Party-bosses vs. party-primaries: quality of legislature under different *selectorate*s*

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Abstract

We study the equilibrium quality of the legislature under two selectorates: the party-principal and the party-primary. In our model, two parties compete in three districts; each party has three candidates who differ in their quality. Each voter prefers higher quality, but the median voters in each district differ in their most-preferred policies: two are home districts of each party while the third is a battleground district characterized by weaker and uncertain (at the time candidates are allocated to districts) policy preferences. We find that when home districts are "safe," and the parties' candidate pools relatively balanced in terms of quality, an equilibrium legislature under party-primaries is always of higher quality than an equilibrium legislature under party-principals.

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> The nature of the workings of government depends ultimately on the men who run it. The men we elect to office and the circumstances we create that affect their work determine the nature of popular government. Let there be emphasis on those we elect to office. V.O. Key (1956, 10)

1 Introduction

Compared to the problem of selecting good policies, the problem of selecting good politicians has received little attention in the formal political economy literature. A notable exception, Besley (2005, p.45), suggests that, both in economics and political science, a common working assumption has been to consider low-quality politicians as default and ignore the selection problem. We break away from this tradition and assume that the good (honest and able) politicians do exist, with the caveat that like many other resources, high-quality politicians are scarce. Elections are part of the mechanism through which this resource is allocated; voters desiring high-quality politicians can vote for them. But, voters have

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preferences over issues other than candidate quality (such as policy); so, a high-quality candidate from a given party may end up losing the election if he runs in a district where the policy of the party is unpopular.[1] Thus, how much of its scarce resource (high-quality politicians) a society is able to use also depends on where these candidates are fielded.

The political body that fields the candidates is called the selectorate (blending the words selector and electorate, Paterson (1967) coined the term). Different selectorates have different objectives; thus, it is no surprise that under different types of selectorates the allocation of candidates may differ. In this paper, we study how the quality of the elected legislature differs under two types of selectorates: the party-principal and the party-primary. We find that when home districts are safe and neither party has candidates of much higher quality, party-primaries always result in equilibrium legislatures of strictly greater quality than party-principals.

In the model we study, two political parties compete over three single-member districts in a legislative election. Each party has a pool of three candidates who differ only in their quality,[2] i.e., non-policy characteristics that are desirable by all voters such as honesty and competence. Each party has a fixed policy; the candidate pool of each party is of comparable (but, not necessarily identical) quality. All voters prefer high quality candidates, but the (median) voters of the districts differ in their policy preferences. Two of the three districts are the home districts of each party (partisan districts where the median voter strictly prefers the policy of one party). The home districts are safe: the home party is able to successfully defend the home district with its second-highest-quality candidate. The remaining district is a battleground district in which partisanship is weaker, and the policy of each party is favored with non-zero probability. We assume that the battleground district is contestable in the sense that if each party runs its highest-quality candidate in the battleground district, each will win with non-zero probability.[3]

The candidates are fielded either by an exclusive and centralized selector(ate), which we simply refer to as the party-principal, or by an inclusive and decentralized selectorate, which we simply refer to as the party-primary.[4] Under both selectorates the candidates propose (and, when elected, support) the party policy. Under either selectorate, the candidate allocation problem can be modeled as a game. In the first case, the players are the party-principals; each principal's objective is to maximize the number of expected seats his party wins (all of our results hold when we consider party-principals who maximizes the probability of winning a majority in the legislature). In the second case, the players are the candidates (the party-primary always chooses the candidate with the highest quality); the candidates are selfish with each maximizing the probability that he wins a seat. Given two outcomes in which this probability is the same, he chooses the one in which his party wins more seats.

[1] Myerson (1993) notes that when there are multiple candidates, the voters may end up electing a low-quality candidate even though a high-quality candidate proposing the same policy also exists. When political competition is among two parties, as in the model we propose below, the coordination problem can be solved if the party designates the high-quality candidates as its official candidate.

[2] We also think of this quality as the valence (Stokes, 1963) of the candidate. Though since valence has been used to denote several different candidate characteristics in the literature, and since we have a specific meaning (competence and integrity) in mind, throughout the paper we refer only to a candidate's quality.

[3] We discuss the robustness of our results to these assumptions in Section 4.

[4] Our analysis applies when one replaces the party-principal with a centralized party committee that has the same objective (to maximize the expected number of seats won). Similarly, party-primaries can be replaced by any mechanism through which local party members vote on the candidate to run in their district.

The contrast in the objectives of these two different sets of players leads to our result that under party-primaries the quality of the elected legislature will be strictly higher than the quality under party-principals. Intuitively, party-principals will always run their best candidates in the contestable battleground district since both parties' home districts can be secured by lower-quality candidates. Alternatively, when candidates decide in which district's primary to run, higher-quality candidates can ensure that they run in the primary of a district they will win with certainty. Thus, under party-primaries the top two candidates always win a seat, while under party-principals, the top two candidates never both win a seat. Since we also show that the third (lowest-quality) member of the legislature will be of no lower quality under party-primaries than under party-principals, it follows that the overall legislature quality will be higher under party-primaries.

In Section 4, we examine the robustness of our results and discuss our assumptions in detail. All of our results are robust to both parties proposing the same policy. If we relax the assumptions of safe home districts and contestable battleground districts, our results weaken but not reversed. For example, even if home districts are not necessarily safe, the highest-quality equilibrium legislature under party-primaries will be of no lower quality than the highest-quality equilibrium legislature under party-principals. However, there may be other equilibria under party-primaries in which the quality of the legislature is lower. Relaxing all three assumptions weakens our results further, and we are only able to say that if an equilibrium legislature of optimal quality exists under party principals, then one will as well under party-primaries. We believe, however, that the stronger restrictions we employ in the main body of the paper do not contradict the political environment in many societies. We also briefly discuss the implications of extending the model to include a general number of each type of district. We show using a simple model with candidates of only high and low quality that as long as there are neither too many nor too few high-quality candidates, our main result holds.[5]

Observers of politics and political scientists alike have noted that party-leaders (or, strong politicians within a party) quite often reward their low-quality loyalists by nominating them (to seats) in safe districts. Although this may be the case in several countries, we find that party-principals whose only purpose is winning as many seats as possible may still nominate lower-quality candidates in safe districts, leading to a legislature with suboptimal quality. Thus, low legislature quality may simply result from the party-principal's solution to his resource (candidate) allocation problem.

Another explanation for the observed low-quality legislators in several countries is that high-quality individuals do not participate in politics in these countries. Caselli and Morelli (2004) study individuals' incentives to enter into politics when some of politics' rewards depend on the overall quality of all politicians. They show that low-quality incumbents reduce entry by higher-quality individuals, since when most politicians are dishonest and incompetent, being a politician is not very desirable. In their analysis, Caselli and Morelli (2004) assume that once a high-quality individual becomes a candidate, he will always be elected to the legislature. We find, however, that under a party-principal even the highest-quality politicians do not necessarily win an office. Thus, the low equilibrium legislature quality predicted in Caselli and Morelli (2004) is likely to be an upper bound when candidates are fielded by party-principals.

Political scientists have long recognized the importance of the selectorate. Sartori (1976,

[5]Specifically, the combined number of high-quality candidates must be larger than the number of battleground districts but less than the total number of districts.

p. 74) considered candidate selection as the defining characteristic of a political party: "A party is any political group that presents at elections, and is capable of placing through elections, candidates for public office." Yet, the workings of the selectorate are not always open; Duverger (1954, p. 354) noted that candidate selection is a "private act which takes place within the party," while Ranney (1981, p. 75) defines candidate selection as a "predominantly extralegal process." With the exception of US (and, to some degree Germany, New Zealand, and Finland), legal regulations on candidate selection are almost non-existent (Rahat, 2007).

