

# Primaries: The Unifying Force <sup>1</sup>

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**Abstract.** We present a formal model of intra-party politics to explain candidate selection within parties. We think of parties as heterogeneous groups of individuals who aim to implement a set of policies but who differ in their priorities. When party heterogeneity is too large, parties are in danger of splitting into smaller yet more homogeneous groups. In this context we argue that primaries can have a unifying role if the party elite cannot commit to policy concessions. Our model shows how alignment in the preferred policies of various factions within a party, the relative weight of each of these factions and the electoral system interact to create incentives for the adoption of primary elections. We discuss the existing empirical literature in the light of our theoretical predictions to provide a new, structured perspective on the adoption of primary elections.

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## 1. INTRODUCTION

Political parties are an important aspect of modern democracies. There is a growing interest in trying to understand the role of political parties and their impact on democratic decision-making.<sup>2</sup> Within parties, candidate selection is a very important aspect of how policies are formed. The use of primary elections for candidate selection and its impact on party politics has recently received particular attention. However the literature is somewhat divided when it comes to the motives of the party (elite) concerning the adoption of primaries. On the one hand, primaries are seen as a screening device that allows the selection of the most apt candidate.<sup>3</sup> On the other hand, primaries are seen as an incentivizing device that pushes candidates to exert more effort to increase their valence or to better target the interests of the median voter.<sup>4</sup>

In the present paper we suggest a complementary view that may help explain why parties adopt primary elections even if this leads to a loss of control over the candidate selection process for the party elite. We consider political parties to be a continuously evolving coalition of citizens where new parties are formed as a result of a split or a fusion of existing parties (Laver and Sergenti, 2010). In this context, primaries are the party elite's commitment device to accommodate the political objectives of under-represented factions. Primaries are the consequence of conflict within the party and are only adopted when the threat of a split from dissenting factions is large enough.

Our approach helps reconcile divergent views in the ongoing debate about the adoption of primaries at the state level in the United States at the beginning of the Twentieth Century. The standard hypothesis is that primaries were adopted due to the pressure of progressive and revisionists in the beginning of the twentieth century after a period of party excesses, corruption and clientelism (Kendall and Ranney, 1956). In this view, primaries were adopted against the will of party elites due to pressures rooted in political movements outside the party machinery. Ware (2002) challenges this view arguing that many party loyalists actually supported the adoption of primaries. In fact, only party elites had the power to change the institutions of candidate selection - reform against their will seems unlikely. Ware argues that party elites themselves pushed for a reform that they later regretted: *"It was a reform that had its origins in changes in American society that, by the 1880s, were starting to pose severe problems for party politicians. The efforts by those politicians to devise procedures and regulations for dealing with them culminated in a reform that, much later, many politicians wished had not been enacted and which they tried to repeal."*<sup>5</sup>

<sup>2</sup>See for example Aldrich (1995); Besley (2005); Caillaud and Tirole (2002); Levy (2004); Eguia (2008); Roemer (2001).

<sup>3</sup>See Adams et al. (2010); Snyder and Ting (2009); Serra (2010); Aragon (2009).

<sup>4</sup>See Caillaud and Tirole (2002); Crutzen et al. (2009).

<sup>5</sup>Ware (2002), pg 22

According to our analysis, primaries were triggered by party reformists or by factions that did not see their preferences reflected in the candidates chosen by the party elite. Party elites, however, were in control of party reforms and chose the institutionalization of primaries willingly because they wanted to avoid a party split/entry of new parties - not because the party elite underestimated the costs.

To the best of our knowledge, ours is the first full theoretical model that analyzes the adoption of primaries in terms of the underlying internal factionalization of the party and the political environment.<sup>6</sup> However, the idea that primaries play a unifying role is not new in the literature. For instance Carey (2003) mentions several instances in which primaries have served as unifying force in Latin American parties “*the threat by a bloc of Chilean Christian Democrats to bolt from the coalition and support a candidacy by Andrs Zaldvar was averted by an agreement to hold primary elections (...) Primaries were held at the party, rather than coalition, level in Uruguay and Mexico in 1999, but in both cases appeared to pull together -or at least to mitigate discord within- parties that were substantially factionalized.*”<sup>7</sup> More recently Kemahlioglu et al. (2009), acknowledging the inability to directly collect data on intra-party conflict, show that more heterogeneous parties (as captured by those that are large, incumbent and centrist) are most likely to hold primaries.

We see our work as a formalization of the ideas behind the previous historical or empirical research. Our added value is that we highlight some nuances that have been overlooked so far. We model a political party composed by two factions, a *party elite* and a *dissenting faction*, and discuss the strategic incentives of these two factions explicitly. Conflict within the party is captured by two variables: the relative *weight of each faction* within the party and the degree of *alignment in their policy preferences* (relative to the policy advocated by their opposing party). In addition, we try to isolate the impact of the political environment by accounting for the *electoral bonus* of running jointly.<sup>8</sup>

In our model, the introduction of primaries requires the party elite to prefer to concede on the selection of the party candidate (by calling a primary) rather than forcing a party split. Moreover, the introduction of primaries also requires the credible threat of a party split by the dissenting faction. It is only in the presence of such threat that the party elite feels pressured to change the internal organization of the party. To illustrate this point, we can think of a situation with a high electoral bonus. Intuitively, it seems that the huge costs incurred from a party split should imply that the party elite would do anything to keep the party united. In other words, it would make sense for the party elite to call a primary in many instances. However, we show that this is not the case because the party elite

<sup>6</sup>Serra (2010) builds a related argument that contains comparative statics with respect to the heterogeneity in preferences within parties.

<sup>7</sup>Carey (2003), pg 16 and 17

<sup>8</sup>We define the electoral bonus as the probability of winning the election when both factions run in one party relative to the joint probability of winning when running separately - in a perfectly proportional system the electoral bonus is minimal, instead in a majoritarian system the electoral bonus can be large.

acknowledges that the threat of a party split by any dissenting faction is not credible due to the aforementioned costs on the deviating factions. When the electoral bonus is very high, we show that the party never accommodates the interests of dissenting factions and always appoints a member from its own group as the party candidate. The explicit discussion of both the threat of a party split and the interests of the party elite opens up a new perspective on the existing empirical literature.

After presenting our model on intraparty politics in section 2 we show in section 3 that the likelihood of primaries increases in the electoral support of the dissenting faction. A larger amount of support towards this faction increases its electoral prospects when running independently (credible threat of a party split) and it also increases the loss for the party elite should the party split (worse valuation of a party split by the party elite). We also show that when two factions start out in the same party and the party elite has only the support of a minority of party members, a decrease in either the alignment (or cohesion) of both factions or a decrease in the electoral bonus leads to an increased likelihood in the adoption of primary elections. Instead, in a situation in which the two factions are organized into two separate parties, a stronger alignment or higher electoral bonus will increase the likelihood that both factions will run together within a party whose candidate is elected through primaries.

In section 4 we show that both the electoral bonus and the relative weight of the factions within the party may convolute with some variables. It is for this reason that we give more structure to our model by founding the previous variables in terms of the vote shares each political group obtains. This allows us to further see the relevance of the vote share of the opposing party and the proportionality of the electoral system in the likelihood of primaries.

In section 5 the strength of our simple modeling approach becomes evident in the light of various extensions. Section 6 discusses our results. All proofs are in the Appendix.

## 2. A MODEL OF INTRA-PARTY POLITICS

We introduce the most simple model of intra-party politics we can think of. We assume there are three groups of homogeneous citizens. The first two are two factions that are close ideologically, that may coalesce by running as a single party or may run as two separate parties. The third group should be seen as the opposing party. We analyze the strategic behavior of the two factions in the presence of a non-strategic opposing party.

Parties cannot commit to implement any policy different than the one of their candidate (*à la* citizen candidate).<sup>9</sup> Candidate selection is therefore critical for political outcomes. When parties are composed by a homogeneous set of citizens there is consensus in the candidate

<sup>9</sup>Lee et al. (2004) argue that citizen candidate models (Osborne and Slivinski, 1996; Besley and Coate, 1997) rather than Downsian models better account for what happens in elections. Put differently, parties select candidates that implement their preferred policy instead of selecting policies that are implemented by their candidates.

selection. Instead, in a party with two factions, candidate selection bears a conflict. *Ceteris paribus* party members prefer a candidate from their own faction.

We assume that one of the factions, which we call *party elite*, holds control over the party machinery. In our model this means that the party elite alone can institutionalize a primary election as a candidate selection method. We assume here that institutionalized primary elections constitute a commitment to follow the will of the majority within the party in candidate selection. If primaries are not introduced the elite chooses its preferred candidate.<sup>10</sup> Once candidate selection has been institutionalized, the other faction within the party, which we call the *dissenting faction*, can split from the party or remain within it.<sup>11</sup> Finally, candidates are selected, elections occur and the candidate that gets a plurality of the total votes in the population implements her preferred policy.

Having three homogeneous groups and a lack of commitment implies that there are three possible policy outcomes after the election. We name the preferred policies of the party elite, the dissenting faction and the opposing party  $p_e$ ,  $p_d$ , and  $p_{op}$ , respectively. The utilities towards these policies by members of each of the two factions are captured in table 1 below.

