choose
<u>Least Divisive Phrases</u>		
banking finance urban	forward continuing work	merchant marine fishery
chemical weapon convention	great deal money	passed signed law
civil service commission	hard work dedication	played important role
committee held hearing	homeland security appropriation	played key role
committee worked hard	important step forward	protect national security
dedicated public servant	improve health care	public private partnership
defense appropriation subcommittee	international financial institution	public private sector
democracy human right	law enforcement assistance	renewable energy source
federal highway administration	law enforcement community	research development administration
finance urban affair	made great stride	theater missile defense
fiscal budget request	major step forward	worked long hard

List of 33 most divisive Republican trigrams, most divisive Democrat trigrams, and least divisive trigrams, as scored by Pearson's Chi-squared metric (Gentzkow and Shapiro, 2010), using the average score pooled across the years in the sample. This ranking uses speech from both the senate and house.

community.’ These intuitive phrase rankings are encouraging for the use of this metric as a measure of divisiveness. The full list of phrases is available from the authors upon request.

We then construct the speech divisiveness for legislator j during session t as the log of the frequency-weighted divisiveness of the phrases used by the legislator during session t . That measure is given by

$$(1) \quad Y_{jt} = \log \left(\frac{1}{N_{jt}} \sum_k \text{Frequency}_{jkt} \cdot \text{Divisiveness}_{kt} \right)$$

where Frequency_{jkt} is the normalized frequency of phrase k for legislator j during session t , and N_{jt} is the total number of phrases used by j at t (from the set of 3000 selected for the analysis).¹⁷ We use the log of the measure so that results can be interpreted as proportional changes in divisiveness due to the treatments. Using levels rather than logs does not change the sign of the estimates, though the degree of statistical significance changes under some specifications.

Table 2 reports summary statistics on congressional speech. Because there are fewer of them, Senators speak a lot more than House members. The small minimum frequency numbers are due to the relatively small included vocabulary of 3000 phrases; this may be concerning, but our results are not affected by dropping the observations with the lowest frequencies. The Speech Divisiveness rows give the measures constructed for Senate speech and House speech, respectively. The negative numbers reflect that the measures are in logs—a divisiveness measure smaller in absolute value means higher divisiveness. Perhaps expectedly, House members have a higher average divisiveness than Senators. The Minimum and Maximum columns show some outliers—dropping these outliers does not affect the results.

5.2. Effect of Electoral Incentives on Posturing. Our sample of politicians for the election analysis is the set of 331 Senators working for the years 1973 through 2012 (the 93rd through 112th congressional sessions). To identify the effect of stronger electoral incentives, we exploit the staggering of elections. Senators face re-election every six years, with one third of the Senators up for re-election in any given election cycle. This gives variation in the time to re-election,

¹⁷The divisiveness index can be computed from the language of either the Senate or the House. In the empirical analysis, we use a legislator’s own chamber as the text source for computing divisiveness, even though a member’s own speech influences the divisiveness measure for their own chamber. The results are nearly identical, however, when using the divisiveness metric computed from speech in the *other* chamber which cannot be affected by the member’s own speech.

TABLE 2
Speech Statistics

	<u>Summary Statistics</u>			
	Mean	Std. Dev.	Minimum	Maximum
<u><i>Senators</i></u>				
Phrases Used	985.922	440.47	1	2306
Summed Frequency	3902.801	3306.333	1	26435
Speech Divisiveness	-12.0835	0.777	-17.527	-9.844
<u><i>House Members</i></u>				
Phrases Used	336.73	225.99	1	1475
Summed Frequency	840.68	960.99	2	11974
Speech Divisiveness	-10.509	0.657	-14.699	-8.536

Observation is a congressman-session. Phrases Used refers to the number of phrases (out of the 3000-phrases vocabulary) used in a session. Summed Frequency refers to the total number of times a phrase in the vocabulary is used in a session. Speech Divisiveness refers to the (log) measure of divisiveness constructed from speech, as described in Appendix C.

with stronger electoral pressures when the next election is more imminent. Previous papers demonstrating that the staggered election cycle can affect Senator behavior include Kuklinski (1978), Elling (1982), Thomas (1985), Quinn et al. (2010), and Conconi et al. (2014).

Building on the approach in these papers, we use fixed effects for each Senator j and see how the behavior of a Senator varies according to her electoral cohort. If cohort status is as good as randomly assigned (conditional on the fixed effects), we obtain consistent estimates of the effect of time to election on the outcome variables of interest. In our regression, we represent the election treatment by the variable E_{jt} for electoral cohort, which equals one for the first cohort, two for the second cohort, and three for the third cohort (that is, currently up for election).

This specification provides a simple linear model of the strength of electoral incentives and is motivated by the upward trend in divisiveness over the election cycle illustrated in Figure 1.

In our Senate elections regressions, we model divisiveness Y_{jt} (defined in Equation 1) for Senator j during session t as

$$(2) \quad Y_{jt} = \alpha_{jt} + \rho_E E_{jt} + X'_{jt}\beta + \varepsilon_{jt}$$

where α_{jt} includes a set of fixed effects and X_{jt} includes controls for years of experience. These terms are discussed in greater detail along with the reported estimates.

Since the outcome variable Y_{jt} is a log measure, the estimate $\hat{\rho}_E$ can be interpreted as the average percent increase in Senator speech divisiveness from moving into the next election cohort (closer to the next scheduled election). If $\hat{\rho}_E = 0$, then electoral incentives do not affect the tendency to use divisive phrases. If $\hat{\rho}_E < 0$ then electoral incentives mitigate divisive rhetoric. If $\hat{\rho}_E > 0$, electoral incentives increase the tendency of Senators to use divisive language.

The error term ε_{jt} includes omitted variables and randomness. Our identifying assumption is that, conditional on the inclusion of fixed effects, ε_{jt} is uncorrelated with the election schedule for the Senate. In our regressions we cluster the error term by state, allowing for arbitrary serial correlation across a state's Senators and over time. The results for estimating Equation 2, the effect of election cohort on divisiveness, are reported in Table 3. We discuss each column in turn.

Column 1 includes party-year fixed effects. This specification allows for arbitrary variation over time in the outcome variable for both Democrats and Republicans, but implicitly compares divisiveness across Senators within years. In this specification, the effect of elections on divisiveness is positive and statistically significant.

Column 2 includes state-year fixed effects. This specification allows for arbitrary variation in the outcome variable over time in each state. This estimate is identified only from differences in divisiveness between the two Senators from the same state, based on which one is closer to re-election. Again, the estimate for $\hat{\rho}_E$ is positive and significant.

Column 3 adds Senator fixed effects rather than state-year fixed effects. This specification allows for variation over time in the whole Senate's divisiveness, as well as Senator-level differences in divisiveness. Again, the estimated effect is significantly positive. The estimate coefficients don't change much across these fixed-effects specifications, supporting the assumption of exogenous assignment to election cohort.

TABLE 3
Election Effects on Senator Speech Divisiveness

	(1)	(2)	(3)	(4)
Election Cohort	0.0906** (0.0148) [0.001]	0.0715** (0.0228) [0.003]	0.0658** (0.0156) [0.001]	0.0556** (0.0158) [0.001]
adj. R-sq.	0.182	0.121	0.459	0.464
Party-Year FE's	X	X	X	X
State-Year FE's		X		
Senator FE's			X	X
Experience Controls				X

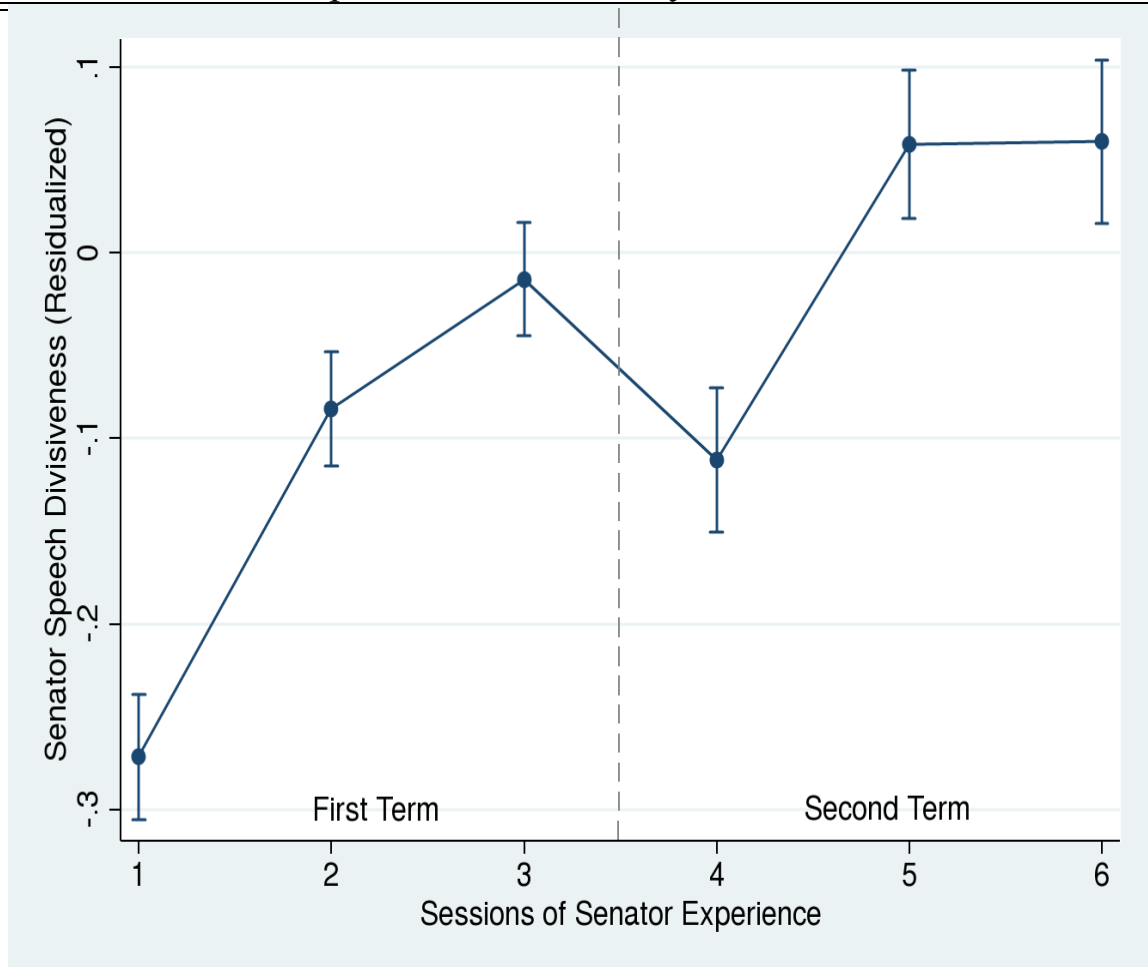
Standard errors (clustered by state) in parentheses, p-values in brackets. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. The sample includes 331 senators, 20 sessions, and 1,985 senator-sessions. Election Cohort equals 1, 2, or 3 depending on senator cohort status. Party-Year FE's include party-year interaction fixed effects. State-Year FE's include state-year interaction fixed effects. Senator FE's include fixed effects for each senator. Experience controls include a cubic in years of experience.

Finally, Column 4 adds X_{jt} , a cubic polynomial in years of experience. This covariate should control for life-cycle trends in divisiveness that may be mechanically correlated with the election cohort. The estimate for $\hat{\rho}_E$ remains positive and statistically significant at the 1% level ($p = .001$); we can reject the null hypothesis that $\rho_E = 0$ in favor of the alternative that $\rho_E > 0$. A coefficient of 0.0556 implies that speech divisiveness increases by 5.56% on average (about one-sixteenth of a standard deviation) as a Senator moves to a cohort nearer to the next election.¹⁸

To demonstrate this graphically, Figure 1 plots the average speech divisiveness for Senators in the first 12 years (the first six sessions) of their career, residualized with Senator fixed effects. For both the first and second terms of office, there is a clear increase in divisiveness as the

¹⁸We ran a separate specifications using the closeness of the Senator's previous election, and separately, the closeness of the presidential election in the state as a measure of electoral closeness. The closeness of a Senator's own election did not have an impact on the estimates. In close presidential election years (less than 5% win), there is a stronger electoral effect on divisiveness, but the increase is not statistically significant ($p = .164$).

Figure 1
 Senator Speech Divisiveness by Election Cohort



This figure plots average senator speech divisiveness over the course of the first two terms (six sessions, 12 years) of a senator's career. The values plotted are the mean residuals from a regression of senator speech divisiveness on a senator fixed effect, grouped by the first 6 sessions. Includes only senators that began their career in the first cohort (excluding senators appointed or elected to finish out an existing term). Error spikes indicate standard errors.

next election becomes more imminent. Moreover, there is a drop in divisiveness from the third to fourth session, reflecting that divisiveness decreases after securing re-election. The same trend holds for later years in the Senators' careers as well. Along with the regression estimates,

this graphical evidence supports the theory of electorally induced posturing: greater electoral pressures induce a greater focus on divisive issues.

This result adds to the previous literature finding that roll call votes tend to be more moderate for election-cohort Senators (e.g., Thomas 1985). As previously discussed, our model shows that elections can induce both more moderate voting (i.e., politicians more likely to support the majority position) on each given issue but at the same time generate a greater emphasis on divisive issues. Our approach allows us to capture these additional nuances in how electoral pressures influence politician behavior.

5.3. Effect of Transparency on Posturing. Our sample of politicians for the transparency analysis is the population of U.S. House Members working for the years 1991 through 2002 (the 102nd through 107th congressional sessions). To identify changes in transparency we use the measure of newspaper coverage constructed by Snyder and Stromberg (2010), which exploits the arbitrary overlap between congressional districts and newspaper distribution markets. In particular, our empirical definition of transparency is the natural log of Snyder and Stromberg’s (2010) “congruence” measure, defined as the weighted average overlap between newspaper markets and congressional districts:

$$(3) \quad T_{jt} = \log \left(\sum_m MarketShare_{jtm} \cdot ReaderShare_{jtm} \right)$$

where $MarketShare_{jtm}$ is the share of the local news market filled by newspaper m , and $ReaderShare_{jtm}$ is the share of newspaper m ’s readers living in district j . Snyder and Stromberg demonstrate that higher newspaper coverage due to higher market-district overlap is associated with more articles and higher voter knowledge about their representative, as well as higher legislator effort on some measures. We use logs so that the coefficients may be interpreted as elasticities, but using the level of the measure generates similar results.

