

Takalo, Tuomas; Poutvaara, Panu

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Panu Poutvaara
Tuomas Takalo

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Panu Poutvaara

*CEBR, CESifo
and IZA Bonn*

Tuomas Takalo

Bank of Finland

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0

Fax: +49-228-3894-180

Email: iza@iza.org

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ABSTRACT

Candidate Quality*

We analyze the topical question of how the compensation of elected politicians affects the set of citizens choosing to run. To this end, we develop a sparse and tractable citizen-candidate model of representative democracy with ability differences, informative campaigning and political parties. Our results suggest that primaries, campaign costs and rewards have previously overlooked interactions that should be studied in a unified framework. Surprisingly, increasing the reward may lower the average candidate quality when the campaigning costs are sufficiently high.

JEL Classification: D70, D72, D79, J24, J4

Keywords: politicians' competence, career concerns, campaigning costs, rewards for elected officials, citizen-candidate models

Corresponding author:

Panu Poutvaara
CEBR
Langelinie Allé 17
2100 Copenhagen
Denmark
Email: panu.poutvaara@cebr.dk

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”Government represents about a third of our gross national product. That is a lot of our national income to waste by discouraging the best young people from entry.”

Joseph S. Nye Jr., Dean of Harvard’s John F. Kennedy School of Government

1 Introduction

People talk about the quality of politicians as much as the quality of their policy. This is not surprising, because the quality of politicians profoundly affects the quality of their policy. More surprisingly, politicians’ quality is often ignored in the economic analysis, although the quality of their policy is carefully scrutinized. By politicians’ quality we simply mean their ability to maximize welfare by making and carrying out decisions on behalf of the rest of society. Such skills are in scarce supply in society. Voters would like to elect competent citizens as their representatives but, typically, these also fare well outside politics. There is also concern that the attraction of governmental posts has been eroding. For example, the Dean of Harvard’s John F. Kennedy School of Government Joseph S. Nye Jr. (2001) reports that while in 1980 three-quarters of American graduates from his school went to work for the government, the share has dropped in two decades to one third. This would suggest that making a career in government attractive for the most able would call for considerable wage increases. It has indeed often been argued - especially by politicians themselves - that the reward for holding public office should be increased to improve the candidate quality.¹ There is, however, an elementary property of politics that may render such an action inefficient at best and detrimental at worst. Increasing the reward level may make politics more lucrative not only to high-ability citizens but also to low-ability citizens, who also have a chance in elections due to electoral uncertainty. The purpose of this study is to provide a stylized

¹The argument has been put forward to justify the relatively high salaries and compensation of the members of the European Parliament. It was one of the main justifications for the 35% increase in the salaries of the members of the Finnish Parliament in 2000.

framework to examine when the candidate quality increases with the reward level, and when it does not.

Because the citizen-candidate models of representative democracy, pioneered by Osborne and Slivinski (1996) and Besley and Coate (1997), render the set of candidates endogenous, they provide a natural framework for our study of the candidate quality. In an archetypal citizen-candidate model any citizen may enter electoral competition at a cost, and then all citizens elect politicians from the group of self-declared candidates. Such a simple description of democracy involves many attractive properties, but it renders political parties redundant, which contrasts with their prominent gatekeeping role in modern elections. Often only citizens nominated as candidates of a major party stand a realistic chance, especially in national elections. We extend the citizen-candidate approach by adding two parties, and assume that a party selects its candidate for the general election from the citizens who would like to become the official candidate of the party. As politics without ideological considerations is rather implausible (Wittman 1973, 1983), we also give parties a distinct ideology.

In our model citizens contemplating candidacy weight the expected payoff from winning an election against campaigning costs and income available outside politics. The citizens differ in their earning potential outside politics and in their competence in the office but, for each citizen, the earning potential and competence are positively correlated. Voters would like to have competent office holders, but the candidates have private information about their ability. Campaigning creates a noisy signal of the ability of citizens entering politics. To capture the inherent random factors of political life, we assume that candidates know only their probability of emitting a good signal. As in Caillaud and Tirole (2002), parties act as political intermediaries that reduce voters' informational deficit. The parties organize primary elections to screen candidates so that the ability distribution of the candidates in the

general election will be improved. The screening in the party primaries benefits all citizens, giving the parties welfare-enhancing role in increasing the quality of candidates.

