

# Informative Party Labels with Institutional and Electoral Variation\*

Scott Ashworth<sup>†</sup>      Ethan Bueno de Mesquita<sup>‡</sup>

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## Abstract

We study a model of party formation in which the informativeness of party labels and inter-party ideological heterogeneity are endogenously and jointly determined in response to electoral incentives. Parties use screening to increase the cost of affiliation for politicians whose ideal points diverge from the party platform. Because affiliation decisions are endogenous, increased screening decreases ideological heterogeneity, improving the informativeness of the party label. The model allows us to examine how the level of screening responds to changes in both the institutional and electoral environments. We find that screening (and, consequently, the informativeness of the party label and ideological homogeneity) are decreasing in the power of the executive branch, the polarization of party platforms, and the average size of partisan tides.

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<sup>†</sup>Assistant Professor, Department of Politics, Princeton University.  
sashwort@princeton.edu

<sup>‡</sup>Assistant Professor, Department of Political Science, Washington University,  
ebuenode@artsci.wustl.edu

What role do political parties play in elections? Perhaps the best known answer is that party labels provide voters with information about candidates (Cox and McCubbins, 1993; Aldrich, 1995; Snyder and Ting, 2002).<sup>1</sup> This idea has a long history, going back at least to Downs (1957), who pointed out that voters have little incentive to acquire costly information about candidates, and will rely on low-cost informational shortcuts. For example, if an American voter knows that a candidate is a Democrat, then she knows that the candidate is more likely than average to favor redistribution, abortion rights, and so on. All else equal, risk-averse voters prefer candidates whose policy positions are relatively better known. Thus, politicians are willing to bear costs to affiliate with a party because the informative party labels confer electoral advantages.

Snyder and Ting (2002) study a model in which these informative party labels are maintained by the endogenous affiliation decisions of politicians. These politicians bear costs if they win while running under the party's label. Because these costs increase with the distance of a member's ideology from the party platform, joining a party is less attractive to a politician whose preferences are far from the party platform. Thus, politicians with policy preferences close to the party platform are more willing to join the party, making party labels informative to uninformed voters.

In this paper, we study a model of how changes in electoral and institutional environments affect politicians' electoral incentives to maintain an informative party label. In doing so, we build on Snyder and Ting's insight that endogenous affiliation decisions can affect the informativeness of party labels. They take the cost of affiliation to be exogenous. Parties, in their model, manipulate ideological heterogeneity (and, thus, the informativeness of party labels) by changing platform positions. In our model, the cost of affiliation is chosen endogenously by party leaders in order to manipulate the ideological make-up of the party and, hence, the informativeness of party labels. The costlier it is to affiliate, the closer a politician's ideal point has to be to the party platform for her to be willing to affiliate. Thus, higher affiliation costs imply greater ideological homogeneity, which makes the party label more informative.<sup>2</sup> We find that smaller partisan tides, less polarized platforms, and a less powerful executive branch all increase incentives for

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<sup>1</sup>There is substantial evidence that voters learn about the policy positions of candidates from party labels. This literature is reviewed in Snyder and Ting (2002).

<sup>2</sup>Although we endogenize the costs of affiliation and ideological heterogeneity, we assume platforms are fixed, thereby reversing Snyder and Ting's simplifying assumptions. Of course, a more complete model would endogenize platform location, affiliation costs, and ideological heterogeneity.

informative labels.

Snyder and Ting provide several possible interpretations of affiliation costs. These costs, they argue, could be understood as party discipline, since the more disciplined a party, the more often legislators with preferences that diverge from the party platform will be forced to vote against their preferences. Another interpretation Snyder and Ting suggest is that party leaders screen potential affiliates for ideological conformity, and that passing this screening process is more difficult for politicians that do not agree with the party platform.

We do not commit to a particular interpretation of the mechanism by which parties' maintain the informativeness of their labels. Instead, we simply adopt the same utility function as they did, though we relax some of their functional form restrictions. We refer generally to screening and the informativeness of party labels. This abstract approach allows us to focus on how changes in electoral and institutional environments affect the electoral incentives that politicians have for bearing the costs associated with building an informative party label through screening. This allows us focus on the implications of changing the parties' decision variable from platform location to the level of screening, while maintaining comparability.

We begin by considering changes in the electoral environment. When partisan tides are small on average, the pivotal voter is more likely to be nearly indifferent between the parties in a given election. The closer the pivotal voter is to being indifferent, the more likely a small increase in the informativeness of a party's label is to swing the election in favor of that party. This increases the incentives to maintain the label for both parties, resulting in more screening.

Platform polarization also affects electoral incentives for maintaining the party label. When platforms are highly polarized, voters are more likely to lean heavily toward one party or the other. This implies that an increase in the informativeness of party labels is less likely to swing the election. Thus, increased platform polarization decreases electoral incentives for screening.

We also examine political parties' responses to institutional variation within presidential systems (i.e., systems in which there is a separately elected executive who does not depend on the confidence of the legislature to maintain power). Empirically, such systems differ greatly in how much authority the president has over legislation.<sup>3</sup> Since presidential power constrains the legislature's authority over policy, these institutional differences affect the voters' induced preferences over uncertainty about their represen-

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<sup>3</sup>See Shugart and Carey (1992) for a comprehensive empirical study of these differences.

tatives' policy preferences. Since the choice of a level of screening affects affiliation decisions and, consequently, the informativeness of party labels, parties choose different levels of screening under different institutional structures. The less the voters value informative party labels, the lower the level of screening. Hence, parties in systems with weak executives choose to have more informative labels than those in systems with strong executives.

## 1 Basic Model

A left-wing ( $L$ ) and a right-wing ( $R$ ) party exist, with fixed platforms  $\pi_L < 0 < \pi_R$  in the policy space  $\mathbb{R}$ . Each party has a leader who determines the party's level of screening. This, in turn, determines which politicians are willing to join each party, and thus the informativeness of the party label. Each party leader acts as utilitarian planner with respect to his party's members.<sup>4</sup>

There are three periods. In period 0, the two party leaders simultaneously choose levels of screening. In period 1, politicians decide whether or not to affiliate with a party. In period 2, there is an election. The candidates in this election are random draws, one from each party.

