Who Emerges from Smoke-Filled Rooms? Political Parties and Candidate Selection

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Abstract

In many countries political parties control who can become a candidate for an election. In this gatekeeping role parties may be tempted to put their own interests first, particularly when voters have little information about candidates. This paper uses a theoretical model to demonstrate that electoral incentives can discipline parties to nominate high-quality candidates even when voters are initially unable to observe quality themselves. In equilibrium voters elect candidates that are ex-ante preferred by the party leader with lower probability. This effectively neutralises the bias of the party leader and induces her to use her superior information to select candidates according to the preferences of the median voter. This result requires that electoral competition is sufficiently strong. If competition is weak, nothing can prevent the party leader from following her own preferences. As ideological alignment between the median voter and a party reduces the degree of competition that this party faces, the median voter can be better off when parties are polarized. Excessively strong competition can be harmful, however, as some politicians cease to be viable candidates and the party leader is less able to select on quality. Allowing the party leadership to nominate candidates strategically makes the benefits of introducing primaries less clear than previously argued in the literature.

Keywords: Political parties, electoral competition, valence, candidate selection, primaries.

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1 Introduction

Before the emergence of primary contests, U.S. presidential candidates were selected by the leadership of their respective parties. The popular cliché of the nominee being chosen in "smoke-filled rooms" by men in dark suits with big cigars captures the sentiment that this process was undemocratic, intransparent, and ultimately to the disadvantage of voters. Other observers have held that party establishments consist of professional politicians who know their potential candidates well and can judge which politician has the best chances of getting into office. Which of these competing views is closer to reality? With candidate selection in many countries firmly under the control of party leaderships even today, this remains a vital question.

This paper contributes to the debate outlined in the previous paragraph by constructing a theoretical model of candidate selection through party elites. A key feature of this model is that the leadership of the party is better informed about potential candidates than voters are. In general, this enables parties to use their superior information to make informed decisions on behalf of voters. Whether they will do so, however, is not immediately clear. Parties often have interests that differ from those of voters and this is the second central assumption of the model. In this setting, can it ever be expected that parties will select the candidate that voters prefer?

The answer, as it turns out, depends crucially on the degree of political competition. When competition is low, the party wins the election no matter which candidate it puts forward and consequently decides the nomination based on its own preferences. As competition increases, the party is forced to take into account which candidate voters prefer. Interestingly, this does not simply mean that the party leader more often chooses the candidate that voters prefer based on their own information. Instead, the party leader nominates the candidate

that voters would choose if they had the same information as the leader does with increasing frequency.

Providing an intuition for this result requires a closer look at the model: The party leader chooses among two potential candidates and these politicians differ along two dimensions: Their ideological position and their quality[1]. Voters are not fully informed about these characteristics of politicians, while the party leader is. This turns the model into a signalling game, where the choice of the party leader reveals information about the selected candidate to voters. In line with the motivation provided above it is assumed that there is conflict of interest between the party leadership and voters along the ideological dimension, such that the median voter and the party leader would choose different candidates if the choice was purely based on ideology. On the other hand, everyone agrees that candidates of higher quality are more desirable, even though the weight that the party leader places on quality may be arbitrarily small.

Now suppose that the election is competitive, meaning that there exists a second party whose candidate is sufficiently attractive to voters in a sense to be made precise below. This enables voters to play a strategy such that the politician whose ideological position is further away from the one favoured by the median voter is less likely to be elected. In equilibrium, this lower electability of more extreme candidates neutralises the ideological bias of the party leader and as a result the nomination is decided based on quality.

A party with polarized interests can thus be induced to select candidates in the interest of voters as long as competition is sufficiently strong. In fact, it may even be the case that the ideological bias of the party leader works to the benefit of voters. This result requires that the weight that the party leader attaches to quality is small. In this case competition is always required to induce the party

[1] Quality here describes a characteristic of politicians that is valued by voters independently of the implemented policy, such as honesty or competence. The political economics literature often uses the term "valence" instead of quality.

leader to select candidates of high quality. Eliminating the ideological bias of the party leader has the effect that she more frequently nominates the politician that the median voter prefers based on ideology. But this effectively reduces competition, resulting in the selection of candidates of lower quality.

This paper thus predicts a positive relationship between political competition and candidate quality that has also been found to hold empirically (Galasso & Nannicini 2011, Dal Bó et al. 2016). With the exception of Galasso & Nannicini (2011) themselves, who also provide a model in their paper, no theory of candidate selection that justifies this link can be found in the literature. The explanation put forward by Galasso & Nannicini is that parties will allocate high-quality candidates to competitive districts to increase their chances of winning seats in parliament. However, their model features the assumption that voters are fully informed about the quality of candidates, which is unlikely to be the case in reality. In contrast, this paper shows how competition can induce parties to nominate candidates of high quality even when quality is not observable to voters.

Other papers that analyze the role of parties in nominating candidates have considered how different methods of selecting candidates induce homogeneous candidates to supply effort (Caillaud & Tirole 2002, Castanheira et al. 2010) or have focused exclusively on either the quality/valence dimension or the policy dimension. Quality is the centre of attention in Mattozzi & Merlo (2015), and Snyder & Ting (2011), while Cadigan & Janeba (2002) and Jackson et al. (2007) are concerned with policy.[2] Contributions that feature both quality and policy are Adams & Merrill (2008), Serra (2011), and Boleslavsky & Cotton (2015). None of these papers feature a party leadership with superior information about

[2]These last two papers are quite similar to the current one in that they extend a citizen-candidate model by candidate nomination through parties. Compared to those contributions, the results here show that there is less policy convergence when candidates also differ in quality.

the characteristics of politicians, while Snyder & Ting (2011) is the only paper where the degree of competition that the party faces plays an important role.

There are other papers that do not deal with candidate selection directly, but are nevertheless related. Callander (2008) and Carrillo & Castanheira (2008) show how more extreme platforms can be used to signal high quality under certain circumstances. The same may be true here, but the relationship between quality and ideology is more subtle: When competition is weak, nominating a more ideologically extreme candidate can actually be a signal of low quality. Caillaud & Tirole (1999) argue that ideological conflict within a party is required for platform choice to reveal information about quality. This paper shows that all that is required for voter learning is superior information on the side of the party leadership.[3]

Among the papers given above, Adams & Merrill (2008), Serra (2011), and Snyder & Ting (2011) investigate the question of why parties may choose to adopt primaries to select their candidates. They take the benefit from primaries to be that they reveal information about the quality of politicians, with the most competent one going on to win the nomination. This can give the party a competitive edge. The benchmark that this is compared to, however, is that the party has only one potential candidate or chooses randomly. As Snyder & Ting (2011) point out (p. 783, footnote 8), "Naturally, introducing a primary would benefit a party less electorally if it had an alternative selection mechanism that more frequently generated the voter's preferred candidate." The results presented here do indeed suggest that the benefits of introducing primaries may be less clear than previously argued. While a fully-fledged comparison to primaries is beyond the scope of this paper, Section 3.5 considers a simple version of primaries and demonstrates that the party leader can strictly prefer

[3]There is voter learning even when the party leader has the same ideal policy as the median voter, as discussed in Section 3.4.2.

nominating candidates herself even under conditions that should favour the opposite result.

The model will be described in the next section. Section 3 presents the results, including a full characterisation of equilibrium, comparative statics, as well as the comparison to primary elections. Subsequently, Section 4 relaxes some of the assumptions made in the basic version of the model. Section 5 concludes.

2 The Model

N voters (N odd) care about two characteristics of politicians. The first is their policy preference: Each politician has an ideal policy $x \in \mathbb{R}$. The second characteristic is quality. A politician can either be of low or high quality $q \in \{0, 1\}$.[4] While the quality of policy makers enters the utility function of voters directly, they care about policy preferences because it is assumed that elected politicians implement their ideal policy. This assumption is supported by a number of empirical studies (Levitt 1996, Chattopadhyay & Duflo 2004, Lee et al. 2004, Bhalotra & Clots-Figueras 2014). The utility of a voter with ideal policy i from a policy x implemented by a policy maker with quality q is

$$u_i(x, q) = -(i - x)^2 + q \ .$$

In this setting the outcome of the election is determined by the median voter, whose ideal policy is assumed to equal zero. More general utility functions could easily be accommodated. The utility of voters over policies could be given by any concave function that is uniquely maximized at i. It would also be possible to introduce a weight on quality. These changes would merely shift the boundaries

[4] It would also be possible to let quality be a continuous variable. The binary representation of quality is chosen for simplicity.

where different equilibria occur in the parameter space but not the nature of the equilibria themselves. The additive separability between policy and quality is discussed in Section 4.

Politicians belong to either one of two parties. The current incumbent belongs to party I and through acting as policy maker has already revealed her quality q_I and ideal policy, which is also denoted by I and assumed to be smaller than zero. Denote by

$$\mathcal{I} \equiv -I^2 + q_I$$

the utility that the median voter would receive from re-electing the incumbent.

The second party, party C, has a party leader whose role it is to nominate one of two politicians as the party's candidate for the election. The politician located further away from zero is referred to as the extremist and her most preferred policy is given by $E \in (0, 1]$. Her competitor for the party nomination is called the moderate, with ideal policy given by $M \in (0, E)$. Politicians are identified by their ideal policies. Voters know that their respective qualities, q_M and q_E, independently take the value one with probability π, which is also the unconditional expectation of quality. The party leader, on the other hand, observes qualities directly.[5]. All other variables are common knowledge.

The party leader can be thought of as representing the group at the top of the party hierarchy that controls the nomination process and has a utility function given by

$$u_C(x, q) = -(x - i_L)^2 + w \cdot q \ + \mathbb{1}_{\omega \in \{M,E\}} Y,$$

where i_L is the ideal policy of the party leader, ω indicates the winner of the election, $Y \geq 1$ represents the benefits of winning the election, and $w \in (0, 1]$ is

[5]The assumption that there are groups in society that are better informed than the electorate at large is not uncommon, particularly in the literature on campaign spending and special interest groups (See, for example, Lohmann 1998, Prat 2002, Wittman 2007).

the weight that the party leader attaches to quality. Allowing w to be smaller than one implies that the party leader may put less weight on policy than voters do, which yields the most interesting results.[6] As stated in the introduction, situations where the party leader and the median voter disagree about the ideal candidate are of particular interest. To ensure that there is such disagreement it will be assumed that the ideal policy of the party leader is closer to the position of the extremist than to the position of the moderate: $|E - i_L| < |M - i_L|$.

It is worth pausing here for a moment to further discuss some of the features of the model. Regarding the politicians of party C, a noteworthy assumption is that the moderate and the extremist are never at a distance greater than one. This implies that competition takes place in a range where quality trumps policy: The median voter always prefers any high quality politician over any low quality politician. Allowing politicians to be further away from each other would not introduce any additional types of equilibria. Restricting attention to two potential candidates is necessary to keep the model tractable. It would seem though that the qualitatively important feature is that the number of politicians competing for the candidacy is "small". As the number of competing politicians grows the trade-off between policy and quality that the party leader faces disappears as high quality candidates become more and more abundant. The assumed scarcity of potential nominees seems, however, to be a realistic choice. Parties rarely recruit outsiders and in order to be considered for nomination for a higher office party members typically need to have gained some experience as well as a public profile through serving in regional or local offices. Another restriction is that regional offices seem to require regional candidates.[7]

[6] One reason why the party leader may put less weight on quality is that she faces pressure to nominate the extremist from the more radical members of the party, who may withdraw their support if they feel that their interests are not sufficiently taken into account.