Our analysis reveals that the effects of the reward for office holders and campaigning costs are not straightforward. Although our model predicts that the candidate quality is increasing in the reward for low campaigning costs, the prediction is reversed for sufficiently high campaigning costs. The finding has far reaching implications. In designing the optimal rewards for the elected officials, the campaigning costs should be given proper attention. It may be possible to design rewards to screen the best candidates, but only when the campaigning costs are high. When they are low, there is no way to deter low-ability citizens from running for office.

We build on strong foundations. There is an extensive literature in which representative democracy is regarded as a principal-agent relationship where voters delegate political power to selected candidates.² Such delegation of decisions leads to well-known problems of moral hazard and adverse selection. Moral hazard problem arises, as politicians need not act in the interest of their voters. Different aspects of moral hazard are studied in an extensive literature emerging from influential contributions by Barro (1973) and Ferejohn (1986). Since it is difficult to provide formal incentives in politics, implicit incentives in the form of career concerns may mitigate the moral hazard problem (Holmström, 1982, and Persson and Tabellini, 2000). Adverse selection problem results from asymmetric information concerning the quality of candidates or platforms, as well as from the fact that voters can select politicians only from those citizens who run for the office. Rogoff and Sibert (1988) and Rogoff (1990) show that when incumbent politicians have private information on their competence, career concerns may lead to political budget cycles.³

²For excellent surveys, see Drazen (2000) and Persson and Tabellini (2000).

³More specifically, the principal-agent relationship in our model as well as in Rogoff and Sibert (1988) and Rogoff (1990) involves asymmetric information about the quality of the agent, whereas Holmström's (1982) original career concern model and its extension to politics by Persson and Tabellini (2000) invoke on

Recent research has raised some fresh issues concerning moral hazard and adverse selection problems in politics. Gersbach (2004a, 2004b) and Gersbach and Liessem (2001) study whether the incentive contracts politicians offer voters could constitute a solution to the moral hazard problem. Besides the incentive contracts, the politicians' opportunistic behavior could also be constrained by the party system as argued by Caillaud and Tirole (2002). We too view parties as delegated monitors, but we focus on the parties' screening role in mitigating the adverse selection problem. The adverse selection problem is also emphasized by Carrillo and Mariotti (2001), Prat (2002), Coate (2003a, 2003b) and Schultz (2003). Carrillo and Mariotti (2001), like us, analyze the quality of candidates in a two-party system where electoral campaign provides voters with information on candidates. They are, however, primarily interested in the effect of electoral competition on the turnover of candidates. In taking the ideological dimension of politics seriously we follow Prat (2002), Coate (2003a, 2003b) and Schultz (2003) who uncover the determinants of campaign finance and informative advertising.

The closest papers to ours are Caselli and Morelli (2004), Messner and Polborn (2003), and Besley (2004) who also study the candidate quality in the citizen-candidate framework and emphasize the payoff from winning an election and the opportunity cost of candidacy in determining the quality of politicians.⁴ There is, however, a number of differences between our work and theirs. For example, Caselli and Morelli (2004) assume that candidates know in advance whether they can convince the electorate of their quality and Messner and Polborn (2003) assume that the abilities of potential candidates are known to voters, but their opportunity costs are private information. Besley (2004) focuses on the agency problem of incumbents subject to a two-period limit, assuming a random selection of politicians and

the assumption of imperfect but symmetric information about the quality of the agent.

⁴We became aware of contributions by Besley (2004) and Messner and Polborn (2003) after having completed our study independently.

abstracting from campaigning costs.

In the next section we present our model. It has three key parameters: the reward for office holders, campaigning costs, and the citizens' ability level. The values of the parameters specify the choice between politics and a private career. In section 3, we characterize the political equilibria. There turns out to be a unique equilibrium set of candidates for a given campaigning cost and a given reward. We show how the level of campaigning costs determines whether an increase in the reward for office holders increases or decreases the candidate quality. The political system that screens the best candidates is assessed in section 4. Ways to pursue plausible extensions, like campaign contributions, lobbying, and corruption, are briefly discussed in the concluding section (section 5).