A party is characterized by the set of its members,  $\mathcal{P}$ , and its level of screening,  $\alpha \in [0, \bar{\alpha}]$ .<sup>5</sup> Screening affects the ideological make-up of the party by imposing costs on politicians that affiliate with the party. The further a politician's ideal point is from the party platform, the higher the costs. Following Snyder and Ting (2002), we assume that a politician who has ideal point  $x$  and is affiliated with party  $P$  receives payoff  $V(\alpha_P) = B - \alpha_P v(x - \pi_P)$  if she wins office, while a candidate who does not win office gets 0. The constant  $B$  represents the non-policy rewards associated with holding office. The cost function  $v$  is symmetric about 0, minimized at 0, twice continuously differentiable, and strictly convex.<sup>6</sup> The second term says that a politician's utility is decreasing in the both the level of screening and the divergence between her policy preferences and her party's platform, and that the rate of decrease is greater for members with ideal points further from the platform.

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<sup>4</sup>In Ashworth and Bueno de Mesquita (2004), we consider an equilibrium concept in which parties are majoritarian institutions, and screening is determined according to the preferences of the party's median member. The results are substantively identical, although the analysis is more intricate.

<sup>5</sup>Throughout, we assume that affiliation decisions are in pure strategies, so we never have to deal with probability measures over these subsets.

<sup>6</sup>This is, for example, satisfied by a quadratic loss function.

There is a density of potential politicians for each party,  $f^P$ . These distributions have supports contained in  $[-2\pi_L, 0]$  for party  $L$  and  $[0, 2\pi_R]$  for party  $R$ .<sup>7</sup> We keep the model symmetric by assuming that  $\pi_L = -\pi_R$ , that these densities are symmetric about the platforms  $\pi_P$ , and that  $f^L(\pi_L - x) = f^R(\pi_R - x)$  for all  $x$ .

After politicians choose whether or not to affiliate with a party, voters are informed that the left party consists of politicians with ideal points  $\mathcal{P}_L \subset \mathbb{R}$  and the right party consists of politicians with ideal points  $\mathcal{P}_R \subset \mathbb{R}$ . Since the affiliations will depend on the level of screening, we can write these as  $\mathcal{P}_P(\alpha_P)$ . However, the voter does not know which party members have been selected to run in the election. Instead, he believes that the ideology of a candidate from party  $P$  is a random variable with distribution

$$F^P(x; \alpha_P) = F^P(x \mid x \in \mathcal{P}_P(\alpha_P)).$$

The representative voter has preferences over the policy position of the office holder, given by  $u(x^* - x)$ , where  $x$  is the office holder's policy position and  $x^*$  is the voter's ideal point. The function  $u$  is symmetric about zero, maximized at zero, twice continuously differentiable and strictly concave.<sup>8</sup> The candidates do not know  $x^*$ ; their common belief is that  $x^*$  is a mean zero random variable with distribution  $F$  and continuous, log-concave density,  $f$ .<sup>9</sup> Finally, we assume that  $F$  has compact support.

Denote the voter's choice of a winning candidate by  $w \in \{L, R\}$ .

## 2 Equilibrium

The main goal of this section is to characterize the equilibria of the game. In later sections we use this characterization to derive comparative statics. These comparative statics show how screening, ideological homogeneity, and the informativeness of party labels change as partisan tides, platform polarization, and executive power change.

We solve the game in several steps. First, we derive the equilibrium affiliation decisions for arbitrary levels of screening, and use these decisions to derive the voters' beliefs at the election stage. Then we find the voters'

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<sup>7</sup>Ansolabehere, Snyder and Stewart (2000) show that, in Congressional elections, there are separate pools of potential candidates for the Republican and Democratic parties with essentially no overlap, just as we assume.

<sup>8</sup>These assumptions are also consistent with quadratic preferences.

<sup>9</sup>See Bagnoli and Bergstrom (1989) for an introduction to log-concave probability distributions.

optimal voting rule in the election stage, given these beliefs. This voting rule is used to construct each party leader's preferences over screening and the politicians' preferences over affiliations. Then we formally define and analyze the game between party leaders.

## 2.1 Affiliations and Beliefs

Consider a potential member of party  $L$  who must decide whether or not to affiliate (party  $R$ 's decision problem is symmetric). A candidate from party  $L$  with ideal point  $x$  has indirect utility over the level of screening ( $\alpha_L$ ) given by

$$\Pr(w = L|\alpha_L)(B - \alpha_L v(x - \pi_L)),$$

where  $\Pr(w = L|\alpha_L)$  is the probability that the candidate from party  $L$  wins, given party  $L$ 's level of screening. The probability of election depends on  $\alpha_L$  because screening affects affiliation decisions, which in turn affect the informativeness of the party's label. Write  $V_L(\alpha_L, x) = B - \alpha_L v(x - \pi_L)$ . A potential member affiliates if and only if  $V_L(\alpha_L, x) \geq 0$ , since the outside option has payoff 0.

Since  $v$  is convex and symmetric about 0, the set of politicians who affiliate with party  $p$  is the interval  $\mathcal{P}(\alpha_p) = [\underline{x}(\alpha_p), \bar{x}(\alpha_p)]$ , where  $\underline{x}(\alpha_p) < \pi_p < \bar{x}(\alpha_p)$  and  $\pi_p - \underline{x}(\alpha_p) = \bar{x}(\alpha_p) - \pi_p$ . Given this, the voter's belief about the members of party  $p$  is that their ideal points have cdf  $F^p(\cdot; \alpha_p)$  given by

$$F^p(x; \alpha_p) = \begin{cases} 0 & \text{if } x < \underline{x}(\alpha_p) \\ \frac{F^p(x) - F^p(\underline{x}(\alpha_p))}{F^p(\bar{x}(\alpha_p)) - F^p(\underline{x}(\alpha_p))} & \text{if } \underline{x}(\alpha_p) \leq x \leq \bar{x}(\alpha_p) \\ 1 & \text{if } \bar{x}(\alpha_p) < x \end{cases} .$$

This allows us to derive the main benefit of screening.

**Proposition 1** *The more screening a party does, the more informative is the party label. Formally, if  $\alpha'_p < \alpha_p$ , then  $F^p(\cdot; \alpha'_p)$  is a mean-preserving spread of  $F^p(\cdot; \alpha_p)$ .*

The proofs of this and all subsequent results are in the appendix.

Intuitively, the more screening a party does, the less uncertainty there is over the policy preferences of its membership, and so the more informative is its party label. This intuition is illustrated in Figure 1. Because of the symmetry of the distribution of potential members around the party's platform, the average ideology in party  $L$  is equal to party  $L$ 's platform position,  $\mu_L = \pi_L$ .