	$p_e$	$p_d$	$p_{op}$
$u_e$	1	$x$	0
$u_d$	$x$	1	0

TABLE 1. Payoff table

These payoffs capture a situation in which each faction obtains a maximum payoff when its preferred policy is implemented and a minimum payoff when the opposing party's policy is implemented - these payoffs have been normalized. For simplicity, we assume a symmetric situation in which each faction derives the same utility from the other faction's policy:  $x \in (0, 1)$ . The parameter  $x$  should be interpreted as a measure of alignment or cohesion between the two factions, relative to the political views in the opposing party. If  $x$  is low, both factions stand in strong opposition towards each other (relative to the opposing party policy). Instead, when  $x$  is high their preferences are very much aligned (or the opposing party is very much disliked by both factions). The symmetry in payoffs seems to be particularly plausible in the context of empirical studies that measure party factionalization at the party level - i.e. identical for all factions within a party.

The described preferences can arise from a spatial model with two policy dimensions where both factions have an equal stand on the ideological dimension that distinguishes them from

<sup>10</sup>The rationale behind this simplifying assumption is that primaries have the tendency to take power away from the party elite relative to other candidate selection methods.

<sup>11</sup>Our model can be easily reinterpreted as one where party splits never occur but where the dissenting faction, if unhappy with the policies implemented by the party elite, does not engage with the election (leading to lower mobilization and an increase in the likelihood the opposing party wins the election).

the opposing party but have (smaller) differences on an orthogonal policy dimension.<sup>12</sup> We could, for instance, think of a left wing party composed by two factions who have different views on environmental issues, and equally dislike the main right wing party (figure 1 depicts such a situation).

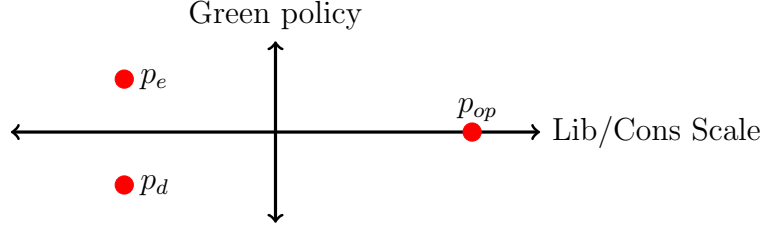


FIGURE 1. Representation of the three preferred policies in a two dimensional space

Initially we avoid to explicitly model the precise process through which parties compete electorally and instead prefer to summarize any such process in the final probabilities that each party has of winning the election. There are two possible scenarios. First, both factions run separately, in which case faction  $i$  wins the election with probability  $\pi_i \in [0, 1]$  for  $i = e, d$ . Second, the two factions run jointly as a single party in which case the party wins the election with probability  $\pi \in [0, 1]$ . The opposing party wins the election with the complementary probability, that is  $(1 - \pi_1 - \pi_2)$  when factions run separately and  $(1 - \pi)$  when factions run jointly.<sup>13</sup>

We can define the *electoral bonus* of running together ( $\alpha$ ) as the relative improvement both factions enjoy when running together as opposed to the joint probability of winning when running separately. Formally the electoral bonus is:

$$\alpha = \frac{\pi}{\pi_e + \pi_d}.$$

Throughout we assume  $\alpha$  to be greater than 1, in other words, it captures the returns from running together. Note that the characteristics of the electoral system are implicitly captured by this parameter. A proportional system is one where the gains from running together are minimal (possibly only due to the apportionment rule -see Balinski and Young, 2001), and  $\alpha$  is close to 1. Instead, in a majoritarian system running together may make all the difference between being selected for office or not, and  $\alpha$  takes very high values.

We also define the *relative strength of the party elite* ( $\gamma$ ) by considering the vote share it obtains when running independently relative to the joint probability of both factions winning the election when running separately, formally

<sup>12</sup>In section 5 we show the robustness of our results when considering a one-dimensional policy space

<sup>13</sup>The probabilities of winning the election capture a large set of models we could have in mind. For example, it could be the case that when the party splits, voters for the party perfectly coordinate by voting for one of the factions in order to avoid a large gain from the opposing party. In such case,  $\pi_i = 0$  (for  $i = e$  or  $i = d$ ) and  $\pi = \pi_e + \pi_d$ .

$$y = \frac{\pi_e}{\pi_e + \pi_d}.$$

To keep things simple and to avoid introducing more parameters we assume that the faction that has largest support when running independently is the winner of the primary (i.e. a candidate from the dissenting faction is elected when  $y < 0.5$  and one from the elite when  $y > 0.5$ ).

All of our results depend solely on the relative values of three parameters:  $x$ ,  $\alpha$ , and  $y$ . The timing of our game is summarized below.

- (1) The party elite decides on the institutional setup for candidate selection. That is, the party elite decides whether to appoint the candidate (in which case it can only commit to select an individual from its own group) or whether to call a primary election where the candidate is selected by a majority of the party voters.
- (2) The faction without control of the institutional setup observes the decision of the party elite and decides whether it wants to run together within the party elite's party or present its own candidate to the electoral race.
- (3) Elections occur and the winning candidate implements her preferred policy.

In figure 2 we draw our game in extensive form. We also incorporate the payoffs the elite and dissenting factions receive at each end node of our game.

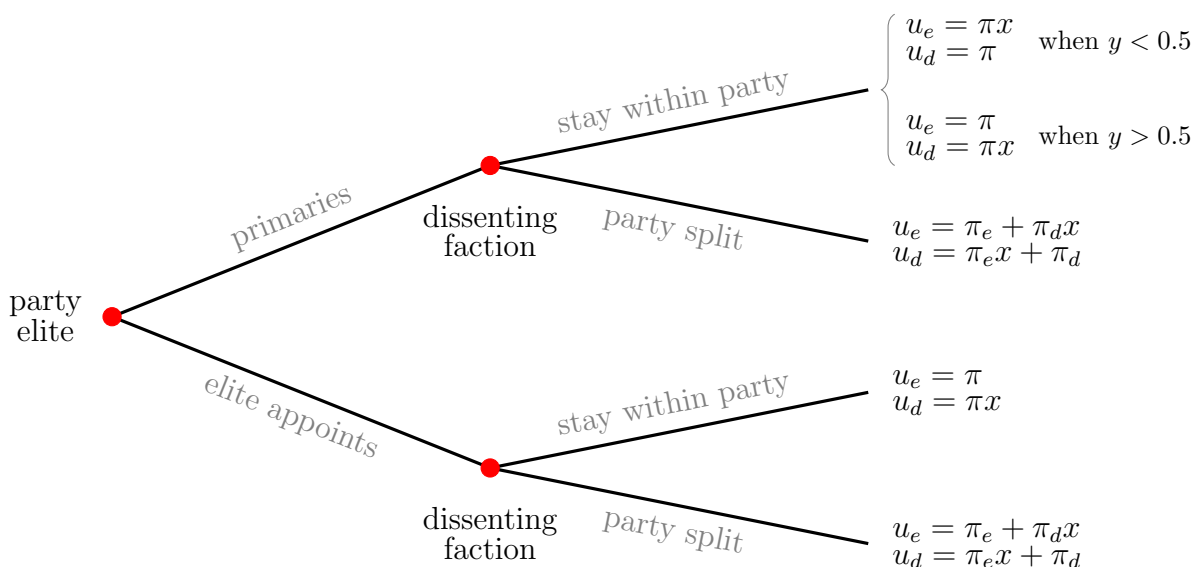


FIGURE 2. Extensive form of our intraparty politics game

### 3. EQUILIBRIUM AND RESULTS

We solve our game using the solution concept of sub-game perfect Nash equilibrium so that all actions can be sustained and incredible threats are ruled out. We solve the game by backwards induction. In the last stage of the game we know that the elected candidate implements her preferred policy. In the second stage of the game the dissenting faction, after observing the institutional setup, needs to decide whether to stay in the party or run separately. The expected utility from running separately reads as follows:

$$u_d(\text{run separately}) = \pi_e x + \pi_d.$$

The first term corresponds to the probability that the party elite wins the election multiplied by the dissenting faction's valuation of the party elite's preferred policy. The second term corresponds to the probability that the dissenting faction wins the election (multiplied by the valuation of its preferred policy which is equal to 1). When deciding whether to split from the party, the dissenting faction compares the utility of running separately with that of running within the party. Factions do not obtain a direct benefit from the particular institutional setup. However, the institutional setup indirectly affects their payoff because it determines the party candidate and the policy that will be implemented in case of electoral victory. Below we write the utility that the dissenting faction obtains when both factions run together conditional on the identity of the candidate:

$$\begin{aligned} u_d(\text{run jointly with candidate from elite faction}) &= \pi x \\ u_d(\text{run jointly with candidate from dissenting faction}) &= \pi. \end{aligned}$$

Given  $\alpha > 1$ , faction 2 will always want to remain within the party when the candidate is from its own group. This is the mechanism by which the introduction of a primary can save the party from breaking up: the party elite can commit credibly to implementing the preferred policy of the majority of party members by calling a primary election. When the dissenting faction has majority support of the party, one of its members becomes the party candidate thus the dissenting faction will never want to break apart from the elite faction. The outcome of the primary election depends on which faction has the support of the majority of the party ( $y$  greater or smaller than 0.5). We analyze one case at a time.