2 The Model

We study a two-party system with twice as many candidates as seats. Policy-makers, say members of the parliament, must decide a polarizing issue, such as starting a war, joining the EU, adopting Euro, nuclear power or abortion. They need also make other, less ideologically charged, decisions on behalf of the rest of society. The representatives are selected in general election where all citizens, including the candidates, have one vote, which is valid only if cast for an official candidate of a party. We focus on one district where the candidate receiving the majority of votes in the general election is elected. In the event of a tie, the winner is selected by a lottery.

Citizens are divided into three groups according to their ideological position. There are $2n$ ideological citizens that are equally split into the two parties, which have adopted the opposite positions in the polarizing issue. The rest of the polity consists of m non-ideological citizens. Both the ideological party members and the non-ideological citizens can be identified by their abilities. Citizen i 's ability is denoted by a_i , and, as we will explain

in detail below, it has a dual role in our model: both the citizen's reservation wage outside politics and the probability of electoral success depend on the ability. This gives the parties an incentive to organize party primaries to screen their pool of candidates.

We consider an electoral game of three stages. The first is the *entry stage*, where each citizen decides whether to stand for an election or not. In the *primary stage* the parties select their candidates from the set of the citizens who express an interest in candidacy in the first stage. The third stage is the *general election*, where the citizens vote for one of the candidates.

The decision whether to enter politics or not is based on the maximization of the expected utility. Unsuccessful candidates and the citizens abstaining from the political campaigning collect their reservation wages. Without loss of generality, we assume that citizen i earns a_i outside politics.⁵ Each candidate incurs a private campaigning cost, e , regardless of the eventual outcome of the election. A successful candidate, an elected official, is rewarded by π . For the moment, we take e and π as exogenous but, in section 4, we seek the values of e and π that maximize the candidate quality. Note that e and π need not to be monetary. For example, campaigning may involve psychological costs such as losing privacy and being subject to searching journalism. Being elected, on the other hand, may give ego rents as discussed, e.g., in Rogoff (1990).

Citizens have lexicographic preferences. They value most the private consumption stemming from private sector wages or reward for holding an office net of campaigning cost. The second most important term in the utility function of ideological citizens is the share of elected candidates representing their ideology. Finally, all citizens care about the average ability of the elected politicians. This last term in the citizens' utility function can be motivated, for example, by assuming that the higher are the representatives' abilities, the better

⁵Regarding the reservation wage as $c + ba_i$, where c and b are positive constants, would not qualitatively change the analysis.

they can serve the interests of society in the less ideological issues.⁶

Voters do not know the candidates' abilities, but campaigning creates a noisy signal $s \in \{L, H\}$ of the ability level where the signal can take only two values, high (H) and low (L). Assuming that a_i is distributed over a unit interval we can let the probability of candidate i emitting signal H in the general election be given by

$$\Pr(s_i = H \mid a_i) = a_i. \quad (1)$$

The complementary probability, i.e., the probability that candidate i signals L , is then

$$\Pr(s_i = L \mid a_i) = 1 - a_i. \quad (2)$$

Also party primaries produce a signal of candidates' abilities. The probability that a primary election candidate i emits a signal H is given by:

$$\Pr(s_i^p = H \mid a_i) = \frac{a_i + \delta}{1 + \delta}, \quad (3)$$

where the presence of δ , $\delta > 0$, captures the stylized fact that screening of politicians tends to be more accurate in general elections. Therefore, even citizens with $a = 0$ have a positive probability of emitting signal H in party primaries.

Finally, we specify that the density function of citizen i 's ability is given by

$$g(a) = \psi \frac{1 + \delta}{a + \delta}, \quad (4)$$

⁶We view lexicographic preferences as a reasonable simplification especially for politicians in parliamentary elections, as the outcome in a single district is rarely decisive. In the absence of lexicographic preferences, some politicians would abstain from party primaries even with a positive expected private return, simply to give their fellow party members with higher ability a chance to run in the general election. Given the lexicographic preferences we can also derive as a special case a simplified version of the model without ideological consideration and with random candidate selection within the parties, (see Poutvaara and Takalo, 2003).