Given all this, it is no surprise that there have been relatively few formal analyses comparing different types of selectorates. In the existing literature, several authors recently studied the informational advantage of party-primaries over selection by party-principals. Among these closest to our work are Snyder and Ting (2011) and Serra (2011), studying how candidate selection through party-primaries reveal information about the valence of the candidates. Both papers provide an analysis that focuses on an election in a single constituency (as well as a detailed review of related literature). Our results complements their findings: in a setup with several districts, if the party-principals cannot observe the candidate quality (Snyder and Ting, 2011) or can observe it only partially (Serra, 2011), but the candidates know their own quality (better than the party-principal) and the quality distribution of the other candidates, then our results will still apply. That is, the high-quality candidates will run in the primaries of safer districts, winning both the primary and the seat, and the resulting legislature quality under party-primaries will be higher than that when candidates are fielded more or less randomly by a party-principal.[6]

2 The Model

Two political parties, $P \in \{L, R\}$, compete for seats in a legislature with three districts, $d \in \{l, b, r\}$, by fielding one candidate in each district's winner-take-all election. The policy of each party P, Ψ_P, is fixed such that

$$\Psi_L < \Psi_R. \tag{1}$$

Each party has three candidates who differ in non-policy characteristics that are desirable to all voters, e.g. wisdom, ability, and honesty. Below, we refer to these characteristics as the quality of the candidate, where q_j^P is a measure of the quality of candidate j from party P. We identify the candidates from party P as Candidates 1, 2, and 3, where

$$q_1^P > q_2^P > q_3^P. \tag{2}$$

We assume that the parties are *relatively evenly-matched* in terms of candidate quality in the sense that a candidate ranked as the nth highest-quality candidate in his own party ranks no lower than as the $2n$th highest-quality candidate in the aggregate candidate pool. Formally, $q_j^P > q_{j+1}^{P'}$ for all $P, P' \in \{L, R\}$ and $j \in \{1, 2\}$. We say parties are *completely*

[6]These models, as well as our analysis, study the equilibrium *allocation* of quality under different selectorates. Caillaud and Tirole (2002), and then Castenheira, Crutzen and Sahuguet (2010), study how party governance affects the *production* of (costly) platform quality by otherwise identical politicians when the quality of a candidate is imperfectly observed. They find that primaries are valuable when voters are poorly informed. Meirowitz (2005), on the other hand, notes the possibility of information transmission in the other direction: the candidates learn about the distribution of voter preferences through the party-primaries.

evenly-matched in terms of candidate quality when $q_j^P = q_j^{P'}$ for all $P, P' \in \{L, R\}$ and $j \in \{1, 2\}$.

There is a continuum of voters in each district. Voting is sincere: when deciding for which candidate to vote, a voter takes into account both the policy of each party and the quality of its candidate running in the voter's district. By abusing notation, let i denote the voter with most-preferred policy $i \in \mathbb{R}$. The preferences of i are represented by the utility function

$$U_i(\Psi_P, q_j^P) = -L(\|i - \Psi_P\|) + q_j^p, \tag{3}$$

where $L(\cdot)$ is strictly-increasing and continuous. We also assume that $L(\cdot)$ is convex; thus, in each district a majority votes for the candidate whom the median voter prefers (Groseclose, 2007, Lemma 1).

Let m_d denote the (ideal policy of the) median voter in district d. We use

$$\lambda_d = -L(\|m_d - \Psi_R\|) + L(\|m_d - \Psi_L\|) \tag{4}$$

to measure the policy preference for party R in district d. If $\lambda_d > (<)0$, the median voter in d strictly prefers Ψ_R (Ψ_L). Districts l and r are partisan districts for (or, the home districts of) parties (resp.) L and R; thus, we have $\lambda_r > 0, \lambda_l < 0$. We assume that l (r) is *safe* for L (R) in the sense that the median voter in l (r) has strong enough preferences that Candidate 2 from L (R) will win against any candidate from R (L) if nominated there, i.e.,

$$q_1^R + \lambda_l < q_2^L$$
$$q_1^L - \lambda_r < q_2^R$$

We say that the home district d is *super-safe* if it can be defended by a Candidate 3, i.e., if in the above inequality one can replace q_2^P with q_3^P.

The battleground district, b, however, has weaker partisanship. Further, depending on the state of the world, the median in b will sometimes favor Ψ_R and sometimes Ψ_L. Formally, we assume λ_b is a continuous random variable with support $[\underline{\lambda_b}, \overline{\lambda_b}]$ and cumulative density function $F(\cdot)$. We also assume that b is *contestable*: there is at least a minimal level of uncertainty about the winner of the battleground district in the race between the two highest-quality candidates. Formally,

$$\underline{\lambda_b} < q_1^L - q_1^R < \overline{\lambda_b}. \tag{5}$$

Contestability rules out the possibility that one party may have a candidate of significantly higher quality who could always win in the battleground district. For some of our results we use a stronger requirement: when the battleground district is *super-contestable*: the second highest-quality candidate from a party has a non-zero chance of winning the election in b when he runs against the highest-quality candidate from the other party. Formally, b is *super-contestable* if both $q_1^R + \underline{\lambda_b} < q_2^L$ and $q_1^L - \overline{\lambda_b} < q_2^R$ hold.

Since the districts differ in their policy preferences, there is no guarantee that the highest-quality candidate(s) will always win a seat. Such a candidate may end up losing the election, if, for instance, he is nominated in the opposing party's safe home district. Let $\mathbf{A} = [q_j^L, q_{j'}^L, q_{j''}^L, q_k^R, q_{k'}^R, q_{k''}^R]$ denote an allocation of candidates, where candidates j, j', and j'' (candidates k, k', and k'') from L (from R) are nominated in districts (resp.) l, b, and r. Given any allocation (as well as each candidate's quality and each district's strength of partisanship), one can determine the expected outcome, i.e., the probability with which

each candidate wins a seat in the legislature, and thus, the legislature's expected total quality (referred to below as the equilibrium legislature quality). For example if q_1^L and q_1^R win seats with certainty and q_2^R and q_2^L win a seat with probability (resp.) π and $1-\pi$, the legislature's quality is given by $q_1^L + q_1^R + \pi q_2^R + (1-\pi)q_2^L$. Thus, as many observers have noted, when there are safe districts, the results of the election for these seats (and, the quality of the elected legislature) is determined before the legislative elections: in these districts the selectorate rules.

We compare the equilibrium legislature quality under a centralized selectorate to the equilibrium quality under a decentralized selectorate. Examples of the former are a party-principal or a centralized party-committee, while examples of the latter are local party-primaries or a vote among the local party-members. Throughout the paper we refer the former selectorate as the party-principal and to the latter as the party-primary. Note that these two selectorates are diametrically opposed both in terms of centralization and exclusiveness, another criteria used to classify selectorates (Rahat and Hazan, 2010). As described below, the decision making problem under each selectorate can be modeled as a game.

2.1 Description of the game under each selectorate

Under party-principals: The objective of each party-principal is to maximize the (expected) number of seats his party wins in the legislative election. The preferences of each party-principal satisfy the expected utility hypothesis, and each principal is risk-neutral.[7] A strategy for the principal of P is an ordered sequence of qualities $q_j^P q_{j'}^P q_{j''}^P$, where playing $q_j^P q_{j'}^P q_{j''}^P$ simply means nominating candidates with qualities q_j^P, $q_{j'}^P$, and $q_{j''}^P$ in districts (resp.) l, b, and r. A strategy profile for this game is denoted by $A_{CS} = (q_j^L q_{j'}^L q_{j''}^L, q_k^R q_{k'}^R q_{k''}^R)$.