[7] Members of the U.S. Senate, for example, are almost always native to the state where they were elected. Furthermore, they also tend to highlight this fact in the biographical section of their website or even directly on the homepage.

Only a limited number of politicians will satisfy these criteria at any point in time. The introduction of the incumbent is another assumption that is made for tractability and clarity of presentation. It would also be possible to let two parties compete by each selecting a candidate from separate pools of two politicians, but unless the candidate pools are assumed to be symmetric this generates a large number of cases to consider.[8] Finally, the assumption that voters perfectly observe policy preferences of politicians while they know little about quality may seem strong. It could be argued that the careers of politicians prior to being considered for a nomination are more informative about policy than quality. After all, politicians make political decisions along similar ideological fault lines throughout their career. On the other hand, higher offices may require skills that a politician was not able to demonstrate before. This argument notwithstanding, Section 4.2 suggests that the results are robust to uncertainty along the policy dimension as well.

The strategic players are the party leader and the median voter. The structure of the game is that of a signalling game, where the party leader is the sender and the median voter is the receiver. In the language of signalling games, the type $q_C \equiv (q_M, q_E)$ of the party leader is the combination of qualities she observes and the type-space is $Q \equiv \{0,1\}^2$. After observing the quality of her politicians the party leader nominates one of them as the party's candidate for the election. The party leader's strategy is given by the function $\eta_E(q_M, q_E)$, which gives the probability that the leader will nominate the extremist given any realization of the qualities of both politicians. While this is sufficient to fully describe the strategy of the party leader, it will be convenient to directly refer to the probability of nomination of the moderate as well, which is given by $\eta_M(q_M, q_E) = 1 - \eta_E(q_M, q_E)$. After the nomination decision has been made,

[8] If symmetry is imposed, however, the unique equilibrium essentially takes the shape of what will be referred to as the Full Competition equilibrium below.

voters update their beliefs and the posterior probability that the nominated politician is of high quality is denoted by $\bar{\pi}_p$. Subsequently the general election takes place. The outcome of the election is driven by the median voter and it is therefore sufficient to focus on her behaviour. Let $r(p)$ be the probability that the median voter elects the candidate of party C given that politician p has been nominated.

Signalling games typically have many perfect Bayesian equilibria, as it is possible to assign any belief that supports an equilibrium at information sets that are off the equilibrium path. The same is true here: For example, if voters believe that the extremist has quality zero, always nominating the moderate independent of actual qualities is an equilibrium. To be able to make sharper predictions it is therefore imposed that beliefs off the equilibrium path satisfy the refinement of Universal Divinity due to Banks & Sobel (1987), which has previously been applied in the literature (Banks 1990, Callander 2008). To give an informal description of the requirements of Universal Divinity, suppose that voters observe that the party leader unexpectedly nominates a certain politician. Voters then believe with certainty that the quality of the unexpectedly nominated politician must be such that it makes the leader most likely to gain from this move. The notion of "most likely to gain" is formalized as the type of leader that gains in utility for the greatest set of voter responses: Let $\Lambda(p|q_C)$ be the set of election probabilities such that the party leader of type q_C receives a greater expected utility from nominating politician p rather than her competitor. If politician p never gets nominated then $\bar{\pi}_p$ is restricted to be consistent with the belief that $q_C \in Q^*$, where Q^* contains all q^* that satisfy $\Lambda(p|q^*) \supseteq \Lambda(p|q') \ \forall q' \in Q$.[9]

[9]The definition of Universal Divinity provided here follows Banks (1990). In the original paper, Banks & Sobel (1987) define Universal Divinity based on an iterative procedure. This is not necessary here as iterations beyond the first round do not eliminate any additional types.

An additional issue more specific to this particular model is that the party leader is indifferent between all possible strategies once neither politician belonging to party C can get elected. As a consequence the party leader could be playing the strategy "always nominate the politician with the lowest quality", which in turn could make it a best response for the median voter to re-elect the incumbent with certainty. However, it seems implausible that voters would expect the party leader to behave in this way. In order to circumvent this issue all equilibria that feature weakly dominated strategies are excluded. As intended this requirement only affects equilibria where both the extremist and the moderate get defeated by the incumbent with certainty.

3 Results

Conditional on beliefs over the quality of candidates, the choice of the median voter is straightforward: she will vote for the incumbent if the utility of the incumbent being re-elected is higher than the expected utility of electing the challenger, vote for the challenger in the opposite case, and may vote for either candidate in the case of indifference. How attractive a candidate is depends both on their political position as well as the expectation of voters regarding the quality of that candidate. Candidates that are very close to the median voter's most preferred policy can get elected even if they are perceived as being of low quality. Conversely, even a candidate far from the centre can be appealing to the median voter if her expected quality is high enough. However, this expectation of high quality is difficult to maintain. Suppose that the extremist gets elected with certainty once nominated because voters believe that the party leader nominates the moderate if the extremist turns out to be of low quality. Given this high probability of winning, the leader then actually prefers to nominate the extremist even when she is of low quality, since the extremist is politically

closer to the leader. This undermines the initial expectation that the extremist is of high quality.

The exact shape of equilibrium therefore depends on the positions of both potential candidates of party C relative to the strength of the incumbent. If both are located close enough to the median relative to the incumbent the latter never gets re-elected. This case is referred to as "No Competition". The case labelled "Limited Competition" describes the situation where only the moderate can get elected. This requires that the moderate is relatively close to the centre while the extremist is indeed too extreme and the median voter can never be persuaded to elect her. The most interesting case, called "Full Competition", features a positive probability of election for either politician belonging to party C as well as the incumbent. The next three sections explore each case in more detail. Finally, it is also possible that neither the moderate nor the extremist stands a chance of being elected. Obviously, this requires that both politicians are relatively far from the centre. The determination of the exact conditions under which this equilibrium exists is relegated to Appendix B.

3.1 No Competition

Characterizing the No Competition equilibrium is straightforward: If both politicians of party C are located close enough to the median voter—given the average level of quality π and the strength of the incumbent $\mathcal{I}$—the incumbent never gets re-elected: $r(M) = r(E) = 1$. Depending on the distance between the moderate and the extremist, the party leader may then behave in two different ways. In the first case, the two potential candidates are located so far from each other that the party leader always nominates the extremist independent of qualities. Accordingly, voters expect that the extremist has average quality: $\bar{\pi}_E = \pi$. The second case applies if the two politicians are so close to

each other ideologically that the party leader prefers a moderate of high quality over an extremist of low quality, but nominates the extremist in all other cases. This implies that voters expect the moderate to have high quality if nominated ($\bar{\pi}_M = 1$), while the posterior quality of a nominated extremist also increases to a value above the prior π. The existence conditions of this equilibrium simply verify that the median voter indeed prefers both the moderate and the extremist over the incumbent given the behaviour of the party leader.

Proposition 1. *An equilibrium where the incumbent never gets re-elected ($r(M) = r(E) = 1$) exists if and only if*

$$E \leq \sqrt{\bar{\pi}_E - \mathcal{I}} \quad ,$$

where

$$\bar{\pi}_E = \begin{cases} \pi & \text{if} \quad -(M - i_L)^2 + w \leq -(E - i_L)^2 \\ \frac{\pi}{\pi + (1-\pi)^2} & \text{otherwise.} \end{cases}$$

The posterior quality of the moderate is given by $\bar{\pi}_M = 1$.

Proof. See Appendix A. □

In this equilibrium the median voter has no means to discipline the party leader who chooses her preferred politician without having to worry about electability. Consequently, the median voter would be better off if the ideal policy of the party leader was closer to her own ideal policy.

3.2 Limited Competition

When only one politician of Party C can successfully challenge the incumbent this is also the only politician who can get nominated. Nominating the candidate who loses for sure could only be optimal for the party leader if she prefers

the incumbent to be re-elected, which is impossible under the assumptions on preferences. The question is then whether it will be the moderate or the extremist who wins the election in equilibrium. The former seems like an obvious answer, since the median voter prefers the moderate over the extremist ex-ante. This is indeed correct. The moderate is therefore always nominated and accordingly expected to be of average quality. Given beliefs, the Limited Competition equilibrium exists whenever the median voter prefers the moderate over the incumbent, who in turn is preferred over the extremist.

Proposition 2. *An equilibrium where only one politician of party C gets elected with positive probability ($r(M) > 0$ and $r(E) = 0$ or $r(M) = 0$ and $r(E) > 0$) generically takes the shape $r(M) = 1$ and $r(E) = 0$ and exists if and only if*

$$\sqrt{\bar{\pi}_E - \mathcal{I}} \leq E \tag{1}$$

with $\bar{\pi}_E = 1$ and

$$M \leq \sqrt{\bar{\pi}_M - \mathcal{I}}$$

with $\bar{\pi}_M = \pi$.

Proof. See Appendix A. □

In general, it may also be an equilibrium to always nominate the extremist while the moderate would lose the election. This situation requires voters to believe that an unexpectedly nominated moderate has sufficiently low quality. Such out-of-equilibrium beliefs are ruled out by Universal Divinity, as Lemma 2 in Appendix A shows.[10] Note that the equilibria discussed in this section are the only equilibria affected by this refinement.

[10] Universal Divinity requires voters to believe that a deviation happens in the situation where the party leader is most likely to benefit from this deviation. As the party leader puts a positive weight on quality, she is most likely to gain from nominating a candidate if that candidate has high quality. Universal Divinity accordingly imposes that voters believe that unexpectedly nominated politicians have high quality.

Limited Competition is the exact opposite of No Competition in the sense that in the former case the party leader is completely constrained in her choice of which politician to nominate. Accordingly, the preferences of the party leader over policies are of no consequence for the outcome of the nomination process.

3.3 Full Competition

In the two previously discussed cases electoral incentives were either too weak to discipline the party leader or too strong to enable her to choose candidates based on quality. The type of equilibrium discussed in this section falls in between those extremes. Here, the extremist is not clearly better or worse than the incumbent from the perspective of the median voter, whose choice now depends on her beliefs over quality. The decision of the party leader to nominate the extremist must then be a credible signal of sufficiently high quality. In equilibrium this is possible because the extremist is less likely to be elected than the moderate. This lower electability offsets the ideological bias of the party leader, who is then more likely to base her decision on the observed quality of the potential candidates.

That the extremist is less likely to be elected than the moderate is achieved in equilibrium through a mixed strategy of the median voter, where she always elects the moderate if nominated and mixes between electing the extremist and the incumbent otherwise. This mixed strategy requires the median voter to be indifferent between a nominated extremist and the incumbent, which in turn requires the party leader to play a mixed strategy herself. A key observation is that indifference of the party leader between the potential candidates can only hold for one particular realisation of qualities: since the quality of candidates affects the utility of the party leader, indifference under one constellation of candidate qualities implies that the party leader will have a strict preference

over candidates under any other combination of qualities.