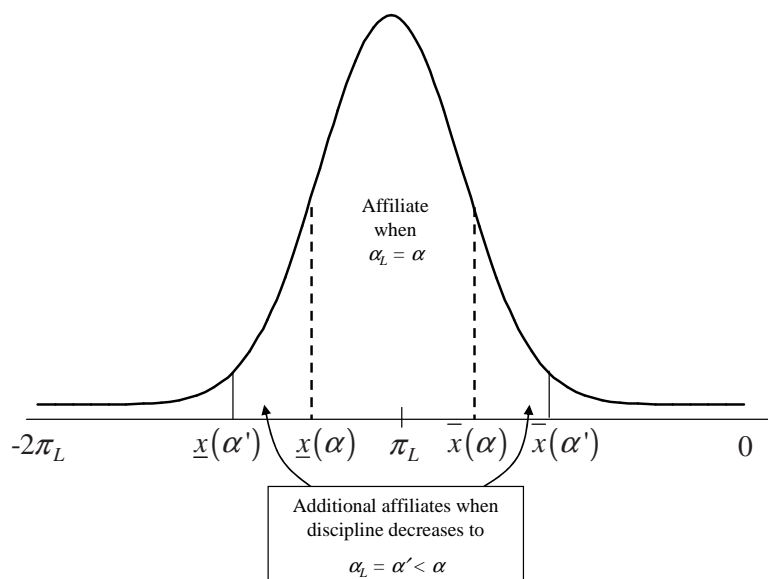


Figure 1: Decreasing screening increases the variance of the distribution of ideologies of party affiliates and, thereby, decreases the informativeness of the party label.

## 2.2 The Election

The voter chooses which candidate to elect by comparing the expected utility of each candidate. His choice is characterized by a cutpoint  $c(\alpha_L, \alpha_R)$  and the decision rule:

$$\text{vote } L \text{ if and only if } x^* \leq c(\alpha_L, \alpha_R).$$

The cutpoint is strictly increasing in  $\alpha_L$  ( $c_L > 0$ ) and strictly decreasing in  $\alpha_R$  ( $c_R < 0$ ). (This is part of Lemma 2 in the appendix.)

Intuitively, the more left-wing is a voter (smaller  $x^*$ ) the more likely he is to vote for party  $L$ . Further, the voter is more likely to vote for party  $L$  the more informative is the left-wing party's label (low  $\sigma_L$ ) or the less informative is the right-wing party's label (high  $\sigma_R$ ). This is because both of these scenarios make electing the left-wing candidate relatively less risky, which benefits the risk-averse voter.

## 2.3 The Game between the Leaders

Given the beliefs and the voting strategies, we can solve for the election probabilities as a function of the affiliation decisions. A candidate from party  $L$  is elected if and only if:

$$x^* \leq c(\alpha_L, \alpha_R).$$

Since  $x^* \sim F$ , the probability that the voter votes for the candidate from party  $L$  is  $F(c(\alpha_L, \alpha_R))$ . Given party  $R$ 's level of screening,  $\alpha_R$ , a politician's indirect utility from affiliating with party  $L$  can be written:

$$F(c(\alpha_L, \alpha_R)) V_L(\alpha_L, x).$$

Since the party leaders are utilitarian (with respect to their party members), we can define an equilibrium in the game between the leaders as follows.

**Definition 1** *A pair  $(\alpha_L, \alpha_R)$  is a party equilibrium if  $\alpha_L$  solves*

$$\max_{\alpha} \int_{V_L(\alpha, x) \geq 0} F(c(\alpha, \alpha_R)) V_L(\alpha, x) dF^L(x),$$

*and similarly for  $\alpha_R$ .*

The level of screening that a party leader chooses maximizes the average utility of the party members, taking into account the fact that a change in screening will change party membership (this is why we integrate over  $V_L(\alpha, x) \geq 0$ ).

## 2.4 The Equilibrium Condition

Now we are ready to present the main equilibrium characterization that we use to prove the substantive results. For the rest of the paper, we restrict attention to symmetric, pure strategy equilibria. The appendix discusses a sufficient condition for such an equilibrium to exist, and shows that quadratic voter utility implies that condition.

Our first step is to derive a characterization of symmetric, interior pure-strategy equilibria.

**Proposition 2** *At any symmetric, interior pure-strategy equilibrium, the common level of screening,  $\alpha^*$ , satisfies*

$$2c_L(\alpha^*, \alpha^*)f(0) = \frac{\int v(x - \pi_L) dF^L(x)}{\int (B - \alpha^*v(x - \pi_L)) dF^L(x)}.^{10}$$

This condition follows from the party leaders' first-order conditions, evaluated at a symmetric equilibrium. This first-order condition is the key to all of our results, so we will go carefully through the intuition. Like all first-order conditions, this says that if  $\alpha$  is optimal, then the marginal benefit from a small increase in the amount of screening must be exactly balanced by the marginal cost of that change.

What are the marginal benefits and costs of screening for the party leader? Recall that  $c$  is a cut-point defining when the pivotal voter will choose the candidate from party  $L$ . A small increase in screening from  $\alpha_L$  to  $\alpha_L + d\alpha_L$  moves the cut-point to the right by approximately  $d\alpha_L c_L$ , and this increases the probability of election by approximately  $d\alpha_L c_L f(c)$ . Winning gives the candidate a payoff of approximately  $B - \alpha_L v(x - \pi_L)$ , so the marginal benefit of an increase in screening is:

$$d\alpha_L f(c)(B - \alpha_L v(x - \pi_L)),$$

the marginal increase in the probability of election multiplied by the benefits of holding office.

The extra costs associated with a small increase in screening are approximately  $d\alpha_L v(x - \pi_L)$ . The candidate only bears these costs if elected,

<sup>10</sup>Notice that party equilibria need not be unique. We will say that one set of equilibria is greater than a second set if the greatest and least equilibria in the first set are greater than the greatest and least equilibria, respectively, of the second set. This is a standard approach to comparative statics with multiple equilibria (Milgrom and Shannon, 1994).

which occurs with approximate probability  $F(c)$ . Thus the marginal cost of an increase in screening is

$$d\alpha v(x - \pi_L)F(c).$$

The first order condition equates these two expressions, after averaging over the different values of potential candidate ideal points and noting that symmetry implies  $F(c) = 1 - F(c) = 1/2$ .

The marginal benefit of more screening is due to the possibility that a small increase in the informativeness of the party label will swing the election results. Said differently, the benefit of a small increase in screening comes entirely from its effect on voters who are close to indifferent between the parties. Consequently, variations in the level of screening will be driven by one of two factors: (1) changes in the responsiveness to the informativeness of party labels of nearly indifferent voters or (2) changes in the number (measure) of such voters.

### 3 Electoral and Institutional Variation

Having defined our notion of equilibrium, discussed existence, and characterized the optimal choice of screening, we now examine how changes in the electoral and institutional environment affect the level of screening undertaken by the parties to insure the informativeness of the party label.