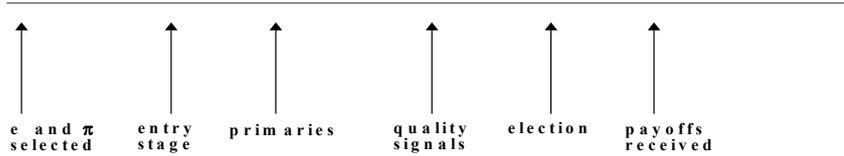


Figure 1: Electoral Game

where $\psi \equiv \frac{1}{(1+\delta)\ln(1+\frac{1}{\delta})}$ solves $\int_0^1 g(a)da = 1$. For a finite δ , (4) suggests that higher ability levels are less likely. Moreover, together with the signalling technology of the party primaries (3), (4) implies that the ability of the citizens who signal H in the party primary will be uniformly distributed, allowing for an analytic solution of the model.⁷ As will be explained in section 2.2., this means that the party primaries provide an additional screening stage that improves the average quality of candidates.

The timing of events is summarized in Figure 1.

We construct political equilibria of the model by using the concept of a perfect Bayesian equilibrium. Such equilibria consist of three components: 1) Citizens' candidacy strategies, i.e., decisions whether to enter primary elections. Let $I_i \in \{0, 1\}$ denote citizen i 's entry decision where $I_i = 1$ if the citizen enters the primaries and $I_i = 0$ if he or she does not. 2) Citizens' voting behavior describes how the citizens vote as a function of the information they have received in the campaign. To reduce the number of equilibria, we assume that

⁷With different distributional assumptions, the model could be solved numerically.

all vote, and that they vote as if they were pivotal. This implies that all ideological voters vote for their party's candidate in the general election, and all non-ideological voters prefer the candidate with higher expected ability, randomizing their vote if indifferent. 3) Voters' belief function describes a common assessment that candidate i is of higher expected ability than candidate j conditional on the variables that voters observe. In other words, given I_i , I_j , s_i , and s_j , voters can share one of three alternative beliefs. We denote the belief that $E(a_i) > E(a_j)$ by 1, the belief that $E(a_i) < E(a_j)$ by -1 , and the belief that $E(a_i) = E(a_j)$ by 0. Let $\mu(I_i, I_j, s_i, s_j) \in \{1, -1, 0\}$ denote the voters' belief given the candidates' entry decisions and the signals they have emitted. As shown in the Appendix, Bayes' rule implies that $\mu(1, 1, H, L) = 1$, $\mu(1, 1, L, H) = -1$, $\mu(1, 1, H, H) = 0$, and $\mu(1, 1, L, L) = 0$.

2.1 General Election

Given the belief μ and our assumptions on voting behavior, a candidate signalling H wins the general election with a probability of one, when the opponent signals L . Each candidate has n secured voters, m voters being mobile. If both candidates send the same signal, each candidate wins with a probability of one-half. In sum, if candidates i and j run for an office as official candidates, candidate i wins with a probability of $p(w | a_i, a_j)$, which is given by:

$$p(w | a_i, a_j) = \Pr(s_i = H | a_i) \Pr(s_j = L | a_j) + \frac{1}{2} [\Pr(s_i = H | a_i) \Pr(s_j = H | a_j) + \Pr(s_i = L | a_i) \Pr(s_j = L | a_j)]. \quad (5)$$

Substituting (1) and (2) for (5) and simplifying, (5) can be expressed as:

$$p(w | a_i, a_j) = \frac{1 + a_i - a_j}{2}. \quad (6)$$

Equation (6) captures the inherent uncertainty of democratic elections. While the probability of being elected is increasing in candidate's relative ability, the better candidate cannot be certain of winning the election.