For the House of Representatives, we model speech divisiveness Y_{jt} (defined in Equation 1) as

$$(4) \quad Y_{jt} = \alpha_{jt} + \rho_T T_{jt} + X'_{jt} \beta + \varepsilon_{jt}$$

where α_{jt} , X_{jt} , and ε_{jt} respectively represent fixed effects, controls, and the error term (as in the previous subsection). The identifying assumption is that, conditional on inclusion of fixed effects and controls, ε_{jt} is uncorrelated with the transparency measure. Standard errors are clustered by congressional district, allowing for arbitrary serial correlation within district over time.

TABLE 4
Effect of Transparency on House Speech Divisiveness

	Effect on Speech Divisiveness					
	(1)	(2)	(3)	(4)	(5)	(6)
Transparency Effect	0.0269 (0.0171) [0.122]	0.0243 (0.0174) [0.170]	0.0309+ (0.0171) [0.076]	0.0645* (0.0278) [0.025]	0.0724* (0.0359) [0.049]	0.0580+ (0.0301) [0.059]
adj. R-sq.	0.096	0.104	0.108	0.419	0.439	0.421
Party-Year FE's	X	X	X	X	X	X
District Vote Controls		X	X	X	X	X
State-Year FE's			X		X	
Member FE's				X	X	X
Experience Controls					X	
Only 1991-2000						X

Standard errors (clustered by state) in parentheses, p-values in brackets. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. The sample includes 649 House members, 6 sessions, and 2,009 member-sessions. Transparency refers to the transparency measure constructed by Snyder and Stromberg (2010), as described in the text. Party-Year FE's include party-year interaction fixed effects. District vote controls include lagged cubic in presidential vote shares. State-Year FE's include state-year interaction fixed effects. Member FE's include fixed effects for each congress member. Experience controls include a full range of party-specific years-of-experience dummies.

Since both T_{jt} and Y_{jt} are in logs, the estimate $\hat{\rho}_T$ can be interpreted as the average percent change in divisiveness due to a one percent increase in transparency. If $\hat{\rho}_T = 0$, then transparency is unrelated to divisiveness. If $\hat{\rho}_T < 0$, then transparency reduces divisive rhetoric. If $\hat{\rho}_T > 0$, then transparency increases the tendency of House members to use divisive language. The results from regressing the use of divisive phrases on the House transparency measure are reported in Table 4. We discuss each column in turn.

Column 1 includes just party-year fixed effects. As with the Senate analysis, this specification allows for variation in divisive speech over time for both parties. On this specification, the effect of transparency on divisiveness is positive but not statistically significant ($p = .12$).

Column 2 adds controls for district ideology. We include this control because other papers such as Grimmer (2013) find evidence that Representatives emphasize appropriations rather than political positions when they are in competitive districts. Specifically, we use a cubic in the

lagged presidential vote margin for j 's party in j 's congressional district. This does not change the transparency effect.¹⁹

Column 3 adds state-year fixed effects. This specification is not comparable to the Senate regressions, where the effect is identified off differences between the two Senators working in the same state. Here, the state-year fixed effect controls for any time-varying state-level factors that may be correlated with transparency and divisiveness, for example regional media trends and the actions of state-wide politicians. The estimates are similar to Columns 1 and 2, but stronger, making them statistically significant at the 10% level ($p = .076$).

Next, Column 4 includes member fixed effects. This specification identifies the within-member changes in the transparency measure due to changes in newspaper market share. The coefficient is positive, more than double the magnitude of the across-legislator coefficients, and statistically significant at the 5% level. Column 5 adds controls for experience, as done in the Senate analysis. These controls do not change the effect very much, with similar estimates to Column 4.

Finally, Column 6 runs the same specification as Column 4 but limiting to the years 1991 through 2000. Since no redistricting occurs in this period, changes in the transparency measure are due only to changes in media coverage. We do this to make sure the effects are not driven only by redistricting, which could cause many changes beyond the level of transparency. The estimated effect is similar, but not quite statistically significant at the 5% level ($p = 0.058$).

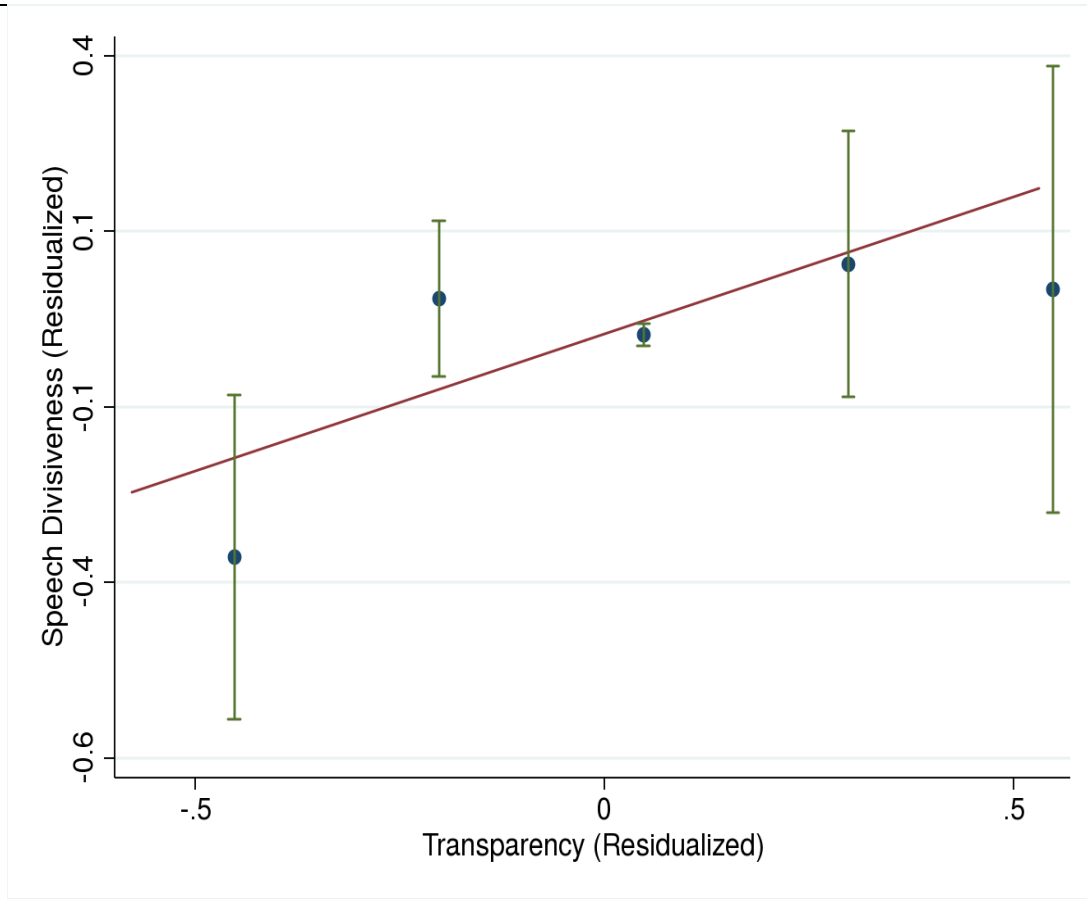
Some graphical evidence of this relationship can be seen in Figure 2. The vertical axis in this figure is the average speech divisiveness, residualized on the fixed effects, and grouped in bins by residualized transparency. The binned means and the fitted line illustrate that increases in transparency across years are associated with increases in the within-member speech divisiveness.

Together, these estimates lend support for the hypothesis that $\rho_T > 0$. A Column 4 coefficient of 0.06 implies that for a 1% increase in transparency, speech divisiveness increases by .06% on average (about one-tenth of a standard deviation). Overall, these results are consistent with the model with $W > 1$, the case in which greater transparency results in more divisiveness.

It is interesting to contrast these transparency results with Snyder and Stromberg's (2010) finding that higher transparency is associated with greater discretionary federal funds to the district and more moderate voting records. Our results suggest that, while improved transparency

¹⁹We also ran a specification controlling for the closeness of the Representative's previous election (less than 5% win). The point estimate is that those elected in close races use more divisive speech, but the difference is not statistically significant. There is no difference in the effect of transparency in close elections.

Figure 2
House Member Speech Divisiveness by Transparency Level



This figure plots House member speech divisiveness against the transparency metric, after residualizing both on a party-year fixed effect, member fixed effect, and vote margin controls. Observations grouped in bins of width .25. Red line gives linear fit. Error spikes indicate 95% confidence intervals.

can have many benefits, including increased legislator effort, these benefits must be balanced against the potential downside of increased political posturing.

6. CONCLUSIONS

We have considered the incentives of politicians to “posture” by focusing their efforts on issues that present the greatest opportunity to signal their preferences to voters, even if they are not the most important issues facing the country. We have shown that this incentive can lead politicians

to spend their time pursuing policies that are not only harmful to the minority, but also an inefficient use of time from the majority's perspective. In addition, we have shown that greater transparency about how politicians allocate their time may increase socially inefficient posturing, while at the same time impeding the selection of congruent politicians. Finally we have produced empirical evidence from the U.S. Congress that incumbent politicians engage in more divisive speech when electoral pressures are stronger or when their actions are more likely to be observed.

While we have focused on only one component of the policymaking process, our analysis raises important issues for the design of political institutions. Given that our results emphasize the difficulty of incentivizing electorally accountable politicians to focus attention on common-values issues, our findings highlight the potential advantage of delegating common-values tasks to individuals who are politically insulated or whose authority is task specific. This can be accomplished, perhaps, by delegating to city managers that are, at least somewhat, politically insulated and who have clearly defined tasks (e.g., Vlaicu and Whalley 2016) or by leaving such issues in the hands of a competent bureaucracy. The design of such institutions, and a full analysis of the tradeoffs, is an important avenue for future research.

From an empirical perspective, our work raises a number of interesting questions. Motivated by our theory, it would be interesting to see which issues incumbents talk about closer to elections and whether the increased focus on divisive issues is concentrated on issues that are relatively less important. Such an analysis could be completed by classifying the speech according to different issue topics, and using public opinion data to rank the issues by importance. Additionally, it would be interesting to understand the extent to which changes in speech patterns reflect that different policies are being pursued. In future research we hope to explore the implications of our empirical findings for policy and economic outcomes.

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APPENDIX FOR “ELECTIONS AND DIVISIVENESS: THEORY AND EVIDENCE”

ABSTRACT. This Appendix consists of three parts. Appendix A provides the formal definition of criterion D1 which was described informally in the main text. In Appendix B we provide the proofs of our theoretical results. Appendix C provides additional details about the specifications for the Empirical Analysis. For online publication only.

APPENDIX A: CRITERION D1

In Appendix A we give the definition of criterion D1 that is incorporated into our definition of equilibrium in Section 3.2. As our model is not a standard sender-receiver game we must precisely define how criterion D1 is applied to our setting. While Cho and Kreps (1987) define D1 in terms of Sequential Equilibrium, because our game has a continuum of potential actions we analyze it using Perfect Bayesian Equilibrium. For our purposes, the only relevant restriction on off-path beliefs from Sequential Equilibrium is that all voters hold the same beliefs at all information sets, and we restrict attention to equilibria with that property.

In order to facilitate the definition, we first define $u^*(x^B)$ to be the expected utility of a type x^B politician in a given Perfect Bayesian Equilibrium. Further we define $u(w^A, w^B, \mu|x^B)$ to be the expected utility, given the equilibrium strategies of the other players, of a type x^B politician from choosing allocation (w^A, w^B) in period 1 if the belief the voters form about her type from choosing that allocation is μ and her behavior in the second period is unchanged.

Definition 1. *Criterion D1 (Cho and Kreps 1987)*

A Perfect Bayesian Equilibrium satisfies criterion D1 if,

- (1) *at all information sets all voters hold the same beliefs, μ , about the politician's type.*
- (2) *if for some off-path allocation (w^A, w^B) , and $x^B \in \{-1, 1\}$,*

$$\{\mu \in [0, 1] : u(w^A, w^B, \mu | -x^B) \geq u^*(-x^B)\} \subsetneq \{\mu \in [0, 1] : u(w^A, w^B, \mu | x^B) > u^*(x^B)\},$$

then $\mu(x^B|w^A, w^B) = 1$.

In essence, criterion D1 says that if voters observe an out of equilibrium effort level they should believe that effort level was taken by the type of politician who would have an incentive to choose that allocation for the broadest range of beliefs.

APPENDIX B: PROOFS

We begin with the results of section 3.1, proving Lemmas 1 and 2 on second period behavior at the voters' decision.

Proof of Lemma 1. Immediate. $\square$

Proof of Lemma 2. We consider the expected second period payoff to a voter of type $x_i^B = x \in \{-1, 1\}$ from a type x and a type $-x$ incumbent as well as from a random replacement. If the incumbent is type x then the expected policy payoff is

$$(1) \quad u_x^x = \begin{cases} -q[(1-W)\gamma + (1-\gamma)] - (1-q)(1-\gamma)(1-W) & \text{if } W \leq 1, \\ -q(1-\gamma)(2-W) & \text{if } W > 1. \end{cases}$$

Similarly, if the incumbent is type $-x$ the expected policy payoff is

$$(2) \quad u_{-x}^x = \begin{cases} -q[(1-W)\gamma + (1-\gamma)] - (1-q)(1-\gamma)(1+W) & \text{if } W \leq 1, \\ -qW(1-\gamma) - 2(1-q)(1-\gamma) & \text{if } W > 1. \end{cases}$$

So the payoff to a type x voter if the incumbent is type x with probability μ_x and has valence v^j is

$$(3) \quad u^x(\mu_x, v^j) = \mu_x(w^A, w^B)u_x^x + (1 - \mu_x(w^A, w^B))u_{-x}^x + v^j.$$

Combining these equations with the fact that a random replacement is type 1 with probability m^P and has expected valence of 0, the expected payoff from a random replacement is

$$(4) \quad u_r^x = m^P u_1^x + (1 - m^P)u_{-1}^x.$$

Combining (3) and (4), and defining $\mu \equiv \mu_1$, it follows that $u_r^{-1} - u^{-1}(1 - \mu, 0) = u^1(\mu, 0) - u_r^1$.