Lemma 1. *In any generic equilibrium, indifference of the party leader between the nomination of the moderate and the extremist can only hold conditional on one particular realisation of candidate qualities.*

Proof. See Appendix A. □

There are thus four potential equilibria that satisfy the definition of Full Competition, one for each possible realisation of candidate qualities. However, indifference of the party leader between a moderate of low quality and an extremist of high quality turns out to be impossible. In this case the party leader would always nominate the moderate whenever the extremist has low quality, which implies $\bar{\pi}_E = 1$ and therefore contradicts that the median voter is indifferent between electing the incumbent and the extremist. The remaining cases can be labelled as low-quality indifference if the party leader is indifferent when $(q_M, q_E) = (0, 0)$, mixed-quality indifference if the party leader is indifferent when $(q_M, q_E) = (1, 0)$, and high-quality indifference if the party leader is indifferent when $(q_M, q_E) = (1, 1)$. The following proposition provides existence conditions for this class of equilibria, equilibrium beliefs, as well as a partial characterisation of equilibrium strategies. A full description of equilibrium strategies is given in Table 1.

Proposition 3. *Equilibria where both politicians belonging to party C and the incumbent get elected ($r(M) > 0$, $r(E) > 0$, and $r(M) + r(E) < 2$) generically take the shape $r(M) = 1$ and $0 < r(E) < 1$ and exist if and only if*

$$\sqrt{\pi - \mathcal{I}} \leq E \leq \sqrt{1 - \mathcal{I}}$$

and

$$M \leq \sqrt{\frac{\pi(\mathcal{I} + E^2)}{\mathcal{I} + E^2 - \pi(1 - \pi)} - \mathcal{I}}\ .$$

The posterior belief over the quality of the extremist is given by

$$\bar{\pi}_E = \mathcal{I} + E^2$$

while the posterior quality of the moderate is given by

$$\bar{\pi}_M = \sqrt{\frac{\pi(\mathcal{I} + E^2)}{\mathcal{I} + E^2 - \pi(1-\pi)}}$$

in the case of low-quality indifference and by $\bar{\pi}_M = 1$ *in the case of high-quality or mixed-quality indifference.*

Proof. See Appendix A. □

If the median voter had the same information as the party leader, she would nominate the extremist if and only if the moderate has low quality while the extremist has high quality. As a look at Table 1 reveals, not all equilibria that fall under the label of Full Competition discipline the party leader to the same extent to act in the median voter's interest. However, in the Full Competition equilibrium under low-quality indifference the strategy of the party leader is very close to the optimal strategy from the median voter's perspective.[11] While this feature makes full Competition under low-quality indifference a particularly interesting case, this equilibrium is also distinguished by the fact that it exists more widely than the other versions of Full Competition. This is illustrated in Figure 1, which exemplifies the existence conditions for the different types of equilibria for given values of $\mathcal{I}$, π, and w.[12] The possible combinations of the positions of the moderate and the extremist lie below the 45-degree line,

[11] This is especially true when the utility of the median voter from re-electing the incumbent is close to the utility of electing an extremist of high quality. In this case the posterior quality of the extremist must be close to one, which requires $\eta_E(0,0)$ to be close to zero.

[12] For simplicity, the figure shows the limit case as w approaches zero. Otherwise the region where the No Competition equilibrium applies would have to be subdivided according to the two different types of No Competition equilibria. The boundaries on the region where the incumbent is always re-elected are derived in Appendix B.

	No Comp.		Lim. Comp.	Full Comp.		
	(1)	(2)	(3)	(4)	(5)	(6)
Strategy of Party Leader						
$\eta_E(0,1)$	1	1	0	1	1	1
$\eta_E(0,0)$	1	1	0	η_E^{*1}	1	1
$\eta_E(1,1)$	1	1	0	0	η_E^{*2}	1
$\eta_E(1,0)$	1	0	0	0	0	η_E^{*3}
Strategy of Median Voter						
$r(M)$	1	1	1	1	1	1
$r(E)$	1	1	0	r_E^{*1}	r_E^{*2}	r_E^{*3}

$$\eta_E^{*1} = \frac{\pi(1-\mathcal{I}-E^2)}{(1-\pi)(\mathcal{I}+E^2)} \qquad \eta_E^{*2} = \frac{(1-\pi)(\pi-\mathcal{I}-E^2)}{\pi^2(\mathcal{I}+E^2-1)}$$

$$\eta_E^{*3} = \frac{\pi-[\pi+(1-\pi)^2](\mathcal{I}+E^2)}{(1-\pi)\pi(\mathcal{I}+E^2)}$$

$$r_E^{*1} = \frac{[-(M-i_L)^2+Y]-[-(I-i_L)^2+w\cdot q_I]}{[-(E-i_L)^2+Y]-[-(I-i_L)^2+w\cdot q_I]}$$

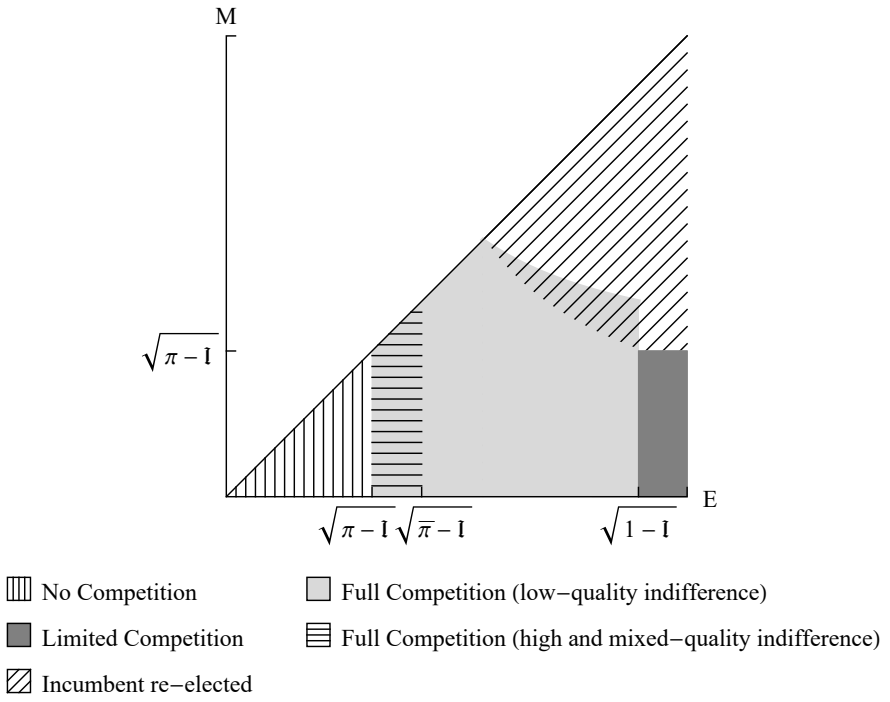
$$r_E^{*2} = \frac{[-(M-i_L)^2+w+Y]-[-(I-i_L)^2+w\cdot q_I]}{[-(E-i_L)^2+w+Y]-[-(I-i_L)^2+w\cdot q_I]}$$

$$r_E^{*3} = \frac{[-(M-i_L)^2+w+Y]-[-(I-i_L)^2+w\cdot q_I]}{[-(E-i_L)^2+Y]-[-(I-i_L)^2+w\cdot q_I]}$$

Table 1: Summary of Equilibrium Strategies

Notes: The table summarises the different equilibria discussed in the text. The first column contains the case of No Competition if $-(M-i_L)^2+w \leq -(E-i_L)^2$, column (2) the case of No Competition if $-(M-i_L)^2+w > -(E-i_L)^2$, column (3) the case of Limited Competition, while columns (4) to (6) contain the Full Competition equilibria under low-quality indifference, high-quality indifference, and mixed-quality indifference, respectively.

Figure 1: Equilibrium for Different Positions of Politicians



as it holds that $M < E$. As the figure makes clear, multiplicity of equilibria is limited to specific subsets of the parameter space. The equilibrium of Full Competition under low-quality indifference in particular is the unique equilibrium in an intermediate range where neither the moderate nor the extremist is unelectable per se, but where the election of the extremist requires a strong signal of high quality. In this region electoral competition is strongest, with the ex-ante probabilities that either party wins being closer to each other than in any other equilibrium. The model thus yields the clear result that electoral competition needs to be sufficiently strong in order to induce the party leader

to select "good" candidates. Importantly, the fact that the party leader mostly follows the preference of the median voter in her nomination choice once competition is sufficiently strong is not driven by the party leader's own preference for politicians of high quality. In fact, w can be arbitrarily small as long as it remains positive. This is because the ideological appeal of the extremist is neutralised by her lower electability in equilibrium. The party leader's decision is therefore driven by quality even when she attaches little value to quality in general. It is also worth mentioning that even though the re-election of the incumbent is certainly the worst outcome for the party leader, she does not always nominate the politician who is most likely to defeat the incumbent. This is noteworthy since observers sometimes chide primary voters for not voting for the candidate with the highest chance of winning the general election.

While the expected quality of the extremist is always such that the median voter is indifferent between the extremist and the incumbent, the relationship between the expected quality of the moderate and of the extremist is another feature of equilibrium that depends on the degree of competition. If $\mathcal{I}$ is relatively low and there is only moderate competition, expected quality is higher for the moderate than for the extremist as in the No Competition case described above. As $\mathcal{I}$ becomes larger and competition intensifies this relationship reverses. In short, it is electability that determines which choice of nominee signals higher quality. The ideological preferences of the party have a tendency to make the extremist look like the weaker candidate, but this is not true if this nomination choice implies a significant drop in the chance of winning the election.

The mixed strategy that the median voter plays when the extremist is nominated reflects the difficulty in maintaining the expectation that the extremist has high quality. Electing her any more frequently would make the extremist too attractive from the perspective of the party leader, which in turn would

lower her expected quality and render this candidate a sure loser. A second interpretation of the mixed strategy, in the spirit of the purification theorem (Harsanyi 1973), is that the party leader is uncertain over the exact position of the median voter, which shows that the assumption of full information about the distribution of voters can be relaxed. This possibility will be discussed in more detail in Section 4.

3.4 Comparative Statics

This section presents two comparative statics exercises. In particular, the effects of changes in the strength of the incumbent and in the ideological bias of the party leader are analysed.

3.4.1 The Strength of the Incumbent

A crucial determinant of the shape that equilibrium takes is the strength of the incumbent, as given by the utility $\mathcal{I}$ that the median voter experiences in the case of re-election of the incumbent. If $\mathcal{I}$ is low, the No Competition equilibrium applies and any candidate of party C is elected with certainty. If $\mathcal{I}$ is sufficiently large, on the other hand, the incumbent is always re-elected independently of the choice that the party leader makes. The following proposition demonstrates that an increase in the attractiveness of the incumbent can hurt the median voter.

Proposition 4. *If*

$$-E^2 + 1 < -M^2 + \pi \tag{2}$$

there exist $\mathcal{I}_1 < \mathcal{I}_2$ such that the expected utility of the median voter is strictly higher if $\mathcal{I} = \mathcal{I}_1$ than if $\mathcal{I} = \mathcal{I}_2$ in any equilibrium.