2.2 Primary Stage

The official candidates are nominated by the parties, who select their candidates in party primaries. All party members can present themselves as potential candidates in their party's primary. If none of the party members present themselves in party primary, the party opens its primary to non-ideological citizens.⁸ As a result, there is a set of primary election candidates $C(e, \pi)$ who have committed to campaigning if nominated as the official candidate of a party. The members of the party prefer candidates who send a high signal in primary election, because such candidates have both a better chance of winning the general election and higher expected competence to serve society in non-ideological issues. If several candidates signal H in the primary, the official candidate is randomly selected among them. If none of the candidates signals H in the primary and there are several potential candidates, the primary election process is repeated so that new signals are drawn until at least one H -signal is obtained. When $\delta > 0$, this occurs with probability one when the signal extraction is repeated sufficiently many rounds.⁹

By (3) and (4), the ability distribution of candidates emerging from the primaries is uniform on the interval that is determined by the start and end points of the ability distribution of primary election candidates, which has more mass on the lower end of the interval. The ability distribution of the candidates in the general election thus first-order stochastically dominates the ability distribution of the primary election candidates. This screening in the

⁸We assume that there are at least two non-ideological citizens of ability zero. This technical assumption prevents in some cases the collapse of democracy merely because of the randomness of ability realization.

⁹To rule out the use of repeated primaries as yet another screening device, we assume that once a candidate has signalled H in primary, the signal persists until the launch of general election campaign.

party primaries also benefits non-ideological citizens, giving the parties welfare-enhancing role in improving the quality of candidates.

We now proceed to the first stage where the citizens choose whether they pursue a career in politics or remain ordinary citizens.

2.3 Entry Stage

Note that (6) measures the winning probability after both parties have nominated the candidates. When a citizen contemplates candidacy the winning probability should be calculated before the parties select their candidates. Formally, if citizen i decides to run for office, the winning probability is given by:

$$P(w | a_i) = \int_{\underline{a}}^{\bar{a}} p(w | a_i, x) f(x) dx, \quad (7)$$

where $f(x)$ is the density function of the abilities of the potential candidates who signal H in primary elections. As explained, this ability distribution is uniform by (3) and (4). We therefore proceed under the assumption that the candidates' abilities are uniformly distributed between \underline{a} and \bar{a} , which denote the lowest and highest ability of the potential opponent with $0 \leq \underline{a} \leq \bar{a} \leq 1$. The ability thresholds \underline{a} and \bar{a} are determined as part of the equilibrium, but each citizen takes them as given when deciding whether to run for office or not. We denote the set of those abilities from which candidates are selected by $C(e, \pi) = [\underline{a}, \bar{a}]$.

By using the uniformity of the distribution of those who actually become candidates and (6), the probability that citizen i wins an election (7) can be rewritten as

$$P(w | a_i) = \frac{1}{2(\bar{a} - \underline{a})} \int_{\underline{a}}^{\bar{a}} (1 + a_i - x) dx. \quad (8)$$

Equation (8) is equivalent to:

$$P(w | a_i) = \frac{1 + a_i - A}{2}, \quad (9)$$

where $A = \frac{\bar{a} + \underline{a}}{2}$ denotes the average quality of potential candidates. Given the campaigning cost, e , the reward for office holders, π , the reservation wage, a_i , the belief, μ , and the voting behavior, citizen i decides to run for office only if:

$$P(w | a_i)\pi + (1 - P(w | a_i))a_i - e \geq a_i, \quad (10)$$

where the left-hand side and the right-hand side capture the expected payoff of running for office and the outside option. Inserting (9) into (10) and simplifying yields:

$$\frac{1}{2}(1 + a_i - A)(\pi - a_i) - e \geq 0. \quad (11)$$

Equation (11) holds as an equality for the pivotal citizens who are indifferent between a public and private career. Letting (11) be an equality and rearranging gives the condition

$$-a_i^2 + a_i(\pi + A - 1) + \pi(1 - A) - 2e = 0. \quad (12)$$

As the left-hand side of (12) is a downward-opening parable, the values of a satisfying (11) are between the values that solve (12). Thus, if a solution exists, it satisfies our hypothesis that all citizens between \bar{a} and \underline{a} are interested in candidacy. However, the solutions of (12) need not to be on the open unit interval. Upon solving (12) for a_i , we can write the ability level of the pivotal citizens as:

$$\underline{a} = \max \left\{ 0, \frac{1}{2} \left[\pi + A - 1 - \sqrt{(\pi + 1 - A)^2 - 8e} \right] \right\} \quad (13)$$

and

$$\bar{a} = \min \left\{ 1, \frac{1}{2} \left[\pi + A - 1 + \sqrt{(\pi + 1 - A)^2 - 8e} \right] \right\}. \quad (14)$$