When the elite has majoritarian support, ( $y > 0.5$ ), the institutional setup does not matter because regardless of the candidate being elected or appointed, a member of the elite is always the candidate of the party.

When the elite does not have majoritarian support, ( $y < 0.5$ ), the institutional setup has an impact on party cohesion. If the elite appoints the leader the only credible candidate it can appoint is a member of its own group and the party breaks apart whenever

$u_2(\text{run separately}) > u_2(\text{run jointly with candidate from elite})$ . Instead, when the elite introduces primary elections, faction 2 never wants to split from the party because the faction receives the largest possible support for their preferred policy ( $\pi$  instead of  $\pi_2$ ).

In figure 3 we depict the best response of the dissenting faction to each institutional setup. The diagram on the left of figure 3 shows the situation where the party elite appoints its own candidate. The dissenting faction wants to leave the party whenever there is low alignment between the policies advocated by both factions ( $x$  small) or whenever the dissenting faction has a large support ( $y$  small). The diagram on the right of figure 3 shows the situation where the party elite calls a primary election to select the candidate of the party. The unifying effect of the primary mentioned is apparent when  $y < 0.5$ : the dissenting faction no longer wants to break away from the party.

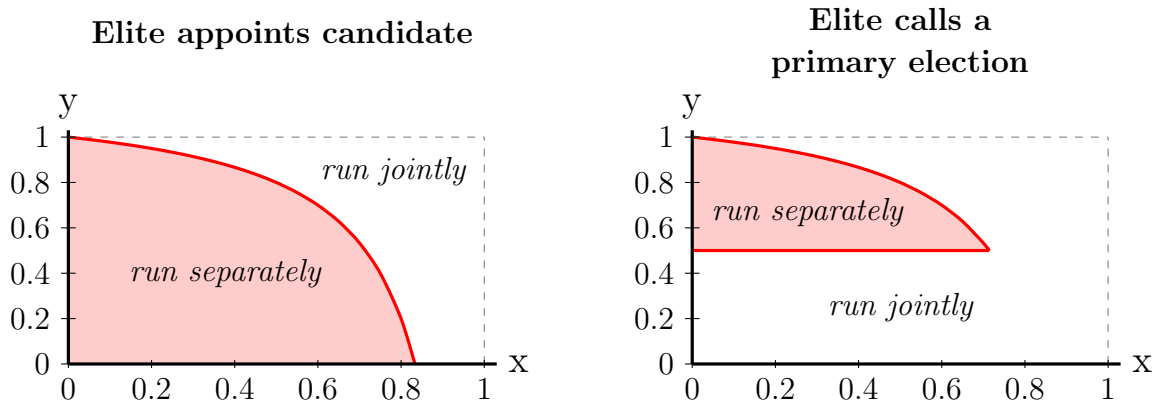


FIGURE 3. Faction 2's best response to each institutional setup ( $\alpha = 1.2$ )

In the first stage the party elite chooses the candidate selection mechanism foreseeing the reaction of the dissenting faction in the second stage. The choice is only relevant when  $y < 0.5$ . Moreover, the primary is never introduced when the dissenting faction does not threaten to leave the party: when there is no threat of break up, the party elite has no reason to give up the power of appointing the candidate. Therefore, when

$$u_d(\text{run separately}) < u_d(\text{run jointly with candidate from elite})$$

the party elite appoints the leader of the party. Note that this contrasts with previous work on primaries because we do not only consider the incentives of the party elite to introduce primaries but also the situations under which the threat of the dissenting faction running separately is credible. When  $y < 0.5$  and the threat of split of the dissenting faction is credible, the party elite only introduces the primary if giving up candidate selection to the dissenting faction is superior to a party split. Formally, primary elections are only introduced when  $y < 0.5$  and if the following two inequalities are satisfied:

$$\begin{aligned} u_d(\text{run separately}) &> u_d(\text{run jointly with candidate from elite}) \\ u_e(\text{call primaries}) &> u_e(\text{run separately}) \end{aligned}$$

In the following proposition we rewrite these two conditions in terms of our three key parameters  $x$ ,  $y$ , and  $\alpha$ .

**Proposition 1.** *When the party elite does not have the support of a majority of its selectorate ( $y < 0.5$ ), it chooses to select the leader through a primary election only when the following two conditions are met: (1)  $y < \frac{1-\alpha x}{1-x}$  and (2)  $y < \frac{(\alpha-1)x}{1-x}$ .*

The first condition in proposition 1 establishes that  $x$  needs to be small enough for the dissenting faction to credibly threaten to run independently of the party elite. The second condition establishes that  $x$  needs to be large enough for the party elite to be willing to give up the selection of the party leader to the dissenting faction by calling a primary election.

In figure 4 we illustrate the proposition's result. As a by-product of our model we characterize not only the situations in which a party adopts primary elections but also the circumstances in which two likewise factions run jointly as a unified party or separately as two independent parties.

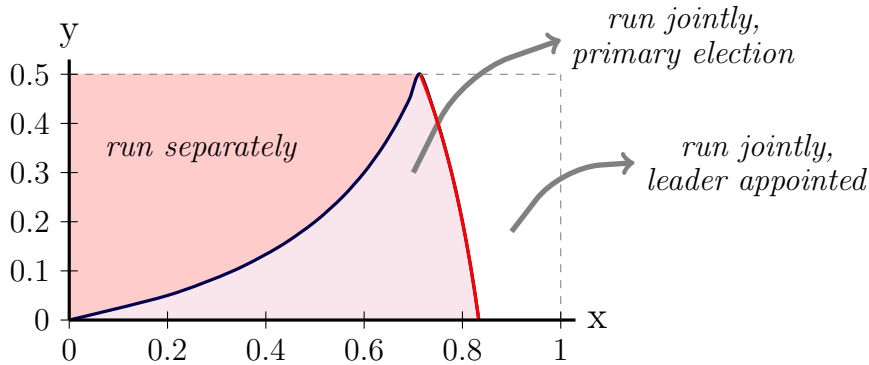


FIGURE 4. Candidate selection when  $y < 0.5$  ( $\alpha = 1.2$ )

In what follows we discuss the comparative statics emerging from proposition 1 and show how they can guide future empirical work.

A first message from figure 4 is that a decrease in  $y$  always leads to a higher likelihood of primaries. According to proposition 1 this is due to two effects. First, the party elite stands to lose more from a party split because a larger group may leave the party. Second, the dissenting faction has a better outside option and is therefore more able to *impose* the adoption of primary elections. We summarize this effect in the following corollary.

**Corollary 1.** *The likelihood of adoption of primary elections by the party elite is increasing in the support for the dissenting faction, i.e. likelihood of primaries increases in  $(1 - y)$ .*

Measuring the size of internal factions is complicated. However, in some circumstances parties form alliances with a common candidate. In that case our model suggests that alliances between equal partners (i.e.  $y$  close to 0.5) are less likely to adopt primaries. This

idea is supported by a study on district elections in Argentina by De Luca et al. (2002) who show that alliances between equal partners were less likely to adopt primaries.

Note that the two conditions in proposition 1 indicate non-monotonic effects of an increase in party alignment (increase in  $x$ ) on the likelihood of primaries. If the preferred policies of both factions are similar (high  $x$ ) a decrease in the alignment of their preferences (decrease in  $x$ ) increases the likelihood that the elite introduces primaries. Instead, if with the latter situation their preferences become even more misaligned (further decrease in  $x$ ), the elite prefers a party split rather than conceding on candidate selection. We summarize the empirical implications in the following corollary.

**Corollary 2.** *In a situation in which two factions start out in the same party and the party elite only has the support of a minority of the party members, a decrease in the alignment of both factions (decrease in  $x$ ) makes the adoption of primary elections more likely.*

*In a situation in which two factions are organized in two separate parties, an increase in the alignment of their preferred policies (increase in  $x$ ) increases the likelihood that both factions run together within a party whose candidate is elected by a primary election.*

The first part of corollary 2 simply states that if conflict increases between two factions, primaries might be used to prevent the split. The measurement of ideological differences within parties is therefore an important step to understand the adoption of primaries. While the argument is not new in the literature (see Ware, 2002; Carey, 2003; Kemahlioglu et al., 2009) tests of this hypothesis have been restricted to indirect measures, some of which convolute changes in  $x$ ,  $y$  and  $\alpha$ . An interesting study is the one by Meinke et al. (2010). They analyze candidate selection rules in the Democratic party at the state level since 1970. Their empirical analysis indicates that as the preferences of Democratic party leaders and the voting public diverge, party leaders choose a less open selection process.<sup>14</sup> The crucial question for interpreting this empirical finding with our model is whether the divergence is driven by a more extreme position of the Republicans (which would imply a higher  $x$ ) or driven by a more extreme position of the Democrat elite (which would imply a lower  $x$ ). Their empirical findings are in line with corollary 2 only when the divergence between the “public” and the Democratic party is driven by more radical Republican positions.