Under party-primaries: The candidates are the players, each deciding in which district's primary to run. When two or more candidates from party P run in the same primary, the local members of P vote to decide which candidate will run in the (general) legislative election.[8] Since all candidates from a given party offer the same policy, the candidate with highest quality wins the primary. Thus each candidate has three strategies, $\{l, b, r\}$. A strategy profile for this game is denoted by $A_{DS} = (d, d', d'', k, k', k'')$ indicating that Candidates 1, 2, and 3 from $L(R)$ run in the primaries of the districts (resp.) d, d', and $d''(k, k'$, and $k'')$. For example, a strategy profile such as (l, b, r, l, r, b) gives rise to an allocation $\mathbf{A} = [q_1^L, q_2^L, q_3^L, q_1^R, q_3^R, q_2^R]$.

The candidates are selfish: each candidate cares first and foremost about his own success in the legislative election. More formally, let (o_j, O) denote candidate j's results from a given strategy profile under party-primaries, where $o_j \in [0, 1]$ is the probability of j winning a seat in the legislative election and O is the number of his party's expected seats. We assume that j has lexicographic preferences: he prefers (o_j, O) to (o'_j, O') if and only if (i) $o_j > o'_j$, or, (ii) $o_j = o'_j$ with $O_j > O'_j$. When he decides between lotteries on the outcomes of election results (mixed strategies), a candidate is selfish in the same way: he ranks two lotteries in terms of the probability that he wins a seat in each, and only if both give rise to the same probability, he then considers the expected number of seats his party wins.

[7] Thus, for instance, a party-principal is indifferent between outcome A in which his party ties in all districts and outcome B in which his party ties only in one district, wins one district and loses the other one.

[8] As long as they do not vote strategically, allowing independents and members of the other party to vote in the primaries, i.e., considering semi-open and open primaries, would have no effect on our results.

3 Equilibrium legislature quality under the two selectorates

We examine the characteristics of the Nash Equilibria under each type of selectorate, before analyzing the implications for the equilibrium legislature quality. Throughout this section we assume that

Assumption 1: In the legislative election, (i) the battleground district is contestable and the home districts are safe, and (ii) the parties are relatively evenly-matched in terms of candidate quality.

Then,

Proposition 1 *In every Nash Equilibrium each party principal nominates his highest-quality candidate in the battleground district with probability one. The set of Nash Equilibria is non-empty.*

Proof. Simply note that no matter which mixed or pure strategy his opponent plays, by nominating Candidate 1 in b and Candidate 2 in the party's home district, the principal of R (L) guarantees that his party is expected to win $1+\pi$ ($2-\pi$) seats, where $\pi = F(q_1^R - q_1^L)$ denotes the probability that the highest-quality candidate from R wins b when he competes against the highest-quality candidate from L. Thus, in no Nash equilibrium should a party expect to receive fewer seats. But, when the principal of, say, L nominates any of its lower-quality candidates (2 and 3) in b with probability $r > 0$, then the principal of R can guarantee a higher expected number of seats by nominating Candidate 1 in b and Candidate 2 in the party's home district, i.e., $1 + (1-r)\pi + rF(q_1^R - q_2^L) > 1 + \pi$.

To see the existence of equilibrium, note that each party principal nominating his best candidate in b, his second-best candidate in his own home district and his worst candidate in the other party's home district is always a Nash Equilibrium. ■

Since in any Nash Equilibrium both parties nominate their highest-quality candidates in the battleground district, only one highest-quality candidate will win a seat in the legislature. Thus, highest-quality candidates will never make up the majority of the legislature. Formally,

Remark 1 *Under party-principals, the total equilibrium legislature quality is bounded from above by* $\overline{Q}^{CS} = \max\{q_1^R, q_1^L\} + q_2^L + q_2^R$.

The Nash Equilibrium mentioned in the proof of Proposition 1 is not necessarily unique. For instance, when a home district is super-safe, there exists another pure strategy Nash Equilibrium in which the party-principal nominates his best candidate in b and his worst candidate in his home district. Thus, when both home-districts are strongly partisan (super-safe), a legislature in which the majority of candidates are of lowest quality is also Nash Equilibrium outcome.[9]

That party-leaders may reward their low-quality but loyal supporters by nominating them in safe seats has already been noted by several observers of politics (Best and Cotta, 2000). Our analysis provides an alternative (and, in certain cases, complementary) explanation for such behavior. We find that low-quality candidates being nominated in safe seats (and, the resulting low-quality of the majority of legislators) may simply be an artifact of party-principals maximizing the usefulness of their resources. Intuitively, it is a waste of

[9] Also note that mixed strategy Nash Equilibrium in which a principal mixes between Candidates 2 and 3 in home districts exists and both Proposition 1 and Remark 1 apply to such equilibria as well.

resources for the party to nominate the highest-quality candidate in any district other than the battleground district, since the party can win its home district using a less valuable resource (a lower-quality candidate) and will never win the opponent's home district (even if the party's highest-quality candidate runs there). Thus, when candidates are selected centrally, lower-quality candidates will be nominated in safe seats even when each selector(ate) cares not at all about the loyalty of the party's members in the legislature and only tries to maximize the expected number of seats the party controls.

Our analysis also clarifies the conditions under which the preferences of party-principals on the loyalty or the quality of candidates might make a difference. It is reasonable to assume that no party-principal will give up a seat to the other party just because otherwise a non-loyal or low-quality candidate from his own party would win that seat. Thus, a principal who wants his party's group in the legislature to be as loyal as possible may nominate his loyal Candidate 3 to the seat in the party's super-safe home district over his disloyal Candidate 2. On the other hand, a policy-motivated party-principal who believes that high-quality candidates can help the party be more effective in the legislature (Londregan, 2000, 32) should always nominate Candidate 2 in the home-district.

Finally, note that Proposition 1 (and, thus Remark 1) still holds when one assumes that each party-principal maximizes the probability that his party wins a majority in the legislature.[10] In a political resource (campaign expenditure) allocation model Snyder (1989) shows that when party-principals maximize the probability of winning a majority of the seats in the legislature they allocate more resources to swing districts than party-principals maximizing the number of expected seats. In our model the equilibrium allocation of resources is identical under both objectives as candidate quality is a discrete and non-additive resource.

When candidates are nominated to the general election by a party-primary, the candidates' primarily selfish objective drives their behavior (and hence the characteristics of the legislature) in equilibrium.

Proposition 2 *Under party-primaries, there is no Nash Equilibrium in which candidate j from P wins a seat with positive probability unless every candidate j' from P with $q^P_{j'} > q^P_j$ also wins a seat with higher probability.*

Proof. To see why, assume otherwise, i.e., that there exists an equilibrium in which a candidate from P with quality q_j runs in the primary of district d winning the legislative election there with probability p, while another candidate from P with quality $q_{j'} > q_j$ runs in the primary of d' and wins the legislative election there with probability $p' < p$. This cannot be an equilibrium as by deviating from d' to d, the higher-quality candidate j' will win the primary in d as well as the seat representing d with a probability higher than $p > p'$. ■

Note that Proposition 2 does not depend on any of the assumptions we imposed in this section. Imposing one of them (safe home districts) allow us to be able to say much more on the quality of elected legislatures under party-primaries.

Proposition 3 *When the home districts are safe, in any Nash Equilibria under party-primaries, both parties' highest-quality candidates certainly win a seat while the third seat*

[10] Then, the argument in the proof of Proposition 1, reads as follows: by nominating his best candidate in b and the second best-candidate in own home district, principal of R (L) can guarantee to win a majority with probability π (resp. with probability $1-\pi$). Whenever a candidate other than Candidate 1 is nominated in b, the principal of the other party wins a majority with higher probability.

is won by the second highest-quality candidate (Candidate 2) from one of the parties.