3 Findings

3.1 Political Equilibria

In this section, we determine political equilibria corresponding all non-negative values of the reward for office holders and campaigning costs. We restrict our attention to the range of parameter values where $e \leq \frac{1}{2}$ and divide parameter space $\{0 \leq e \leq \frac{1}{2}; \pi \geq 0\}$ into different regions according to what is the ability range from which citizen-candidates enter politics. It turns out that the equilibria we specify are unique for each combination (e, π) . One type of equilibria is a pooling equilibrium where the set of those willing to become candidates $C(e, \pi) = [0, 1]$. We call it *universal democracy*. Then there are potentially three types of semiseparating equilibria, *mediocre candidates* when $C(e, \pi) = [\underline{a}, \bar{a}]$ with $0 < \underline{a} \leq \bar{a} < 1$, *competent candidates* when $C(e, \pi) = [\underline{a}, 1]$ with $\underline{a} > 0$, and *incompetent candidates* when $C(e, \pi) = [0, \bar{a}]$ with $\bar{a} < 1$. Finally, we take that there is a *collapse of democracy* when the parties cannot be certain that they are able to nominate a candidate. Fortunately, it turns out that various political equilibria can be characterized by dividing the campaigning costs into two ranges. We say that campaigning costs are relatively *high* when $e \geq \hat{e} \equiv \frac{3}{8}$. Accordingly, they are called relatively *low* when $e < \hat{e}$.¹⁰

Using the aforementioned terminology we will first present six Lemmas characterizing the political equilibria. The proofs of Lemmas are relegated to the Appendix. We then invoke on the Lemmas to derive the two main results concerning the impact of π and e on the candidate quality. We first prove:

¹⁰We report results allowing for $e > \frac{1}{2}$ in an earlier version (Poutvaara and Takalo, 2003).

Lemma 1 *There is no mixed strategy equilibrium where a positive mass of citizens would be indifferent between standing for an election and staying outside politics.*

Because Lemma 1 means that examining mixed strategy equilibria is inconsequential, in what follows, we focus on equilibria in which citizen-candidates play pure strategies, i.e., they either stand for an election or stay outside politics.

Lemma 2 *Universal democracy exists when campaigning costs are high and $\pi \geq 4e$ or when campaigning costs are low and $\pi \geq 1 + \frac{4}{3}e$.*

Lemma 2 simply says that when the reward for office holders is sufficiently high relative to the costs of campaigning, everyone is willing to gamble and become a candidate.

Lemma 3 *Candidates are mediocre when campaigning costs are high and $\pi \in (1 + \sqrt{1 - 2e}, 2 - \sqrt{1 - 2e})$.*

Lemma 3 reveals that in an intermediate range of the reward for office holders and high campaigning costs, both citizens with highest and those with lowest ability find politics unattractive. With low campaigning costs, there is no such range of rewards that this would be the case.

Lemma 4 *Candidates are competent when campaigning costs are high and $\pi \in [2 - \sqrt{1 - 2e}, 4e)$.*

There are two requirements for the high expected competence of elected politicians. The campaigning costs should be sufficiently high *and* the reward for office holders sufficiently low to deter low competence citizens from politics. The reward for office holders, however, should not be too low so that it dilutes the high ability citizens' incentives to engage in politics.

Lemma 5 *Candidates are incompetent when campaigning costs are high and $\pi \in [2e, 1 + \sqrt{1 - 2e}]$ or when campaigning costs are low and $\pi \in [2e, 1 + \frac{4}{3}e)$.*

Lemma 5 gives a warning that the expected quality of politicians may be low when the campaigning is cheap. In such a case, especially the low-ability citizens are willing to take the gamble and run for office. Expected quality of politicians may be low also with high campaigning costs, in case the reward is set in a low level.

There are also equilibria without a properly working democracy. We take that democracy collapses if there is no political equilibrium where both parties are certain to nominate a candidate.

Lemma 6 *i) If $\pi < e$, neither party is able to nominate a candidate. ii) If $\pi \in [e, 2e)$, there is no equilibrium where both parties nominate a candidate with probability one.*

The explanation why democracy can collapse is straightforward. If the reward from winning an election is smaller than campaigning costs, citizens do not enter politics even if they were certain to win the election. If the reward is low but slightly above the campaigning costs, citizens may stand for an election if they are rather certain of winning it. But if both parties could nominate a candidate, the probability of winning cannot exceed one half for both candidates. This unravels all the symmetric equilibria where both parties nominate a candidate.