The second part of corollary 2 suggests a different view on the use of primaries. In this view, primaries are not used to hold parties together but to facilitate a fusion. This might shed some light on the findings by Hirano and Snyder (2008). They investigate the decline of third party votes over the second half of the twentieth century in the United States. They provide evidence that the decline was most likely due to policy cooption of left positions by the Democratic party. While they find mixed evidence regarding the direct effect of primary

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<sup>14</sup>Their measure of this divergence is the difference between the Berry state citizen ideology score (a weighted average between the Democrat and Republican representatives scores) and the Berry-based Democratic elite ideology score.

laws on third party votes they suggest that “...the introduction of the direct primary may have helped the Democratic Party move to the left by electing candidates not connected to the Democratic Party machine.”<sup>15</sup> According to our model this adoption of left policy positions was facilitated by changes in the Democratic party elite prior to the New Deal period that lead to an increase in the alignment of both groups.

In addition to the parameters  $y$  and  $x$  proposition 1 also provides comparative statics with respect to the electoral bonus,  $\alpha$ . An important difference to  $y$  and  $x$  is that the electoral bonus depends on variables that are exogenous to the party’s strategic decisions such as the district magnitude, the apportionment rule, etc. Measurable changes in  $\alpha$  should thus allow us to test the plausibility of our theory. We can show that the electoral bonus has a non-monotonic effect on the likelihood of primaries. In other words, when the party elite does not have the support of a majority of its selectorate, it chooses to select the leader through a primary election only when  $\alpha$  takes intermediate values. Once we condition on the particular organization of both factions we can derive testable implications.

**Corollary 3.** *In a situation in which two factions start out in the same party and the party elite only has the support of a minority of the party members, a decrease in the electoral bonus (decrease in  $\alpha$ ) makes the adoption of primary elections more likely.*

*In a situation in which the two factions are organized in two separate parties, an increase in the electoral bonus (increase in  $\alpha$ ) increases the likelihood of both factions running together within a party whose candidate is elected by a primary election.*

In figure 5 we depict graphically the consequences of varying the electoral bonus. On the left we illustrate the case with a low electoral bonus ( $\alpha = 1.05$ ) intuitively corresponding to a situation where the electoral system is *very* proportional. We can see that an  $\alpha$  close to 1 implies that the threat of a party split is credible for a large set of parameters because the electoral costs associated with running separately are small. At the same time, given that these electoral costs are small the faction in control of the party machinery is not willing to concede on the selection of the party candidate and rarely calls a primary election; in this situation, the party elite allows the dissenting faction to split and both factions run independently. In other words, a proportional system implies (in our model like in previous studies –see for instance Cox, 1997) the existence of more political parties and an unlikely presence of party primaries.

On the right of figure 5 we show the opposite case with a very large electoral bonus ( $\alpha = 5$ ). In this case, the dissenting faction cannot credibly commit to run independently because the electoral costs are prohibitive, i.e. running separately dramatically increases the probability that the opposing party wins the election. Knowing this, the elite faction calls primary elections in very few cases. In such a scenario, we should observe fewer parties and an

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<sup>15</sup>Hirano and Snyder (2008), pg 21.

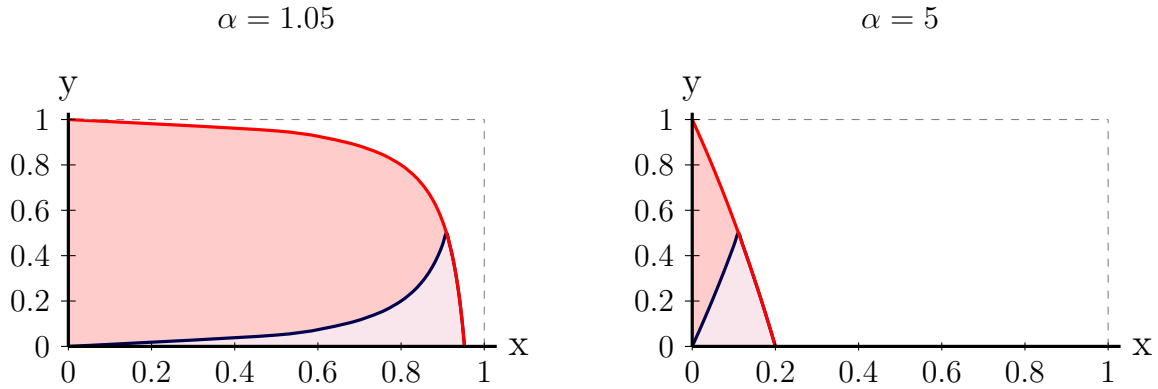


FIGURE 5. Effect of the electoral bonus on leader selection

unlikely presence of party primaries. From both situations depicted in figure 5 we can see that primaries are most likely when  $\alpha$  takes intermediate values.

The results in the above corollary look at the likelihood of primaries while conditioning on the specific party organization of both factions. When the party organization is not observable, the effect of  $\alpha$  on the use of primaries is non-monotonic. This reconciles contradicting empirical findings on the existence of party primaries.

On the one hand, the likelihood of primaries in US state level elections is lowest when the costs of running separately are prohibitively high (see Snyder and Ting, 2009). More specifically, Snyder and Ting (2009) show that the likelihood of primaries is lowest when the electorate is equally divided among the two main parties. A similar effect could arise from an incumbency advantage. If this advantage is high and attached to the party name, the threat of a party split is weakened and primaries may be avoided. This could explain the finding by De Luca et al. (2002) who find that both the Partido Justicialista and the Unión Cívica Radical in Argentina were less likely to hold primaries to nominate their congressional candidates when they were the incumbent party.

On the other hand Kemahlioglu et al. (2009) show that “*when the party system or electoral rules make it relatively easy for intraparty groups to strike out on their own, Latin American elites are less likely to opt to use primary competition to select their presidential candidates*” (pg 350)- i.e. when  $\alpha$  is low, the likelihood of primaries is lowest. Interestingly, their cross-country data reveals that this relationship only holds for some parameter values. This can be regarded as an indicator for a non-monotonic relationship between primaries and the electoral bonus.<sup>16</sup>

<sup>16</sup>In their cross-country section Kemahlioglu et al. (2009) code the thresholds for preventing runoff elections as 0, 1 and 2 respectively. A higher likelihood of a runoff can be interpreted as a lower  $\alpha$  and our theory suggests a non-monotonous effect on the aggregate use of primaries. However, their empirical design treats the effect of this variable as monotonous and finds no significant impact on the use of primaries. Instead, they find a negative relationship when bunching the values of 0 and 1 and comparing them with 2.

An additional finding in Kemahlioglu et al. (2009) is that the above mentioned relationship between low  $\alpha$  and a small likelihood of primaries disappears when controlling for the number of parties. In other words, they find that when  $\alpha$  is very low, the reduction in the use of primaries goes hand in hand with an increase in the number of parties: in figure 5 we can see that when  $\alpha$  is low (the graph on the left hand side) the relevant trade-off is between a party split and the use of primaries.

#### 4. VOTE SHARES AND INTRA-PARTY POLITICS

We have just argued that  $\alpha$  bears a close relationship with the electoral system. However, it is not difficult to envisage situations where the electoral bonus not only depends on the electoral rule but also depends on the particular distribution of vote shares across the different groups. For instance, in a purely majoritarian electoral system the difference between running together or not, may imply winning or losing the election (e.g. vote shares of the elite and dissenting factions are in both cases 30%, and the opposing party's vote share is 40%), or it may not have any consequence for the group in control of the party machinery (e.g. vote shares of the elite faction is 36%, the one of the dissenting faction is 30%, and the one of the opposing party is 34%). In other words, the effects of the electoral system are mitigated or enhanced by the particular electoral landscape (i.e. the vote share of each party).

Keeping in mind the previous results on the adoption of primaries we want to endogenize the probabilities of winning the election. We do this by giving more structure to the common factors that may be simultaneously affecting  $\alpha$  and  $y$ . In particular, we now explicitly consider the vote shares each political group obtains. Preferences of members of each group are analogous to the ones of the previous section and we assume that citizens vote sincerely and never abstain. If a primary is called, we assume that only the voters for either of the two factions can cast their vote (as would be the case if we considered closed primaries and all voters from both factions were registered party members).