#### 3.1 Partisan tides

Politicians, in this model, are willing to bear the costs of screening because it decreases ideological homogeneity, which increases the informativeness of the party label, providing electoral benefits. In particular, the more a party screens, the more likely any given voter is to vote for that party. However, the magnitude of this benefit depends on how likely the pivotal voter is to change his vote in response to an increase in the informativeness of a party's label. Changes in the electoral environment that affect this likelihood will change the optimal level of screening.

From the politicians' perspective, the voter's ideal point is a random variable with distribution  $F$ . We can think of the dispersion of this distribution as a measure of the average magnitude of partisan tides. When the dispersion is large, then the extent to which voters lean in one direction or the other in any given election is also expected to be large.

How does the expected size of such partisan tides affect politicians' willingness to bear the costs of screening? When partisan tides are large, voters

are likely to have relatively strong partisan preferences in any given election. This implies that the pivotal voter is less likely to be close enough to indifferent between the two parties to have his vote changed by an increase in the informativeness of a party's label. Since the benefit of screening, from the politicians' perspective, is precisely the increased probability of capturing the pivotal voter's vote, the marginal benefit of screening is higher when partisan tides are expected to be small.

To formalize this intuition, we first must formally define the notion of dispersion that we will use.

**Definition 2** *Let  $y_1$  and  $y_2$  be random variables with distributions  $F_1$  and  $F_2$ , respectively. Call  $y_1$  a strong mean-preserving spread of  $y_2$  if:*

1.  $\mathbb{E}(y_1) = \mathbb{E}(y_2) \equiv m$ ,
2.  $F_1(y) > F_2(y)$  for all  $y < m$ , and
3.  $F_1(y) < F_2(y)$  for all  $y > m$ .

This is a refinement of second-order stochastic dominance. For examples, consider any symmetric scale family of distributions:  $y(\sigma) = \sigma\epsilon$ , where  $\epsilon \sim F(\cdot)$  with  $F$  symmetric about its mean. Then increasing  $\sigma$  induces a strong mean-preserving spread in  $y(\sigma)$ . This class includes most parametric examples commonly used in political science. For instance, if two normal distributions have the same mean, the one with greater variance is a strong mean preserving spread of the other. Similarly, if two uniform distributions have the same mean, the one with a larger support is a strong mean preserving spread of the other. Intuitively, a strong mean preserving spread stretches the density of a distribution uniformly, without changing the mean.

Given this definition, we can now consider what happens to the level of screening when the average size of partisan tides changes. In order to do so, we exploit the fact that a strong mean-preserving spread of the distribution of voter ideal points makes a voter less likely to be close to indifferent between the two parties. Equivalently, the voter's ideal point is less likely to be near zero.

At a symmetric profile, the voter's cutpoint between the two parties is 0. That is, if the two parties' labels are equally informative, a voter with an ideal point to the left of zero votes for the left party and a voter with an ideal point to the right of zero votes for the right party. Since a strong mean-preserving spread of the distribution of the voter's ideal point moves probability mass away from any neighborhood of this cutpoint, the voter is less likely to be close to indifferent between the two parties (his ideal point

is less likely to be close to zero) when partisan tides are expected to be large. Thus, a small increase in the informativeness of the party label is less likely to swing the election, resulting in less screening in equilibrium. This intuition is formalized in the following result.

**Proposition 3** *Consider two distributions of the partisan shock,  $F_1$  and  $F_2$ . If  $F_1$  is a strong mean-preserving spread of  $F_2$ , then the equilibrium level of screening associated with  $F_1$  is weakly less than the equilibrium level of screening associated with  $F_2$ , and the level of screening is strictly less for generic choices of  $F_1$  and  $F_2$ .<sup>11</sup>*

### 3.2 Platform Polarization

An important part of the debate on parties in Congress concerns the relationship between ideological polarization of the parties and party strength. Indeed, a central claim of Aldrich's (1995) and Rohde's (1991) conditional party government hypothesis is that polarization increases the incentives for parties to be strong. Although our model is not specifically about legislative elections, in this section we ask if the CPG prediction regarding the effect of polarization on party strength (i.e., screening) arises from general electoral incentives to maintain party labels, as argued by Cox and McCubbins (1993).

To explore this issue, we compare the equilibrium level of screening before and after the platforms move away from each other. Formally, this means that both  $\pi_L$  and  $\pi_R$  move away from zero. To maintain symmetry of the parties both before and after the change, we assume that the densities of potential candidates are uniform.

Intuitively, as the parties move further apart, the voter becomes more concerned about platform and less concerned about uncertainty regarding the candidates' exact ideal points. This makes the voter less responsive to the informativeness of the party label. Hence, politicians are less willing to bear the costs of maintaining the label, and so the equilibrium level of screening diminishes as polarization increases. This intuition is formalized in the following result.

**Proposition 4** *The more polarized are the party platforms, the lower is the level of screening.*

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<sup>11</sup>The appendix makes the notion of genericity precise.

Proposition 4 points to a tension between Cox and McCubbins's (1993) cartel theory and CPG. Cox and McCubbins (1993) hypothesize that parties screen in order to maintain the value of the party label, just as in our model.<sup>12</sup> As we have just seen, the electoral incentives for screening decrease as polarization increases. However, a central claim of CPG is that polarization should increase party strength. Thus, an account based on purely electoral incentives for maintaining the party label (such as in Cox and McCubbins (1993) and the current paper) and CPG theory yield different predictions regarding the effect of polarization on party strength.

Of course, there is much left out of our model that might mitigate this tension. First, we treat platforms exogenously. A more nuanced account might arise in a model in which both screening and platforms are endogenous. Second, our notion of party strength includes only screening. Aldrich (1995), Rohde (1991), and Cox and McCubbins (1993) all have a broader notion of party strength in mind. Their concept of party strength includes screening activities, such as campaign support, as well as actions such as the imposition of discipline in the legislature, which may have both a screening effect as well as a direct effect on the cohesiveness of legislative voting.

Third, our model ignores the policy benefits candidates might gain from winning office. This is a potentially major oversight and could prove vital in bridging the gap between CPG and the informative party label account. Indeed, Aldrich and Rhode emphasize that policy preferences are an important part of their conditional party government thesis. One way to partially capture such effects in our model is to look at the comparative statics with respect to the benefit from winning election,  $B$ .