Proof. Assume that there exists an equilibrium in which the highest-quality candidate from one party is not in the legislature. By Proposition 2, the opposing party must have won all of the seats in the legislature. But, by running in his party's safe home district, Candidate 1 can ensure that he will win a seat. Therefore, in equilibrium both Candidate 1's must win a seat with probability one. By Proposition 2, one of the candidates with the second highest-quality must win the third seat in the legislature. ■

To determine exactly which candidate wins which seat is not always possible. One key condition is whether the battleground district is super-contestable or not. If it is, then neither highest-quality candidate will run in b; in the unique Nash Equilibrium outcome of the game, each highest-quality candidate wins his own home district, while Candidate 2 from R will win the battleground district with probability $F(q_2^L - q_2^R)$.[11] If b is not super-contestable, (at least one Candidate 1 can guarantee to win b against a Candidate 2 from the opposing party), then at least one additional PSNE exists.[12] In these PSNE, Candidate 1 from P runs in b. He, as well as Candidate 1 from P' and Candidate 2 from P (both running in their own party's home district), win the election for sure.

In either case, the equilibrium legislature includes both Candidate 1's and one Candidate 2. Thus,[13]

Remark 2 *Under party-primaries, the total equilibrium legislature quality is bounded from below by* $\underline{Q}^{DS} = q_1^L + q_1^R + \min\{q_2^R, q_2^L\}$.

When we compare the total (or, average) quality of legislature under two selectorates, we find

Theorem 1 *The equilibrium legislature will always be of higher quality under party-primaries than under party-principals.*

Proof. When the candidate pool of each party is relatively-evenly matched, the lowest-quality parliament under party-primaries has a higher quality than the highest-quality parliament under party-principals, $\underline{Q}^{DS} - \overline{Q}^{CS} = \min\{q_1^R, q_1^L\} - \max\{q_2^R, q_2^L\} > 0$. ■

It is important to note that under neither mechanism the decision-makers (party-principals and candidates) have the slightest interest in the quality of elected legislature. Yet, under party-primaries the quality is higher, because the selfishness of the candidates leads to allocations in which those who are able run in districts in which they will win with

[11] Since in this equilibrium the probability that a party wins a majority of seats will depend on the quality difference between the second-highest candidates of each party, our model also predicts that under party-primaries the parties have strong incentives to recruit high quality Candidate 2's, while under party-principals, each party is mostly concerned about recruiting "stars" (Candidate 1's) of as high quality as possible.

[12] Although there are mixed strategy Nash Equilibrium in which Candidate 3s mix, under party-primaries there is no Nash equilibrium in which a candidate who wins a seat with positive probability mixes. Intuitively, this is because for a candidate to mix, he must be indifferent between two strategies on two levels: the probability that he wins a seat and the expected number of seats his party wins. Given the differences in candidate qualities and district preferences, one can show that running in two different primaries will never give rise to two lotteries in which these two are the same.

[13] Note that Propositions 2 and 3 (and, thus, the Remark 2), too, still hold if candidate objectives are lexicographic with top priority given to winning the primary: each candidate evaluating an outcome with the order the primary, the seat and then the success of the party.

certainty. Under party-principals, the career of these high-quality politicians may be sacrificed for better winning chances for the party. So while neither set of players cares about legislative quality, the differences between each set's incentives still result in party-primaries dominating party-principals.

Studying the allocation of campaign expenditures in a multi-district setup under party-principals, Snyder (1989) finds that marginal districts receive a larger share. When the resource allocated is candidate quality, we find that his result still holds. But, unlike the campaign dollars, the candidates are free to choose where to run under a decentralized selectorate, so, we find a quite different allocation of candidate quality result under party-primaries. Further, we conjecture that our result will hold in multi-member districts as well, i.e., then, too, a party-principal will nominate his highest-quality candidates in battleground districts or in a lower place in the party's list.

Note that Theorem 1 compares the equilibrium quality of the legislature and not the equilibrium social welfare under different selectorates. We focus only on the quality dimension as social welfare depends on not only the quality of elected candidates, but also their policy. Unlike the quality of a candidate, policy is an issue over which voters disagree.[14] In general one cannot calculate equilibrium voter welfare under the two selectorates without making interpersonal comparisons. For such comparisons, one must study a much more specific model in which (i) the measure and the distributions of voters in each district, and (ii) the exact shape of the voter utility function are both specified.[15]

Still, we can compare the welfare levels under two selectorates if the parties are completely evenly matched in terms of candidate quality or if there is a certain degree of symmetry.

Proposition 4 *Assume that the voters' welfare increases in the quality of the legislature. If the quality differences between the highest and the next highest-quality candidates is the same in each party ($q_1^L - q_2^L = q_1^R - q_2^R$) and the battleground district is super-contestable, then the equilibrium social welfare is always higher under party-primaries.*

Proof. When b is super-contestable there exists a unique equilibrium under party-primaries. When $q_1^L - q_2^L = q_1^R - q_2^R$ in this equilibrium the probability that, say, L's policy wins, $F(q_2^L - q_2^R)$, is the same as the probability that L's policy wins in any equilibrium under party-principals; see proof of Proposition 1. Given that under both selectorates the probability that each policy wins the election is the same, if the voters' welfare increases in the quality of legislature, the selectorate under which the quality of legislature is higher results in higher voter welfare. By Theorem 1, this is the decentralized selectorate. ■

Note that, if the parties are completely evenly-matched in terms of candidate quality ($q_1^L = q_1^R$ and $q_2^L = q_2^R$), and the battleground district is super-contestable, then, by Proposition 4, equilibrium social welfare is always higher under party-primaries.

In Proposition 4 we assume that voters' welfare increases in the quality of the legislature. This assumption seems logical since corrupt legislatures will steal public funds and those with less ability or wisdom will produce badly written laws with damaging loopholes or extensive uncertainty (Londregan, 2000, p.29). Further, as low-quality agents of the voters, such legislatures will be low-quality principals to bureaucrats as well (Laffont,

[14] In Section 4, we study the equilibrium when the parties propose identical policies. Then, of course, we can always make welfare comparisons; equilibrium welfare under party-primaries is always strictly larger.

[15] Additionally, for welfare calculations, one may want to take the cost of each candidate selection method into account.

2000). So, even when the expected policy under party-primaries is inferior to that under party-principals, the welfare gain due to the higher-quality legislature may outweigh the cost.

The above analysis shows that party primaries are better in producing a high quality legislature and possibly a higher level of voter welfare. Then, one wonders why they are not commonly adopted throughout the world. Although the adoption of party-primaries is not the question we study here, our analysis may give some clues as to why candidate selection through party-primaries (or, other inclusive and decentralized candidate selection methods) are relatively uncommon. We find that the safe partisan districts would support a switch from centralized to decentralized selectorate as they gain (in terms of expected representative quality), while this is not always true for the battleground (or, contested) districts. So, the lack of voter support may not be the main issue. Comparing the equilibria under both selectorates, we can see that the parties would be reluctant to unilaterally adopt party-primaries in legislative elections unless there exists a considerable "primary bonus."[16] This is because, if one party-principal could manipulate his own party's primaries while the other one does not, by placing his highest quality candidate in the battleground district the former could increase his party's expected number of seats (and, guarantee an election victory when b is not super-contestable) even when his party has no advantage. In such a case the legislature is of high quality, but one principal meddling in the affairs of his own party is not an equilibrium; when he can, the other principal, too, will do the same, leading to the situation mentioned in Proposition 1.

4 Robustness check and discussion

In this section, we study how robust our results are to changes to our assumptions. First, we examine how our results change if we remove parts, and then, all of the Assumption 1, i.e., if we do not assume that battleground districts are contestable, home districts are safe, or candidate pools are relatively evenly matched. We then address the restrictions imposed in (1), (2), and (3), and consider an extension in which two parties compete over many districts. Last, we discuss the implications of candidates' (perceived) quality varying in different districts. All of the proofs for the claims in this section are provided in the Appendix.