To calculate retention probabilities, we note that with probability $1 - \eta$ the majority of the voters in next election are type 1, in which case the incumbent is re-elected if and only if $v^j \geq u_r^1 - u^1(\mu, 0)$. Similarly with probability η the majority of the voters are type -1 , and the incumbent is re-elected if and only if $v^j \geq u_r^{-1} - u^{-1}(1 - \mu, 0) = u^1(\mu, 0) - u_r^1$. So the re-election probability is

$$(5) \quad \eta + (1 - 2\eta)Pr(v^j \geq u_r^1 - u^1(\mu, 0)).$$

As $u_1^1 > u_{-1}^1$, $u^1(\mu, 0)$ is strictly increasing in μ , and so the re-election probability is strictly increasing in μ . Further, given that $u^1(m^P, 0) = u_r^1$ and v^j is non-negative with probability $1/2$, the re-election probability if $\mu = m^P$ is $\eta + (1 - 2\eta)1/2 = 1/2$. $\square$

Having established that the probability of retention is increasing in μ we now define the probability of re-election when voters are sure of the incumbent's type as follows:

$$(6) \quad X(\sigma, \eta, W) \equiv \Pr(\text{re-elect} | \mu = 1),$$

$$(7) \quad Y(\sigma, \eta, W) \equiv \Pr(\text{re-elect} | \mu = 0).$$

By Lemma 2 it follows that $Y(\sigma, \eta, W) < 1/2 < X(\sigma, \eta, W)$.

We now turn to first period behavior. We begin by characterizing the unique equilibrium—where equilibrium requires off-path beliefs to be consistent with D1, and the uniqueness is up to the beliefs at off-path information sets—in the game with transparent effort. We then proceed to consider the non-transparency case.

Proof of Results with Transparent Effort. We now turn to proving Proposition 1 in the main text. This consists of characterizing first period behavior and proving that there is a unique equilibrium. To prove Proposition 1 we prove the following stronger result.

Proposition (Proposition A1). *There exists $\hat{\phi}(W) \geq 0$ such that, when $\phi > \hat{\phi}(W)$, there is a unique equilibrium up to the beliefs at off-path information sets. Assume $\phi > \hat{\phi}(W)$. Then there exist $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ such that in the first period,*

- (1) *if $\phi \in (\hat{\phi}(W), \bar{\phi}(\sigma, \eta, W)]$, type 1 politicians choose $w^B > 0$ and $w^A = W - w^B$ and the type -1 politicians choose $w^A = \min\{W, 1\}$, $w^B = -(W - w^A)$.*
- (2) *if $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$, type 1 politicians choose $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and the type -1 politician randomizes between $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and $w^A = \min\{W, 1\}$, $w^B = -(W - w^A)$.*
- (3) *if $\phi \geq \phi^*(\sigma, \eta, W)$ all politicians choose $w^B = \min\{W, 1\}$ and $w^A = W - w^B$.*

Moreover, there exists $\bar{W} \in (1, 2]$ such that $\hat{\phi}(W) < \bar{\phi}(\sigma, \eta, W) < \phi^(\sigma, \eta, W)$ for all $W \in (0, \bar{W})$. Finally, there exists $\bar{\gamma} > 1/2$ such that $\bar{W} = 2$ when $\gamma < \bar{\gamma}$.*

Proposition A1 implies Proposition 1 and also includes additional details referenced in Footnote 8 of the main text. We now proceed to prove Proposition A1, which also proves Proposition 1. As this is somewhat involved we break the argument into several pieces, and begin with some supporting lemmas. The first lemma shows that in any equilibrium type 1 politicians must always

choose $w^A + w^B = W$. This will allow us to rule out equilibria in which type 1 politicians have surplus effort they do not use.

Lemma 3. *In any equilibrium $w^A + w^B = W$ for any allocation (w^A, w^B) chosen by type 1 on the equilibrium path in period 1.*

Proof. Suppose there exists an allocation (w_*^A, w_*^B) with $w_*^A + w_*^B < W$ chosen on the equilibrium path by type 1 in period 1 in an equilibrium. Let $\pi^* \in [Y(\sigma, \eta, W), X(\sigma, \eta, W)]$ be the probability with which the politician is re-elected after choosing (w_*^A, w_*^B) . Now define $u^x(w^A, w^B, \pi)$ to be the utilities to the politicians of each type, $x \in \{-1, 1\}$, from implementing a given policy (w^A, w^B) if the probability of re-election after choosing policy (w^A, w^B) is π . There are two cases to consider: (a) $u^{-1}(w_*^A, w_*^B, \pi^*)$ less than the equilibrium payoff for type -1 ; (b) $u^{-1}(w_*^A, w_*^B, \pi^*)$ equal to the equilibrium payoff for type -1 . We now show that it not possible to have an equilibrium with either (a) or (b).

Consider case (a). For type -1 to be optimizing, (w_*^A, w_*^B) can only be chosen by type 1, and hence $\pi^* = X(\sigma, \eta, W)$. Moreover, by continuity, there exists (w', w'') such that $w' \geq w_*^A$ and $w'' \geq w_*^B$, with at least one of the inequalities strict, such that $u^{-1}(w', w'', \pi^*)$ is strictly less than the equilibrium payoff of type -1 . As such, type -1 would not choose (w', w'') even if it induced re-election with probability $\pi^* = X(\sigma, \eta, W)$. However, since the first period payoff for type 1 is higher by choosing (w', w'') than (w_*^A, w_*^B) , type 1 would have a strict incentive to choose (w', w'') over (w_*^A, w_*^B) if the re-election probability was π^* . As the set of beliefs for which type -1 would have an incentive to choose (w', w'') are then a proper subset of the beliefs for which type 1 would, criterion D1 requires that voters believe the incumbent is type 1 with certainty after observing (w', w'') . This leads to re-election probability $X(\sigma, \eta, W)$, giving type 1 a strict incentive to not choose (w_*^A, w_*^B) . Hence, there cannot exist an equilibrium of the specified form satisfying (a).

Now consider case (b), and let (w', w'') be such that $w' \geq w_*^A$ and $w'' \geq w_*^B$, and at least one of the inequalities strict. Define

$$\pi_1 = \inf\{\pi' : u^1(w', w'', \pi') > u^1(w_*^A, w_*^B, \pi^*)\}$$

and

$$\pi_{-1} = \min\{\pi' : u^{-1}(w', w'', \pi') \geq u^{-1}(w_*^A, w_*^B, \pi^*)\}$$

Then π_1 defines the probability of re-election for which type 1 would have a strict incentive to choose (w', w'') if $\pi > \pi_1$. Similarly π_{-1} defines the minimum probability of re-election for which type -1 would have a weak incentive to choose (w', w'') .

We now show that $\pi_1 < \min\{\pi_{-1}, X(\sigma, \eta, W)\}$. First, note that the benefit of securing re-election is

$$B_1(W) = \begin{cases} \phi + 2(1 - \gamma)(1 - m^P)(1 - q)W & \text{if } W \leq 1, \\ \phi + 2(1 - \gamma)(1 - m^P)(1 + q(W - 2)) & \text{if } W > 1, \end{cases}$$

to type 1 and

$$B_{-1}(W) = \begin{cases} \phi + 2(1 - \gamma)m^P(1 - q)W & \text{if } W \leq 1, \\ \phi + 2(1 - \gamma)m^P(1 + q(W - 2)) & \text{if } W > 1, \end{cases}$$

to type -1 . Hence, $u^1(w', w'', \pi') > u^1(w_*^A, w_*^B, \pi^*)$ if and only if

$$\gamma(w' - w_*^A) + (1 - \gamma)(w'' - w_*^B) > \delta(\pi^* - \pi')B_1(W),$$

Conversely, $u^{-1}(w', w'', \pi') > u^{-1}(w_*^A, w_*^B, \pi^*)$ if and only if

$$\gamma(w' - w_*^A) + (1 - \gamma)(w_*^B - w'') > \delta(\pi^* - \pi')B_{-1}(W).$$

Now since $w' \geq w_*^A$, $w'' \geq w_*^B$, with at least one inequality strict, we can see immediately that $\gamma(w' - w_*^A) + (1 - \gamma)(w'' - w_*^B) > 0$, and so $\pi_1 < \pi^* \leq X(\sigma, \eta, W)$. Similarly, because

$$\gamma(w' - w_*^A) + (1 - \gamma)(w'' - w_*^B) \geq \gamma(w' - w_*^A) + (1 - \gamma)(w_*^B - w''),$$

and, as $m^P > 1/2$,

$$B_1(W) < B_{-1}(W),$$

we have that $\pi_1 < \pi_{-1}$. So we can conclude that $\pi_1 < \min\{\pi_{-1}, X(\sigma, \eta, W)\}$.

We conclude by showing that, since $\pi_1 < \min\{\pi_{-1}, X(\sigma, \eta, W)\}$, we cannot have an equilibrium in which type 1 ever chooses (w_*^A, w_*^B) . To see this, note that (w', w'') cannot be on path: As $\pi_1 < \min\{\pi_{-1}, X(\sigma, \eta, W)\}$, if type 1 ever chooses (w_*^A, w_*^B) over (w', w'') then type -1 must strictly prefer (w_*^A, w_*^B) over (w', w'') and so type -1 can never choose (w', w'') . As the voters would then assign beliefs that the politician is type 1 with certainty, she would be re-elected with probability $X(\sigma, \eta, W)$, and, as $\pi_1 < X(\sigma, \eta, W)$, the politician would have a strict incentive to choose (w', w'') over (w_*^A, w_*^B) . Further, (w', w'') cannot be off the equilibrium path—if it were, by criterion D1 the voters must believe the politician is type 1 with certainty after observing (w', w'') . As the probability of re-election would then be $X(\sigma, \eta, W)$, type 1 would have a strict incentive to deviate to (w', w'') . This shows that we cannot have an equilibrium of the specified form satisfying (b), which completes the proof. $\square$

Next we show that, as choosing B instead of A is less costly for type 1 than type -1 , a deviation to exerting less effort on B is beneficial for a larger set of beliefs for type -1 than type

1. For this we define

$$(8) \quad \hat{\phi}(W) \equiv \begin{cases} \max\{(1-q)(2\gamma m^P - 1)W, 0\} & \text{if } W \leq 1, \\ \max\{(1+q(W-2))(2\gamma m^P - 1), 0\} & \text{if } W > 1. \end{cases}$$

Our next Lemma shows that, if $\phi > \hat{\phi}(W)$, then the set of beliefs for which a type 1 politician is willing increase her effort on issue B is strictly larger than for type -1 . This shows that there cannot be an equilibrium in which both types choose the same two different effort allocations on the equilibrium path. Moreover, as our definition of equilibrium includes criterion D1, it will help pin down off-path beliefs.

Lemma 4. *Consider an allocation w^B and $w^A = W - w^B$, and suppose the probability of being re-elected after that allocation is π . Then, if $\phi > \hat{\phi}(W)$, at any allocation (w', w'') with $w'' < w^B$, one of the following must hold:*

- (1) *both types would prefer (w^A, w^B) to allocation (w', w'') for all beliefs.*
- (2) *both types would prefer (w', w'') to (w^A, w^B) for all beliefs.*
- (3) *the set of beliefs for which a type -1 strictly prefers (w', w'') to (w^A, w^B) is a proper superset of those for which a type 1 weakly prefers (w', w'') to (w^A, w^B) .*

Proof. Consider an allocation w^B and $w^A = W - w^B$ and another allocation w', w'' where $w'' < w^B$, and let $\pi \in [Y(\sigma, \eta, W), X(\sigma, \eta, W)]$ be the probability of being re-elected by implementing $w^B, w^A = W - w^B$. We must show that, the set of beliefs the voters could hold after observing (w', w'') for which type -1 would prefer (w', w'') to (w^A, w^B) is either a proper superset of the beliefs for which type 1 would weakly prefer (w', w'') , or alternatively that, for both types, (w', w'') is preferred for either all beliefs, or for no beliefs, voters could hold. Let π' be the re-election probability induced by the beliefs the voters hold after (w', w'') .

We prove this separately for the case in which $W \leq 1$ and when $W > 1$. Consider first the case in which $W \leq 1$. Then type -1 would have a strict incentive to choose (w', w'') if and only if the re-election probability π' is such that

$$(w' + w^B - W)\gamma + (w^B - w'')(1 - \gamma) > \delta(\pi - \pi')[\phi + 2(1 - \gamma)(1 - q)m^P W],$$

or equivalently

$$\pi' - \pi > \pi_{-1} \equiv \frac{-(w' + w^B - W)\gamma - (w^B - w'')(1 - \gamma)}{\delta[\phi + 2(1 - \gamma)(1 - q)m^P W]}.$$

Now consider type 1. She will have a weak incentive to choose (w', w'') if and only if the re-election probability π' is such that

$$(w' + w^B - W)\gamma - (w^B - w'')(1 - \gamma) \geq \delta(\pi - \pi')[\phi + 2(1 - \gamma)(1 - q)(1 - m^P)W],$$

or equivalently

$$\pi' - \pi \geq \pi_1 \equiv \frac{-(w' + w^B - W)\gamma + (w^B - w'')(1 - \gamma)}{\delta[\phi + 2(1 - \gamma)(1 - q)(1 - m^P)W]}.$$

We now show that $\pi_{-1} < \pi_1$. To see this, note that we can write

$$\pi_{-1} = \frac{(W - w'' - w')\gamma}{\delta[\phi + 2(1 - \gamma)(1 - q)m^PW]} - \frac{w^B - w''}{\delta[\phi + 2(1 - \gamma)(1 - q)m^PW]},$$

and

$$\pi_1 = \frac{(W - w'' - w')\gamma}{\delta[\phi + 2(1 - \gamma)(1 - q)(1 - m^P)W]} - \frac{(w^B - w'')(2\gamma - 1)}{\delta[\phi + 2(1 - \gamma)(1 - q)(1 - m^P)W]}.$$

Next note that, as $m^P > 1/2$ it follows that

$$\frac{W - w'' - w'}{\delta[\phi + 2(1 - \gamma)(1 - q)m^PW]} \leq \frac{W - w'' - w'}{\delta[\phi + 2(1 - \gamma)(1 - q)(1 - m^P)W]}.$$

Hence, given that $w^B > w''$, it is sufficient to show that

$$\frac{1}{\phi + 2(1 - \gamma)(1 - q)m^PW} > \frac{(2\gamma - 1)}{\phi + 2(1 - \gamma)(1 - q)(1 - m^P)W}.$$

Cross multiplying, this holds whenever

$$\phi > \hat{\phi}(W) = (1 - q)(2\gamma m^P - 1)W.$$

As we have now established that $\pi_{-1} < \pi_1$ when $\phi > \hat{\phi}(W)$ we can conclude that either the set of beliefs which give type -1 a strict preference for (w', w'') are a proper subset of those which give the type -1 a weak incentive—or that, for both types, (w', w'') is preferred for either all beliefs, or for no beliefs, that the voters could hold.