If candidates are policy motivated, then these benefits should increase as platforms become more polarized because there is more at stake in the election, in terms of policy outcomes. It is clear that an increase in the benefits of winning office would increase the equilibrium level of screening. Thus, this policy-driven effect runs counter to the purely electoral effect we have identified. If this effect is strong enough, it could potentially reconcile the tension between the informative party labels theory and CPG discussed above. That is, if the policy-driven increase in benefits from winning office resulting from heightened polarization more than compensates for the voter's decreased concern with informative party labels following height-

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<sup>12</sup>Recall that imposing discipline in the legislature is one means of screening, since it imposes costs on legislators whose preferences differ from the party platform. This is one of the forms of screening that Cox and McCubbins (1993) have in mind. They also discuss, for example, the provision of campaign support by the party, which could also serve a screening purpose.

ened polarization, then both models (CPG and informative party labels) would predict that party strength is positively correlated with polarization. Nonetheless, we consider it significant that purely electoral forces suggest that polarization decreases, rather than increases, party strength.

### 3.3 Executive Strength

Thus far, we have studied how electoral incentives for the preservation of the party label change with changes in the electoral environment in a general model of elections. However, institutional variation—in particular, separation of powers—can also alter such incentives.

In order to study institutional variation, we focus on legislative elections and add a simple policy-making stage to the model. Since our focus is on the role of parties in elections, not in the legislature, rather than attempt to model the complex politics of bargaining in a legislature, we follow Grossman and Helpman (1999) by adopting a reduced form representation. In particular, we assume that national policy is determined by an average of legislator ideal points. We focus on the case of majority party control, in which policy reflects a simple average of the ideal points of legislators in the majority party.<sup>13</sup> The assumption that policy outputs reflect the mean, rather than the median, of legislator ideal points is motivated by the substantive belief that voters care about the policy preferences of their representatives even when they do not believe their representative will be the median voter in the legislature.

To focus on the role of executive power over policy, we consider systems that are identical except for presidential bargaining power. There are a number of single-member legislative districts, each of which is contested by the same two parties. In a presidential system, the members of the legislature must bargain with the president to set policy. Following Alesina and Rosenthal (1995), we assume that policy is a weighted average of the legislature’s proposal and the president’s ideal point, with weight  $\beta$  on the legislative proposal:  $x = \beta x_{\text{leg}} + (1 - \beta)x_{\text{pres}}$ .

Since our focus is on the legislative election, we make the following simplifying assumptions. First, when casting his legislative vote, a voter assumes that he is not pivotal in the presidential election (this is because there are many districts). Second, we focus on equilibria that treat the parties sym-

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<sup>13</sup>Our results do not depend on this assumption of majority party control. In Ashworth and Bueno de Mesquita (2004) we show that the results also hold for “floor control”, in which policy is determined by the average of all legislators’ ideal points. We focus on majority party control here because it is less technically cumbersome.

metrically. Jointly, these imply that the lottery over presidential ideology has mean 0. Lastly, for analytic tractability, we assume that the voter has quadratic utility.

In order to determine the optimal voting rule, we mimic our previous analysis, taking into account bargaining between the legislature and the president. Simple modifications of the algebra in the proof of Remark 1 show that a voter in the presidential system will vote for legislative candidate  $L$  if and only if:

$$x^* \leq \frac{1}{2}\beta(\mu_R + \mu_L) + (1 - \beta)\mathbb{E}[x_{\text{Pres}}] + \frac{\beta(\sigma_R^2 - \sigma_L^2)}{(n + 1)(\mu_R - \mu_L)}.$$

Since  $\mu_L = -\mu_R$  and  $\mathbb{E}[x_{\text{Pres}}] = 0$  in equilibrium, this simplifies to:

$$x^* \leq \frac{\beta(\sigma_R^2 - \sigma_L^2)}{(n + 1)(\mu_R - \mu_L)},$$

so the cut-point is

$$c^{\text{pres}}(\alpha_L, \alpha_R) = \frac{\beta(\sigma_R^2(\alpha_R) - \sigma_L^2(\alpha_L))}{(n + 1)(\mu_R - \mu_L)}. \quad (1)$$

Equation (1) shows how the voters' incentives depend on presidential power ( $1 - \beta$ ). In particular, voters care more about what policies the legislative candidate's are expected to pursue the greater is the legislature's influence over policy. The president helps to moderate legislative extremism, at least on average. Voters are more concerned about the possibility of an extreme legislature when the president's ability to counterbalance it is limited. Formally, this means that the marginal benefit of an informative party label in legislative elections is attenuated by presidential power. Informative party labels are more likely to influence a voter's vote for the legislature when the president is weak. To see this, recall that the marginal benefit of screening for party  $P$  is proportional to  $c_P$ . Direct calculation shows that both  $|c_L|$  and  $|c_R|$  are increasing in  $\beta$ . This suggests the following result.

**Proposition 5** *All else equal, within a presidential system, the stronger the president is relative to the legislature the less screening parties will do.*

Intuitively, within a presidential system, the more powerful the president is relative to the legislature in determining national policy (smaller  $\beta$ ), the less the voters will focus on uncertainty over candidate ideology in legislative elections, so the less value the parties derive from creating highly informative

party labels, and so the less screening there will be. This theoretical result is consistent with Shugart’s (1998) empirical finding that, within presidential systems, there is an inverse relationship between executive strength and party strength.

The comparison of different presidential systems also suggests a further result with applicability to comparative legislative-electoral politics. Since one important difference between presidential and parliamentary forms of government is the existence of a separate executive branch with independent influence on policy in presidential systems, a highly stylized model of a parliamentary system would treat it as the limit of a presidential system as the president’s independent power goes to zero. This gives rise to the following result.

**Corollary 1** *All else equal, the level of screening is greater in a parliamentary system than in a presidential system.*

These results also have implications for the empirical work in Persson and Tabellini’s (2003) study of the comparative politics of public finance. Since, in their model, one of the mechanisms leading to different performance in presidential and parliamentary systems is based on differences in party strength (pp. 24–25), our results suggest a qualification—we should see substantial variation in performance *within* presidential systems, accompanying the substantial variation in presidential power in presidential systems. This variation within presidential systems could dampen the estimated importance of institutional variation in a simple, dichotomous comparison of presidential and parliamentary systems that neglects variation within presidential systems. Our results also suggest a constructive response to this problem. If our theory is correct, then Persson, Roland and Tabellini’s (2000) model of party-mediated differences in policy outcomes implies that we should observe differences in fiscal policy *within* the universe of presidential systems, and since those differences will be correlated with differences in screening, the hypothesis is testable.