4.1 Unsafe home districts, no battleground districts, and unevenly matched candidate pools

We analyze a setup in which the two parties have roughly equal resources and influence. For example, the parties are relatively evenly-matched in terms of candidate quality. When one removes this assumption, it is possible to come up with examples under which the quality of the elected legislature is the same under both selectorates. For instance, when the quality difference between the (candidate pools of the) parties is so large that the lowest quality candidate from P has much higher quality than the highest quality candidate from P', all the candidates from P will win the election under *any* selectorate. The popularity of each party's policy is relatively similar as well: each party has safe a home district, and there is a contestable battleground district. As in the case of a party that dominates the

[16] See Carey and Polga-Hecimovich (2006) on the existence of such a bonus in case of presidential elections in Latin America, but see also Kemahlioglu, Weitz-Shapiro and Hirano (2009).

other one in terms of quality, when a party dominates the other in popularity of its policy our main result will not hold: if b certainly prefers the policy of one party, and that party has the highest-quality candidate, then the highest possible equilibrium quality level under party-principals is no less than that under party-primaries.

In an earlier working paper version of this paper we study a setup in which there is no uncertainty about the location of the median voter in battleground district. When imposing almost no restriction on the quality distributions and district loyalties, that setup gives rise to almost two hundred thousand different games under each type of selectorate. Still we find that if for a given election an optimal-quality legislature is a pure strategy Nash Equilibrium outcome under party-principals, then for the same election an optimal-quality legislature is an pure strategy Nash Equilibrium outcome under party-primaries.[17] And while such a result applies only to those cases in which one selectorate can attain a legislature of optimal quality, it is worth noting the analogous result when the battleground district's policy preference is uncertain.

Proposition 5 *Consider an election with no restrictions on the relative power of the parties (either in terms of popularity of policies in the districts or the quality of candidates). If optimal-quality legislature is a pure strategy Nash Equilibrium outcome under party-principals, then it is a pure strategy Nash Equilibrium under party-primaries as well.*

Proof. In the Appendix. ■

If, instead we maintain our assumption that the parties have relatively evenly-matched candidate pools while continuing to relax the assumptions of safe home districts and contestable battleground districts (that is, assume $\lambda_l < \underline{\lambda_b} < q_1^L - q_1^L < \overline{\lambda_b} < \lambda_r$, but not necessarily that l and r are safe), then by assuming that the candidate of quality q_j^P can always win in his party's home district against $q_j^{P'}$ for $j \in \{1, 3\}$, a somewhat stronger result can be derived.

Proposition 6 *If the parties are relatively evenly matched in candidates (but, not necessarily in popularity of their policies), then the highest-quality pure strategy Nash Equilibrium legislature under party-principals will be of no higher quality than the highest-quality pure strategy Nash Equilibrium legislature under party-primaries.*

Proof. In the Appendix. ■

Both Proposition 5 and 6, help to rank the two selectorates in terms of the equilibrium legislature quality, but the generalizability of both suffer from the multiple equilibria with different legislature qualities.[18] In other words, while Proposition 6 shows that there will always be an equilibrium legislature under party-primaries of at least as high quality as the highest-quality equilibrium legislature under party-principals, in many cases there are additional equilibria that result in lower legislature quality under party-primaries. Thus, Propositions 5 and 6 cannot make any testable predictions.

However, we think that the assumptions of safe home districts, a contestable battleground district, and relatively evenly-matched candidate pools do not contradict the political environment in many societies (and thus the predictions of our main results are valid). In

[17] By optimal-quality legislature we mean that no candidate of strictly lower quality wins a seat in the legislature with non-zero probability if a candidate of strictly higher quality does not win with certainty.

[18] Though we show only that Propositions 5 and 6 hold for pure strategy equilibria, we speculate that both Proposition 5 and 6 hold under mixed strategies as well.

the case of safe home districts, it is not uncommon for the majority of districts to (almost) always elect a candidate from a particular party, despite the fact that candidate quality varies from election to election. For instance, Denver (1988) notes that "[b]etween 1955 and 1970, a period in which there were five general elections, three quarter of the seats in Britain have never changed hands, and a further 13 percent of constituencies were won by the same party in four out of the five elections." Similarly, that the battleground district is contestable seems essential to its definition: if one party can always win a district by nominating a particular candidate, that district does not seem to be a battleground district (since one party can always ensure an election victory). It is worth noting that we do not restrict the probability with which each party will win the battleground district, only that by nominating its top candidate in b, each party will have a non-zero chance.

4.2 Identical policies

Another assumption we make is that the parties diverge in policy (1). The models of legislative elections with endogenously determined party policy (but, with homogeneous candidates) in Callander (2005) and Snyder (1994) predict policy divergence, while the one in Hinich and Ordeshook (1974) predicts policy convergence (at the median of the district medians). When we study the equilibria under identical policies we find that under party-principals there exists no equilibrium in pure strategies, while under party-primaries the equilibrium outcome is unique.[19] In terms of equilibrium quality, we find

Proposition 7 *When the parties propose identical policies ($\Psi_L = \Psi_R$),*

(i) under party-principals, no equilibrium in pure strategies exists and in any mixed strategy Nash Equilibrium both Candidate 1's never win a seat with probability one, $\overline{Q}^{CS} < q_1^L + q_1^R + \max\{q_2^R, q_2^L\}$,

(ii) under party-primaries, the three highest-quality candidates always win a seat, $\underline{Q}^{DS} = q_1^L + q_1^R + \max\{q_2^R, q_2^L\}$.

Proved in the Appendix, Proposition 7 shows that all of our previous results apply when parties propose identical policies. Further, in this case we need neither equal quality differences nor super-contestable battleground districts for our welfare result to hold (Proposition 4). Intuitively, when parties propose identical policies, the election becomes deterministic in b and no district is safe; there are three battleground districts.[20] The voters in every district vote purely based on the quality of the candidates, thus, under party-primaries a candidate will never fail to win a seat if any other candidate of lower-quality wins one.

4.3 Different policies under different selectorates

In our model the parties are what Austin-Smith (1987) calls Downsian: all the candidates from the same party does adopt the party policy. Austin-Smith (1987) studies a model with non-Downsian parties. In that model an equilibrium exists only under certain strong restrictions; in the equilibrium the policy of the parties (but not that of the candidates) converge to the median of the medians. Eyster and Kittsteiner (2007), too, study a model in which candidates may deviate from the party policy even though such deviations are costly.

[19] When $q_2^L = q_2^R$, the outcome is unique in terms of winners' quality levels. When $q_2^L \neq q_2^R$, the set of winners is also uniquely determined.

[20] The game under party-principals is similar to the Blotto game where PSNE also fails to exist.

They find that, under certain conditions, candidates in highly partisan districts will deviate from the party policy (in their model, the parties adopt divergent policies in equilibrium). Such a setup would not affect Theorem 1 in any qualitative way as long as such moves are sufficiently costly that the home districts remain safe, i.e., the high quality candidate from the other party cannot deviate sufficiently from the policy of his party to appeal to the voters in the home district.

The above studies do not consider party-primaries, but one can imagine that such deviations are less costly under party-primaries. Indeed, in their analysis of the adoption of party-primaries in the US, Ansolobehere, Hirano and Snyder (2007, p. 22) note that the overall assessment in the literature concerning the US is that there is less party discipline when candidates are fielded through the party-primaries. If the policy of the party becomes sufficiently more extreme under party primaries, our welfare comparisons (Proposition 4) would be affected: the voters' welfare may be lower under party-primaries due to a larger degree of polarization or variation in the legislature. Yet, Ansolobehere, Hirano and Snyder (2007) also note about the aforementioned claim that "[t]he ratio of conjecture to hard evidence in this literature is quite high, however, and the evidence that exists is decidedly mixed." Further, using roll call voting data Hirano et. al. (2010) finds that the introduction of party-primaries has no effect on partisan polarization. Both Gerber and Morton (1998) and Bullock and Clinton (In Press) finds that certain types of party-primaries (closed primaries in the former and blanket primaries in the latter) may contribute to polarization, but as the title of the latter study suggests the size of such effect is limited. Malloy (2006) reports that in Canada where the dues-paying local party members are the selectorate, the party discipline has been considerably high. Finally, studying the relationship between the selectorate and the policy in a theoretical model with a single constituency, Jackson, Mathevet and Mattes (2007) find that the equilibrium policies of the parties under party-primaries may be more or less extreme than their policies under party-principals.