There is a well established empirical relationship between vote shares and seat shares first mentioned by James Parker Smith in the Royal Commission of Systems of Elections in 1909 and extensively analyzed since then (see Kendall and Ranney, 1956 and Tufte, 1973; an excellent review is offered in Taagepera and Shugart, 1989).<sup>17</sup> When there are two parties with vote shares  $v_1$  and  $v_2$ , and seat shares  $s_1$  and  $s_2$ , this relationship is usually expressed as follows:

$$\log \left( \frac{s_1}{s_2} \right) = \beta + p \log \left( \frac{v_1}{v_2} \right)$$

<sup>17</sup>Besley and Preston (2007) and Coate and Knight (2007) are, to the best of our knowledge, the only two theoretical works where the relationship between votes and seats is derived from an underlying model with a continuum of equal sized single member constituencies with partisan and swing voters.

where  $\beta$  represents the bias in favor of party 1 and  $p \geq 1$  represents the responsiveness of the electoral system to the vote difference. In order to keep things as simple as possible we consider a situation with zero bias,  $\beta = 0$ .<sup>18</sup> This allows us to rewrite the previous expression as:

$$s_i = \frac{v_i^p}{v_1^p + v_2^p} \quad (1)$$

The proportionality of the voting system is captured by  $p$ . When  $p = 1$  we are in a perfectly proportional electoral system where the ratio of votes coincides with the ratio of seats. As  $p$  grows, the electoral system becomes less proportional. In the limit, when  $p$  grows to infinity, we are in a perfectly majoritarian system where the party that obtains most votes obtains the totality of the seats ( $s_i = 1$  when  $v_i > 0.5$  and  $s_i = 0$  when  $v_i < 0.5$ ). When we have an arbitrary number of parties with vote shares  $v_1, \dots, v_n$ , the relationship in (1) naturally reads as:

$$s_i = \frac{v_i^p}{v_1^p + \dots + v_n^p}$$

In what follows we assume that the probability that a candidate implements her preferred policy is equal to the seat share she obtains, i.e.  $\pi_i = s_i$ . This may be motivated by the fact that a higher seat share yields more posts in committees and, thus, allows more possibilities to influence policy.<sup>19</sup>

For notational convenience we denote  $v_3 \in (0, 1)$  the vote share of the opposing party and  $\lambda \in (0, 1)$  the relative vote share of the elite faction with respect to the dissenting faction. In other words, the vote share of the elite faction, the dissenting faction and the opposing party are  $\lambda(1 - v_3)$ ,  $(1 - \lambda)(1 - v_3)$ , and  $v_3$ , respectively. Capturing the vote share of the three groups in this manner allows us to compare situations where the vote share of the opposing party changes while the relative vote share of the two factions remains constant. It also allows us to analyze changes in the relative vote share of both factions while keeping constant the vote share of the opposing party.

We now have four variables of interest:  $\lambda$  and  $v_3$  capture the vote shares of the three political groups we analyze,  $x$  captures the level of cohesion or alignment between the two factions, and  $p$  captures the proportionality of the electoral system.<sup>20</sup> Before we show the effects of

<sup>18</sup>It has been shown that in the United Kingdom, there is no bias ( $\beta = 0$ ) and  $p$  is equal to 3 -the rule is thus commonly known as the *cubic rule*. Gelman and King (1994) show the relevance of the bias parameter in other countries and the way it is affected by gerrymandering.

<sup>19</sup>Gamson's law (Gamson, 1961) establishes that parties within a coalition obtain a share of portfolios proportional to their amount of seats. As a consequence, their impact on policy can be seen to be proportional to their seat share.

<sup>20</sup>While we focus our attention on the interaction between vote shares, the level of cohesion and the proportionality of the electoral system we leave out of our analysis other relevant institutional features. For instance, a change from majoritarian (single district constituencies) to proportional systems is normally seen as a decrease in the electoral bonus but such a change may also increase the power of the party elite due to the power to choose the order of the candidates in the party list. Other relevant institutional factors are out of the scope of the present paper are minimum thresholds, the Italian plurality bonus, etc.

the vote shares on  $y$  and  $\alpha$ , we explicitly describe the effects of the electoral rule on the electoral bonus.

**Lemma 1.** *When the electoral system deviates from proportional representation by favoring the largest parties, the electoral bonus is larger than 1, i.e.  $p > 1 \Rightarrow \alpha > 1$ . Instead, when the electoral bonus deviates from proportional representation by favoring the smaller parties the electoral bonus is smaller than 1, i.e.  $p < 1 \Rightarrow \alpha < 1$ .*

When the electoral rule benefits larger parties, factions have an incentive to run together because they obtain an electoral bonus. Needless to say, when the electoral system does not favor larger parties, there is no reason for any political group to concede in its policy objectives by coalescing with another group. This implies that when the electoral bonus is smaller than 1, primaries can never exert an unifying role because party elites do not want to retain a dissenting faction by giving up the selection of the party candidate. However, even though an electoral bonus smaller than one is a mathematical possibility in all electoral systems analyzed by Taagepera and Shugart (1989) the electoral bonus is always larger than 1. That is, electoral systems always deviate from a perfectly proportional system by favoring larger parties. In what follows we assume that  $p \geq 1$  (i.e.  $\alpha \geq 1$ ).

The following two lemmas summarize the effects of the vote shares on our two key variables  $y$  and  $\alpha$ .

**Lemma 2.** *The vote share of the opposing party has no effect on the relative strength of the elite faction:  $\frac{\partial y}{\partial v_3} = 0$ . Instead, the electoral bonus strictly increases in the vote share of the opposing party ( $\frac{\partial \alpha}{\partial v_3} > 0$ ).*

An important empirical point is the fact that changes in the vote share of the opposing party do not affect the relative strength of the elite faction because it implies that such changes do not affect the likelihood of primaries through that channel. However, the lemma also shows that changes in the vote share of the opposing party play a role in the likelihood of primaries through their effect on the electoral bonus: the electoral boost that the two factions obtain from coalescing (rather than running independently) increases with the size of the opposing party. The larger the opposing party, the higher the threat for both factions and the more incentives there are for both factions to run within a single party. This however, does not imply that the party elite will always be willing to make policy concessions. As we saw in the previous section, we not only need to look at the incentives of the party elite but also at the threat of splitting of the dissenting faction. Precisely, we have seen that party primaries can only occur for intermediate values of  $\alpha$  (corollary 3). It follows that changes in the vote share of the opposing party may also display non-monotonic effects on the likelihood of primaries. This result should guide future empirical work on the likelihood of primaries. At present, the likelihood of party primaries is regressed on institutional factors and characteristics of the party subject of the analysis. Instead, our analysis highlights the need to take into

account the political environment in which a party operates -in particular, the vote share of the party's opposition.

**Lemma 3.** *The relative strength of the elite faction increases in her relative vote share:  $\frac{\partial y}{\partial \lambda} > 0$ . The electoral bonus increases in the vote share of the elite only when the elite obtains a smaller vote share than the dissenting faction ( $\frac{\partial \alpha}{\partial \lambda} > 0$  when  $\lambda < 0.5$ ). Instead, when the elite obtains a higher vote share than the dissenting faction, the electoral bonus decreases in the vote share of the elite ( $\frac{\partial \alpha}{\partial \lambda} < 0$  when  $\lambda > 0.5$ ). In other words, the electoral bonus is higher when both factions are of similar size.*

It is not surprising that an increase in the relative vote share of the elite faction produces an increase in the relative strength of this faction vis-a-vis the dissenting faction. More interestingly perhaps, is the fact that the electoral bonus depends directly on the relative vote share of both factions. When both factions are of similar size they have more to lose by running independently. This implies that when the elite faction does not have the support of the majority of the party ( $y < 0.5$ ) an increase in the vote share of the dissenting faction decreases the electoral bonus. How this affects the likelihood of primaries remains uncertain due to the non-monotonicity of the likelihood of primaries on *alpha*. However, as we have shown above, once we condition on whether the two factions are coalescing or running separately, our model can tell us how a marginal change in any of our key variables might affect the likelihood of primaries. These results are precisely the ones we should be interested in when empirically testing our theory.

**Proposition 2.** *In a situation in which two factions start out in the same party and the party elite only has the support of a minority of the party members, a decrease in the vote share of the party elite (decrease in lambda) or a decrease in the vote share of the opposing party (decrease in  $v_3$ ), increases the likelihood of primaries.*

*In a situation in which the two factions are organized in two separate parties, a decrease in the vote share of the party elite (decrease in lambda) or an increase in the vote share of the opposing party (increase in  $v_3$ ), increases the likelihood of primaries.*

When the political party is composed by various factions, a decrease in the vote share of the party elite (lower  $\lambda$ ) decreases the relative strength of the party elite which gives higher bargaining power to the dissenting factions and increases the likelihood of primaries (see corollary 1). At the same time, the change in the vote share also has an effect on  $\alpha$ . Given that we are in the situation where the party elite has only the support of a minority of the party, a decrease in the party elite's vote share decreases the electoral bonus. This implies that there are less incentives to run under the same umbrella and that the threat of a party split is credible for a larger set of values. In other words, the area where primaries occur moves to the right and primaries become more likely. The effects on  $y$  and *alpha* reinforce each other and unambiguously increase the likelihood of primaries. A decrease in the vote

share of the opposing party when the political party is composed by various factions, does not affect  $y$  and decreases the electoral bonus (the opposing party is now less of a threat for either of the factions). As we have just seen, this decrease in the electoral bonus increases the likelihood of primaries.