Now consider the case in which $W > 1$. Then type -1 would have a strict incentive to choose (w', w'') if and only if the re-election probability π' is such that

$$(w' + w^B - W)\gamma + (w^B - w'')(1 - \gamma) > \delta(\pi - \pi')[\phi + 2(1 - \gamma)m^P(1 + q(W - 2))],$$

or equivalently

$$\pi' - \pi > \pi_{-1} \equiv \frac{-(w' + w^B - W)\gamma - (w^B - w'')(1 - \gamma)}{\delta[\phi + 2(1 - \gamma)m^P(1 + q(W - 2))]}.$$

Now consider type 1. She will have a weak incentive to prefer (w', w'') if and only if the re-election probability π' is such that

$$(w' + w^B - W)\gamma - (w^B - w'')(1 - \gamma) \geq \delta(\pi - \pi')[\phi + 2(1 - \gamma)(1 - m^P)(1 + q(W - 2))],$$

or equivalently

$$\pi' - \pi \geq \pi_1 \equiv \frac{-(w' + w^B - W)\gamma - (w^B - w'')(1 - \gamma)}{\delta[\phi + 2(1 - \gamma)(1 - m^P)(1 + q(W - 2))]}.$$

We now show that $\pi_{-1} < \pi_1$, as we did for the case $W \leq 1$. To see that this, note that

$$\pi_{-1} = \frac{(W - w'' - w')\gamma}{\delta[\phi + 2(1 - \gamma)m^P(q(W - 1) + (1 - q))]} - \frac{w^B - w''}{\delta[\phi + 2(1 - \gamma)m^P(1 + q(W - 2))]}$$

and

$$\pi_1 = \frac{(W - w'' - w')\gamma}{\delta[\phi + 2(1 - \gamma)(1 - m^P)(q(W - 1) + (1 - q))]} - \frac{(w^B - w'')(2\gamma - 1)}{\delta[\phi + 2(1 - \gamma)(1 - m^P)(1 + q(W - 2))]}.$$

As

$$\frac{W - w'' - w'}{\delta[\phi + 2(1 - \gamma)m^P(q(W - 1) + (1 - q))]} \leq \frac{W - w'' - w'}{\delta[\phi + 2(1 - \gamma)(1 - m^P)(1 + q(W - 2))]}$$

and $w^B > w''$ it is sufficient to show

$$\frac{2\gamma - 1}{\phi + 2(1 - \gamma)(1 - m^P)[1 + q(W - 2)]} < \frac{1}{\phi + 2(1 - \gamma)m^P[1 + q(W - 2)]}.$$

Cross multiplying and simplifying, this holds when

$$\phi > \hat{\phi}(W) = [1 + q(W - 2)](2\gamma m^P - 1).$$

As we have $\pi_{-1} < \pi_1$ when $\phi > \hat{\phi}(W)$, we can conclude that either the set of beliefs which give type -1 a strict preference for (w', w'') are a proper subset of those which give type -1 a weak incentive—or that, for both types, (w', w'') is preferred for either all beliefs or no beliefs the voters could hold. $\square$

We use Lemmas 3 and 4 to prove the next supporting Lemma. Namely we prove that in any equilibrium either type 1 politicians choose $w^B = \min\{W, 1\}$ or reveal themselves with certainty. This will allow us to pin down the behavior of type 1, allowing us to subsequently characterize the equilibrium by looking at the behavior of type -1 .

Lemma 5. *If $\phi > \hat{\phi}(W)$, there does not exist an equilibrium in which type 1 ever chooses $w^B < \min\{W, 1\}$ on the equilibrium path and is re-elected with probability $\pi < X(\sigma, \eta, W)$.*

Proof. We show, by contradiction, that there cannot exist an equilibrium in which type 1 ever chooses an allocation $w^B < \min\{W, 1\}$ and is re-elected with probability less than $X(\sigma, \eta, W)$ after taking that action. Note that, by Lemma 3, in any equilibrium type 1 must choose (w^A, w^B) such that $w^A + w^B = W$.

Suppose type 1 chooses allocation $w^B < \min\{W, 1\}$, $w^A = W - w^B$ on the equilibrium path, and suppose the probability of re-election after choosing that action is $\pi^* \in [Y(\sigma, \eta, W), X(\sigma, \eta, W)]$. Note that, as the probability of re-election is strictly less than $X(\sigma, \eta, W)$ type -1 must also choose $w^B < \min\{W, 1\}$, $w^A = W - w^B$ on the equilibrium path. Now, by continuity, there exists an allocation $(W - w', w')$ with $w' > w^B$ such that a type 1 politician's utility from choosing $(W - w', w')$ and being elected with probability $X(\sigma, \eta, W)$ is strictly higher than from choosing (w^A, w^B) and being re-elected with probability π^* . Note that, by Lemma 4, the set of $\pi' \leq X(\sigma, \eta, W)$ that a politician who chose $(W - w', w')$ could be re-elected with for which type 1 has a weak incentive to choose (w^A, w^B) over $(W - w', w')$, is a proper subset of beliefs for which type -1 has a strict incentive to choose (w^A, w^B) over $(W - w', w')$. This means that in any equilibrium either $(W - w', w')$ is on-path, in which case only type 1 would ever choose it, or it is off-path, in which case to be consistent with criterion D1 the voters must believe that an incumbent who chose $(W - w', w')$ is type 1 with certainty. Either way the re-election probability would be $X(\sigma, \eta, W)$ and type 1 would have an incentive to deviate.

This completes the proof that if type 1 chooses (w^A, w^B) with $w^B < \min\{W, 1\}$ on the equilibrium path, the re-election probability after (w^A, w^B) must be $X(\sigma, \eta, W)$. $\square$

With these the lemmas we can determine when a separating, pooling, and partial-pooling equilibria exist, allowing us to characterize equilibrium behavior. As Proposition A1 consists of three parts, we prove when each type of equilibrium exists in sequence as separate lemmas. We begin by considering separating equilibria, and show that the equilibrium must be minimally separating and only exists when the benefits from holding office are not too large.

Lemma 6. *Suppose $\phi > \hat{\phi}(W)$. Then there exists a Separating Equilibrium if and only if $\phi < \bar{\phi}(\sigma, \eta, W)$ where*

$$(9) \quad \bar{\phi}(\sigma, \eta, W) \equiv \begin{cases} \frac{W}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2(1 - \gamma)m^P(1 - q)W & \text{if } W \leq 1, \\ \frac{1 - (W - 1)(2\gamma - 1)}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2(1 - \gamma)m^P[1 + q(W - 2)] & \text{if } W > 1. \end{cases}$$

In this equilibrium, type -1 chooses $w^A = \min\{W, 1\}$, $w^B = \min\{W, 1\} - W$ and type 1 chooses $w^B \equiv w_(\delta, \phi) = \max\{w'_*(\delta, \phi), W - 1\} > 0$ where $w'_*(\delta, \phi)$ is equal to*

$$(10) \quad \begin{cases} \delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))(\phi + 2(1 - \gamma)m^P(1 - q)W) & \text{if } W \leq 1, \\ (2\gamma - 1)(W - 1) + \delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))(\phi + 2(1 - \gamma)m^P[1 + q(W - 2)]) & \text{if } W > 1. \end{cases}$$

and $w^A = W - w^B$. Moreover, there exists $\bar{W} \in (1, 2]$ such that $\bar{\phi}(\sigma, \eta, W) > \hat{\phi}(W)$ for all $W \in (0, \bar{W})$. Finally, there exists $\bar{\gamma} > 1/2$ such that, if $\gamma < \bar{\gamma}$ then $\bar{W} = 2$.

Proof. We begin by showing that, if $\phi \in (\hat{\phi}(W), \bar{\phi}(\sigma, \eta, W))$, the behavior described can be supported in an equilibrium. First note that, since the politician is revealed to be type 1 with certainty when $w^B = w_*(\delta, \phi)$, $w^A = W - w_*(\delta, \phi)$, and all politicians strictly prefer to implement $w^B = w_*(\delta, \phi)$, $w^A = W - w_*(\delta, \phi)$ to any allocation with $w^B > w_*(\delta, \phi)$, allocations with $w^B > w_*(\delta, \phi)$ are equilibrium dominated for both types. The beliefs after such allocations then are not relevant for the equilibrium behavior. Next note that, under the specified strategies, a type -1 who chooses $(W - w_*(\delta, \phi), w_*(\delta, \phi))$ would be re-elected with probability $X(\sigma, \eta, W)$, and by following her prescribed strategy of $(\min\{W, 1\}, \min\{W, 1\} - W)$ she is re-elected with probability $Y(\sigma, \eta, W)$. The benefit to a type -1 of increasing her re-election probability from $Y(\sigma, \eta, W)$ to $X(\sigma, \eta, W)$ is

$$\begin{cases} \delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))(\phi + 2(1 - \gamma)m^P(1 - q)W) & \text{if } W \leq 1, \\ \delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))(\phi + 2(1 - \gamma)m^P[q(W - 1) + (1 - q)]) & \text{if } W > 1. \end{cases}$$

However, as $w_*(\delta, \phi) \geq w'_*(\delta, \phi)$, the cost of implementing $(W - w_*(\delta, \phi), w_*(\delta, \phi))$ instead of $(\min\{W, 1\}, \min\{W, 1\} - W)$ is at least

$$\gamma[\min\{W, 1\} + w'_*(\delta, \phi) - W] + (1 - \gamma)(w'_*(\delta, \phi) + W - \min\{W, 1\})$$

which, by (10), is equal to be benefit of increasing her re-election probability from $Y(\sigma, \eta, W)$ to $X(\sigma, \eta, W)$. As the benefits of deviating are less than or equal to the costs, type -1 has no incentive to deviate. Moreover, since $\phi > \hat{\phi}(W)$ this implies that type 1 strictly prefers $(W - w_*(\delta, \phi), w_*(\delta, \phi))$ to $(\min\{W, 1\}, \min\{W, 1\} - W)$ by Lemma 4.

Now consider the beliefs after $w^B = w' < w_*(\delta, \phi)$ where $w' \neq \min\{W, 1\} - W$. There are two cases to consider: when $w_*(\delta, \phi) = W - 1$ and when $w_*(\delta, \phi) > W - 1$. In the first case type 1 secures maximal re-election probability by following her most preferred effort allocation and so all other effort allocations are equilibrium dominated for type 1. Hence specifying that $\mu = 0$ for any $w' < w_*(\delta, \phi)$ is consistent with criterion D1.

When $w_*(\delta, \phi) > W - 1$ then, given the specified beliefs, type -1 is indifferent between choosing $w^B = \min\{W, 1\} - W$ and $w^B = w_*(\delta, \phi)$ in the initial period. Hence, by Lemma 4, the set of beliefs for which type 1 would have a weak incentive to deviate to $w^B = w'$ are a proper subset of those for which type -1 would have a strict incentive to deviate, and so the voters must infer that a politician who chose any $w' < w_*(\delta, \phi)$ is type -1 with certainty. As type -1 would then prefer to implement $(\min\{W, 1\}, \min\{W, 1\} - W)$ to any other allocation generating those beliefs, type -1 , and hence also type 1, would have a strict incentive not to choose any $w' < w_*(\delta, \phi)$ with $w' \neq \min\{W, 1\} - W$. As such, $\mu = 0$ is consistent with D1 and the above strategies constitute an equilibrium.

Having now established that the above strategies constitute an equilibrium we now turn to showing that there is no other separating equilibrium. Note first that, by Lemma 3, type 1 must always choose an allocation such that $w^A + w^B = W$. Moreover, since in a separating equilibrium the type is perfectly revealed from the allocation, and since type 1 receives strictly different first period payoffs from different allocations that satisfy $w^A + w^B = W$ it follows that type 1 must be playing a pure strategy. Consider an equilibrium in which type 1 chooses $w^B = \hat{w} > w_*(\delta, \phi)$ and $w^A = W - \hat{w}$. Now consider the effort allocation $w^B = w' \in (w_*(\delta, \phi), \hat{w})$, $w^A = W - w'$. We show that such an allocation is equilibrium dominated for type -1 , but not type 1. Consider first type -1 . We have shown that a type -1 politician is indifferent between choosing $w^B = w_*$ and $w^A = W - w_*$ and being re-elected with probability $X(\sigma, \eta, W)$ and $(\min\{W, 1\}, \min\{W, 1\} - W)$ with probability $Y(\sigma, \eta, W)$. Further, as type -1 strictly prefers the allocation $w^B = w_*$, $w^A = W - w_*$ to $w^B = w'$, $w^A = W - w'$, she would then have a strict incentive not to choose $w^B = w'$, $w^A = W - w'$ for any voter beliefs. So $w^B = w'$, $w^A = W - w'$ is equilibrium dominated for type -1 . Now consider type 1. Note first that the politician prefers allocation $w^B = w'$, $w^A = W - w'$ to $w^B = \hat{w}$, $w^A = W - \hat{w}$ in period 1, so if the beliefs were such that she would be re-elected with probability $X(\sigma, \eta, W)$ by choosing $w^B = w'$, $w^A = W - w'$ she would have an incentive to choose that allocation. Therefore, $w^B = w'$, $w^A = W - w'$ is equilibrium dominated for type -1 , but not type 1, and so the voters must believe that any politician who took that action was type 1 with certainty. Hence, after observing allocation $w^B = w' \in (w_*(\delta, \phi), \hat{w})$, $w^A = W - w'$ voters must believe the incumbent is type 1 with certainty so the probability of re-election is the same as from choosing $w^B = \hat{w}$ and $w^A = W - \hat{w}$. But, as the type 1 politician receives greater utility in the first period by increasing w^A and decreasing w^B , she would not be optimizing by choosing $w^B = \hat{w}$. We can then conclude that it is not possible to support a separating equilibrium with $w^B > w_*(\delta, \phi)$.