4.4 Candidates from the same party with identical quality

In (2), we assume that within a party, all candidates differ in their quality, ruling out quality distributions in which two (or, more) of the candidates from the same party have the same quality. Of course, if each party has two highest-quality candidates, then the equilibrium quality is the same under both selectorates.[21] But, note that there is not much scarcity in this case: there are four highest-quality candidates and three seats. If, on the other hand each party has two lowest-quality candidates, all of our results still hold. In an earlier working paper version, we investigate the equilibria when there is no shortage of the lowest-quality candidates, i.e., when there exists several Candidate 3's in each party. In this case, it is straightforward to show that the equilibrium quality of legislature is unchanged under party-primaries and the equilibrium quality of legislature will not increase under party-principals (it would decrease when one of these additional lower-quality candidates is more loyal than Candidate 2 to the party-principal and when the home district is super-safe). Thus, all of our results holds when there is no shortage of lowest-quality candidates.

[21] Unless the home districts are super-safe, in which case there is an equilibrium under party-principals in which one or both parties run their lowest-quality candidates in the super-safe home districts. In such a case, in addition to the optimal-quality equilibrium legislature found under party-primaries, under party-principals there are other equilibria with suboptimal legislature quality.

4.5 Alternative voter preferences

In (3), we assume that voter preferences are represented by the additive utility function, while the utility from policy is concave (the loss function is convex). Following Enelow and Hinich (1982), this is by far the most commonly employed utility function in the literature studying political competition with valence differences (where the disutility from policy difference is generally assumed to be either quadratic or linear in that difference). The main advantage of employing such preferences in our model is that to compute the electoral winner in a given district we only need to know the median voter's most preferred policy: as Groseclose (2007, Lemma 1) shows, additivity with convexity are sufficient conditions for the majority to always vote for the same alternative as the median voter.[22] Under alternative

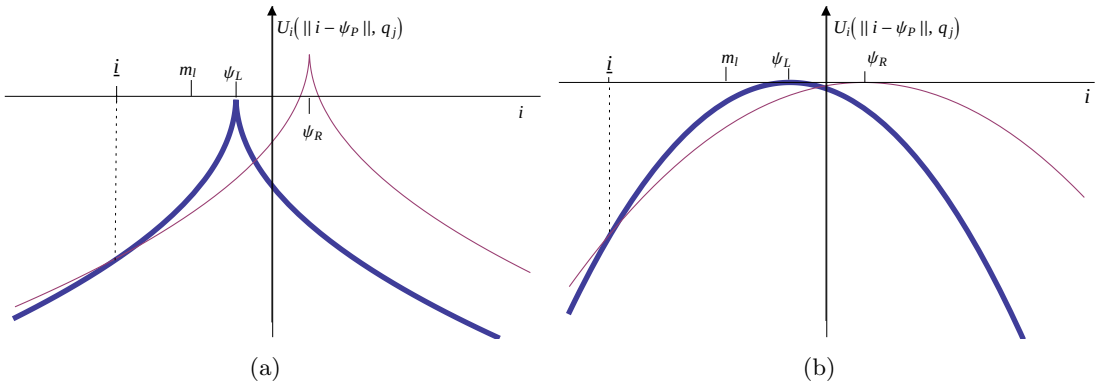

Figure 1: Candidate 2 from L ranks higher in the median voter's preferences, but l is not safe (Candidate 1 from R can capture it) when there are sufficiently many voters to the left of $\underline{i}$. In both panels the thick (thin) curve represents the utility of voter i from Candidate 2 (Candidate 1) from party L (R).

preferences (utility functions), to consider safe home districts one needs to impose case-specific restrictions on the support of the voter ideal points, the quality difference between the candidates, or the curvature of $L(\cdot)$. Intuitively, with such restrictions one can avoid having the utility functions crossing more than once (and, thus, having two indifferent voters in a given district). To illustrate this idea Figure 1 presents two examples: an additive utility with concave loss function and a multiplicative utility with convex loss function (a multiplicative utility with a concave loss function is subject to the same problem as well).[23] In both examples the median in district l prefers the candidate from L even though the candidate from R has a higher valence. Yet, in both examples a majority of the district

[22] Our notation is different form that in Groseclose (2007): we use $-L(\cdot)$ to measure utility from policy while he uses $u(\cdot)$. As a result, he finds that for the majority to prefer the same alternative that the median voter prefers, a sufficient condition is that $u(z)$ is concave, i.e., $L(\cdot)$ is convex.

[23] Groseclose (2001) refers to the multiplicative utility as the *competency* form. When we replace (3) with $U_i(\Psi_P, q_j^P) = \frac{-L(\|i-\Psi_P\|)}{q_j^P}$, to study equilibrium legislature we need to change the way we measure policy preferences in a district and the quality differences between candidates (and, to assume that for all P and j now we have $q_j^P > 0$). More specifically, since the payoff matrices and the equilibria are determined by the relative magnitude of these two advantages only, when we define (i) P's policy advantage in a given district by $\widehat{\lambda}_d = \frac{L(\|m_d-\Psi_L\|)}{L(\|m_d-\Psi_R\|)}$, and (ii) the quality advantage between two given candidates as the ratio of their qualities, $\frac{q_j}{q_{j'}}$, the games become isomorphic. As we discuss below, the only issue is that to ensure that the home districts are safe, one has to impose more restrictions on preferences and voter density in these districts.

may not prefer the candidate from L if there are sufficiently many voters at the far left (to the left of $\underline{i}$). One can still assume that l is a safe district for L by employing additional restrictions, i.e., in addition to the assumption that m_l prefers Candidate 2 from L over Candidate 1 from R, it must also be assumed that the measure of voters to the left of the leftmost intersection between the two candidates is sufficiently small. Note that $\underline{i}$ (and, thus, the required restriction on voter density) also depends on the policies of the parties. So, for instance, additional restrictions are not necessary when both parties propose the same policy as in Section 4.2.

4.6 $N>3$ districts

In our model, we assume that each party has the same number of safe home districts (which we set to 1) and that it is equal to the number of contestable battleground districts. This simplification allows us to be more general when discussing the level of partisanship in each district and to address the implications of parties with low-, medium-, and high-quality candidates. We can, however, construct a simple model to give a sense of how this could be extended to parties that differ in the number of home districts. This illustration also sheds light on some of the difficulties encountered when considering such a model.

Assume that there are a total of $N > 3$ districts, with n_l (n_r) safe home districts for L (R), and n_b contestable battleground districts. Further, assume that either party has only two types of candidates, those of low-quality, q_3^P, and those of high-quality, q_1^P, with home districts that are safe enough such that a low-quality candidate will win in his party's home district against a high-quality candidate from the opposing party. If each party has k_P high quality candidates such that $k_L + k_R \in (n_b, N)$, or, in other words, high-quality candidates are scarce but not endangered, as long as there are no more battleground districts than either party has home districts, our main result holds. Specifically,

Proposition 8 *Consider electoral competition when each party P has n_p safe home districts and there are $n_b < min\{n_l, n_r\}$ contestable battleground districts. If $k_L + k_R \in (n_b, N)$, then the equilibrium legislature quality will be strictly higher under party-primaries than under party-principals.*

Proof. In the Appendix. ■

Note that while our main result holds, several limiting assumptions were made for simplicity. First, we consider only two quality types as opposed to three. Further, if the total number of high-quality candidates (in both parties) is less than the number of battleground districts (or the total number of high-quality candidates greater than the total number of districts), then an equilibrium under party-principals may exist in which all of the highest-quality candidates win (or in which all of the districts will be represented by high-quality candidates). In such a case, the two types of selectorates perform equally.