The effects when both factions are running separately are more intricate. A decrease in the vote share of the party elite (lower  $\lambda$ ) has opposite effects on the likelihood of primaries through its effects on  $y$  and  $\alpha$ . A decrease in  $\lambda$  increases the bargaining power of the dissenting faction (increases the likelihood of primaries) and decreases the electoral bonus (because  $\lambda < 0.5$ ). The decrease in the electoral bonus makes the elite less willing to introduce primary elections.<sup>21</sup> In the proof we show that the effect  $y$  always dominates; in other words, when  $\lambda$  decreases, the likelihood of primaries increases.

Finally, when both factions are running separately, a higher vote share by the opposing party (higher  $v_3$ ) increases the electoral bonus which makes the party elite more willing to call a primary election.

**4.1. The Effects of the Electoral Rule.** Our mapping from vote shares to seat shares parameterizes all electoral rules with a single parameter,  $p$ . This parameter captures how proportional (or majoritarian) the electoral rule is. It may be extremely difficult to discern which of two electoral systems is more proportional, but from a theoretical point of view it is still interesting to assess the impact of a change in the proportionality of the electoral system. Cross-sectional empirical studies have attempted to measure such effects and, in what follows, we show that it may be very difficult to predict the effects of the voting rule given that it simultaneously affects the relative strength of the party elite and the electoral bonus in intricate ways.

**Lemma 4.** *When the electoral rule decreases its proportionality ( $p$  increases), the relative strength of the party elite decreases when its vote share is below the one of the dissenting faction and increases when its vote share is above that of the dissenting faction. In other words,  $\frac{\partial y}{\partial p} < 0$  when  $\lambda < 0.5$  and  $\frac{\partial y}{\partial p} > 0$  when  $\lambda > 0.5$ .*

*When the electoral rule decreases its proportionality ( $p$  increases), the electoral bonus increases when the opposing party obtains the highest vote share among the three political groups. Instead, when one of the two factions obtains a larger vote share than the opposing party the electoral bonus initially increases and later decreases as  $p$  becomes larger. Formally,  $\frac{\partial \alpha}{\partial p} > 0$  when  $v_3 > \max\{\lambda(1 - v_3), (1 - \lambda)(1 - v_3)\}$ . When the opposite occurs,  $\frac{\partial \alpha}{\partial p} > 0$  for small values of  $p$  and  $\frac{\partial \alpha}{\partial p} < 0$  for large values of  $p$ .*

A very non-proportional voting rule benefits larger parties and handicaps small parties. The first half of the lemma simply restates the claim. When the elite faction is larger than the

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<sup>21</sup>We are now to the left of the area where primaries are called (see figure 4) so the binding condition is the curve on the left which is determined by equation (2) in proposition 1.

dissenting faction, it prefers a majoritarian system. Instead, when the elite obtains a lower vote share than the dissenting faction, it prefers a proportional electoral system.

The influence of the electoral rule on the electoral bonus is more complicated, it precisely reflects the way in which the vote shares influence the effects of the voting rule on the electoral bonus (see example at the beginning of section 4). When the opposing party is the one that obtains the largest vote share, we have a situation where both factions have a clear incentive to coordinate by joining forces and running as a single party. This incentive grows with  $p$  because, a lower proportionality in the voting rule advantages the opposing party.

Instead, when one of the factions has the largest vote share it becomes less important for this faction to coalesce when the electoral rule is very non-proportional. In fact, when the electoral rule is almost majoritarian, the largest faction will almost certainly win the election when it is running on its own! It thus follows that the electoral bonus cannot increase in the non-proportionality of the electoral rule.

**Proposition 3.** *In a situation in which the two factions are organized in two separate parties, and the opposing party has the highest vote share among the three political groups, a decrease in the proportionality of the voting rule (increase in  $p$ ), increases the likelihood of primaries.*

When the two factions are running independently and the opposite party has plurality support, a decrease in the proportionality of the electoral system increases the incentives for both factions to coalesce. There are two driving forces: first, the smaller faction needs to overcome the contraction in its seat share due an the electoral system that is “more” majoritarian; and second, both factions need to overcome the rising seat share of the opposing party. Moreover, the smaller faction is willing to coalesce while giving up on the selection of the party candidate; i.e. it is willing to coalesce and select the party candidate through primaries.

Little can be said about the effects of the electoral system when the opposing party is not the largest party or when both factions are running within the same party. Changes in the electoral system can have opposing effects in the likelihood of primaries through their influence in  $y$  and  $\alpha$ . However, numerically we have seen that when one of the two factions has the largest vote share, primaries are very unlikely. This is because in such circumstances the electoral boost such a faction derives from coalescing is very small ( $\alpha$  is close to 1) thus the smaller faction has very little bargaining power and the largest faction can simply run independently or appoint the leader of its own party.

The result in the previous proposition matches with the second half of corollary 3 where we saw that when two factions are organized into two separate parties, an increase in the electoral bonus increases the likelihood of primaries. Note that intuitively, a decrease in the proportionality of the electoral rule always seems to imply an increase in the electoral bonus. We have seen that this intuition is not always true but it indeed applies when the conditions

in proposition 3 are satisfied. Instead the first half of corollary 3 (a party composed by two factions and controlled by a minority of its members is more likely to adopt primaries when the electoral bonus decreases) can no longer be *translated* to a comparative static in terms of the proportionality of the electoral rule.

Once again, this highlights the need for caution when carrying out cross-sectional empirical work. Above we have realized the importance of conditioning on the vote share of the opposing party ( $v_3$ ) and now we realize that it also matters which of the three groups has the largest vote share. This last aspect interacts with the proportionality of the voting rule in ways that are not obvious. On that account, any cross-sectional empirical work may suffer from the inability to isolate such effects.

## 5. EXTENSIONS

The basic model presented in the previous sections allows for several extensions. In what follows we will present some examples intuitively.<sup>22</sup> We show that all these examples have the potential to deliver new insights into the adoption of primaries and, indirectly, may also help us understand the endogenous creation/destruction of political parties.

**5.1. A Dynamic Model.** In the basic model, primary elections are never introduced when the party elite is in the majority. This is because such institutional change is no concession to under-represented factions (the party candidate still belongs to the party elite). However, in a dynamic model, primaries can be seen as a commitment to accept the will of the majority today and in subsequent elections. The future commitment may be enough to dissuade factions from splitting up.

In order to illustrate this consider a two period model where the adoption of primaries is irreversible (i.e. if primaries are adopted in period 1 they are also in place in period 2). For simplicity we assume that a party split is also irreversible, so that two parties that have run independently in one period cannot fuse in the following period. Any of our variables of interest can change from one period to the next. We are interested in the likelihood that in period 2 we lie in any of the five regions depicted in the figure 6 (the borders of any of the regions may also change, but from the modelers' perspective we simply need to know whether the conditions in proposition 1 are satisfied -i.e. in which area we are located).

We can solve the game by backwards induction. In the second period we are in a single period model and the previous analysis applies. In the first period, we need to consider the consequences of any decision in subsequent periods (by considering the expected utility from the present election plus the expected discounted utility from the next election). The dissenting faction needs to acknowledge that if it runs separately today it will also run separately tomorrow thus losing the opportunity to extract the gains of the electoral bonus

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<sup>22</sup>The algebraic analysis is available from the authors upon request.

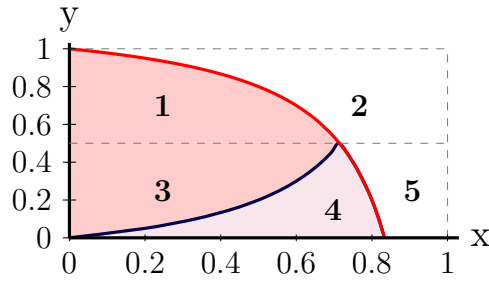


FIGURE 6. The five areas that are key for our analysis

in the future (possibly with a primary election and a party candidate of its own group). Similarly, the elite faction acknowledges that allowing the party to split today has long lasting effects so it may be willing to call a primary election for a larger set of parameters.

We now realize that the party elite may call a primary election when it has the support of the majority of the party. Such a change introduces no variation in the current party candidate but commits the party elite to call a primary in the next election (thus allowing the dissenting faction to select the candidate should they have majoritarian support).

It is convenient to separate the case where the party elite has majoritarian support ( $y > 0.5$ ) in period one from the case where it does not ( $y < 0.5$ ).

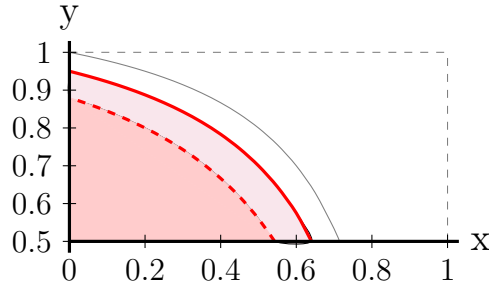


FIGURE 7. Adoption of primaries in a two period model when  $y > 0.5$

In figure 7 we show the elite's optimal institutional setup in period 1 when the elite has the support of the majority of the party. The gray (thin) curve shows the maximum value of  $x$  for which the dissenting faction splits from the party in the one period model. The red curve (solid line) shows the same value for the two period model: the range of values for which the split occurs is smaller in the two period case. This occurs because the dissenting faction internalizes the future costs of running separately (when it could be beneficial to stay as a single party). When the threat of a split is credible the elite faction will always want to call a primary election (this changes nothing in the current election and it is weakly superior in the next period election). However, the dissenting faction is not always willing to stay within the party when a primary is called. It is only for intermediate values of  $x$  (those between the dashed and continuous red curves) that the dissenting faction sees the commitment to call a primary election to be sufficient to stay within the party.