Proof. See Appendix A. □

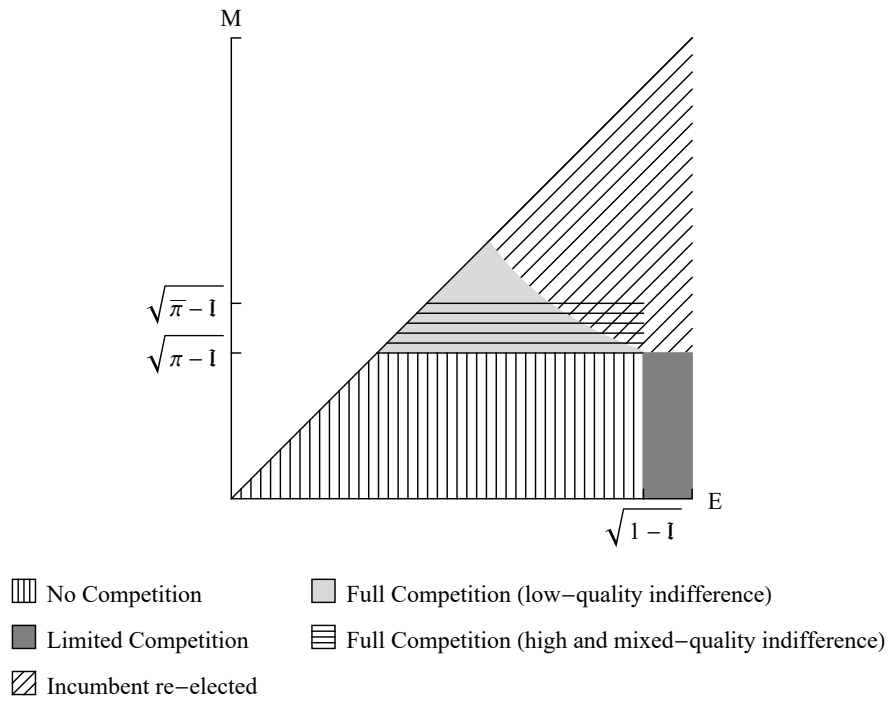
Why can an increase in the utility from re-electing the incumbent be bad for the median voter? The drop in utility occurs when the applicable equilibrium switches from Full Competition under low-quality indifference to Limited Competition. In the former equilibrium the selection of candidates is strongly based on quality. In fact, the average quality of the candidates of party C is at its highest possible level, as the party leader never nominates a politician of low quality when a politician of high quality is available. As soon as the equilibrium switches to Limited Competition, however, the extremist ceases to be a viable candidate and the party leader is forced to always nominate the moderate. Candidate selection is thus no longer based on quality and the average quality of the candidate of party C is sharply reduced. The decrease in the expected utility of the median voter is a direct consequence.

3.4.2 Common Interests

A central question raised in the introduction was whether the special interests of the party imply that it will select "bad" candidates. As was pointed out in previous sections, in the case of No Competition the median voter would indeed be better off if the party leader shared her political interests. In the case of Limited Competition, on the other hand, the preferences of the party leader over policies were of no consequence. What has not been taken into account so far though is that the existence conditions for the different types of equilibria also depend on the preferences of the party leader. These boundaries are shown in Figure 2 for a party leader located at zero.[13] The boundaries on the equilibrium where the incumbent always gets re-elected and the Limited Competition equilibrium are unchanged. In contrast, the equilibrium where both the moderate and the extremist get elected with certainty exists much

[13]The derivation of the equilibria in the $i_L = 0$-case will not be given here as it proceeds exactly as before. The figure again displays the limit case as w approaches zero.

Figure 2: Equilibrium under Common Interests



more widely. Previously, the binding constraint on the existence of the No Competition equilibrium was that the median voter had to prefer an extremist of average quality over the incumbent. A party leader with the same ideological preference as the median voter, in contrast, selects the extremist only if the extremist has high quality. As a consequence the boundary on the existence of this equilibrium is pushed outwards. As the following proposition shows, this shift in the equilibrium can mean that the median voter is better off under diverging interests.

Proposition 5. *Fix a set of parameters such that*

$$w \leq -E^2 + M^2$$

and under diverging interests Full Competition and under common interests No Competition applies. Then the median voter is better off under diverging interests if and only if

$$-M^2 \leq \mathcal{I} \ .$$

Proof. See Appendix A. □

If the party leader shares the ideological preferences of the median voter, the leader is more likely to nominate candidates that are attractive to the median voter ex-ante. This effectively reduces the amount of competition that party C faces relative to diverging interests. In case the party leader puts a relatively small weight on quality,[14] sufficiently strong competition is required to induce the leader to select candidates based on quality. The drop in competition associated with the switch from diverging to common interests then leads to a reduction in the average quality of the candidates of party C. The condition that $-M^2 \leq \mathcal{I}$ given in Proposition 5 implies that the reduction in quality affects the utility of the median voter more strongly than the benefit of a more frequent nomination of the moderate.

3.5 Comparison to Primaries

A number of papers have argued that primaries reveal information about participating politicians and thus allow parties to select candidates of higher quality (Adams & Merrill 2008, Serra 2011, Snyder & Ting 2011). The way that candidates are generated in the absence of primaries in these papers, however, is that

[14] That is, w is below the threshold at which the party leader nominates a moderate of high quality under No Competition when the extremist has low quality.

either there is only one candidate or that the nomination occurs at random, while the quality of the nominee remains unknown in either case. If parties were instead selecting candidates as described here, the advantage of primaries would be much less clear. To demonstrate this point, this section will compare the results presented so far to the outcomes under a simple version of primaries where the nomination is decided by a vote among the party's rank and file. The median voter among primary voters is decisive and thus effectively chooses between the extremist and the moderate. This median member of the party has an ideal policy given by $i_P \in \mathbb{R}$ and possesses a utility function that is otherwise the same as that of the party leader.

It will be assumed that campaigning in the run-up to the primary generates a perfectly informative signal about the quality of the candidates of party C. If the benefit of primaries was that they increase the amount of information available about quality as in the aforementioned papers, then this assumption would increase the likelihood that the party leader benefits from the introduction of primaries compared to the case where information is only partially revealed. The timing of the game under primaries is as follows: First, nature draws qualities and these then become perfectly observable to all players during the campaign leading up to the primary election. Subsequently the primary election is held, followed by the general election between the incumbent and the winner of the primary.

The outcome of the primary election is easy to characterize: Without any private information, the game can be solved by backwards induction. First, the result of the general election for each possible combination of candidates and qualities can be calculated. With this information in mind, the task of the median member of choosing between the two possible candidates is simple. The consequences for the utility of the party leader are less straightforward. As

a starting point, the case $i_P = i_L$ will be considered. The preferences of the median member are then the same as those of the party leader and it might therefore seem that the party leader has nothing to lose from introducing primaries. However, the introduction of primaries makes the party leader strictly worse off in a range of cases, as the following proposition shows.

Proposition 6. *Suppose that $i_P = i_L$. Then the party leader is strictly worse off under primaries if and only if*

i) in the absence of primaries the No Competition equilibrium applies and $-E^2 < \mathcal{I}$,

ii) in the absence of primaries the Limited Competition equilibrium applies and $-M^2 < \mathcal{I}$,

iii) in the absence of primaries the Full Competition equilibrium under low-quality indifference applies and $-M^2 < \mathcal{I}$ as well as

$$\begin{aligned} &\pi^2 \left[-(M - i_L)^2 \ + \ (E - i_L)^2 \right] \\ &\quad > \ (1-\pi)^2 \left[-(I - i_L)^2 \ + \ w \cdot q_I \ + \ (M - i_L)^2 \ - \ Y \right] . \end{aligned} \tag{3}$$

iv) in the absence of primaries the Full Competition equilibrium under high-quality indifference applies and either $-M^2 \geq \mathcal{I}$ and $\pi < 0.5$ or $-M^2 < \mathcal{I}$ and

$$\begin{aligned} &\pi^2 \left[-(M - i_L)^2 \ + \ (E - i_L)^2 \right] \\ &\quad > \ (1-\pi)^2 \left[-(I - i_L)^2 \ + \ w \cdot q_I \ + \ (E - i_L)^2 \ - Y \right] . \end{aligned} \tag{4}$$

v) in the absence of primaries the Full Competition equilibrium under mixed-quality indifference applies.

Proof. See Appendix A. □

To understand why primaries can make the party leader worse off even if the median member has the same preferences, note that without primaries there is always at least some pooling going on. That is, there is always a chance from the perspective of voters in the general election that the nominee of party C is of high quality. This enables the party leader to get even politicians of low quality elected. If the quality of candidates becomes observable, this may no longer be the case. Accordingly the condition $-M^2 < \mathcal{I}$, which implies that the median voter would not elect a moderate or extremist of low quality, features prominently in Proposition 6. On the other hand, pooling may be a disadvantage if it makes all potential candidates of party C unelectable. Primaries may then enable the party to get at least politicians of high quality into office. A second potential advantage is that primaries increase the electability of an extremist of high quality relative to the case of Full Competition, which makes it worthwhile to nominate such an extremist more frequently as well. Despite these benefits, Proposition 6 shows that the party leader prefers to retain control over the nomination process in a wide range of circumstances.

Primaries can thus be disadvantageous even in the case of perfect alignment between the interests of the party leader and the rank and file. Any gap between leader- and membership further erodes the likelihood that the leadership benefits from the introduction of primaries, as demonstrated by the following proposition.

Proposition 7. *The utility of the leader of party C under primaries is weakly decreasing in the distance from i_L of the ideal policy i_P of the median member.*

Proof. See Appendix A. □

Perfect agreement between party elites and the rank and file is unlikely to apply in reality. The results presented in this section therefore indicate that the theoretical case for primaries as a tool to generate candidates of higher

quality is substantially weakened once the ability of parties to select candidates strategically is accounted for.

4 Robustness

The model features a number of assumptions that can be relaxed. First of all, the results are robust to adding some uncertainty over the position of the median voter. It is possible to interpret the mixed strategy that the median voter is playing in this vein. The belief of the party leader over the position of the median voter would have to be given by a smooth density, which would make the election probability of the extremist a smooth function of her posterior quality.[15] In contrast, all other equilibria do not feature mixing by the median voter but are nevertheless robust in a similar way. Here the differences between the possible candidates are so large that uncertainty over the position of the median voter would not translate into uncertainty over the outcome of the election.

Additional assumptions that will be discussed in more detail in the following subsections are the additive separability of quality in the utility function of voters and the contrast between full information over politicians' positions and uncertainty over their quality.

4.1 Non-Additive Quality

Specifying quality as additively separable from policy has received criticism in the past. The main argument is that it seems implausible that, for example, a

[15] If the position of the median voter was private information and drawn from a smooth distribution, then there would exist a cutoff such that the median voter votes for the incumbent whenever the ideal policy of the median voter falls below the cutoff and votes for the candidate of party C otherwise. The probability that either candidate wins the election can then be calculated based on the cutoff. If the differences between candidates are large, the cutoff may fall outside of the support of the distribution of the position of the median voter, showing that equilibria where the median voter does not mix are consistent with this interpretation of the strategy of the median voter.

left-wing voter would want a right-wing candidate to be very effective at implementing policy. Put differently, quality should become a bad for a sufficiently high political distance. It would be possible to allow for this effect by giving voters the following utility function:

$$-(i-x)^2 + h(|x-i|) \cdot q$$

where the function $h : \mathbb{R}_+ \to \mathbb{R}$ is decreasing and positive at zero. The difficulty that arises with this specification is that the median voter may no longer be decisive, which would at the very least complicate the analysis of the model. However, additional assumptions would ensure the applicability of the median voter theorem (a proof can be found in Appendix C) while still allowing for an interaction between ideology and quality as described above. These assumptions are that the function h is concave and all voters are located in an interval $[-d, d]$ with $d > 0$ such that $h(d) \geq 0$.