Finally, note that $w'_*(\delta, \phi)$ is increasing in ϕ , and, in order to have an equilibrium, we must have $w'_*(\delta, \phi) \leq \min\{W, 1\}$. As $w'_*(\delta, \bar{\phi}) = \min\{W, 1\}$ by equations (9) and (10), a separating equilibrium exists if and only if $\phi \in (\hat{\phi}(W), \bar{\phi}(\sigma, \eta, W)]$.

We now consider the conditions under which $\bar{\phi}(\sigma, \eta, W) > \hat{\phi}(W)$, and so there exists a non-empty interval for which a separating equilibrium exists. Note first that by equation (9), and the fact that $X(\sigma, \eta, W) - Y(\sigma, \eta, W) < 1$, it follows immediately that $\bar{\phi}(\sigma, \eta, W) > 0$. Recalling the definition of $\hat{\phi}(W)$ from equation (8) when $W \leq 1$, $\bar{\phi}(\sigma, \eta, W) > \hat{\phi}(W)$ if and only if

$$\bar{\phi}(\sigma, \eta, W) = \frac{W}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2(1 - \gamma)(1 - q)m^P W > (1 - q)(2\gamma m^P - 1)W.$$

This inequality follows immediately because

$$\begin{aligned}
(1-q)(2\gamma m^P - 1)W &< (2\gamma m^P - 1)W \\
&< W - 2(1-\gamma)m^P W \\
&< \frac{W}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2(1-\gamma)(1-q)m^P W.
\end{aligned}$$

Hence $\bar{\phi}(\sigma, \eta, W) > \hat{\phi}(\sigma, \eta, W)$ whenever $W \leq 1$.

Similarly, when $W > 1$ then $\bar{\phi}(\sigma, \eta, W) > \hat{\phi}(W)$ if and only if

$$(1 + (W-2)q)(2\gamma m^P - 1) < \frac{1 - (W-1)(2\gamma - 1)}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2m^P(1-\gamma)(1 + (W-2)q),$$

or equivalently

$$(1 + (W-2)q)(2m^P - 1) < \frac{1 - (W-1)(2\gamma - 1)}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))}.$$

As this inequality holds strictly when $W = 1$, by continuity there exists $\bar{W} \in (1, 2]$ such that this inequality is satisfied for all $W < \bar{W}$. Finally, since $W < 2$ and $X(\sigma, \eta, W) - Y(\sigma, \eta, W) < 1$ this inequality is satisfied for all $W \in (1, 2)$ if

$$\gamma < \bar{\gamma} \equiv 1 - (m^P - 1/2)\delta \in \left(\frac{1}{2}, 1\right).$$

We can then conclude that there exists a $\bar{W} \in (1, 2]$ and $\bar{\gamma} \in (\frac{1}{2}, 1)$ such that $\bar{\phi}(\sigma, \eta, W) > \hat{\phi}(W)$ for all $W \in (0, \bar{W})$ and $\bar{W} = 2$ if $\gamma < \bar{\gamma}$. $\square$

So a separating equilibrium exists if and only if re-election pressures are not too strong and, when a separating equilibrium exists, it can be uniquely characterized. We now consider the possibility of a pooling equilibrium. We use Lemma 5 to show that the only possible pooling equilibrium involves both types pooling on maximal effort on issue B, and that such an equilibrium exists if and only if the benefits of holding office are sufficiently large.

Lemma 7. *Suppose $\phi > \hat{\phi}(W)$. There exists a pooling equilibrium if and only if $\phi > \phi^*(\sigma, \eta, W)$ where*

$$(11) \quad \phi^*(\sigma, \eta, W) \equiv \begin{cases} \frac{2W}{\delta(1-2Y(\sigma, \eta, W))} - 2(1-\gamma)(1-q)m^P W & \text{if } W \leq 1, \\ \frac{2(1-(W-1)(2\gamma-1))}{\delta(1-2Y(\sigma, \eta, W))} - 2m^P(1-\gamma)(1 + (W-2)q) & \text{if } W > 1. \end{cases}$$

In this equilibrium both types choose effort allocation $w^B = \min\{W, 1\}$ and $w^A = W - w^B$. Moreover, $\phi^(\sigma, \eta, W) > \bar{\phi}(\sigma, \eta, W)$.*

Proof. Since, in a pooling equilibrium, both politician types are re-elected with probability $1/2$ (Lemma 2), by Lemma 5 we cannot have a pooling equilibrium unless all politicians choose $w^B = \min\{W, 1\}$ in period 1. We first determine the range of parameters for which there exist off-path beliefs which incentivize both types to choose $w^B = \min\{W, 1\}$ then verify that those off-path beliefs satisfy criterion D1.

We show a pooling equilibrium with $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and voters believing any other effort must have been taken by type -1 can be supported if and only if $\phi \geq \phi^*(\sigma, \eta, W)$. Since $\phi > \hat{\phi}(W)$ we need only check that type -1 has no incentive to deviate, and if she were to deviate it would be to $(\min\{W, 1\}, \min\{W - 1\} - W)$. This means that by deviating the benefit in terms of policy today is

$$\begin{cases} W & \text{if } W \leq 1, \\ \gamma(2 - W) + (1 - \gamma)W & \text{if } W > 1. \end{cases}$$

However, the cost of reducing her re-election probability is

$$\begin{cases} \delta \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2(1 - \gamma)m^P(1 - q)W) & \text{if } W \leq 1, \\ \delta \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2(1 - \gamma)m^P[q(W - 1) + (1 - q)]) & \text{if } W > 1. \end{cases}$$

As $\gamma(2 - W) + (1 - \gamma)W = 1 - (W - 1)(2\gamma - 1)$ we have that type -1 is incentivized to choose $w^B = \min\{W, 1\}$, $w^A = W - w^B$ if and only if $\phi \geq \phi^*(\sigma, \eta, W)$, where $\phi^*(\sigma, \eta, W)$ is defined by (11). Hence, when $\phi > \hat{\phi}(W)$, there exist off-path beliefs which incentivize both types to choose $w^B = \min\{W, 1\}$ if and only if $\phi \geq \phi^*(\sigma, \eta, W)$.

We now must show the beliefs supporting the politicians' strategies are consistent with criterion D1. This follows from Lemma 4 since any allocation with $w^B = w' < \min\{W, 1\}$ is either equilibrium dominated or type -1 would have an incentive to choose the allocation for a proper superset of the beliefs for which type 1 would have a weak incentive to choose that allocation.

We can then conclude that, when $\phi \geq \phi^*(\sigma, \eta, W)$, in the unique pooling equilibrium all politicians choose $w^B = \min\{W, 1\}$ in period 1 and, when $\phi < \phi^*(\sigma, \eta, W)$, we cannot have a pooling equilibrium. So a pooling equilibrium exists if and only if $\phi \geq \phi^*(\sigma, \eta, W)$. Finally, it follows immediately from comparing (9) and (11) that $\phi^*(\sigma, \eta, W) > \bar{\phi}(\sigma, \eta, W)$. $\square$

So we have that when $\phi \leq \bar{\phi}(\sigma, \eta, W)$ there exists a unique separating equilibrium but no pooling equilibrium, and, when $\phi \geq \phi^*(\sigma, \eta, W)$, there exists a unique pooling equilibrium but no separating equilibrium. And, if $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$, neither a separating or pooling equilibrium can exist. We now explore the possibility of a semi-separating equilibrium. For this range, there exists a unique semi-separating equilibrium in which type -1 randomizes so that the

politician is re-elected with probability between $1/2$ and $X(\sigma, \eta, W)$ after choosing the posturing allocation: the randomization probability is uniquely determined to make type -1 indifferent and willing to randomize.

Lemma 8. *Suppose $\phi > \hat{\phi}(W)$. There exists a partial-pooling equilibrium if and only if $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$ and this equilibrium is unique. In this equilibrium, type 1 chooses $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and type -1 randomizes with a non-degenerate probability between $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and $w^A = \min\{W, 1\}$, $w^B = \min\{W, 1\} - W$ in period 1.*

Proof. By Lemma 5 we know that the equilibrium must either involve all type 1 politicians choosing $w^B = \min\{W, 1\}$ or have type 1 re-elected with probability $X(\sigma, \eta, W)$. Since we cannot have a separating equilibrium, type 1 must choose $w^B = \min\{W, 1\}$ in period 1. Since type 1 always chooses $w^B = \min\{W, 1\}$, $w^A = W - w^B$, any other effort allocation would reveal the politician to be type -1 with certainty. Hence the equilibrium must involve type -1 randomizing between $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and $w^A = \min\{W, 1\}$, $w^B = \min\{W, 1\} - W$. Let $\rho \in [0, 1]$ be the probability with which type -1 takes action $w^B = \min\{W, 1\}$, $w^A = W - w^B$ and let $\pi(\rho)$ be the associated probability of being re-elected after the voter observes $w^B = \min\{W, 1\}$, $w^A = W - w^B$. The voters' updated beliefs are

$$\mu(w^B = \min\{W, 1\}, w^A = W - w^B) = \frac{m^P}{m^P + (1 - m^P)\rho}$$

As $\mu(w^B = \min\{W, 1\}, w^A = W - w^B)$ is decreasing in ρ and equal to 1 when $\rho = 0$ and m^P when $\rho = 1$, the probability of re-election, $\pi(\rho)$, is decreasing in ρ with $\pi(0) = X(\sigma, \eta, W)$ and $\pi(1) = 1/2$. We now show that we have a solution with $\rho \in (0, 1)$ if and only if $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$, and that the probability of randomization is unique. In order for type -1 to be willing to randomize we must have that

$$\pi(\rho) - Y(\sigma, \eta, W) = \begin{cases} \delta \frac{W}{\phi + 2(1-q)(1-\gamma)m^P W} & \text{if } W \leq 1, \\ \delta \frac{1 - (W-1)(2\gamma-1)}{\phi + 2m^P(1-\gamma)(1+(W-2)q)} & \text{if } W > 1. \end{cases}$$

Notice that the left hand side of this expression is strictly decreasing in ρ and the right hand side is constant. Note also that, when $\rho = 0$, $\pi(\rho) = X(\sigma, \eta, W)$, and so when $\phi > \bar{\phi}(\sigma, \eta, W)$,

$$\pi(0) - Y(\sigma, \eta, W) > \begin{cases} \delta \frac{W}{\phi + 2(1-q)(1-\gamma)m^P W} & \text{if } W \leq 1, \\ \delta \frac{1 - (W-1)(2\gamma-1)}{\phi + 2m^P(1-\gamma)(1+(W-2)q)} & \text{if } W > 1, \end{cases}$$

and, when $\rho = 1$, $\pi(\rho) = 1/2$, and so when $\phi < \phi^*(\sigma, \eta, W)$,

$$\pi(1) - Y(\sigma, \eta, W) < \begin{cases} \delta \frac{W}{\phi + 2(1-q)(1-\gamma)m^P W} & \text{if } W \leq 1, \\ \delta \frac{1-(W-1)(2\gamma-1)}{\phi + 2m^P(1-\gamma)(1+(W-2)q)} & \text{if } W > 1. \end{cases}$$

Hence, there exists a unique solution with $\rho \in (0, 1)$ when $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$ and no solution otherwise. We conclude that there exists a unique partial pooling equilibrium if $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$, and there does not exist a partial pooling equilibrium otherwise. $\square$

We have now established that, for $\phi \in (\hat{\phi}(W), \bar{\phi}(\sigma, \eta, W)]$ the unique equilibrium is minimally separating, when $\phi \geq \phi^*(\sigma, \eta, W)$ the unique equilibrium is the pooling equilibrium, and when $\phi \in (\bar{\phi}(\sigma, \eta, W), \phi^*(\sigma, \eta, W))$ the unique equilibrium is partial-pooling. Combining the above characterizations completes the proof of Proposition A1 and so also Proposition 1.

Proof of Proposition A1. Follows immediately by combining Lemmas 6–8. $\square$

Having characterized the equilibrium we now turn to the comparative statics result of Proposition 2.