When the party elite does not have majority support in period 1 (see figure 8), the story is analogous to the one in figure 4. However, the conditions shift to the left capturing the fact that both the elite and dissenting factions are more reluctant to run separately because this has potentially high costs on the next period election.

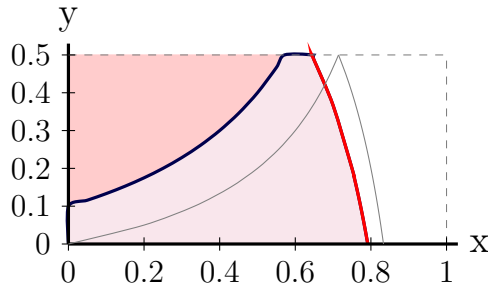


FIGURE 8. Adoption of primaries in a two period model when  $y < 0.5$

**5.2. Party Elite Can Commit.** All our model has been built on the assumption that the party has no commitment power (empirically this seems to be the case, see Lee et al., 2004). In particular, we disregarded the possibility of making policy concessions. We now analyze the robustness of our results to dropping such assumption.

It can be shown that when the party elite can credibly offer policy concessions it will never call a primary election. When the threat of a split by the dissenting faction is credible, the party elite only has to offer the policy concession that makes the dissenting faction indifferent between staying in the party or running separately. By doing so, the party elite avoids the party split and it can be shown that such a concession is always better for the party elite than a primary election (in which case the policy concession towards the dissenting faction is maximal) or a party split (in which case the party elite loses the electoral bonus of being a party with larger support).

It thus follows that the party elite introduces primary elections as a way to avert the scission of dissenting factions only when its commitment to implementing policies is limited. Another way to see this is to model imperfect policy concessions, i.e. a policy announcement that can be taken back with some probability. If the commitment power of the elite vis a vis the dissenting faction is high (if policy promises cannot be broken) primaries never occur. Only when the commitment power of the elite is low, institutional change is necessary to keep the party together. <sup>23</sup>

Another way the party elite could offer partial commitment is by implementing primaries where *the winner wouldn't take it all*. If the party elite was able to implement a primary election with a certain degree of proportionality, the party would never split. We would

<sup>23</sup>See Acemoglu and Robinson (2005) for an analogous discussion. Again, it should be stressed that we assume that the institutionalization of primaries makes them less reversible than a policy concession. Note also that this establishes an interesting link to the work of Levy (2004) who motivates the existence of parties as a commitment device.

observe a primary election with rules that were most favorable to the party elite, and such that the dissenting faction would be indifferent between staying in the party or running separately.

**5.3. Contagion Effects.** The elections of Latin American presidential candidates unveil a contagion effect by which parties are more likely to call a primary election if the opposition also do so.<sup>24</sup> Our model can be easily extended to a situation in which the opposing party is composed of two factions thus allowing us to study the circumstances under which a primary on one side of the political spectrum can influence the adoption of primaries on the other side of the political spectrum.

The adoption of primaries by one of the parties may change the candidate of the party (and the policy advocated by the party). This affects the relative alignment ( $x$ ) of the factions in the opposing party, which in turn may influence the opposing party's internal organization (corollary 2). Similarly, a party split affects the electoral bonus, which in turn influences the internal party organization of any other party.

These mechanisms can lead to an interesting multiplicity of equilibria. For instance, there are parameter configurations in which the following three configurations constitute an equilibrium: first, both opposing parties stay united and each party elite appoints its own candidate (the unity in each party reinforces the unity in the other party because the threat of a split by dissenting factions is not credible); second, both parties call a primary election and their candidates no longer belong to the party elite (the change in policy in each party makes the threat of split credible which in turn makes the party elite call a primary election); and third, both parties split and the four factions run independently in the election (the split in one party makes the split in the other party viable because parties face smaller competitors).

Our model can also be extended to explain geographical contagion, for example, across states of a country which are connected through a common federal legislative chamber. In that case the electoral bonus that any party obtains, varies according to the overall composition of the federal chamber. This implies that any change in a particular state can propagate into other states, because changes in one state affect the federal electoral bonus and, hence, the party organization in the remaining states.

**5.4. One-Dimensional Policy Space.** In section 2 we described the model and characterized the factions' payoffs (table 1) as being symmetric. These payoffs could be retrieved from a two-dimensional policy space but never from a one-dimensional policy space. Assuming a one-dimensional model does not change our main results but the presentation slightly more cumbersome because we have to distinguish two cases: when the dissenting faction advocates a policy in between the preferred policies of the elite faction and the opposing party (e.g.

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<sup>24</sup>See Aragon (2009).

$p_e < p_d < p_o$ ); and, when the dissenting faction has more extreme views than both the elite faction and the opposing party (e.g.  $p_d < p_e < p_o$ ).

In both cases we can find qualitatively identical results to the ones found in section 3. Once again, primary elections are implemented when the dissenting factions credibly threatens to leave the party and when the party elite prefers to concede on the party candidate rather than a party split. We obtain that the threat is only credible when the distance between  $p_d$  and  $p_e$  is large enough; and the party elite calls a primary election only when the distance between  $p_d$  and  $p_e$  is not too large. By replicating the maths in section 3 it can be easily shown that there is a set of values for which both conditions are satisfied. An interesting insight from this model is that the set of parameter values for which primaries occur is smaller when the dissenting faction has more extreme views (e.g.  $p_d < p_e < p_o$ ). Note that a dissenting faction with extreme views dislikes in a stronger manner the preferred policy of the opposing party so the dissenting faction is less willing to increase the likelihood the opposing party wins the election. In other words, the threat of party split is reduced (i.e. the threat of split is reduced).<sup>25</sup> Similarly, an elite faction with extreme views dislikes in a stronger manner the preferred policy of the opposing party so the party elite is more willing to call a primary election in order to avoid a party split.

## 6. DISCUSSION

In this article we provide a simple model to explain the introduction of primary elections. Our model is based on two main assumptions. First, political actors cannot commit to implement anything different than their preferred policies, thus conflict arises within heterogeneous parties. Second, commitment can only be reached through institutional change. More precisely, primaries can help the party elite commit to implement policies different to their preferred policies and mitigate in this way the discontent of the remaining members of the party.

Two conditions need to hold for primaries to occur. The threat of a party split by the dissenting members of the party needs to be credible (i.e. dissenting members should prefer running separately than remaining in the party). And the party elite should be inclined to give up on the selection of the party candidate to avoid a party split. We characterize these conditions formally and derive comparative statics with respect to the conflict within the party, the relative support of the factions within the party and the electoral bonus of competing jointly against the opposing party.

We demonstrate that our basic model can provide a micro-motivated structure for a wide range of existing empirical studies. Table 2 summarizes the comparative statics of the two main sections. When the party elite only has the support of a minority of its electorate,

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<sup>25</sup>That this effect is not unrealistic is shown by Obler (2009) in his analysis of the introduction of primaries in Belgium parties. Obler argues that the Christian Social party did not adopt primaries when the elite perceived the likely winner of the primaries being more extreme.

an increase in the variables in the first column (when the additional condition in the middle column is satisfied) makes primaries more or less likely as indicated in the last column. As has been highlighted in the text above, one of the key messages in our formal model is the interaction between various variables: factors that increase the likelihood of primaries when factions belong to the same party may have opposite effect when factions are organized in separate parties.

variable	additional condition	primaries
strength of party elite, $y$ relative vote share of party elite, $\lambda$		<i>less likely</i>
within party alignment, $x$ electoral bonus, $\alpha$ opposing party's vote share, $v_3$	factions in same party	<i>less likely</i>
within party alignment, $x$ electoral bonus, $\alpha$ opposing party's vote share, $v_3$	factions in separate parties	<i>more likely</i>
non-proportionality of electoral system, $p$	factions in same party and $v_3 > v_1, v_2$	<i>more likely</i>

TABLE 2. Testable Empirical Predictions

In addition, our results indicate that future empirical studies should incorporate variables in the political landscape where a party operates. We have also shown that comparative statics in terms of the proportionality of the voting rule are not straightforward and their effect may be mitigated or enhanced by the distribution of vote shares across the various political parties.

Future theoretical work may introduce uncertainty about our exogenously given parameters and, most importantly, may try to endogenize these variables. One avenue of fruitful research would be to analyze the relationship between vote shares and the policies advocated by each political party. Such model would allow us to assess the usual trade-off between electing a candidate that represents the party members or electing a candidate that appeals to the overall median voter. Understanding this trade-off would allow analyzing which party members stand as candidates in a primary election and may help micro-founding the existence of factions within the party.