If it is assumed in addition that $d \geq 1$, all the results remain qualitatively the same. A recent paper by Gouret et al. (2011) lends empirical support to the latter assumption. Using data from the French presidential election of 2007 the authors find that a utility function that allows for an interaction between quality and policy fits the data well while the simple additive utility function is rejected. However, the parameter estimates indicate that the main candidates are well within the range in which higher quality is beneficial to the median voter.

4.2 Uncertainty about Politicians' Policy Preferences

The distribution of information imposed in the model may seem to lack a strong justification. While voters know much about the policies a candidate stands for they know little about quality. Furthermore, many of the findings seem to

rest on this skewed information structure: Voters observe policy preferences and are able to make inferences about the quality of candidates based on this observation. This section will argue that it is possible to introduce uncertainty about the policy positions of politicians while leaving the main results intact.

To this end, suppose that the policy positions of the candidates of party C, M and E, are drawn from some distributions F_M and F_E, respectively. A party leader confronted with a particular draw of positions and qualities will decide whom to nominate based on a comparison of the expected utility resulting from either choice, taking into account how likely each candidate is to win the election. As is discussed in Appendix D in more detail, the choice of the party leader now allows voters to update their beliefs about both quality as well as the ideal policy of the nominated candidate. What is never the case though is that the nomination of a politician makes voters believe that this candidate has a more moderate ideal policy than previously thought. The reason for this is that if the party leader finds it worthwhile to nominate, say, the extremist given a certain realisation of positions, then the party leader will also be willing to do so if the position of the extremist is shifter closer to the ideal policy of the party leader and further away from the median voter. Beyond this additional insight, Appendix D also demonstrates through an example that equilibrium can take a shape very similar to the Full Competition equilibrium in the basic model, which played a central role in the results presented above.

5 Conclusion

This paper has presented a model of candidate selection through party elites where the central premise was that the party leadership has more information about the characteristics of potential candidates than voters do. Given that the party leadership itself has preferences over these characteristics, the nomination

choice often reveals information about the chosen candidate to voters. What exactly voters learn depends on the degree of competition a party faces. When competition is low, the nomination of an extreme candidate serves as a signal of low quality, while the opposite can be true when competition is more intense. In the latter case, electoral incentives strongly discipline the party leadership to select candidates in the interest of the median voter. Voters can therefore benefit when parties are polarized as this tends to increase competition compared to a situation where one party is located in the political centre. This result requires that the party leader puts little weight on quality, in which case she can only be induced to select high-quality candidates under sufficiently strong competition.

An important implication of these results is that parties do not necessarily need to introduce primaries in order to generate candidates of high quality. In the model presented here the party leadership is often better off retaining control over the nomination of candidates even when many of the disadvantages of primaries discussed in the literature are absent. This raises the question whether alternative explanations for the introduction of primaries should be given closer consideration. For example, Hortala-Vallve & Mueller (2015) argue that primaries could help heterogeneous parties to prevent factions from defecting.

From the perspective of voters, the potential downside of candidate selection through party elites is that parties prioritize ideology and select low quality candidates when competition fails. Such failure is common at sub-national levels of government where often only one party stands a realistic chance of holding office. This seems to occur in districts where the electorate is politically more aligned with one particular party than at the national level. From this perspective, what is problematic about political parties is not that they select "bad" candidates per se, but their ability to insulate themselves from competition at

least at the regional or local level.

Appendix

A Proofs

Lemma 2. *Fix some $p \in \{M, E\}$. An equilibrium in which $\eta_p(q_C) = 0$ for all $q_C \in Q$ satisfies Universal Divinity if and only if $\bar{\pi}_p = 1$.*

Proof. If politician p is nominated unexpectedly, Universal Divinity requires that voters believe that politician p has quality $q_p \in q_C$ such that $\Lambda_p(q'_C) \subset \Lambda_p(q_C)$ for any possible q'_C, where $\Lambda_p(q_C)$ denotes the set of election strategies of the median voter such that the party leader benefits from the deviation conditional on having type q_C. As the utility of the party leader is increasing in the election probability of her nominated candidate it holds that $\Lambda_p(q_C) = (\lambda_p(q_C), 1]$, where $\lambda_p(q_C)$ is the election probability that makes the party leader indifferent between deviating and sticking to her equilibrium strategy. The proof therefore needs to demonstrate which q_C minimises $\lambda_p(q_C)$. Let p' denote the competitor for the party nomination of politician $p \in \{M, E\}$. The interim utility of the party leader under a strategy profile $\sigma = (\eta_p, r)$ where $\eta_p(q) = 0$ for all $q \in Q$ (politician p is nominated only off the equilibrium path) is given by

$$r(p')[-(p' - i_L)^2 + w \cdot q_{p'} + Y] + (1 - r(p'))[-(I - i_L)^2 + w \cdot q_I] \ .$$

Suppose politician p would be elected with probability λ if nominated. The utility of the party leader from nominating p would then be

$$\lambda[-(p - i_L)^2 + w \cdot q_p + Y] + (1 - \lambda)[-(I - i_L)^2 + w \cdot q_I] \ .$$

Equating the two utilities and solving for λ yields the probability of electing

politician p that makes the party leader indifferent between nominating either politician:

$$\lambda_p(q_C) = \frac{r(p')[-(p'-i_L)^2 + (I-i_L)^2 + w(q_{p'} - q_I) + Y]}{[-(p-i_L)^2 + (I-i_L)^2 + w(q_p - q_I) + Y]} \ .$$

As q_p only shows up in the denominator of this expression, the minimum of $\lambda_p(q_C)$ can only be attained for q_p equal to one. Universal Divinity therefore implies $\bar{\pi}_p = 1$. □

Proof of Proposition 1. Suppose that $r(M) = r(E) = 1$ in equilibrium. Then the party leader prefers to nominate the extremists whenever the moderate and the extremist have the same quality as well as when $q_M = 0$ and $q_E = 1$. When $q_M = 1$ and $q_E = 0$ the party leader nominates the extremist if

$$-(M-i_L)^2 + w \leq -(E-i_L)^2$$

and nominates the moderate otherwise. In the former case the posterior belief of the median voter over the quality of the extremist $\bar{\pi}_E$ is equal to π while in the latter case Bayes' rule implies $\bar{\pi}_M = 1$ and

$$\bar{\pi}_E = \frac{\pi}{\pi + (1-\pi)^2} \ .$$

According to Lemma 2 $\bar{\pi}_M = 1$ under any of the two possible strategies of the party leader. Equilibrium is satisfied if the median voter prefers any nominated candidate of party C over the incumbent under these beliefs. The extremist is preferred over the incumbent if

$$-E^2 + \bar{\pi}_E \geq \mathcal{I} \ ,$$

which is equivalent to the condition given in the statement of the proposition. This condition is also sufficient, as the median voter prefers a moderate of high quality over the incumbent whenever she prefers the extremist over the incumbent. □

Proof of Proposition 2. If only one politician of party C is elected with positive probability, the party leader always nominates this politician. Nominating the politician who loses for sure could only be optimal if the party leader prefers the incumbent over a member of her party. This would require

$$-(I - i_L)^2 + w \geq -(M - i_L)^2 + Y \ , \tag{5}$$

as the lowest possible utility for the party leader from one of her own candidates winning is if this candidate is a moderate of low quality. As the moderate is located closer to the party leader than the incumbent and $Y \geq 1$ Inequality (5) is never satisfied.

Suppose $r(M) = 0$ and $r(E) > 0$ and the party leader accordingly always nominates the extremist. By Lemma 2, Universal Divinity requires $\bar{\pi}_M = 1$. But if this is the case the utility of the median voter from electing the moderate must be strictly larger than the utility from electing the extremist, contradicting either that $r(M) = 0$ or that $r(E) > 0$. The only possible case is therefore $r(M) > 0$ and $r(E) = 0$, in which case the party leader must always nominate the moderate. This implies $\bar{\pi}_M = \pi$. The condition that the median voter at least weakly prefers the moderate over the incumbent is then

$$\mathcal{I} \leq -M^2 + \pi \ .$$

Generically this inequality will be strict, implying $r(M) = 1$. On the other hand, the median voter must at least weakly prefer the incumbent over the

extremist, which is satisfied if

$$-E^2 + 1 \leq \mathcal{I} \ .$$

Solving the last two conditions for M and E, respectively, yields the conditions given in the statement of the proposition. □

Proof of Lemma 1. Consider an election strategy r such that the party leader is indifferent between nominating the moderate and the extremist for some realization of qualities (q_M, q_E). That is

$$\begin{aligned} &r(M)[-(M-p_L)^2 + w \cdot q_M] + (1-r(M))[-(I-i_L) + w \cdot q_I] = \\ &r(E)[-(E-p_L)^2 + w \cdot q_E] + (1-r(E))[-(I-i_L) + w \cdot q_I] \ . \end{aligned} \tag{6}$$

Generically,

$$-(M-i_L)^2 + w \cdot q_M \neq -(E-i_L)^2 + w \cdot q_E$$

and indifference thus requires $r(M) \neq r(E)$. Now suppose there was a second realization of qualities $(q'_M, q'_E) \neq (q_M, q_E)$ such that

$$\begin{aligned} &r(M)[-(M-p_L)^2 + w \cdot q'_M] + (1-r(M))[-(I-i_L) + w \cdot q_I] = \\ &r(E)[-(E-p_L)^2 + w \cdot q'_E] + (1-r(E))[-(I-i_L) + w \cdot q_I] \ . \end{aligned}$$

Adding and subtracting $r(M) \cdot w \cdot q_M$ and $r(E) \cdot w \cdot q_E$ to the left-hand and right-hand side of this equality, respectively, and using Equality (6) yields

$$r(M) \cdot w(q'_M - q_M) = r(E) \cdot w(q'_E - q_E) \ . \tag{7}$$

Since it must be generically true that $r(M) \neq r(E)$, this equality is violated for any combination $(q'_M, q'_E) \neq (q_M, q_E)$. □

Proof of Proposition 3. First of all, it is generically impossible that $0 < r(M) < 1$ and $0 < r(E) < 1$ simultaneously. This would require that the median voter is indifferent between all candidates, that is

$$-M^2 + \bar{\pi}_M \;=\; \mathcal{I} \;=\; -E^2 + \bar{\pi}_E$$

. However, by the law of iterated expectations it also needs to be true that

$$\eta_M \bar{\pi}_M + (1 - \eta_M)\bar{\pi}_E \;=\; \pi \;,$$

where η_p denotes the unconditional nomination probability of politician p. Both conditions can be satisfied simultaneously only in knife-edge cases and a Full Competition equilibrium must therefore generically take the shape $r(M) = 1$ and $0 < r(E) < 1$ or $0 < r(M) < 1$ and $r(E) = 1$.

Next, assume that the politician getting elected with certainty was the extremist. This would imply that the moderate either never gets nominated or is chosen only in the case $q_C = (1, 0)$, depending on the value of w. Both cases lead to the posterior belief $\bar{\pi}_M = 1$. But if the median voter is willing to elect the extremist then she must certainly prefer a moderate of high quality over the incumbent as well, contradicting that $r(M) + r(E) < 2$.