Proof of Proposition 2. By (5) the probability of re-election for any μ is

$$Pr(re - election|\mu) = \eta + (1 - 2\eta)Pr(v^j \geq u_r^1 - u^1(\mu, 0)).$$

Given that $X(\sigma, \eta, W) = Pr(re - election|\mu = 0)$, $Y(\sigma, \eta, W) = Pr(re - election|\mu = 1)$, and the fact that v^j is normally distributed with variance σ^2 it follows that

$$(12) \quad X(\sigma, \eta, W) = \begin{cases} \eta + (1 - 2\eta)F\left(\frac{2(1-\gamma)(1-m^P)(1-q)W}{\sigma}\right) & \text{if } W \leq 1, \\ \eta + (1 - 2\eta)F\left(\frac{2(1-\gamma)(1-m^P)[1+q(W-2)]}{\sigma}\right) & \text{if } W > 1, \end{cases}$$

$$(13) \quad Y(\sigma, \eta, W) = \begin{cases} \eta + (1 - 2\eta)F\left(-\frac{2(1-\gamma)m^P(1-q)W}{\sigma}\right) & \text{if } W \leq 1, \\ \eta + (1 - 2\eta)F\left(-\frac{2(1-\gamma)m^P[1+q(W-2)]}{\sigma}\right) & \text{if } W > 1, \end{cases}$$

where F is the cdf of the standard Normal. This implies that $X(\sigma, \eta, W) - Y(\sigma, \eta, W)$ is equal to

$$(1 - 2\eta) \begin{cases} F\left(\frac{2(1-\gamma)(1-m^P)(1-q)W}{\sigma}\right) - F\left(-\frac{2(1-\gamma)m^P(1-q)W}{\sigma}\right) & \text{if } W \leq 1, \\ F\left(\frac{2(1-\gamma)(1-m^P)[1+q(W-2)]}{\sigma}\right) - F\left(-\frac{2(1-\gamma)m^P[1+q(W-2)]}{\sigma}\right) & \text{if } W > 1, \end{cases}$$

which is strictly decreasing in η and σ . From the definitions of $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ in (9) and (11), as $X(\sigma, \eta, W) - Y(\sigma, \eta, W)$ is strictly decreasing in η and σ , $\bar{\phi}(\sigma, \eta, W)$ and $\phi^*(\sigma, \eta, W)$ are strictly increasing. This proves part 1.

Next note that since $2(1-\gamma)(1-m^P)(1-q)W$ and $2(1-\gamma)(1-m^P)[1+q(W-2)]$ are strictly positive and independent of σ and $-2(1-\gamma)m^P(1-q)W$ and $-2(1-\gamma)m^P[1+q(W-2)]$ are strictly negative and independent of σ we can conclude that

$$\lim_{\sigma \rightarrow 0} X(\sigma, \eta, W) = 1 - \eta,$$

$$\lim_{\sigma \rightarrow 0} Y(\sigma, \eta, W) = \eta.$$

So we can see immediately that

$$\bar{\phi}_0(\eta, W) \equiv \lim_{\sigma \rightarrow 0} \bar{\phi}(\sigma, \eta, W) = \begin{cases} \frac{W}{\delta(1-2\eta)} - 2(1-\gamma)(1-q)m^PW & \text{if } W \leq 1, \\ \frac{1-(W-1)(2\gamma-1)}{\delta(1-2\eta)} - 2m^P(1-\gamma)(1+(W-2)q) & \text{if } W > 1, \end{cases}$$

and

$$\phi_0^*(\eta, W) \equiv \lim_{\sigma \rightarrow 0} \phi^*(\sigma, \eta, W) = \begin{cases} \frac{2W}{\delta(1-2\eta)} - 2(1-\gamma)(1-q)m^PW & \text{if } W \leq 1, \\ \frac{2(1-(W-1)(2\gamma-1))}{\delta(1-2\eta)} - 2m^P(1-\gamma)(1+(W-2)q) & \text{if } W > 1. \end{cases}$$

Differentiating with respect to W ,

$$\frac{\partial \bar{\phi}_0(\eta, W)}{\partial W} = \begin{cases} \frac{1}{\delta(1-2\eta)} - 2(1-\gamma)(1-q)m^P & \text{if } W \leq 1, \\ -\frac{2\gamma-1}{\delta(1-2\eta)} - 2m^P(1-\gamma)q & \text{if } W > 1, \end{cases}$$

and

$$\frac{\partial \phi_0^*(\eta, W)}{\partial W} = \begin{cases} \frac{2}{\delta(1-2\eta)} - 2(1-\gamma)(1-q)m^P & \text{if } W \leq 1, \\ -\frac{2(2\gamma-1)}{\delta(1-2\eta)} - 2m^P(1-\gamma)q & \text{if } W > 1. \end{cases}$$

It then follows by inspection that both derivatives are strictly positive when $W < 1$ and strictly negative when $W > 1$. This proves part 2. $\square$

Proof of Results with Non-Transparency. We now turn to proving the results from Section 3.3 when the effort allocation is not observed. We begin with the result when $W < 1$.

Proof of Proposition 3. We now show that there exists a $\phi^{A0}(\sigma, \eta, W)$ such that, for all $\phi > \phi^{A0}(\sigma, \eta, W)$ there exists a unique pure strategy equilibrium in which type 1 chooses $w^B = W$. In this equilibrium type -1 chooses $w^A = 0, w^B \in (0, W)$. For there to be an equilibrium of the form described, type -1 must be indifferent between B (i.e. $p^B = 1, p^A = 0$) and 0 (i.e. $p^A = p^B = 0$) and prefer either alternative to $p^A = 1$. As the benefit to a type -1 of securing

re-election is $\phi + (1 - q)(1 - \gamma)m^P W$ in period 2, in order to have type -1 indifferent between B and 0 it must be that

$$(14) \quad \pi_B - \pi_0 = \frac{1 - \gamma}{\delta[\phi + 2(1 - q)(1 - \gamma)m^P W]},$$

where π_i is the probability of being re-elected after outcome i . Assume that after seeing $p^A = 1$, the incumbent is re-elected with probability $\pi_A = Y(\sigma, \eta, W)$ regardless of p^B . In order to have an equilibrium, in addition to the above indifference condition, we must have that neither type wants to exert effort on A , and that type 1 prefers B to doing nothing. Note however that $\pi_B > \pi_0$, so when $\phi > \hat{\phi}(1)$, so if type -1 is optimizing it means that type 1 is as well.

We first show that there exists a unique $w^B \in (0, W)$ such that type -1 is indifferent between B and 0 . To see this, note that the right hand side of (14) is constant in w^B but

$$\mu(p^A = 0, p^B = 1) = \frac{m^P W}{m^P W + (1 - m^P)w^B}$$

is strictly decreasing in w^B and

$$\mu(p^A = 0, p^B = 0) = \frac{m^P(1 - W)}{m^P(1 - W) + (1 - m^P)(1 - w^B)}$$

is strictly increasing in w^B . As the probability of re-election is increasing in the probability perceived to be type 1, $\pi_B(w^B) - \pi_0(w^B)$ is decreasing in w^B . Furthermore, evaluating at $w^B = 0$ and $w^B = W$, we see that $\pi_B - \pi_0$ is greater than $X(\sigma, \eta, W) - 1/2$ when $w^B = 0$ and equal to 0 when $w^B = W$. Then there exists ϕ_1 such that for all $\phi > \phi_1$,

$$\pi_B(0) - \pi_0(0) \geq X(\sigma, \eta, W) - 1/2 > \frac{1 - \gamma}{\delta[\phi + (1 - q)(1 - \gamma)m^P W]} > 0 = \pi_B(W) - \pi_0(W).$$

So by the intermediate value theorem we have a solution $w^B \in (0, W)$ to (14) and, since $\pi_B - \pi_0$ is strictly decreasing in W , this solution is unique.

As the probability of re-election after $p^A = 1$ is $\pi_A = Y(\sigma, \eta, W)$, to show that type -1 would not want to deviate to A it is sufficient to show that

$$\pi_B - Y(\sigma, \eta, W) \geq \frac{1}{\delta[\phi + 2(1 - q)(1 - \gamma)m^P W]}.$$

But, as $\pi_B > 1/2$ there exists a ϕ_2 such that this is satisfied when $\phi > \phi_2$. Hence we have that type -1 is optimizing by choosing $w^A = 0, w^B \in (0, W)$ which implies that type 1 is playing a best response by choosing $w^B = W$. Defining $\phi_1^{A0} = \max\{\hat{\phi}(1), \phi_1, \phi_2\}$, we can conclude that when $\phi > \phi_1^{A0}$ there exists an equilibrium of the specified form.

We now turn to showing that this is the unique pure strategy equilibrium in which type 1 chooses $w^B = W$. As we have already ruled out an equilibrium in which type -1 chooses $w_A = 0$ and $w^B \in \{0, W\}$ it is sufficient to show that we cannot have a pure-strategy equilibrium in which type -1 chooses $w^A > 0$ or $w^B < 0$. Suppose there is an equilibrium in which type -1 chooses $w^A > 0$ on issue A and $w^B \in [0, W - w^A]$ on issue B. As $p^A = 1$ never happens when the incumbent is type 1 we have that the probability of re-election after $p^A = 1$, regardless of p^B , is $\pi_A = Y(\sigma, \eta, W)$. Next, note that by Bayes' rule,

$$\mu(p^A = 0, p^B = 0) = \frac{m^P(1 - W)}{m^P(1 - W) + (1 - m^P)(1 - w^A)(1 - w^B)} < m^P,$$

$$\mu(p^A = 0, p^B = 1) = \frac{m^PW}{m^PW + (1 - m^P)(1 - w^A)w^B} > m^P.$$

Hence, the probability of re-election after $p^A = 0, p^B = 1$ is $\pi_B > 1/2$, and the probability of re-election after $p^A = p^B = 0$ is $\pi_0 < 1/2$. Note that the probability of re-election for type -1 is $w^AY(\sigma, \eta, W) + (1 - w^A)w^B\pi_B + (1 - w^A)(1 - w^B)\pi_0 < w^AY(\sigma, \eta, W) + w^B\pi_B + (1 - w^A - w^B)\pi_0$.

If she deviates to effort allocation $(0, w^A + w^B)$ her probability of re-election is

$$(w^A + w^B)\pi_B + (1 - w^A - w^B)\pi_0,$$

and her first period policy payoff is decreased by w^A . So, in order for $(0, w^A + w^B)$ not to be a profitable deviation we must have

$$w^A \geq w^A(\pi_B - Y(\sigma, \eta, W))(\phi + 2(1 - q)m^P(1 - \gamma)W) > w^A \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2(1 - q)m^P(1 - \gamma)W),$$

which is not possible when

$$\phi > \phi_3 \equiv \frac{1}{1/2 - Y(\sigma, \eta, W)} - 2(1 - q)m^P(1 - \gamma)W.$$

As such, when $\phi > \phi_3$ we cannot have an equilibrium in which $w^A > 0$.

Now consider the possibility of $w^B < 0$. Then since $p^A = 1$ or $p^B = -1$ only happens if the incumbent is type -1 , we have $\pi_A = \pi_{-B} = Y(\sigma, \eta, W)$. Similarly, since $p^B = 1$ is only possible if the incumbent is type 1 we have $\pi_B = X(\sigma, \eta, W) > \pi_0 > Y(\sigma, \eta, W)$. The re-election probability for type -1 is then

$$(1 - w^A)(1 - w^B)\pi_0 + (w^A + w^B - w^Aw^B)Y(\sigma, \eta, W),$$

and the probability of re-election from $(0, w^A + w^B)$ is

$$(1 - w^A - w^B)\pi_0 + (w^A + w^B)X(\sigma, \eta, W),$$

so the cost in forgone election probability is at least

$$\delta(\phi + 2m^P(1 - \gamma)W)(w^A + w^B - w^Aw^B)(X(\sigma, \eta, W) - Y(\sigma, \eta, W)).$$

As the cost in terms of first period policy payoff is

$$w^A + 2w^B(1 - \gamma) < w^A + w^B,$$

given that $w^A + w^B \leq W < 1$ this deviation is profitable if

$$w^A + w^B < \delta(\phi + 2m^P(1 - \gamma)W)(w^A + w^B - w^Aw^B)(X(\sigma, \eta, W) - Y(\sigma, \eta, W)),$$

and there exists a ϕ_4 for which is true when $\phi > \phi_4$. Hence defining

$\phi^{A0}(\sigma, \eta, W) = \max\{\phi_1^{A0}(\sigma, \eta, W), \phi_3, \phi_4\}$, when $\phi > \phi^{A0}(\sigma, \eta, W)$ there cannot exist an equilibrium in which type -1 chooses $w^A > 0$ or $w^B < 0$.

Having now ruled out every other possibility, we can conclude that when $\phi > \phi^{A0}(\sigma, \eta, W)$ type -1 chooses $w^A = 0$ and $w^B < W$ in the unique pure strategy equilibrium. $\square$

We conclude with the result when effort is non-transparent and $W > 1$.

Proof of Proposition 4. We first prove part (1) that the minimum level of patience for which a posturing equilibrium can exist is greater than $\phi^*(\sigma, \eta, W)$ and $\hat{\phi}(W)$. We begin by defining

$$(15) \quad \phi_{NA}^*(\sigma, \eta, W) \equiv \frac{2}{\delta(1 - 2Y(\sigma, \eta, W))} - 2m^P(1 - \gamma)[1 + q(W - 2)].$$

Note that by (11),

$$\phi^*(\sigma, \eta, W) = \frac{2(1 - (W - 1)\gamma)}{\delta(1 - 2Y(\sigma, \eta, W))} - 2m^P(1 - \gamma)(1 + (W - 2)q) < \phi_{NA}^*(\sigma, \eta, W),$$

and by (8),

$$\hat{\phi}(W) = \frac{1 + (W - 2)q}{2}(2\gamma m^P - 1) < \gamma m^P < \frac{2}{\delta(1 - 2Y(\sigma, \eta, W))} - 2m^P(1 - \gamma) < \phi_{NA}^*(\sigma, \eta, W),$$

so it follows that $\phi_{NA}^*(\sigma, \eta, W) > \max\{\phi^*(\sigma, \eta, W), \hat{\phi}(W)\}$.

We now show that we cannot support a posturing equilibrium in which type -1 chooses $w^B = 1, w^A = W - 1$ when $\phi < \phi_{NA}^*(\sigma, \eta, W)$. First note that, given that in the purported equilibrium the incumbent is re-elected with probability $1/2$ if $p^B = 1$ regardless of p^A . The

harshes possible beliefs, to support such an equilibrium, induce re-election probability $Y(\sigma, \eta, W)$ when $p^B = 0$. So, in order to prevent type -1 from deviating to $(w^A = 1, w^B = W - 1)$, we must have

$$(2 - W) \leq \delta(2 - W) \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2m^P(1 - \gamma)(1 + q(W - 2)),$$

or, equivalently, $\phi \geq \phi_{NA}^*(\sigma, \eta, W)$. So it is not possible to support a posturing equilibrium if $\phi < \phi_{NA}^*(\sigma, \eta, W)$.