## 4 Conclusions

We have presented a model in which screening, party memberships, and the informativeness of party labels are jointly determined in response to electoral incentives. The model generates a variety of hypotheses. Ideological homogeneity and the informativeness of party labels are predicted to be negatively correlated with the average size of partisan tides, the polarization

of the parties, and the power of the executive branch. Moreover, this last implies that there will be more informative party labels in parliamentary systems than in presidential systems. Finally, since Persson, Roland and Tabellini (2000) argue that strong parties lead to broadly targeted rather than narrowly targeted government spending, our model suggests that presidential strength may create incentives for narrowly targeted fiscal policies.

Although they are suggestive, these results should be understood as somewhat tentative. Our findings are about how electoral and institutional variation alter the purely *electoral* incentives for maintaining informative party labels. As we mentioned earlier, while these effects are likely to persist in a more complete model (e.g., one with policy-motivated candidates or a more fully specified legislative stage), there may be other, off-setting effects that we have not identified. Nonetheless, it is our view that understanding these electoral incentives is an important step toward building a more nuanced account of party strength, ideological heterogeneity, and informative party labels.

## A Proofs

We start with some preliminary results that will be useful several times in the sequel. Then we discuss existence of pure-strategy equilibria, and then we present the proofs of all results stated in the text.

### A.1 Preliminary Results

**Lemma 1** *The functions  $\underline{x}(\alpha)$  and  $\bar{x}(\alpha)$  are differentiable with  $\underline{x}'(\alpha) > 0$  and  $\bar{x}'(\alpha) < 0$ .*

**Proof** Since  $F^p$  is absolutely continuous with respect to Lebesgue's measure, the functions  $\underline{x}$  and  $\bar{x}$  satisfy the indifference conditions

$$B - \alpha_p v(\underline{x}(\alpha_p) - \pi_p) = 0 = B - \alpha_p v(\bar{x}(\alpha_p) - \pi_p).$$

Since  $v$  is differentiable and  $v'(x - \pi_p) \neq 0$  for  $x \neq \pi_p$ , an easy application of the implicit function theorem implies the result.  $\square$

**Lemma 2** *The voting subgame has an essentially<sup>14</sup> unique equilibrium. In that equilibrium, the voter votes for the left-wing candidate if and only if*

$$x^* \leq c(\alpha_L, \alpha_R)$$

for some cut-point  $c(\alpha_L, \alpha_R)$ . Moreover, this cut-point satisfies the following properties:

1.  $c$  is twice continuously differentiable,
2.  $c$  is strictly increasing in  $\alpha_L$  ( $c_L > 0$ ) and strictly decreasing in  $\alpha_R$  ( $c_R < 0$ ), and
3.  $c$  is symmetric ( $c(\alpha_L, \alpha_R) = -c(\alpha_R, \alpha_L)$ ).

**Proof** The voter's payoff from the  $L$  candidate is  $\int u(x^* - x) dF^L(x; \alpha_L)$  and her payoff from  $R$  is  $\int u(x^* - x) dF^R(x; \alpha_R)$ . Since  $u$  concave implies that  $u(x^* - x)$  is supermodular in  $x^*$  and  $x$ , and  $F^R$  dominates  $F^L$  in the FOSD sense (this follows from the non-overlapping support condition), the solution to

$$\max_{L,R} \left( \int u(x^* - x) dF^L(x; \alpha_L), \int u(x^* - x) dF^R(x; \alpha_R) \right)$$

<sup>14</sup>The voter can resolve indifference arbitrarily; this has measure 0.

is monotone in  $x^*$ . This means that there is a cutpoint  $c$  such that the voter votes  $L$  if and only if  $x^* \leq c$ .

The cutpoint satisfies

$$\int u(c(\alpha_L, \alpha_R) - x) dF^L(x; \alpha_L) = \int u(c(\alpha_L, \alpha_R) - x) dF^R(x; \alpha_R).$$

The implicit function theorem implies that  $c$  is twice continuously differentiable with derivatives

$$c_L(\alpha_L, \alpha_R) = \frac{- \int u(c - x) f_{\alpha_L}^L(x; \alpha_L) dx}{\int u'(c - x) (f^L(x; \alpha_L) - f^R(x; \alpha_R)) dx}$$

and

$$c_R(\alpha_L, \alpha_R) = \frac{\int u(c - x) f_{\alpha_R}^R(x; \alpha_R) dx}{\int u'(c - x) (f^L(x; \alpha_L) - f^R(x; \alpha_R)) dx}.$$

We will show that  $c_L > 0$ ; the proof for  $c_R < 0$  is almost identical.

First, Proposition 1 implies that increasing  $\alpha_L$  leads to a mean-preserving contraction in the distribution  $F^L$ . Since  $u$  is concave, this means that the numerator

$$- \int u(c - x) f_{\alpha_L}^L(x; \alpha_L) dx < 0.$$

Now consider the denominator. Integrate by parts to get

$$\begin{aligned} & \int u'(c - x) (f^L(x; \alpha_L) - f^R(x; \alpha_R)) dx \\ &= u'(c - x) (F^L(x) - F^R(x)) \Big|_{-\infty}^{\infty} + \int u''(c - x) (F^L(x) - F^R(x)) dx. \end{aligned}$$

The first term is 0, since both  $F^L$  and  $F^R$  converge to 1 as  $x \rightarrow \infty$  and converge to 0 as  $x \rightarrow -\infty$ . The integral in the second term is negative, since  $u$  is concave and  $F^L(x) > F^R(x)$  for all  $x$ . Thus the denominator of  $c_L$  is also negative, and we conclude that  $c_L > 0$ .

Finally, symmetry follows from the symmetry of  $u$  and from the fact that  $F^L$  and  $F^R$  are identical up to a translation that is symmetric about the origin.  $\square$

## A.2 Some Remarks on Existence

Since the party leaders' payoff functions are continuous and the levels of screening are bounded by  $\bar{\alpha}$ , an easy application of Glicksberg's Theorem ensures that mixed-strategy party equilibria exist.<sup>15</sup> Unfortunately, the question of pure-strategy existence is more delicate. The impediment to applying one of the standard existence theorems is that the endogenous function  $c(\alpha_L, \alpha_R)$  determines whether the objective functions have nice properties like concavity or supermodularity. Consequently, we see no hope of proving pure strategy existence in general. Instead, we will present sufficient conditions on  $c$  for a pure-strategy equilibrium to exist, and then we will construct an explicit example of primitives that imply these conditions. Since the conditions will be strictly satisfied in our example, we will actually prove the stronger result that there are open sets of primitives on which pure-strategy equilibria exist.<sup>16</sup>

In order to do this, we need the following notation. Let  $c_L$  be the partial derivative of  $c$  with respect to  $\alpha_L$ ,  $c_R$  be the partial derivative of  $c$  with respect to  $\alpha_R$ , and  $c_{LR}$  be the cross-partial derivative of  $c$  with respect to  $\alpha_L$  and  $\alpha_R$ .