It must therefore be true that $r(M) = 1$ and $0 < r(E) < 1$. This can only hold if the median voter is indifferent between the incumbent and the extremist, which requires

$$\bar{\pi}_E = \mathcal{I} + E^2 \;. \tag{8}$$

To generate this posterior expected quality of the extremist the party leader must be playing a mixed strategy. By Lemma 1, mixing is only possible for one particular realization of qualities. As the moderate gets elected with certainty

the expected utility of the party leader from nominating the moderate is

$$-(M - i_L)^2 + w \cdot q_M + Y$$

while nominating the extremist gives

$$r(E)[-(E - i_L)^2 + w \cdot q_E + Y] + (1 - r(E))[-(I - i_L)^2 + w \cdot q_I] \ .$$

Equating the two utilities it is possible to derive the following identity:

$$r(E) = \frac{[-(M - i_L)^2 + w \cdot q_M + Y] - [-(I - i_L)^2 + w \cdot q_I]}{[-(E - i_L)^2 + w \cdot q_E + Y] - [-(I - i_L)^2 + w \cdot q_I]} \ . \tag{9}$$

Given the restrictions on parameters the expression on the right-hand side is always positive. In the case of $q_M = q_E = 0$ the numerator is smaller than the denominator and accordingly there exists an election probability $r(E)$ that leaves the party leader indifferent between nominating either a moderate or an extremist of low quality.

Indifference between politicians of low quality implies that under the quality combinations $(1, 0)$ and $(0, 1)$ the party leader nominates the politician of high quality, while in the case of both having high quality the party leader strictly prefers to nominate the moderate. The last point can be seen by recognizing that in this case the utility from nominating the moderate is equal to the utility of nominating a moderate of low quality plus w and the utility from nominating the extremist equal to the utility of nominating an extremist of low quality plus $r(E)w$. Hence, indifference in the $(0, 0)$-case implies that the difference in utilities from nominating the moderate and the extremist is equal to $w(1-r(E))$ in the $(1, 1)$-case, which is positive. Given this strategy of the party leader,

posterior expectations are given by

$$\bar{\pi}_M = \frac{\pi}{\pi \ + \ (1-\pi)^2(1-\eta_E(0,0))} \tag{10}$$

and

$$\bar{\pi}_E = \frac{\pi}{\pi \ + \ (1-\pi)\eta_E(0,0)} \ .$$

Solving this last equality for $\eta_E(0,0)$ and using Equation (8) to substitute for $\bar{\pi}_E$ gives

$$\eta_E(0,0) = \frac{\pi(1-\mathcal{I}-E^2)}{(1-\pi)(\mathcal{I}+E^2)} \ . \tag{11}$$

For this expression to be no greater than 1, it must be true that $\mathcal{I} \geq -E^2 + \pi$. This first necessary condition for the existence of this equilibrium implies that the denominator is positive. The second condition, which ensures that the numerator is non-negative, is $\mathcal{I} \leq -E^2 + 1$. Finally, it has to be true that the median voter weakly prefers the moderate over the incumbent: $\mathcal{I} \leq -M^2 + \bar{\pi}_M$. After substituting Equation (11) into Equation (10) this condition can be written as

$$\mathcal{I} \leq -M^2 + \frac{\pi(\mathcal{I}+E^2)}{\mathcal{I}+E^2-\pi(1-\pi)} \ . \tag{12}$$

If the election strategy of the median voter was such that the party leader was indifferent if $q_M = 0$ and $q_E = 1$, then the party leader would strictly prefer to nominate the moderate whenever the quality of the extremist is zero. This implies $\bar{\pi}_E = 1$ and contradicts that the median voter could be indifferent between the incumbent and the extremist.

Indifference under $q_M = 1$ and $q_E = 0$, on the other hand, is possible only if w is sufficiently small. As a consequence the extremist would be nominated whenever she has high quality and when both politicians have low quality. The

posterior beliefs are then

$$\bar{\pi}_M = 1$$

and

$$\bar{\pi}_E = \frac{\pi}{\pi + (1-\pi)^2 + (1-\pi)\pi\eta_E(1,0)} \ .$$

Solving this last equality for $\eta_E(1,0)$ and using Equation (8) to substitute for $\bar{\pi}_E$ gives

$$\eta_E(1,0) = \frac{\pi - [\pi + (1-\pi)^2](\mathcal{I} + E^2)}{(1-\pi)\pi(\mathcal{I} + E^2)} \ . \tag{13}$$

The necessary and sufficient conditions for this expression to be positive and no greater than one are

$$-E^2 + \pi \leq \mathcal{I} \leq -E^2 + \frac{\pi}{\pi + (1-\pi)^2}.$$

The requirement that the median voter at least weakly prefers the moderate over the incumbent in this case is equivalent to the condition $\mathcal{I} \leq -M^2 + 1$, which is satisfied whenever $\mathcal{I} \leq -E^2 + \frac{\pi}{\pi+(1-\pi)^2}$ as $\frac{\pi}{\pi+(1-\pi)^2} < 1$.

Finally, suppose the party leader is indifferent between nominating either politician if both are of high quality. Proceeding as before, an equilibrium with this feature can be shown to exists under the same conditions as in the previous paragraph.

Thus, $-E^2 + \pi \leq \mathcal{I}$ is a necessary condition for any Full Competition equilibrium. The condition

$$\mathcal{I} \leq -E^2 + \frac{\pi}{\pi + (1-\pi)^2}$$

required for the existence of the Full Competition equilibria under high-quality

and mixed-quality indifference is satisfied whenever

$$\mathcal{I} \leq -E^2 + 1 \ ,$$

which is required for the existence of the equilibrium under low quality indifference. The necessary conditions for the existence of the former equilibria are therefore always satisfied when the conditions for the existence of the latter equilibrium hold. Inequality (12) combined with

$$-E^2 + \pi \leq \mathcal{I} \leq -E^2 + 1$$

are accordingly jointly sufficient for the existence of a Full Competition equilibrium. Solving these expressions for M and E, respectively, yields the conditions provided in the statement of the proposition. □

Proof of Proposition 4. Suppose Condition (2) is satisfied and let

$$\mathcal{I} = -E^2 + 1 \ .$$

It then follows from Propositions 1, 2, and 3 and Appendix B that the only equilibria that exist in this case are Full Competition under low-quality indifference and Limited Competition. For the Full Competition equilibrium the existence condition

$$-E^2 + 1 \geq \mathcal{I}$$

is binding, while the same is true for the existence condition

$$-E^2 + 1 \leq \mathcal{I}$$

of the Limited Competition equilibrium. The second existence condition for the

Limited Competition equilibrium

$$-M^2 + \pi \geq \mathcal{I}$$

is satisfied as a strict inequality due to the above assumptions. The second existence condition for the Full Competition equilibrium, on the other hand, is

$$M \leq \sqrt{\frac{\pi(\mathcal{I} + E^2)}{\mathcal{I} + E^2 - \pi(1-\pi)} - \mathcal{I}} \; .$$

Using $\mathcal{I} = -E^2 + 1$ this can be rewritten as

$$\mathcal{I} \leq -M^2 + \frac{\pi}{1 - \pi(1-\pi)} \; .$$

This condition is satisfied as a strict inequality since

$$\mathcal{I} < -M^2 + \pi < -M^2 + \frac{\pi}{1 - \pi(1-\pi)} \; .$$

There thus exists $\mathcal{I}_1 = \mathcal{I} - \delta$ with $\delta > 0$ and sufficiently small such that the Full Competition equilibrium under low quality indifference is the unique equilibrium under $\mathcal{I}_1$. On the other hand, there exists $\mathcal{I}_2 = \mathcal{I} + \epsilon$ with $\epsilon > 0$ and sufficiently small such that the Limited Competition equilibrium is the unique equilibrium under $\mathcal{I}_2$. As the moderate is always nominated and elected in this equilibrium, the expected utility of the median voter is equal to $-M^2 + \pi$. For $\delta \to 0$ the utility of the median voter under $\mathcal{I}_1$ converges to the utility under $\mathcal{I} = -E^2 + 1$ due to the continuity of the utility function of the median voter and the continuity of the strategy of the party leader in $\mathcal{I}$ in the Full Competition equilibrium under low-quality indifference. This latter utility is equal to

$$(1 - \pi(1-\pi))(-M^2 + \frac{\pi}{1 - \pi(1-\pi)}) + \pi(1-\pi)(-E^2 + 1)$$

as the median voter is indifferent between the extremist and the incumbent in this equilibrium and the extremist is only nominated in the case where $q_M = 0$ and $q_E = 1$ when $\mathcal{I} = -E^2 + 1$. To complete the proof it needs to be shown that the utility of the median voter under $\mathcal{I}_1$ in the limit as $\delta \to 0$ is strictly larger than the utility in the Limited Competition Equilibrium. The condition for this is

$$(1 - \pi(1-\pi))(-M^2 + \frac{\pi}{1-\pi(1-\pi)}) + \pi(1-\pi)(-E^2+1) > -M^2 + \pi$$

which simplifies to

$$-E^2 + 1 > -M^2 \ .$$

As $0 < M < E \leq 1$ this condition is always satisfied. □

Proof of Proposition 5. If $w \leq -E^2 + M^2$ a party leader with ideal policy equal to zero always nominates the moderate under No Competition. The utility of the median voter in this case is equal to

$$-M^2 + \pi$$

while the utility under Full Competition with a party leader with ideal policy equal to one is

$$\tilde{\eta}_M(-M^2 + \bar{\pi}_M) + \tilde{\eta}_E[r(E)(-E^2 + \bar{\pi}_E) + (1 - r(E))\mathcal{I}] \ ,$$

where $\tilde{\eta}_p$ denotes the ex-ante probability that politician p gets nominated. Replacing all strategies and beliefs with their equilibrium expressions, some tedious but straightforward algebra shows that the difference in the utilities can be written as $-\mathcal{I} - M^2$. □

Proof of Proposition 6. Suppose that in the absence of primaries the equilibrium is such that $r(M) = r(E) = 0$. Then the utility of the party is at its lowest possible level and the introduction of primaries cannot hurt the party leader.

Next, suppose that the equilibrium in the absence of primaries is the No Competition case, which implies that the utility of the party leader is at its highest possible level. Then the introduction of primaries lowers the utility of the party leader if the preferred candidate of the party leader conditional on a particular realisation of qualities would not be elected under primaries. The weakest condition for this to be the case is that the median voter prefers the incumbent over an extremist of low quality, i.e. $-E^2 < \mathcal{I}$. If this condition is satisfied the median member will be forced to nominate the moderate conditional on $q_C = (0, 0)$ and the utility of the party leader is strictly lower under primaries.

If the equilibrium in the absence of primaries is the Limited Competition equilibrium, then the introduction of primaries would not increase the electability of the extremist even if the extremist is revealed to be of high quality. This is the case as the Limited Competition equilibrium exists only if $-E^2 + 1 < \mathcal{I}$, as can be seen after slightly rearranging Inequality (1). In contrast, the electability of a moderate of low quality will drop to zero after the introduction of primaries if $-M^2 < \mathcal{I}$, lowering the utility of the party leader.