4.6.1 District dependent quality

More fundamentally, however, extending the model to many districts may stretch the implicit assumption in our model that a voter is able to perceive the quality of candidates running in her district, and further that each candidate has the same perceived quality in each district. Of the first, we take the (perhaps optimistic) view that voters are able to

distinguish candidate quality through several signals.[24] Still, note that we are not assuming that a voter is informed about the quality of all the candidates in all the districts: even though the voters prefer high quality legislatures, when voting each voter decides based on the quality of solely candidates in his district.

Of the second assumption, while helpful for tractability (it allows one to calculate equilibrium without considering state-dependent quality), we recognize that voters in different districts may differ in their assessment of the quality of the candidates. Consider the case of carpetbaggers[25] in the United States. While some carpetbaggers are ultimately successful in their candidacy, the term is often used to denigrate opponents, presumably hoping to lower their perceived quality (in the sense that these politicians will be unable to deliver good policy for the district because of less knowledge about the district).[26] Alternatively, it seems reasonable that a candidate's perceived quality may not differ greatly in three districts in high geographic proximity (thus generalizing this problem to include a, potentially large, unspecified number of districts may have limited additional value).[27] In any case, our results would still apply if the quality of the highest and second-highest quality candidates do not differ in the own home and the battleground districts. It should be duly noted that if this weaker version, too, is violated (if, for example, a candidate is thought of as having high quality in only one district, while having low perceived quality in all the others), then, there is no quality difference under different selectorates. Intuitively, under either selectorate, it may make no sense to nominate him elsewhere. We hope that despite this limitation, our analysis both helps explain a meaningful difference between the two types of selectorates and encourages future research on this topic.

5 Conclusion

In this paper we study the quality of the legislature under two selectorates: the party-principal and the party-primary, where the former is representative of any kind of centralized selector whose objective is to maximize the expected number of seats his party wins in the election and the latter is representative of any decentralized and inclusive selector. We find that the equilibrium legislature quality is always higher under party-primaries when home districts are safe, battleground districts are contestable, and neither party has a candidate pool of much higher quality. Our study is atypical among recent studies of selectorate type in that the mechanism in the model that leads to higher-quality legislators under party-primaries is the *incentives* of the politicians (both the party-principals and the candidates). Thus while our results are consistent with other studies in which primaries lead to higher-quality politicians (through, for example, information transmission), they are also complementary, indicating an additional avenue through which party-primaries may lead

[24] These includes news that are possibly biased due to the partisanship of the source. For the case of newspaper endorsements in the presidential primaries, Knight and Chiang (forthcoming) finds that voters do filter such bias.

[25] The term carpetbagger refers to politicians who move to a particular district in order to run for office representing that district (sometimes the term parachute politician is used in the same context).

[26] Prominent examples of successful carpetbagger campaigns include the US Senate campaigns of Hillary Clinton (in 2000 from New York), Robert Kennedy (in 1964 from New York), and Elizabeth Dole (in 2002 from North Carolina). Unsuccessful carpetbaggers are myriad but notably Alan Keyes ran a late campaign against Barack Obama for a US Senate seat from Illinois in 2004 after the original Republican candidate, Jack Ryan, withdrew following a scandal.

[27] Spanning an area of around two thousand square miles, the city of Istanbul elects 85 (out of 550) members to the Grand Representative Assembly of Turkey.

to higher-quality legislatures.

Whether one classifies the selectorate according to degree of centralization or inclusiveness, the selectorates we consider lie at the opposite ends of the spectrum. There are several countries in which the final decision is made through some bargaining between these two types of selectorate, i.e., both subnational organs and national organs in the party have a say in the final selection (Bille, 2001). As the workings of these selectorates has a significant informal part and there is considerable variation, the analysis of equilibrium quality of legislature under these selectorates has been left for future research.

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6 Appendix: Proofs

Proof of Proposition 5. Assume that for a given set of parameters (quality vectors, policies of parties, and policy preferences) under the centralized selectorate (party-principal) there exists a PSNE of optimal quality. Let $A_{CS} = (q_j^L q_{j'}^L q_{j''}^L, q_k^L q_{\tilde{k}}^L q_{\tilde{\tilde{k}}}^L)$ denote the strategy profile giving rise to this PSNE. Note that from A_{CS} we can always construct a strategy profile for the game under the decentralized selectorate (party-primaries), an A_{DS}, in the following way: if under A_{CS} a candidate from P runs in d, then under A_{DS} the same candidate alone will run in the primary of d. Now, we claim that under party-primaries, the strategy profile A_{DS} is a PSNE.

Let us proceed by contradiction. Suppose that A_{DS} is not an equilibrium strategy profile under party-primaries. Then, one candidate must be able to switch seats in which he runs and improve his personal outcome (to improve the party's number of expected seats, the candidate must also win with higher probability than before). In an optimal-quality legislature, the top two candidates win with certainty, and if the third highest-quality candidate has unique quality or quality equal to the second highest-quality candidate, he will win with certainty as well. Otherwise (the third and fourth candidates ranked in quality are of the same quality), the sum of the probability that two candidates with the third highest-quality win a seat equals 1. Thus, if A_{DS} is not a PSNE, then either (i) a candidate who wins with probability zero must be able to switch districts in which he is running and win with some non-zero probability, or (ii) one of the candidates who wins with probability less than 1 can switch seats and win with higher probability.

Let us consider the first case. A candidate j who does not win a seat with certainty cannot switch districts to one in which his party won with non-zero probability and improve his outcome. Since A_{CS} gives rise to an optimal-quality legislature, this candidate j will be of strictly lower quality than the candidate who wins a seat in the district with non-zero

probability (and thus the deviating candidate will lose in the primary). If he was able to switch to a district his party loses with certainty and win, then the party-principal would have done so, and A_{CS} would not be an equilibrium.

Let us consider the second case. If candidate j wins a district with probability $p_j < 1$ under A_{DS} deviates to another district, this must be a district that another candidate won with certainty. But since under A_{CS}, the equilibrium results in an optimal quality legislature, the two highest-quality candidates win with probability 1. Since there are three districts, j must be deviating to one of the two districts in which these highest-quality candidates win. He will not deviate to a district in which his party wins, since his party won the district with higher probability than he won his own district under A_{CS}, and since the legislature is of optimal quality, he must be of lower quality and would lose in the primary. Thus he must be able to deviate to a district the other party won and win with probability $p'_j > p_j$. Then he would increase the expected number of seats his party wins, implying A_{CS} is not an equilibrium. Contradiction.

Therefore, A_{DS} must be a PSNE. And since the same candidates are running in the same districts as in A_{CS}, the resulting legislatures are identical and A_{DS} results in optimal legislature quality as well. ■

Proof of Proposition 6. First note that an equilibrium under party-primaries always exists in which each party nominates its highest-quality candidates in the home districts and its second highest-quality candidates in the battleground district. This will result in a legislature with the two highest-quality candidates overall and either the third or the fourth highest-quality candidate. Thus the equilibrium quality will be $q_1 + q_2 + \pi q_3 + (1 - \pi)q_4$ in which candidates are ranked one through six in terms of quality. We refer to this equilibrium below as the benchmark equilibrium under party-primaries.

The proof considers the following two mutually exclusive and collectively exhaustive cases. (We show in both cases that if an equilibrium of higher quality than the benchmark under party-primaries exists, then that equilibrium or an equilibrium of higher quality will also be an equilibrium under party-primaries.)

Case 1: Both Candidate 1's win a seat with certainty under party-principals.
There are the three subcases:

1.(i) If the three highest-quality candidates win with certainty, then, by Proposition 5, under party-primaries this will be an equilibrium as well.