**Lemma 3** *Assume that*

$$c_L c_R \frac{d}{dc} \log \left( \frac{f(c)}{F(c)} \right) \geq -c_{LR}$$

and

$$c_L c_R \frac{d}{dc} \log \left( \frac{f(c)}{1 - F(c)} \right) \geq -c_{LR}.$$

*Then there is a symmetric, pure strategy equilibrium.*

**Proof** Rewrite the objective function as

$$\log F(c(\alpha_L, \alpha_R)) + \log \left( \int_{V_L(\alpha_L, x) \geq 0} V_L(\alpha_L, x) dF^L(x) \right).$$

Differentiate to get

$$\frac{\partial}{\partial \alpha_L} \log F(c(\alpha_L, \alpha_R)) = c_L \frac{f(c)}{F(c)}$$

<sup>15</sup>See Fudenberg and Tirole (1998), theorem 1.3.

<sup>16</sup>The open sets are in the  $C^2$  topology on the voter's utility function.

and

$$\frac{\partial^2}{\partial \alpha_R \partial \alpha_L} \log F(c(\alpha_L, \alpha_R)) = c_{LR} \frac{f(c)}{F(c)} + c_{LCR} \frac{d}{dc} \frac{f(c)}{F(c)}.$$

A similar calculation for the  $R$  party yields

$$\frac{\partial^2}{\partial \alpha_R \partial \alpha_L} \log (1 - F(c(\alpha_L, \alpha_R))) = -c_{LR} \frac{f(c)}{1 - F(c)} - c_{LCR} \frac{d}{dc} \frac{f(c)}{1 - F(c)}.$$

The hypotheses of the theorem imply that the first cross-partial is non-negative, and that the second is nonpositive. Thus the game has strategic complementarities in  $\alpha_L$  and  $-\alpha_R$ , and Theorem 12 of Milgrom and Shannon (1994) tells us there is a pure-strategy equilibrium. Finally, standard arguments can be used to extend the result to ensure a symmetric equilibrium.  $\square$

Essentially, this lemma identifies sufficient conditions for the game between the party leaders to be parameterizable as a supermodular game, so that standard theorems can be used to establish existence. To make this lemma informative, we need to identify conditions on primitives that imply its hypothesis. We do so in the following remark.

**Remark 1** *If the voter has quadratic utility,  $u(x - x^*) = -(x - x^*)^2$ , then a pure strategy equilibrium exists.*

**Proof** Lemma 2 implies that  $c_L c_R < 0$  and logconcavity of  $f$  implies that both  $F$  and  $1 - F$  are logconcave, so both  $f(c)/F(c)$  and  $f(c)/(1 - F(c))$  are decreasing. Thus Lemma 3 implies that there is pure strategy existence if  $c_{LR} \equiv 0$ . We will show that this holds when the voter has quadratic utility:  $u(y) = -y^2$ . In this case, direct calculation shows that the cutpoint is

$$c(\alpha_L, \alpha_R) = \frac{1}{2}(\mu_R + \mu_L) + \frac{\sigma_R^2 - \sigma_L^2}{2(\mu_R - \mu_L)}.$$

Further, since  $\mu_P = \pi_P$  and the two party platforms are themselves symmetric about 0 (so that  $\frac{1}{2}(\mu_L + \mu_R) = 0$ ), the voting rule simplifies to

$$c(\alpha_L, \alpha_R) = \frac{\sigma_R^2 - \sigma_L^2}{2(\pi_R - \pi_L)}.$$

Since the right-hand side is a function of  $\alpha_L$  only through  $\sigma_L^2$  and of  $\alpha_R$  only through  $\sigma_R^2$ , the cross partial is 0.  $\square$

### A.3 Proofs of Propositions

#### A.3.1 Proof of Proposition 1

It's clear the two distributions have the same mean. Thus, by Proposition 4.6 of Wolfstetter (1999), it suffices to show that the cdfs are single-crossing: there is an  $x^*$  such that  $F^p(x; \alpha'_p) > F^p(x; \alpha_p)$  for  $x < x^*$  and  $F^p(x; \alpha'_p) < F^p(x; \alpha_p)$  for  $x > x^*$ . To verify this, notice that the symmetry of  $F^p$  implies

$$\frac{F^p(x) - F^p(\underline{x}(\alpha_p))}{F^p(\bar{x}(\alpha_p)) - F^p(\underline{x}(\alpha_p))} = \left(\frac{1}{2}\right) \frac{F^p(x) - F^p(\underline{x}(\alpha_p))}{1/2 - F^p(\underline{x}(\alpha_p))}.$$

Then differentiate to get

$$\begin{aligned} & \frac{d}{d\alpha} \frac{F^p(x) - F^p(\underline{x}(\alpha_p))}{1/2 - F^p(\underline{x}(\alpha_p))} \\ &= \frac{-f^p(\underline{x}(\alpha))\underline{x}'(\alpha)(1/2 - F^p(\underline{x}(\alpha))) + (F^p(x) - F^p(\underline{x}(\alpha)))f(\underline{x}(\alpha))\underline{x}'(\alpha)}{(1/2 - F^p(\underline{x}(\alpha)))^2} \\ &= \frac{f(\underline{x}(\alpha))\underline{x}'(\alpha)(F^p(x) - 1/2)}{(1/2 - F^p(\underline{x}(\alpha)))^2}. \end{aligned}$$

Since  $\underline{x}'(\alpha) > 0$ , this derivative is positive (negative) if and only if  $F^p(x) > (<)1/2$ . Thus the cdfs are single-crossing about  $x^* = \pi_p$ .  $\square$

#### A.3.2 Proof of Proposition 2

Taking logs, the  $L$  party leader solves

$$\max_{\alpha_L} \log F(c(\alpha_L, \alpha_R)) + \log \left( \int_{V_L(\alpha_L, x) \geq 0} V_L(\alpha_L, x) dF^L(x) \right).$$

The condition is essentially the first-order condition for this problem, evaluated at the equilibrium choices.