Finally, suppose that the equilibrium that applies in the absence of primaries is one of the equilibria labelled as Full Competition. In this case an extremist of low quality cannot get elected under primaries since the existence of any Full Competition equilibrium requires $\sqrt{\pi - \mathcal{I}} \leq E$ by Proposition 3, which implies $-E^2 < -E^2 + \pi \leq \mathcal{I}$. Any candidate of high quality, on the other hand, will be elected under primaries as the existence of any Full Competition equilibrium requires $E \leq \sqrt{1 - \mathcal{I}}$ by Proposition 3, which implies $\mathcal{I} \leq -E^2 + 1 < -M^2 + 1$. Finally, the condition $-M^2 < \mathcal{I}$ may or may not be satisfied in any

Full Competition equilibrium, indicating that a moderate of low quality may or may not be elected under primaries. Under primaries the median member will therefore nominate the extremist if and only if the extremist has high quality. Keeping in mind that the utility of the party leader conditional on observed qualities is equal to

$$-(M - i_L)^2 + w \cdot q_M + Y$$

whenever the party leader mixes in any Full Competition equilibrium, the change in the utility of the party leader after the introduction of primaries can then be calculated.

Consulting Table 1 shows that the only effective change in the utility of the party leader after the introduction of primaries conditional on mixed-quality indifference comes from the fact that the moderate will be nominated and potentially not even elected for $q_C = (0, 0)$ under primaries, while the extremist would be nominated and elected with positive probability without primaries. The introduction of primaries therefore always harms the party leader under mixed-quality indifference.

Under high-quality indifference combined with $-M^2 \geq \mathcal{I}$ the condition that the utility of the party leader is higher without primaries can be written as

$$\begin{aligned} &\pi^2[-(M - i_L)^2 + w + Y] + (1 - \pi)^2[-(E - i_L)^2 + Y] \\ &> \pi^2[-(E - i_L)^2 + w + Y] + (1 - \pi)^2[-(M - i_L)^2 + Y] \ , \end{aligned}$$

as the identity of the elected politician changes only if $q_C = (0, 0)$ and if $q_C = (1, 1)$. This simplifies to $\pi < 0.5$. If $-M^2 < \mathcal{I}$, on the other and, the relevant

condition is

$$\begin{aligned}&\pi^2[-(M-i_L)^2+w+Y]+(1-\pi)^2[-(E-i_L)^2+Y]\\&>\pi^2[-(E-i_L)^2+w+Y]+(1-\pi)^2[-(I-i_L)^2+w\cdot q_I]\ ,\end{aligned}$$

which can be rewritten as

$$\pi^2[-(M-i_L)^2+(E-i_L)^2]>(1-\pi)^2[-(I-i_L)^2+w\cdot q_I+(E-i_L)^2-Y]\ .$$

Under low quality indifference, the utility of the party leader does not decrease under primaries if $-M^2 \geq \mathcal{I}$, as a moderate of low quality can still get elected. If $-M^2 < \mathcal{I}$, the condition that the party leader is strictly worse off under primaries is

$$\begin{aligned}&\pi^2[-(M-i_L)^2+w+Y]+(1-\pi)^2[-(M-i_L)^2+Y]\\&>\pi^2[-(E-i_L)^2+w+Y]+(1-\pi)^2[-(I-i_L)^2+w\cdot q_I]\ ,\end{aligned}$$

which can be rewritten as

$$\pi^2[-(M-i_L)^2+(E-i_L)^2]\ >\ (1-\pi)^2[-(I-i_L)^2+w\cdot q_I+(M-i_L)^2-Y]\ .$$

□

Proof of Proposition 7. Under primaries the electability of candidates of party C does not depend on the nomination strategy of the median member as there is no asymmetric information. Fix a combination (q_M, q_E) of candidate qualities. Generically there then exists a unique election strategy for the median voter in the general election as the median voter is indifferent only in knife-edge cases. If neither potential candidate can get elected, the nomination choice

is inconsequential and the utility of the party leader conditional on realized qualities is flat in i_P. Suppose both potential candidates of party C get elected if nominated. In this case the median member is indifferent between nominating either of them if

$$-(M - i_P)^2 + w \cdot q_M = -(E - i_P)^2 + w \cdot q_E \ .$$

Solving this expression for i_P shows that there exists a unique real number such that the median member strictly prefers the nomination of the moderate (the extremist) if her ideal point lies below (above) this number. The ex-post utility of the party leader is therefore flat in i_P with a single discontinuity at the threshold where the nomination choice of the median member changes. Next, consider the case where only one potential candidate of party C can get elected. Without loss of generality, let this be the moderate. The median member is indifferent between nominating either politician if

$$-(M - i_P)^2 + w \cdot q_M + Y = -(I - i_P)^2 + w \cdot q_I \ .$$

As in the previous case there exists a unique value of i_P for which equality holds and the ex-post utility of the party leader is again flat in i_P with a single discontinuity. Now consider the ex-ante utility of the party leader. For $i_P = i_L$ the utility functions of the median member and the party leader are identical and the choices of the median member maximise the utility of the party leader. As i_P shifts away from i_L, however, the utility of the party leader drops whenever a threshold is reached where the median member changes her nomination choice for a particular quality combination. □

B Weakly Dominated Strategies

This appendix derives bounds on the existence of equilibria where the incumbent is re-elected with certainty. When no politician of party C is elected with positive probability the party leader is indifferent between any of her pure strategies. Given the restrictions on equilibrium strategies, whether this case can be an equilibrium crucially depends on which posterior beliefs can be generated by weakly undominated strategies.

Fix an arbitrary nomination strategy η and let $m(\eta)$ be the ex-ante probability that the moderate gets nominated under η. A second strategy η' weakly dominates η only if $m(\eta) = m(\eta')$: In the case $m(\eta) > m(\eta')$ the expected utility of the party leader under η would be strictly higher under η than under η' given that $r(M) = 1$ and $r(E) = 0$, i.e. the median voter elects the moderate for sure and never elects the extremist. Similarly, if $m(\eta) > m(\eta')$ η gives a strictly higher utility for $r(M) = 0$ and $r(E) = 1$.

Given this first result, the intuition for which strategies are weakly dominated can be given as follows: A strategy η is weakly dominated if and only if it is possible to find a second strategy η' such that $m(\eta) = m(\eta')$ and η' nominates politician p more frequently when this politician is of high quality and less frequently when this politician is of low quality, relative to η. The remainder of the proof formalizes this idea.

It is claimed that any nomination strategy that features $\eta_M(0,1) > 0$ and $\eta_M(1,1) < 1$ is weakly dominated. Construct a second strategy η'_M by setting $\eta'_M(1,1) = \eta_M(1,1)+\varepsilon$ and $\eta'_M(0,1) = \eta_M(0,1)-\frac{\pi}{1-\pi}\varepsilon$ with $\varepsilon > 0$ and leaving all other nomination probabilities unchanged relative to η_M. Choosing ε sufficiently small ensures that all probabilities in the new strategy η'_M are well defined. By construction, both politicians ex-ante get nominated with the same probability under η_M and η'_M. The only difference between the two strategies is that for

the quality combination $(1,1)$ the moderate is nominated more frequently under η'_M than under η_M, while for the quality combination $(0,1)$ the moderate is nominated less frequently. The expected utility of the party leader under the strategy η_M can be written as

$$\begin{aligned}\sum_{q\in Q} Pr[q_C = q]\ \Big\{ & \eta_M(q)\big[r(M)(-(M-i_L)^2 + Y + w\cdot q_M) \\ & \qquad + (1-r(M))(-(I-i_L)^2 + w\cdot q_I)\big] \\ & + (1-\eta_M(q))\big[r(E)(-(E-i_L)^2 + Y + w\cdot q_E) \\ & \qquad + (1-r(E))(-(I-i_L)^2 + w\cdot q_I)\big]\ \Big\}.\end{aligned}$$

Define $U_M \equiv -(M-i_L)^2+Y$, $U_E \equiv -(E-i_L)^2+Y$, and $U_I \equiv -(I-i_L)^2+w\cdot q_I$. The difference in the expected utilities under η'_M and η_M is

$$\begin{aligned}\pi^2\ \varepsilon\ \Big\{ & r(M)(U_M+w) + (1-r(M))U_I \\ & - r(E)(U_E+w) - (1-r(E))U_I\Big\} \\ -\pi(1-\pi)\frac{\pi}{1-\pi}\ \varepsilon\ \Big\{ & r(M)U_M + (1-r(M))U_I \\ & - r(E)(U_E+w) - (1-r(E))U_I\Big\}\ ,\end{aligned}$$

which is equal to $\pi^2\ \varepsilon\ r(M)\ w$ and non-negative for any election strategy r. This shows that η'_M weakly dominates η_M.

By analogous arguments any strategy such that either $\eta_M(0,0) > 0$ and $\eta_M(1,0) < 1$, $\eta_M(0,0) < 1$ and $\eta_M(0,1) > 0$, or $\eta_M(1,0) < 1$ and $\eta_M(1,1) > 0$, is weakly dominated as well. Now consider a strategy such that $\eta_M(1,0) < 1$. For this strategy not to be weakly dominated it must be true that $\eta_M(0,0) = 0$ and $\eta_M(1,1) = 0$ by the second and fourth rule above, which in turn leads to

the requirement $\eta_M(0,1) = 0$ by the third rule. Any resulting strategy is not weakly dominated, as the construction of a weakly dominating strategy would require reducing the probability of nominating a high quality moderate.

Next, consider a strategy such that $\eta_M(1,0) = 1$ and $\eta_M(0,1) > 0$. By the first and third rule given above it must hold that $\eta_M(1,1) = 1$ and $\eta_M(0,0) = 1$ for this strategy to not be weakly dominated. Similar to before, to find a strategy that could weakly dominate this strategy it would be necessary to reduce the probability of nominating a high quality extremist, which would reduce utility against most strategies of the party leader.

Finally, let $\eta_M(1,0) = 1$ and $\eta_M(0,1) = 0$. None of the conditions above imposes any restrictions on $\eta_M(0,0)$ and $\eta_M(1,1)$. Furthermore, any strategy of this kind is not weakly dominated. Raising the probability of nominating a high quality politician while keeping the ex-ante nomination probabilities constant necessarily implies reducing the probability of nominating the second politician when she is of high quality by an equivalent amount.

To summarize, there are only three different types of nomination strategies that are not weakly dominated:

- $\eta_M(1,0) = 1$, $\eta_M(0,1) = 0$, $0 \leq \eta_M(0,0) \leq 1$, $0 \leq \eta_M(1,1) \leq 1$
- $\eta_M(1,0) = 1$, $\eta_M(0,1) > 0$, $\eta_M(0,0) = 1$, $\eta_M(1,1) = 1$
- $\eta_M(1,0) < 1$, $\eta_M(0,1) = 0$, $\eta_M(0,0) = 0$, $\eta_M(1,1) = 0$

The second of these strategies nominates the extremist only if she has high quality and consequently $\bar{\pi}_E = 1$ in this case. For the moderate this strategy implies

$$\bar{\pi}_M = \frac{\pi}{\pi + \pi(1-\pi)\eta_M(0,1) + (1-\pi)^2} \ .$$

This expression achieves its minimum of π for $\eta_M(0,1) = 1$. The conditions $\mathcal{I} > -M^2 + \pi$ and $\mathcal{I} > -E^2 + 1$ are therefore jointly sufficient for the existence of

an equilibrium where $r(M) = r(E) = 0$. Similarly, the third strategy nominates the moderate only if she has high quality and $\bar{\pi}_M = 1$ must hold, while the lowest posterior expectation over the quality of the extremist that this strategy can generate is π for $\eta_M(1,0) = 0$. This implies the joint sufficient conditions $\mathcal{I} > -M^2+1$ and $\mathcal{I} > -E^2+\pi$, where the second condition is satisfied whenever the first condition holds.