1.(ii) If the remaining seat is won with non-zero probability by two candidates, then these should be Candidate 2's (otherwise one party-principal could always increase his party's expected seats by nominating his party's Candidate 2 to the seat). But, any such equilibrium is an equilibrium under party-primaries as well: neither of the Candidate 2's can deviate and win with higher probability (each is of lower quality than his own candidate 1, and if he could win with higher probability against the other party's candidate 1, the party-principal would have done so under party-principals), and neither Candidate 1 can deviate and improve his or his party's outcome (he is already winning with certainty).

1.(iii) If the fourth highest-quality candidate (or even a lower-quality candidate) wins the remaining seat with certainty, then in any such equilibrium quality of legislature would be lower than the benchmark under party-primaries.

Case 2: At least one Candidate 1 does not win a seat with certainty under party-principals. Again, there are three subcases.

2.(i) If the two Candidate 1's run in the same district., then, by the reasoning in Theorem 1, any such equilibrium will be of lower quality than our benchmark equilibrium under party-primaries.

2.(ii) If the Candidate 1 who wins with probability less than 1 runs in a district against a Candidate 2., then it must be that they either both run in the battleground or in Candidate 2's home district.

To consider the first possibility, suppose, w.l.o.g., that Candidate 1 from R (q_1^R) and Candidate 2 from L (q_2^L) run in the b. First note, that since q_2^L wins with non-zero probability, q_2^L can run in his home district against q_1^R (or any other candidate from R) and win with certainty (since the home district is more partisan than b in all realizations of b's partisanship). Note that if the other Candidate 2 and Candidate 1 (q_2^R and q_1^L) run in the same district, one Candidate 3 wins with certainty and the equilibrium quality of legislature will be lower than the benchmark under party-primaries. Thus, suppose q_2^R and q_1^L each runs in his own party's home district (then each will win against the opposing Candidate 3 with probability 1). Then L can increase the number of expected seats by moving q_2^L to l from b (since he wins with certainty there) and q_1^L to b (since he would win with higher probability than q_2^L), thus no equilibrium of this type exists under party-principals. Alternatively, suppose q_2^R and q_1^L each runs in the opposing party's home district. If q_1^L wins with certainty, then R would increase its expected seats by moving q_1^R from b to r (thus no such equilibrium under party-principals). If q_1^L ties or loses, then L would increase its expected seats by moving q_1^L from r to l unless q_3^L ties or wins in l. But if q_3^L ties or wins in l, then q_2^R ties or loses in l and q_1^L ties or loses in r, ensuring that the legislature quality will be lower than the benchmark under party-primaries (as at least one expected seat goes to the Candidate 3's collectively). Therefore, no equilibrium of higher quality exists under party-principals when a Candidate 1 and Candidate 2 both run in b and neither wins with certainty.

To consider the second possibility, suppose, w.l.o.g., that Candidate 1 from R (q_1^R) and Candidate 2 from L (q_2^L) run in the l (if they ran in r, q_1^R would win with certainty). Again, if the other Candidate 2 and Candidate 1 (q_2^R and q_1^L) run in the same district, one Candidate 3 wins with certainty and the equilibrium quality of legislature will be lower than the benchmark under party-primaries. So, suppose q_1^L runs in r. If he ties (or loses), then the Candidate 1's win only 1 ($\frac{1}{2}$) expected seat and the legislature quality will be lower than the benchmark under party-primaries. If he wins, then R would increase its expected seats by moving q_1^R from l to r (R will gain $\frac{1}{2}$ an expected seat), and thus this would not be an equilibrium under party-principals. Finally, suppose instead that q_1^L runs in b. If b is contestable, R will win more expected seats by running Candidate 2 in b (winning with some non-zero probability) and Candidate 3 in r (winning with certainty since he is running against Candidate 3 from L). Thus, in any equilibrium under party-principals, one expected Candidate 3 wins (and the legislature is of lower quality than the benchmark under party-primaries). If b is not contestable, then there is an equilibrium under party-primaries in which the highest-quality Candidate 2 runs in his home district, his party's Candidate 1 runs in b, and the other party's Candidate 1 runs in his own home district. This equilibrium is of optimal quality (and thus no equilibrium under party-principals can be of higher quality). Therefore, no equilibrium of higher quality exists under party-principals when a Candidate 1 and Candidate 2 both run in Candidate 2's home district and neither wins with certainty.

2.(iii) If Candidate 1 who wins with probability less than 1 runs in a district against a Candidate 3, then it must be that they either both run in the battleground or in Candidate 3's home district. To consider the first possibility, suppose, w.l.o.g., that Candidate 1 from R (q_1^R) and Candidate 3 from L (q_3^L) run in the b and neither wins with certainty. This implies that q_3^L can win against any candidate from R in l. Thus, switching q_3^L with

whichever higher-quality candidate is running in l will increase L's expected seats (and this is not an equilibrium under party-principals).

To consider the second possibility, suppose w.l.o.g. that Candidate 1 from R (q_1^R) and Candidate 3 from L (q_3^L) run in the l and neither wins with certainty. This implies that the parties must tie in r. Otherwise, if L loses, L would move that candidate to l (and win in l with certainty). Alternatively, if R loses, R could move q_1^R to r and win with certainty. But if q_1^L is nominated in r, then the top two candidates garner only one expected seat and the equilibrium quality will be lower than the benchmark under party-principals. If q_2^L is nominated to r, then q_3^R must be nominated to r (otherwise they would not tie and one party could win more expected seats). But in such a case, the two Candidate 3's win one expected seat collectively, and the legislature quality will be lower than the benchmark under party-primaries. Therefore, no equilibrium of higher quality exists under party-principals when a Candidate 1 and Candidate 3 both run in the same district and neither wins with certainty.

Therefore, as all cases were inspected, no equilibrium legislature of higher quality exists under party-principals than the highest-quality equilibrium legislature under party-primaries under the assumptions given in the proposition. ■

Proof of Proposition 7. Part (i): Assume that both Candidate 1's win a seat with probability one. Then, it must be the case that the third seat goes to the party to whom the higher-quality Candidate 2 belongs (there is a tie in the third seat if $q_2^L = q_2^R$). But, the principal of the other party (any party if $q_2^L = q_2^R$) can increase its expected seats by switching the districts in which he nominates the party's Candidate 1 and Candidate 2. Contradiction.

Part (ii): To see the existence of PSNE under party-primaries, note that any strategy profile in which the candidates with the three highest qualities run in the primaries of three different districts is a PSNE (if there is a tie among the two Candidate 2's in terms of quality, they must be running in the same district). To see that the equilibrium legislature quality is unique, note that by Proposition 2, under party-primaries no equilibrium exists in which candidate j wins a seat with positive probability, while candidate j' with $q_{j'} > q_j$ does not: j' could simply deviate to the primary of the district in which j runs, winning both the primary and the legislative election with probability one. ■

Proof of Proposition 8. Under party-principals, in any equilibrium each party-principal will nominate at least $\min\{n_b, k_P\}$ high-quality candidates to battleground districts. Since $k_L + k_R > n_b$, some high-quality candidates will run against each other.

To see that equilibrium quality under party-primaries is higher, note that there are two mutually exclusive and collectively exhaustive cases. If each party has fewer high-quality candidates than the sum of the number of its home districts and battleground districts, then in any equilibrium under party-primaries, no high-quality candidates will run against each other. (Thus, the high-quality candidates will win more (expected) seats under party primaries.) If, on the other hand, one party, say L, has at least as many high-quality candidates as the the sum of the number of its home districts and battleground districts, then R must have fewer than n_R high-quality candidates (since $k_L + k_R < N$). Under both party-principals and party-primaries, in any equilibrium party L nominates at least one high-quality candidate in each of its home districts in addition to all of the battleground districts. However, party R nominates all of its high-quality candidates in its home districts only under party-primaries. Under party-principals, still $\min\{n_b, k_R\}$ high-quality candidates are nominated in the battleground district. Clearly, more high-quality candidates win under party-primaries and the equilibrium quality of legislature is strictly higher. ■