We now turn to part (2). We show that there exists $\phi^{**}(\sigma, \eta, W) \in (\phi^*(\sigma, \eta, W), \phi_{NA}^*(\sigma, \eta, W))$ such that, for all $\phi \in (\phi^{**}(\sigma, \eta, W), \phi_{NA}^*(\sigma, \eta, W))$, there exists an equilibrium in which type 1 chooses allocation $(W - 1, 1)$ and type -1 chooses effort allocation $(1, W - 1)$ with probability $r \in (0, 1]$, and allocation $(W - 1, 1)$ otherwise. Note that, given the above strategies,

$$\mu(p^A = 1, p^B = 1) = m^P,$$

$$\mu(p^A, p^B = 0) = 0,$$

$$\mu(p^A = 0, p^B = 1; r) = \frac{m^P(1 - W)}{m^P(1 - W) + (1 - m^P)(1 - r)(1 - W)} = \frac{m^P}{m^P + (1 - m^P)(1 - r)}.$$

Notice that $\mu(0, 1; r)$ is increasing in r and $\mu(0, 1; 1) = 1$. We first show that types 1 and -1 are optimizing conditional on choosing allocation $(w^A, w^B) \in \{(1, W - 1), (W - 1, 1)\}$. For each r we then have $\pi_A = Y(\sigma, \eta, W)$, $\pi_{AB} = 1/2$, and $\pi_B = \pi(r)$, where $\pi(r)$ is increasing in r with $\pi(0) = 1/2$ and $\pi(1) = X(\sigma, \eta, W)$. Now note that, in order to have type -1 willing to randomize we must have that her payoff from choosing $(1, W - 1)$ is the same as $(W - 1, 1)$. As the difference in first period utility is $W - 1$, and the change in re-election probability is $(W - 1)(\pi_B - \pi_A)$ randomization is optimal if and only if

$$1 = \delta(\pi(r) - Y(\sigma, \eta, W))(\phi + 2m^P(1 - \gamma)(1 + q(W - 2))).$$

Note that, since $\phi < \phi_{NA}^*(\sigma, \eta, W)$ we have

$$1 > \delta \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2m^P(1 + q(W - 2))).$$

Since $\pi(r)$ is increasing with $\pi(0) = 1/2$ and $\pi(1) = X(\sigma, \eta, W)$, we have a solution with $r \in (0, 1)$ if and only if

$$1 < \delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))(\phi + 2m^P(1 - \gamma)(1 + q(W - 2))).$$

So if $\phi \geq \frac{1}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2m^P(1 + q(W - 2))$ there exists a unique $r \in (0, 1)$ to make type -1 indifferent. Now note that, if type -1 is randomizing and $\phi > \hat{\phi}(W)$, type 1 has a strict

preference for allocation $(W - 1, 1)$ over $(1, W - 1)$. Defining $\phi^{**}(\sigma, \eta, W)$ as the maximum of $\hat{\phi}(W)$, $\phi^*(\sigma, \eta, W)$ and

$$\frac{2\gamma - 1}{\delta(X(\sigma, \eta, W) - Y(\sigma, \eta, W))} - 2(1 - m^P)(1 - \gamma)(1 + q(W - 2)),$$

it follows that neither type 1 or -1 wants to deviate between $(W - 1, 1)$ and $(1, W - 1)$ when $\phi > \phi^{**}(\sigma, \eta, W)$. It is immediate from (15) that $\phi^{**}(\sigma, \eta, W) < \phi_{NA}^*(\sigma, \eta, W)$.

We now must show that neither type 1 or -1 can benefit from deviating to $(w^A, w^B) \notin \{(1, W - 1), (W - 1, 1)\}$ when $\phi \in (\phi^{**}, \phi_{NA}^*)$. Recall that under the above strategies $\pi_A = Y(\sigma, \eta, W)$, $\pi_{AB} = 1/2$, and $\pi_B \in (1/2, X(\sigma, \eta, W))$. Note that the beliefs when $p^A = p^B = 0$ or $p^B = -1$ are off the equilibrium path; we assign beliefs $\mu = 0$ at either information set so that $\pi_0 = \pi_{-B} = Y(\sigma, \eta, W)$. Note that, as the re-election probability is then $Y(\sigma, \eta, W)$ from any strategy with $w^B \leq 0$, and we have established in Lemma 8 that when $\phi > \phi^*(\sigma, \eta, W)$ both types prefer to implement $w^B = 1, w^A = W - 1$ and be re-elected with probability $1/2$ to any effort allocation that ensures re-election probability $Y(\sigma, \eta, W)$, we can then restrict attention to deviations with $w^B > 0$.

The probability of re-election from choosing (w^A, w^B) is then

$$\begin{aligned} w^B(1 - w^A)\pi_B + w^Aw^B\pi_{AB} + w^A(1 - w^B)\pi_A + (1 - w^A)(1 - w^B)\pi_0 &= \\ w^B(1 - w^A)\pi_B + \left(\frac{1}{2}w^Aw^B + (1 - w^B)\right)Y(\sigma, \eta, W). \end{aligned}$$

To see that type -1 has no incentive to choose $(w^A, w^B) \notin \{(1, W - 1), (W - 1, 1)\}$, note that if type -1 chooses allocation (w^A, w^B) her first period payoff is

$$-\gamma(1 - w^A) - (1 - \gamma)(1 + w^B).$$

Her first period payoff from allocation $(1, W - 1)$ however is $-(1 - \gamma)W$ and her re-election probability is $(W - 1)\frac{1}{2} + (2 - W)Y(\sigma, \eta, W)$. Hence, for type -1 to prefer (w^A, w^B) to $(1, W - 1)$ requires that $\gamma(1 - w^A) + (1 - \gamma)(1 + w^B - W)$ be less than

$$\begin{aligned} \delta \left(w^B(1 - w^A)\pi_B + (1 + w^Aw^B - W)\frac{1}{2} - (1 + w^B - W)Y(\sigma, \eta, W) \right) \\ (\phi + 2m^P(1 - \gamma)(1 + q(W - 2))). \end{aligned}$$

To verify that this inequality is violated for all w^A it is sufficient to check for $w^A = \min\{1, W - w^B\}$. Note that when $w^A = W - w^B$ this inequality reduces to the requirement that $(1 + w^B - W)$

be less than

$$(1 + w^B - W)(w^B(\pi_B - Y(\sigma, \eta, W)) + (1 - w^B) \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2m^P(1 - \gamma)(1 + q(W - 2))).$$

But because type -1 weakly prefers $(1, W - 1)$ to $(W - 1, 1)$, and $\phi < \phi_{NA}^*(\sigma, \eta, W)$, this inequality cannot be satisfied. Similarly, when $w^A = 1$, since $1 + w^B - W \leq 0$ this reduces to

$$(1 - \gamma) > \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2m^P(1 - \gamma)(1 + q(W - 2))),$$

Which violates the assumption that $\phi > \phi^{**}(\sigma, \eta, W) \geq \phi^*(\sigma, \eta, W)$. So it is not optimal for type -1 to deviate to any $(w^A, w^B) \notin \{(1, W - 1), (W - 1, 1)\}$ when $\phi \in (\phi^{**}(\sigma, \eta, W), \phi_{NA}^*(\sigma, \eta, W))$.

We conclude by considering type 1. Her first period payoff from allocation (w^A, w^B) is

$$-\gamma(1 - w^A) - (1 - \gamma)(1 - w^B),$$

while the first period payoff from $(W - 1, 1)$ is $-\gamma(2 - W)$ with associated re-election probability $(W - 1)\frac{1}{2} + (2 - W)\pi_B$. Note that, as the first period payoff, and re-election probability, for type 1 are both increasing in w^B we can restrict attention to cases in which $w^B = \min\{1, W - w^A\}$ without loss of generality. The type 1 would only benefit from deviating if $\gamma(W - 1 - w^A) + (1 - \gamma)(1 - w^B)$ is strictly less than

$$\delta \left((w^B(1 - w^A) + W - 2)\pi_B + \frac{w^A w^B + 1 - W}{2} + (1 - w^B)Y(\sigma, \eta, W) \right) (\phi + 2(1 - m^P)(1 - \gamma)(1 + q(W - 2))).$$

Note first that when $w^B = 1$ this reduces to

$$\gamma(W - 1 - w^A) < \delta \left(\pi_B - \frac{1}{2} \right) (W - 1 - w^A)(\phi + 2(1 - m^P)(1 - \gamma)(1 + q(W - 2)))$$

which, because $\gamma > 1/2$, can't be satisfied when $\phi < \phi_{NA}^*(\sigma, \eta, W)$. And, if $w^B = W - w^A$, using the fact that $\pi_B > 1/2$, it implies that

$$(2\gamma - 1)(1 + w^A - W) > (1 + w^A - W) \left(\frac{1}{2} - Y(\sigma, \eta, W) \right) (\phi + 2(1 - m^P)(1 - \gamma)(1 + q(W - 2))),$$

which can't be satisfied when $\phi > \phi^{**}(\sigma, \eta, W)$. So type 1 doesn't have an incentive to deviate to any $(w^A, w^B) \notin \{(1, W - 1), (W - 1, 1)\}$.

We can then conclude when $\phi \in (\phi^{**}(\sigma, \eta, W), \phi_{NA}^*(\sigma, \eta, W))$ it is an equilibrium for type -1 to randomize between $(W - 1, 1)$ and $(1, W - 1)$ while type 1 always chooses $(W - 1, 1)$. $\square$

APPENDIX C: EMPIRICAL METHODS

Appendix C describes how the text data were assembled and used to construct our measure of speech divisiveness. The raw text of the *Congressional Record* was obtained from Jensen et al. (2012). Data are stored and analyzed as a relational database. The segmentation and processing of text is implemented using Python’s Natural Language Toolkit package. Our statistical estimates were produced using Stata.

A script reads through the text, detects dates and speakers, and segments speeches for each member. Next, we remove capitalization and punctuation, tokenize the text into sentences and words, and use a “lemmatizer” to reduce words to their dictionary root when possible. This is preferred by NLP practitioners to the relatively lossy Porter stemmer, which just removes word suffixes.

We have developed a relatively aggressive list of words for exclusion from the corpus. First we remove any words fewer than 3 characters. Second we remove common “stop-words” such as “the” and “which.” We also did our best to exclude procedural vocabulary, which could be correlated with our treatment variables without indicating changes in policy effort. We also removed other non-policy words that are common in the record, such as the names of states. Finally, some common misspellings are included. A full list of excluded words (at least three letters long) is included in Table A1.

An individual floor speech is represented as a list of sentences, each of which is a list of words. Speeches with two or fewer sentences are excluded. Then for each Senator/Representative, all of the sentences for a two-year congressional session are appended together as her speech output for that session.

From the tokenized sentences we then construct lists of two-word and three-word phrases (bigrams and trigrams), not allowing for word sequences across sentence boundaries. The full set of phrases has over 120 thousand features. To achieve a computationally feasible metric for divisiveness of speech, we reduced the feature set as follows. We began by removing any phrases that did not appear in at least ten of the twenty congressional sessions in our sample. Then we ranked each phrase k in two ways. First, the overall frequency of the phrase in the corpus, f_k . Second, the point-wise mutual information (PMI) for the phrase, PMI_k . This metric is used by linguists to uncover the most informative phrases from a corpus (Bouma 2009). For example, one of the highest-PMI phrases in our corpus is “notre dame” — the words “notre” and “dame” rarely occur except in the name of the university. We selected the phrases with the highest

frequency and the highest PMI, with some subjective judgement about where to set the cutoffs. As a reasonably large and computationally feasible set of phrases, we selected 2000 bigrams and 1000 trigrams. The thresholds for these numbers were $f_k \geq 2336$, $PMI_k \geq 3.145$ for bigrams, and $f_k \geq 1173$, $PMI_k \geq 10.016$ for trigrams.

The full phrase feature set for our empirical analysis are available on request from the authors. These data include frequency and PMI for each phrase. Note that this set of phrase features is more representative of the distribution of topics in the Congressional Record than that used in Gentzkow and Shapiro (2010) and Jensen et. al (2012). In those papers, the authors selected the most divisive phrases as ranked by the Chi-squared metric (see below). Instead, we construct our feature set using non-political metrics (frequency and PMI), and then score this set of representative phrases by divisiveness.

The Chi-squared metric for the political divisiveness of a phrase is constructed as follows. We begin with the phrase frequencies for each political party in each congressional chamber and each congressional session. Define n_{klct}^D and n_{klct}^R as the number of times phrase k of length l is used by Democrats and Republicans, respectively, during session t in legislative chamber c (House or Senate). Let $N_{lct}^D = \sum_k n_{klct}^D$ and $N_{lct}^R = \sum_k n_{klct}^R$ be the summed frequencies of all phrases of length l used by Democrats and Republicans, respectively, at session t in chamber c . Finally, let $\tilde{n}_{klct}^D = N_{lct}^D - n_{klct}^D$ and $\tilde{n}_{klct}^R = N_{lct}^R - n_{klct}^R$ equal the total number of times phrases of length $l \in \{2, 3\}$ besides k (but still in the filtered sample) were used by Democrats and Republicans, respectively, during session t in chamber c . Then construct Pearson’s χ_{klct}^2 statistic for each phrase k of length $l \in \{2, 3\}$ at time t in chamber c as

$$\chi_{klct}^2 = \frac{(n_{klct}^R \tilde{n}_{klct}^D - n_{klct}^D \tilde{n}_{klct}^R)^2}{N_{lct}^D N_{lct}^R (n_{klct}^D + n_{klct}^R)(\tilde{n}_{klct}^D + \tilde{n}_{klct}^R)}.$$

As shown in Gentzkow and Shapiro (2010), this metric ranks phrases by their association with particular political parties. If the frequencies n_{klct}^D and n_{klct}^R are drawn from multinomial distributions, χ_{klct}^2 provides a test statistic for the null that phrase k is used equally by Democrats and Republicans during session t in chamber c . That paper provides a lengthy discussion of the measure.