We capture the consequences of Lemmas 1-6 in Proposition 1 and Figure 2.

Proposition 1 *i) When campaigning costs are low, there is universal democracy for $\pi \geq 1 + \frac{4}{3}e$ and candidates are incompetent for $\pi \in [2e, 1 + \frac{4}{3}e)$.*

ii) When campaigning costs are high, there is universal democracy for $\pi \geq 4e$, candidates are competent for $\pi \in [2 - \sqrt{1 - 2e}, 4e)$, candidates are mediocre for $\pi \in (1 + \sqrt{1 - 2e}, 2 - \sqrt{1 - 2e})$, and candidates are incompetent for $\pi \in [2e, 1 + \sqrt{1 - 2e}]$.

iii) If $\pi < 2e$, there is no equilibrium where both parties nominate a candidate with a probability one.

Proof. Follows directly from Lemmas 1-6. ■

As one would expect, when the payoff from winning an election is sufficiently high, everyone is willing to gamble and run for office. Analogously, when the payoff is sufficiently low, no one is willing to sacrifice the campaigning costs to become a candidate. The findings are somewhat more surprising when they are evaluated against the common view (and the findings in Caselli and Morelli, 2004) that increasing the reward for office holders or decreasing the campaigning costs increases the candidate quality. Proposition 1 suggests that the range of parameters where the common view holds is rather restricted. When starting in the region with competent candidates, increasing the reward or reducing the campaigning cost may result in a decrease in the average quality of candidates, by encouraging also low-ability citizens to run. When campaigning is costly, the low ability citizens are reluctant to run for the office, since their prospects to be elected are low. Thus, decreasing the expected returns on campaigning effectively excludes the low-ability citizens from the set of candidates. In contrast, when campaigning is cheap, there is no way to screen the best candidates, because the low ability citizens are eager to run for office even when the payoff from winning is low.

Note that our findings do not hinge on the multiplicity of equilibria.

Proposition 2 *Provided that democracy does not collapse, there is a unique symmetric political equilibrium for a given campaigning cost and a given reward.*

Proof. It directly follows from Lemmas 1-6 and Proposition 1 that there is no range of parameter values where two or more types of equilibria overlap, if democracy does not collapse, i.e., if $\pi \geq 2e$. ■

The messages of Propositions 1 and 2 can be illustrated in the (e, π) -space (Figure 2). Let us first consider the region of low campaigning costs ($e < \hat{e}$). The region is split by two

lines, $\pi = 2e$ and $\pi = 1 + \frac{4}{3}e$. Below the lower line ($\pi = 2e$), there is no democracy (N) in the sense that one or both of parties fail to nominate a candidate. Between the lines, candidates are incompetent (I). Above the upper line ($\pi = 1 + \frac{4}{3}e$), there is universal democracy (U). Figure 2 also shows the role of campaigning costs. If we exclude them, we will stay on the vertical axis $e = 0$ of Figure 2. In that case, increasing the pay of politicians would increase candidate quality until universal democracy is reached.¹¹ As can be seen from Figure 2, such a result does not carry over to high values of campaigning costs.

The region of high campaigning costs ($e \in [\hat{e}, \frac{1}{2}]$) is divided into five subareas by two lines, $\pi = 2e$ and $\pi = 4e$, and two curves, $\pi = 2 - \sqrt{1 - 2e}$ and $\pi = 1 + \sqrt{1 - 2e}$. As in the case of low campaigning costs, below the lower line ($\pi = 2e$), democracy collapses and, above the upper line ($\pi = 4e$), democracy is universal. Between the lower line ($\pi = 2e$) and the lower curve ($\pi = 1 + \sqrt{1 - 2e}$), candidates are incompetent whereas between the upper curve ($\pi = 2 - \sqrt{1 - 2e}$) and the upper line ($\pi = 4e$), candidates are competent. Finally, between the curves the candidates are mediocre (M).