For the first of the weakly undominated strategies given above the posterior expectations are

$$\bar{\pi}_M = \frac{\pi(1-\pi) + \pi^2\eta_M(1,1)}{\pi(1-\pi) + \pi^2\eta_M(1,1) + (1-\pi)^2\eta_M(0,0)} \tag{14}$$

and

$$\bar{\pi}_E = \frac{\pi(1-\pi) + \pi^2(1-\eta_M(1,1))}{\pi(1-\pi) + \pi^2(1-\eta_M(1,1)) + (1-\pi)^2(1-\eta_M(0,0))} \ . \tag{15}$$

This strategy generates $\bar{\pi}_E = 1$ if and only if $\eta_M(0,0) = 1$ and the lowest value of the posterior expectation $\bar{\pi}_M$ that can be achieved in this case is π, which implies the same sufficient conditions as the first set of conditions given in the previous paragraph. On the other hand, the lowest value that the right-hand side of Equation (15) can take is π. Together with the previous results this shows that no undominated strategy can lead to a posterior expected quality below π for any politician. It remains to show which sufficient conditions the current strategy yields if E is such that $-E^2 + \pi \leq \mathcal{I} \leq -E^2 + 1$. This requires for any such E to find the lowest M such that the median voter is indifferent between the incumbent and both politicians of party C. This M satisfies $\mathcal{I} = -M^2+\bar{\pi}^*_M$, where $\bar{\pi}^*_M$ is the solution to the minimization problem

$$\begin{aligned} \min_{0\leq x,y\leq 1} \quad & \frac{\pi(1-\pi) + \pi^2 x}{\pi(1-\pi) + \pi^2 x + (1-\pi)^2 y} \\ s.t. \quad & -E^2 + \frac{\pi(1-\pi) + \pi^2(1-x)}{\pi(1-\pi) + \pi^2(1-x) + (1-\pi)^2(1-y)} = \mathcal{I} \end{aligned}$$

C Non-Additive Quality

This appendix provides a proof for the claim in Section 4.1 that the median voter theorem applies if the utility function of voters is given by

$$-(i-x)^2 + h(|x-i|) \cdot q$$

as long as the following assumptions are satisfied: the function $h : \mathbb{R}_+ \to \mathbb{R}$ is decreasing and concave, there exists a positive constant d such that $h(d) \geq 0$, and all voters are located in the interval $[-d, d]$. It needs to be shown that either all voters to the left or all voters to the right of the median voter agree with the preference ordering of the median voter for all possible combinations of candidates. Without loss of generality, assume that the median voter prefers the extremist over the incumbent: For i equal to zero it then holds that

$$-(E-i)^2 + h(|E-i|) \cdot \bar{\pi}_E \;>\; -(I-i)^2 + h(|I-i|) \cdot q_I \;. \tag{16}$$

Consider voters such that $i \in [0, E]$. As $I < 0$ and $E > 0$, Inequality (16) must hold for these voters: The right-hand side of the expression is decreasing in i while the left-hand side is increasing on this interval.

Now consider voters located in the interval $(E, d]$ in the case where $d > E$. These voters clearly prefer the extremist over the incumbent on ideological grounds. As $h(|E-i|) \geq 0$ for any of these voters, the only way that they could prefer the incumbent over the extremist was if the quality q_I of the incumbent was larger than the expected quality $\bar{\pi}_E$ of the extremist. But this, together with the result shown above that a voter located at $i = E$ must prefer the extremist over the incumbent, implies that all voters in the interval $(E, d]$ must prefer the extremist as well. To see this note that it follows from h being concave and decreasing, $q_I > \bar{\pi}_E$, and $I < E$ that the function $h(|I-i|) \cdot q_I$ decreases

at least as fast as the function $h(|E-i|)\cdot\bar{\pi}_E$ in i on the interval $(E,d]$. It is then clear that Inequality (16) holds for all $i\in(E,I]$.

D Uncertainty over Candidate Locations

This appendix considers a generalised version of the basic model where the ideal policies of the moderate and the extremist are drawn from distributions F_M and F_E, respectively, and only observed by the party leader, but not voters. To keep things reasonably simple, the disutility from policy will now be given by the absolute value, rather than the square, of the difference between policy and ideal position of an agent. Furthermore, assume that $i_L=1$ and that the party leader expects that the moderate would get elected with certainty while the extremist would get elected with probability $r(E)$, as in the Full Competition case above. The decision rule of the party leader is then to nominate the moderate if and only if

$$\begin{aligned}-|M-1|+w\cdot q_M+Y \;&\geq r(E)[-|E-1|+w\cdot q_E+Y]+\\ &\quad (1-r(E))[-|I-1|+w\cdot q_I]\end{aligned}$$

or equivalently

$$\begin{aligned}M-r(E)E \;&\geq r(E)[w\cdot q_E+Y]\;+\;(1-r(E))(I+w\cdot q_I)-w\cdot q_M-Y\\ &\equiv K(q_C)\;.\end{aligned}$$

This choice rule implies that under different quality combinations politicians will be nominated with different probabilities and the nomination choice can therefore still be a signal of quality. The expected quality of a moderate nominated

according to this rule is

$$\bar{\pi}_M = \frac{\sum_{q\in\{0,1\}} \pi \ Pr[q_E = q] \ Pr[M - r(E)E \geq K(q_C)|q_C = (q,1)]}{\sum_{q\in Q} Pr[q_C = q] \ Pr[M - r(E)E \geq K(q_C)|q_C = q]} \ ,$$

which is simply the probability that the moderate gets nominated conditional on being of high quality divided by the unconditional nomination probability. One way to find an expression for $Pr[M - r(E)E \geq K(q_C)]$ is to first derive the density of the random variable $M - r(E)E$ at some point t. This is given by

$$\int_{\text{supp}(F_E)} f_E(e) f_M(t + r(E)e) \ de \ .$$

Appropriately integrating over this density one obtains the desired probability. The expression for the posterior quality of the extremist can be derived analogously.

Beyond quality the nomination choice can now also be a signal of the policy position of a candidate. Considering the decision rule of the party leader, one observation is immediate: If all possible candidates are closer to the median than the party leader, then it is impossible that the expectation of the posterior distribution of the policy position of a nominated politician is below the expectation of the prior distribution. If the party leader prefers to nominate the moderate for a given M then she must ceteris paribus prefer to nominate the moderate for any higher M as well, implying that the posterior distribution first order stochastically dominates the prior distribution. The same holds for the extremist. Therefore, if a nomination tells voters anything about the policies a candidate stands for then that these are more extreme than previously thought. In other words, politically extreme parties are bad for the median voter in terms of the political views of the candidates they select.

To find an expression for the expected policy position of a moderate nomi-

nated according to the decision rule above, first note that according to Bayes' rule the posterior probability density over M conditional on a certain quality combination q is given by

$$f_{M|q}(m) \equiv f_M(m) \frac{Pr[M - r(E)E \geq K(q_C)|M = m, q_C = q]}{Pr[M - r(E)E \geq K(q_C)|q_C = q]}$$

with

$$Pr[M - r(E)E \geq K(q_C)|M = m, q_C = q] = F_E\left([m - K(q_C)]/r(E)\right) \ .$$

The unconditional expected policy position of a nominated moderate is then given by the weighted sum of the conditional expectations:

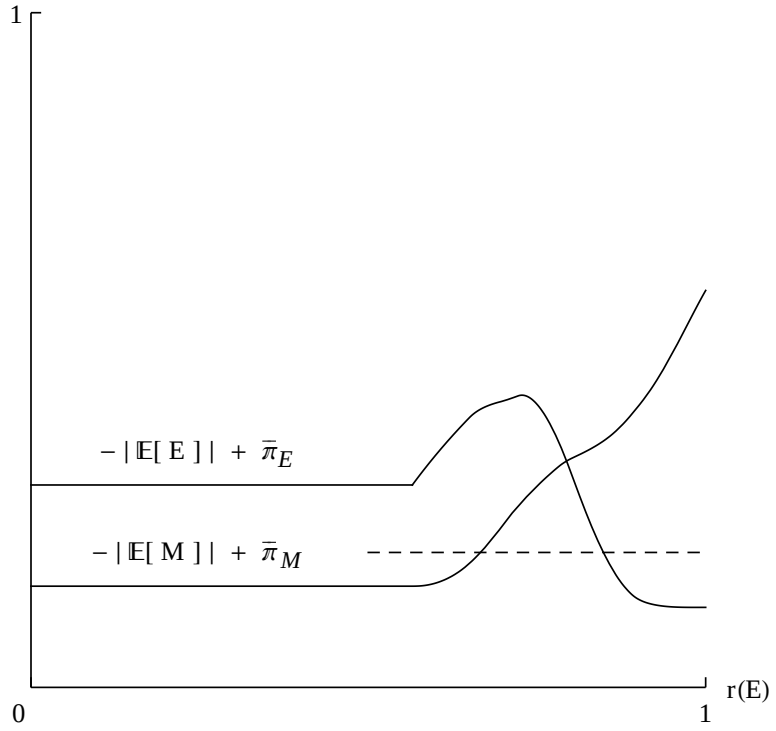
$$\frac{\sum_{q \in Q} Pr[q_C = q] \ Pr[M - r(E)E \geq K(q_C)|q_C = q] \int_{\text{supp}(F_M)} \ m \ f_{M|q}(m) \ dm}{\sum_{q \in Q} Pr[q_C = q] \ Pr[M - r(E)E \geq K(q_C)|q_C = q]} \ .$$

Again, the expected policy position of the extremist follows analogously.

Giving a general description of equilibrium is beyond the scope of this paper. Instead, a specific example will be given to illustrate that the characteristics of the Full Competition equilibrium emphasized above remain unchanged in the extended model. It is assumed that both M and E are uniformly distributed with support $[0.2, 0.5]$ and $[0.4, 0.7]$, respectively, while incumbent is located at -0.8 and has high quality. Note that the moderate is expected to be closer to the median than the extremist, but the opposite might be the case in actuality. In addition, $\pi = w = 0.5$, $Y = 1$ and $i_L = 1$ will be used.

Figure 3 plots the expected utility of the median voter from electing either politician of party C, which can be calculated using the expressions above, as a function of the probability $r(E)$ that the extremist will get elected. The dashed line represents the utility that the median voter receives in case the incumbent

Figure 3: Expected Utilities with Uncertain Policy Positions



is re-elected. For low values of $r(E)$ the party leader always selects the moderate and both expected utilities are flat in this region.[16] As $r(E)$ increases the party leader finds it worthwhile to nominate the extremist for high values of E in the case where the extremist has high quality and the moderate has low quality, and eventually also for lower values of E. This makes the extremist less extreme in expectation and explains the initial increase in the expected utility from electing her. For even higher values of $r(E)$ the extremist gets nominated under other quality combination as well, which lowers her expected quality and results in a

[16] In the extended model Universal Divinity implies that an unexpectedly nominated politician p is of high quality and located as close to the party leader as possible given the distribution F_p.

decrease in utility for the median voter. The increase in the expected utility from electing the moderate, on the other hand, stems from the fact that her expected quality increases as it becomes more attractive to nominate the extremist.

The figure shows that there is a unique election probability of the extremist such that the median voter is indifferent between the extremist and the incumbent while strictly preferring the moderate. This point in the graph thus represents an equilibrium—an equilibrium that is equivalent to the case of Full Competition described above.

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