Finally, the model can be used to make predictions about the creation and termination of political parties. We have seen how the distribution of political preferences, the electoral system and the internal organization of political parties affects the total number of parties. Our current framework may thus be regarded as a stepping stone towards a general model of political parties.

## APPENDIX

*Proof. (Lemma 1)* The effects of the electoral system in the representation of political parties can be easily depicted when we only have two parties. In figure 9 we see that a perfectly proportional system (depicted in black,  $p = 1$ ) is one where the relationship between seats and votes is on the 45 degree line: an increase in vote share sees a likewise increase in seat share. Non-proportional electoral systems can be of two kinds: first it may benefit larger parties by over-representing the party that receives a majority of the votes (depicted in blue,  $p > 1$ ); and second, it may benefit smaller parties by over-representing the party that receives a minority of the votes (depicted in red,  $p < 1$ ).<sup>26</sup>

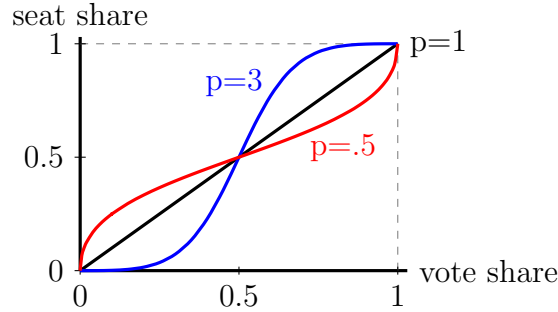


FIGURE 9. Relationship between votes and seats (two parties)

By looking at figure 9 we can see that when  $p > 1$  ( $p < 1$ ) the joint probability of two parties winning the election when running independently is always smaller (larger) than the probability of these parties winning the election when running jointly. Given that the electoral bonus is the ratio between these two quantities,  $\alpha$  is greater (smaller) than one.

In order to show this result formally we just need to write the expression for each probability:

$$\pi_e + \pi_d = \frac{\lambda^p + (1 - \lambda)^p}{\lambda^p + (1 - \lambda)^p + \left(\frac{v_3}{1-v_3}\right)^p} \quad (2)$$

$$\pi = \frac{1}{1 + \left(\frac{v_3}{1-v_3}\right)^p} \quad (3)$$

and realize that when  $p > 1$ ,  $(\lambda^p + (1 - \lambda)^p)$  is always smaller than one thus equation (2) is smaller than equation (3) thus  $\alpha = \pi/(\pi_1 + \pi_2)$  is greater than one. Instead when  $p < 1$ ,  $(\lambda^p + (1 - \lambda)^p)$  is always greater than one and the opposite occurs.  $\square$

<sup>26</sup>In the limit when  $p$  grows to infinity we have that the largest party obtains the totality of the votes (i.e. perfectly majoritarian system); and in the limit when  $p = 0$  we have that the electoral system assign an equal seat share to all parties regardless of their vote share.

*Proof. (Lemma 2)* Recall that the relative strength of the elite faction reads as follows:

$$y = \frac{\pi_e}{\pi_e + \pi_d} = \frac{\lambda^p}{\lambda^p + (1 - \lambda)^p}. \quad (4)$$

where the second equality is derived from the definitions of  $\pi_i, i = e, d$ . Trivially, the expression is independent of  $v_3$ , thus the partial derivative with respect to  $v_3$  is equal to 0. Recall that the electoral bonus reads as follows:

$$\alpha = \frac{\pi}{\pi_e + \pi_d} = \frac{\lambda^p + (1 - \lambda)^p + \left(\frac{v_3}{1 - v_3}\right)^p}{(\lambda^p + (1 - \lambda)^p) \left(1 + \left(\frac{v_3}{1 - v_3}\right)^p\right)}. \quad (5)$$

Differentiating  $\alpha$  with respect to  $v_3$  we obtain that the sign of this partial derivative coincides with the sign of  $\frac{\partial}{\partial v_3} \left(\frac{v_3}{1 - v_3}\right)$ , which is always positive.  $\square$

*Proof. (Lemma 3)* The partial derivative of  $y$  (see equation (4)) with respect of  $\lambda$  is equal to

$$\frac{p\lambda^{p-1}(1 - \lambda)^{p-1}}{(\lambda^p + (1 - \lambda)^p)^2} \quad (6)$$

which is always greater than 0. The partial derivative of  $\alpha$  (see equation (5)) with respect to  $\lambda$  is equal to:

$$\frac{\partial \alpha}{\partial \lambda} = \frac{v_3^p}{(1 - v_3)^p + v_3^p} \cdot \frac{(1 - \lambda)^{p-1} - \lambda^{p-1}}{(\lambda^p + (1 - \lambda)^p)^2} \quad (7)$$

It is obvious from the previous expression that it can be positive (negative) only when  $\lambda$  is smaller (greater) than 0.5  $\square$

*Proof. (Proposition 2)* We want to compare how a change in  $\lambda$  affects  $y$  and shifts the curve  $\frac{(\alpha-1)x}{1-x}$ . We need to compare the variation in  $y$  with the variation in the curve at the particular value of  $x$  uniquely given by  $\lambda$ . The partial derivative  $\frac{\partial y}{\partial \lambda}$  has been computed above -see (6). The partial derivative  $\frac{\partial}{\partial \lambda} \left(\frac{1-\alpha x}{1-x}\right)$  is:

$$p \cdot \frac{x}{1-x} \cdot \frac{v_3^p}{(1-v_3)^p} \cdot \frac{\lambda^{p-1} - (1-\lambda)^{p-1}}{(\lambda^p + (1-\lambda)^p)^2}$$

We need to evaluate the previous partial derivative at the policy position  $x = \frac{y}{\alpha+y-1}$  that corresponds to the actual  $\lambda$ . Doing so we obtain that

$$\frac{\partial}{\partial \lambda} \left(\frac{1-\alpha x}{1-x}\right) \Big|_{x=\frac{y}{\alpha+y-1}} = \frac{-p\lambda^p}{(\lambda^p + (1-\lambda)^p)^2} \cdot \frac{\lambda^{p-1} - (1-\lambda)^{p-1}}{1-\lambda^p - (1-\lambda)^p}.$$

The marginal change in  $y$  is higher than the marginal change in  $\frac{1-\alpha x}{1-x}$  if and only if:

$$1 > \frac{\lambda}{(1-\lambda)^{p-1}} \cdot \frac{(1-\lambda)^{p-1} - \lambda^{p-1}}{1-\lambda^p - (1-\lambda)^p}$$

which can be shown to be always true when  $\lambda < 1/2$ .  $\square$

*Proof. (Lemma 4)* The partial derivative of  $y$  (see equation (4)) with respect of  $p$  is equal to:

$$\frac{\lambda^p(1-\lambda)^p(\ln \lambda - \ln(1-\lambda))}{(\lambda^p + (1-\lambda)^p)^2} \quad (8)$$

The sign of the previous expression is equal to the sign of  $(\ln \lambda - \ln(1-\lambda))$  which in turn is equal to the sign of  $\lambda - (1-\lambda) = 2\lambda - 1$ . And this expression is positive only when  $\lambda$  is greater than 0.5. In order to compute partial derivative of  $\alpha$  with respect to  $p$  we will consider three different scenarios. First when  $v_3$  is greater than 0.5 it will be useful to rewrite expression (5) as follows:

$$\alpha = \frac{\pi}{\pi_e + \pi_d} = \frac{\lambda^p + (1-\lambda)^p + \left(\frac{v_3}{1-v_3}\right)^p}{\lambda^p + (1-\lambda)^p + (\lambda^p + (1-\lambda)^p) \left(\frac{v_3}{1-v_3}\right)^p}.$$

Note that  $(\lambda^p + (1-\lambda)^p)$  is always smaller than one, but, given that  $v_3 > 0.5$ ,  $\frac{v_3}{1-v_3}$  is greater than 1. This implies that as  $p$  grows large, the last term in the numerator grows at a higher speed than the last term in the denominator thus  $\frac{\partial \alpha}{\partial p} > 0$  when  $v_3 > 0.5$ . Note also, that  $\alpha$  tends to  $\infty$  in the limit. Second, we need to look at the case where  $v_3$  is smaller than 0.5 but greater than the vote shares of both the elite and dissenting factions. In this case, we know that  $\pi$  grows with  $p$  because both factions gather a majority of the votes. Instead,  $(\pi_e + \pi_d)$  decreases with  $p$  because the opposing party has a larger vote share than any of the two factions. It follows that  $\alpha$  is increasing in  $p$  and, once again, tends to  $\infty$  in the limit. Finally, whenever one of the factions obtains a larger vote share than the opposing party, we have that both  $\pi$  and  $(\pi_e + \pi_d)$  tend to 1 as  $p$  grows. However, we know that when  $\alpha$  is always greater than one when  $p > 1$  and is exactly equal to 1 when  $p = 1$ . This implies that  $\alpha$  cannot be monotone in  $p$  and it can be easily shown that it has a unique maximum (i.e. it first increases and then decreases).  $\square$

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