By Leibnitz's rule, the derivative of

$$\int_{\underline{x}(\alpha_L)}^{\bar{x}(\alpha_L)} V_L(\alpha_L, x) f(x) dx$$

is

$$\begin{aligned} & V_L(\alpha_L, \bar{x}(\alpha_L))\bar{x}'(\alpha_L)f^L(\bar{x}(\alpha_L)) - V_L(\alpha_L, \underline{x}(\alpha_L))\underline{x}'(\alpha_L)f^L(\underline{x}(\alpha_L)) \\ & + \int_{\underline{x}(\alpha_L)}^{\bar{x}(\alpha_L)} -v(x - \pi_L)f(x) dx, \end{aligned}$$

which simplifies to

$$- \int_{\underline{x}(\alpha_L)}^{\bar{x}(\alpha_L)} v(x - \pi_L) dF^L(x)$$

since  $V_L(\alpha_L, \underline{x}(\alpha_L)) = V_L(\alpha_L, \bar{x}(\alpha_L)) = 0$ .

Thus the  $L$  leader's first-order condition is

$$c_L \frac{f(c)}{F(c)} - \frac{\int v(x - \pi_L) dF^L(x)}{\int V_L(\alpha, x) dF^L(x)} = 0.$$

A similar argument shows that the  $R$  leader's first-order condition is

$$c_R \frac{f(c)}{1 - F(c)} - \frac{\int v(x - \pi_R) dF^R(x)}{\int V_R(\alpha, x) dF^R(x)} = 0.$$

At a symmetric equilibrium,  $c(\alpha, \alpha) = 0$ , so  $F(c) = 1 - F(c) = 1/2$ . Furthermore,  $\alpha_L = \alpha_R$  imply that the derivatives of  $c$  and the integrals are also equal, so the two first-order conditions reduce to the same equation:

$$2c_L(\alpha^*, \alpha^*)f(0) = \frac{\int v(x - \pi_L) dF^L(x)}{\int (B - \alpha^*v(x - \pi_L)) dF^L(x)}.$$

□

### A.3.3 Proof of Proposition 3

Say that a property that a twice continuously differentiable function might have is *generic* if it holds for an open and dense subset of  $\mathcal{C}^2$ , the space of twice continuously differentiable functions. A property is *nongeneric* if it is not generic.

We use the following result:

**Lemma 4** *If  $y_1$  and  $y_2$  have compactly supported densities  $f_1$  and  $f_2$ , respectively, and  $y_1$  is a strong mean-preserving spread of  $y_2$ , then  $f_1(m) \leq f_2(m)$ , with equality nongeneric.*

**Proof** Consider the function  $G$  defined by  $G(y) = F_1(y) - F_2(y)$ . By the definition of a strong mean-preserving spread,  $G(y) > 0$  for  $y < m$  and  $G(y) < 0$  for  $y > m$ . Since  $G$  is continuously differentiable, this implies that  $G$  is decreasing at  $m$ , so

$$G'(m) = f_1(m) - f_2(m) \leq 0.$$

Because  $G$  is decreasing on a neighborhood of  $m$ , the only way to get equality of  $f_1(m)$  and  $f_2(m)$  is for  $m$  to be an inflection point of  $G$ . But this

implies that both  $G'(m)$  and  $G''(m)$  are zero. The Theorem on page 104 of Vassiliev (2000) says that this property is nongeneric.  $\square$

The equilibrium condition in Proposition 2 says that the equilibrium level of screening,  $\alpha^*$  is a zero of

$$2c_L(\alpha^*, \alpha^*)f(0) - K(\alpha^*) = 0,$$

where  $K$  does not depend on the distribution of the partisan tide. Recall that we assumed the voter's ideal point distribution has compact support. Thus Lemma 4 implies that a strong mean-preserving spread of the distribution of partisan tides (strictly) reduces  $f(0)$  (for generic distributions), so Theorem 4 of Milgrom and Roberts (1994) implies that the set of solutions is decreasing in the dispersion of the partisan tides.  $\square$

#### A.3.4 Proof of Proposition 4

We start by recording some implications of the uniform distribution of candidate ideal points. Write  $\underline{x}(\alpha, \pi)$  and  $\bar{x}(\alpha, \pi)$  for the endpoints of a party's support, making the dependence on  $\pi$  explicit. Uniformity implies that the difference

$$\Delta(\alpha) \equiv \bar{x}(\alpha, \pi) - \pi = \pi - \underline{x}(\alpha, \pi)$$

does not depend on  $\pi$ . Thus the density of party members,

$$\frac{1}{2\Delta(\alpha)},$$

is also independent of  $\pi$ . Finally, note that the cdf is

$$F^p(x) = \begin{cases} 1 & \text{if } x \geq \bar{x}(\alpha, \pi) \\ \frac{x - \underline{x}(\alpha, \pi)}{2\Delta(\alpha)} & \text{if } \underline{x}(\alpha, \pi) < x < \bar{x}(\alpha, \pi) \\ 0 & \text{if } x \leq \underline{x}(\alpha, \pi) \end{cases} .$$

As before, equilibrium is characterized as a zero of the equation

$$2c_L(\alpha^*, \alpha^*)f(0) = \frac{\int v(x - \pi_L) dF^L(x)}{\int (B - \alpha^*v(x - \pi_L)) dF^L(x)}.$$

Because we assume that the distribution of potential candidates is uniform, the RHS of this equation is constant in  $\pi_L$ . Thus the result will be established as soon as we show that  $c_L$  is decreasing in the polarization of the platforms.

From the proof of Lemma 2, we know that

$$c_L(\alpha_L, \alpha_R) = \frac{-\int u(c-x) f_{\alpha_L}^L(x; \alpha_L) dx}{\int u''(c-x) (F^L(x) - F^R(x)) dx}.$$

The numerator is constant in  $\pi_L$ . The since  $u$  is concave, both the numerator and denominator are negative, so the derivative  $c_L$  is positive. Thus it suffices for us to show that  $F^L(x) - F^R(x)$  is weakly increasing in  $\pi_R - \pi_L$ , with strict inequality on a set of positive measure.

To see that this is true, note that the cdf is

$$\frac{x - \underline{x}(\alpha, \pi)}{2\Delta(\alpha)} = \frac{x - \pi + \Delta(\alpha)}{2\Delta(\alpha)}$$

on its support. Thus  $F^L$  increases and  $F^R$  decreases as  $\pi_L$  and  $\pi_R$  move away from zero.  $\square$

### A.3.5 Proof of Proposition 5

By Proposition 2, an equilibrium is a zero of the equation

$$2c_L(\alpha, \alpha)f(0) - K(\alpha) = 0$$

Since  $c_L$  is increasing in  $\beta$ , the left-hand side of the equation is point-wise increasing in  $\beta$ . Furthermore, the functions are continuous in  $\alpha$  since  $c$ ,  $f$ , and  $K$  are all continuous. Thus theorem 4 of Milgrom and Roberts (1994) implies that the set of solutions to the first system is increasing in  $\beta$ .  $\square$

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