Now that we have an annual divisiveness score for each phrase, we use these phrases to construct a measure of the divisiveness of congressional speech. Our approach is based on Jensen et al. (2012), who use a similar method to measure historical levels of polarization in the U.S. House. First define the raw frequency for phrase k by member i in chamber c during session t as ϕ_{ikt}^c . Using the set of frequencies for phrase k in chamber c at year t , $\{\phi_{1kt}^c, \phi_{2kt}^c, \phi_{3kt}^c, \dots\}$, construct the mean μ_{kt}^c and standard deviation σ_{kt}^c of the frequency for that phrase-chamber-year,

and define the normalized frequency f_{ikt}^c to have zero mean and standard deviation one:

$$f_{ikt}^c := \frac{\phi_{ikt}^c - \mu_{kt}^c}{\sigma_{kt}^c}.$$

This will mean that each phrase has the same influence on our divisiveness measure.

Define the number of phrases K , indexed by $k \in \{1, 2, \dots, K\}$. In our case $K = 3000$. The divisiveness of phrase k for chamber c at year t is χ_{kct}^2 , where we drop l and ignore length since all the phrases are scored on the same scale. Let

$$F_{it} = \sum_{k=1}^K f_{ikt},$$

the total number of phrases spoken by member i during t . We define politician divisiveness as the frequency-weighted phrase divisiveness for the phrases used by the member. In particular:

$$Y_{it}^c = \log \left(\sum_{k=1}^K \frac{f_{ikt} \chi_{kct}^2}{F_{it}} \right).$$

We have taken logs to obtain a unit-less measure. Jensen et al. (2012) show the usefulness of this aggregate measure in a range of contexts.

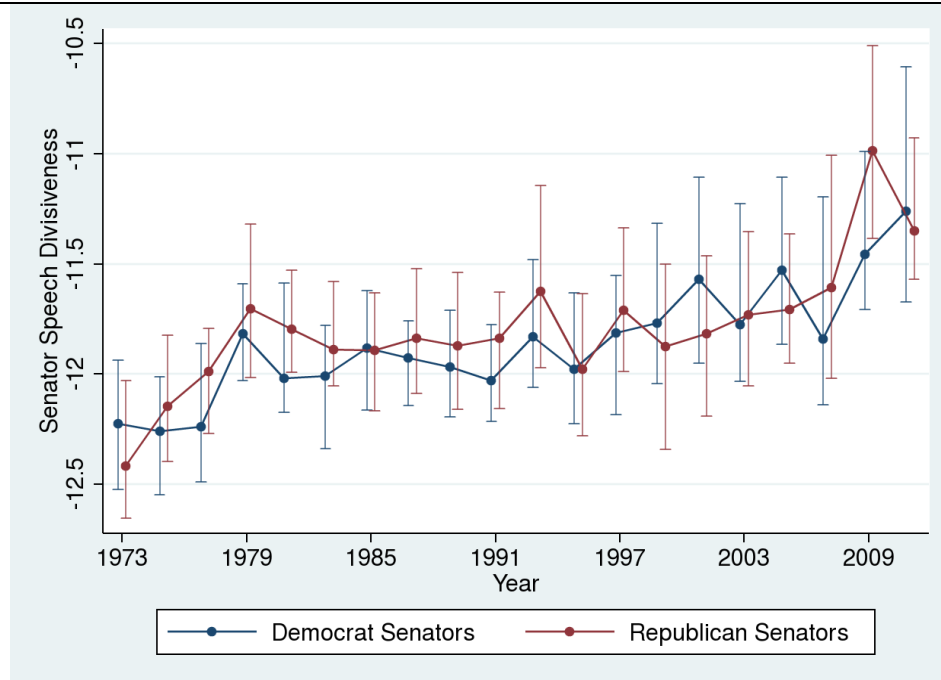
Note that the phrase divisiveness metric χ_{kct}^2 can be based on the language of either chamber $c \in \{H, S\}$. This turns out not to matter empirically, as the results are similar using the scores from either chamber.

Table A3 reports summary statistics on legislator characteristics and treatment variables. Figures A1 and A2 give the trends in average divisiveness for the Senate and House of representatives, respectively. As seen in the figures, Republicans and Democrats have similar levels and trends in speech divisiveness. Note that chamber-wide differences in divisiveness over time will not affect our results, since we include year fixed effects in our regressions.

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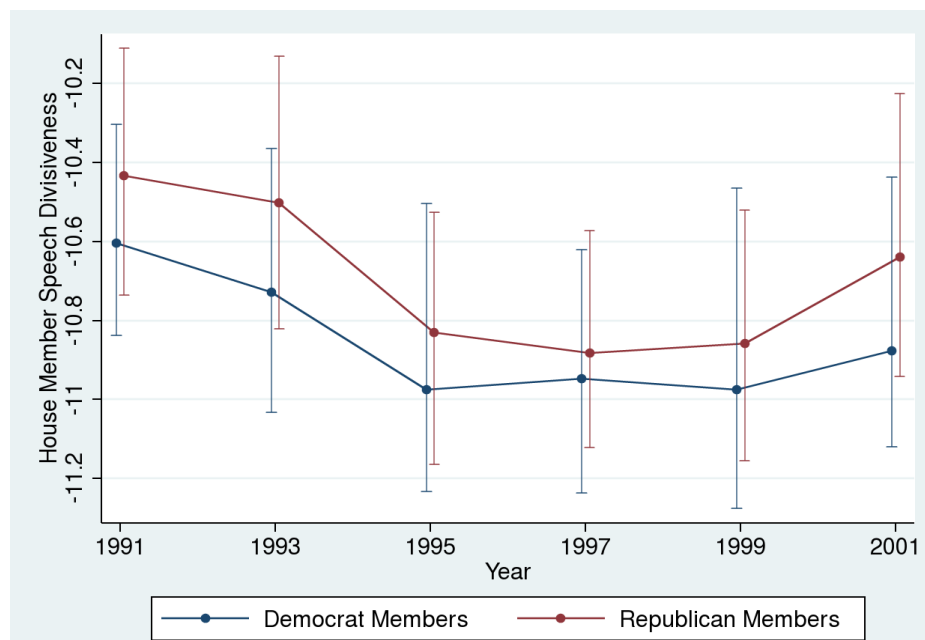
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Figure A1
 Senator Speech Divisiveness, 1973-2012



This figure plots the mean senator speech divisiveness for each congressional session, separately by political party. Error spikes indicate 25th and 75th percentiles. Speech divisiveness measure is constructed from House speech.

Figure A2
 House Member Speech Divisiveness, 1991-2002



This figure plots the mean House member speech divisiveness for each congressional session, separately by political party. Error spikes indicate 25th and 75th percentiles. Speech divisiveness measure is constructed from Senate speech.

TABLE A1
List of Excluded Words

a's	among	been	come	don't	former
able	and	before	comes	done	formerly
about	announce	beforehand	complete	down	forth
above	another	behind	concerning	downwards	four
absence	any	being	confer	during	friday
absent	anybody	believe	conference	each	from
according	anyhow	below	congress	effort	further
accordingly	anyone	beside	congressional	eight	furthermore
across	anything	besides	connecticut	either	gentleman
act	anyway	best	consent	else	gentlewoman
acting	anyways	better	consequently	elsewhere	georgia
actually	anywhere	between	consider	enactment	get
adding	apart	beyond	consideration	enough	gets
adopt	appear	bill	considering	entirely	getting
affirm	appreciate	bloc	contain	especially	given
after	appropriate	both	containing	etc	gives
afterwards	approve	brief	contains	even	goes
again	april	but	corresponding	ever	going
against	are	c'mon	could	every	gone
ago	aren't	c's	couldn't	everybody	got
agree	arizona	california	coun	everyone	gotten
ain't	arkansas	call	country	everything	greetings
aisle	around	came	course	everywhere	had
alabama	aside	can	currently	exactly	hadn't
alaska	ask	can't	dakota	example	hampshire
all	asked	cannot	date	except	happens
allow	asking	cant	debate	express	hardly
allows	assistant	carolina	december	extend	has
almost	associated	cause	defeat	far	hasn't
alone	attend	causes	delaware	favor	have
along	august	certain	described	february	haven't
already	available	certainly	desk	few	having
also	away	chairman	despite	fifth	hawaii
although	awfully	chapter	device	first	he's
always	aye	clause	did	five	hello
amdt	ayes	clearly	didn't	floor	hence
amend	back	clerk	different	florida	her
amended	became	cloture	distinguish	followed	here
amendment	because	colleague	does	following	here's
america	become	colorado	doesn't	follows	hereafter
american	becomes	com	doing	for	hereby

List of words excluded from text before construction of bigrams and trigrams.

TABLE A1 (cont.)
List of Excluded Words

herein	itself	maine	ness	ours	provision
hereupon	ity	mainly	nevada	ourselves	pur
hers	january	majority	never	out	purpose
herself	jersey	make	nevertheless	outside	que
him	join	many	new	over	question
himself	joint	march	next	overall	quite
his	journal	maryland	nine	override	quorum
hither	july	massachusetts	nobody	own	quorum
hopefully	june	may	non	page	rather
house	just	maybe	none	particular	read
how	kansas	mean	noone	particularly	really
howbeit	keep	meanwhile	nor	pass	reasonably
however	keeps	meet	normally	passag	reconsider
i'd	kentucky	member	not	passage	record
i'll	kept	ment	note	past	regarding
i'm	kill	merely	nothing	pct	regardless
i've	know	mexico	novel	pennsylvania	regards
idaho	known	michigan	november	peo	reject
ident	knows	might	now	people	relatively
ignored	last	minnesota	nowhere	per	remark
illinois	lately	minute	number	percent	rep
immediate	later	mississippi	objection	perhaps	report
inasmuch	lation	missouri	obviously	period	requir
inc	latter	mittee	oclock	permission	requisite
include	latterly	monday	october	placed	resolut
increas	least	montana	off	ple	resolution
indeed	legisla	month	officer	please	respectively
indiana	legislative	more	often	plus	result
indicate	less	moreover	ohio	point	retary
indicated	lest	most	okay	possible	revise
indicates	let	mostly	oklahoma	pre	rhode
ing	let's	motion	old	present	rise
ington	lic	move	once	presid	roll
inner	lieu	much	one	president	rollcall
inserting	lieve	must	ones	presiding	rule
insofar	like	myself	only	presumably	said
instead	liked	name	onto	printed	saturday
into	likely	namely	oppos	pro	saw
invok	line	nay	order	probably	say
inward	little	near	ordered	proceed	saying
iowa	look	nearly	oregon	proceeded	says
isn't	looking	nebraska	other	program	section
it'd	looks	necessary	others	propos	see
it'll	louisiana	need	otherwise	proposed	seeing
it's	ltd	needs	ought	provide	seem
its	madam	neither	our	provides	seemed

List of words excluded from text before construction of bigrams and trigrams.

TABLE A1 (cont.)
List of Excluded Words

seeming	stat	thereby	twice	well	yield
seems	state	therefore	two	went	york
seen	states	therein	unanimous	were	you
self	statu	thereof	under	weren't	you'd
selves	still	theres	unfortunately	what	you'll
senat	strike	thereupon	united	what's	you're
senate	striking	these	unless	whatever	you've
senator	sub	they	unlikely	when	your
send	subchapter	they'd	until	whence	yours
sense	subsection	they'll	unto	whenever	yourself
sensible	subsequ	they're	upon	where	yourselves
sent	such	they've	urge	where's	zero
september	sunday	think	use	whereafter	
sergeant	sup	third	used	whereas	
serious	support	this	useful	whereby	
seriously	sure	thorough	uses	wherein	
serv	suspend	thoroughly	using	whereupon	
session	t's	those	usually	wherever	
seven	table	though	utah	whether	
several	take	three	uucp	which	
shall	taken	through	various	while	
she	tary	throughout	vermont	whither	
should	tell	thru	very	who	
shouldn't	tem	thursday	veto	who's	
side	tempore	thus	via	whoever	
since	tends	tiff	vide	whole	
sion	tennessee	time	vided	whom	
sions	ter	tion	virginia	whose	
six	texas	tional	viz	why	
some	than	tions	vol	will	
somebody	thank	title	vote	willing	
somehow	thanks	tive	wait	wisconsin	
someone	thanx	tleman	waive	wish	
something	that	today	want	with	
sometime	that's	together	wants	within	
sometimes	thats	too	was	without	
somewhat	the	took	washington	won't	
somewhere	their	toward	wasn't	wonder	
soon	theirs	towards	way	word	
sorry	them	tried	we'd	would	
speak	themselves	tries	we'll	wouldn't	
speaker	then	truly	we're	wyoming	
specified	thence	try	we've	yea	
specify	there	trying	wednesday	year	
specifying	there's	tuesday	week	yes	
spend	thereafter	ture	welcome	yet	

List of words excluded from text before construction of bigrams and trigrams.

TABLE A2
Filtering the Feature Set

Feature Filtering Step	Set of Text Features
1 Entire Vocabulary	671,679 words
2 Words used in at least 10 separate sessions	56,392 words
3 Words used at least 50 times per session on average when they appear	13,088 words
4 Full set of bigrams and trigrams using the vocabulary from Step 3.	20,271,332 bigrams; 99,78,398 trigrams
5 Bigrams with total frequency ≥ 2336 and PMI ≥ 3.14 , trigrams with PMI ≥ 10 and total frequency ≥ 1000	2000 bigrams, 1000 trigrams

TABLE A3
Legislator Characteristics and Treatment Variables

	<u>Summary Statistics</u>			
	Mean	Std. Dev.	Minimum	Maximum
<u><i>Senators</i></u>				
Year	1992.1890	11.6473	1973	2011
Experience	10.8240	9.3855	0	50
Republican	0.4529	0.4979	0	1
Election Cohort	1.9561	0.8252	1	3
<u><i>House Members</i></u>				
Year	1995.9290	3.4111	1991	2001
Experience	8.5913	8.0860	0	52
Republican	0.4660	0.4989	0	1
Transparency	-2.0709	1.1744	-5.516	0

Observation is a congressman-session. Sample includes 331 senators and 649 House members. *Experience* refers to the number of years since joining Congress.

Republican equals one for Republican Congressmen. *Election Cohort* equals 1, 2, or 3 depending on senator election cohort status. *Transparency* is the (log) measure of news coverage constructed by Snyder and Stromberg (2010).