In assessing the reliability of observations here, a caveat should be kept in mind. Models with private information raise the question of how robust are findings with respect to the parameter that is private information. Fortunately, this is not an issue here. On the one hand, our findings are broadly speaking similar to the ones in Messner and Polborn (2003) where the reward from office, $(\pi - e)$, is private information and vary across candidates. On the other hand, letting campaigning costs be private information and vary across candidates would certainly change the findings, but the problem would then be rather uninteresting, since the voters care only about candidates' ability, not their campaigning costs. Such an assumption might be more fruitful in analyzing private provision of a public good in a small group like a university department or a school district, and could result in wars of attrition

¹¹Indeed, a similar finding emerges from Besley (2004) where there is neither campaigning costs nor signaling.

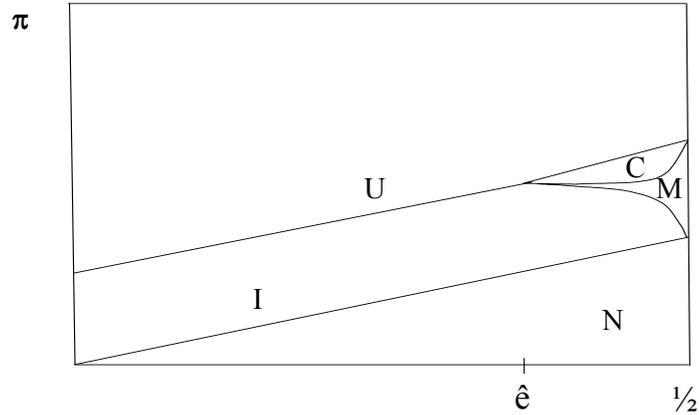


Figure 2: Political Equilibria

as suggested by Bliss and Nalebuff (1984) and Bilodeau and Slivinski (1996). Our model predicts that the wars of attrition may emerge in the region of the collapse of democracy, but for a wide range of parameter values becoming a politician is attractive at least for some citizens. Because in almost all elections in large jurisdictions there is more than one candidate, politicians at least in major elections seem to be pleased to be elected rather than reluctantly concede to run.

3.2 Interpretation

As illustrated by Figure 2, political equilibria are complex but unique. The condition for citizen i to enter politics, (10), can be rewritten as

$$(\pi - a_i) \cdot P(w | a_i) \geq e. \quad (15)$$

The left-hand side of (15) presents the expected increase in income created by candidacy. It is the product of the net return from winning election, $\pi - a_i$, and the probability of winning, $P(w | a_i)$. The right-hand side is the campaigning cost, e , paid with certainty. Equation (15) shows that politics is attractive if the expected increase in income exceeds campaigning costs, and that a change in either π or e has both a direct and an indirect effect on the attractiveness of politics. Keeping $P(w | a_i)$ constant, the direct effect of an increase in π or a decrease in e encourages the entry to politics for all ability levels. To arrive at full behavioral responses, we also have to take into account the induced changes in $P(w | a_i)$. If the direct effect improves the average quality of candidates, there will be a reduction in $P(w | a_i)$. This indirect effect then discourages the entry to politics. Whether there is ultimately an improvement in the candidate quality depends on the relative magnitude of the direct and indirect effects. For example, consider the shift from the area I to area M in Figure 2. The direct effect of an increase in π renders politics lucrative for some high ability citizens. Because new high ability citizens become candidates, $P(w | 0)$ decreases. When campaigning costs are moderate, the indirect effect can dominate over the direct effect for low-ability citizens. As a result, the citizens of the lowest abilities leave politics and the average candidate quality improves.

To illustrate the direct and indirect effects, we present in Figure 3 \underline{a} and \bar{a} as a function of π , fixing $e = \frac{4}{9}$. The behavior of \bar{a} is easy to explain: The direct effect of increasing π always dominates for high-ability types, so that increasingly higher ability citizens find politics attractive when the reward for elected politicians rises. The behavior of low-ability citizens is more complicated. Initially an increase in the reward in a case of being elected more than offsets the decrease in the probability of winning caused by the entry of the high-ability citizens, and all low-ability citizens want to become candidates. However, when $\frac{4}{3} \leq \pi < \frac{5}{3}$, the candidates with the lowest ability opt out if the reward rises, because the

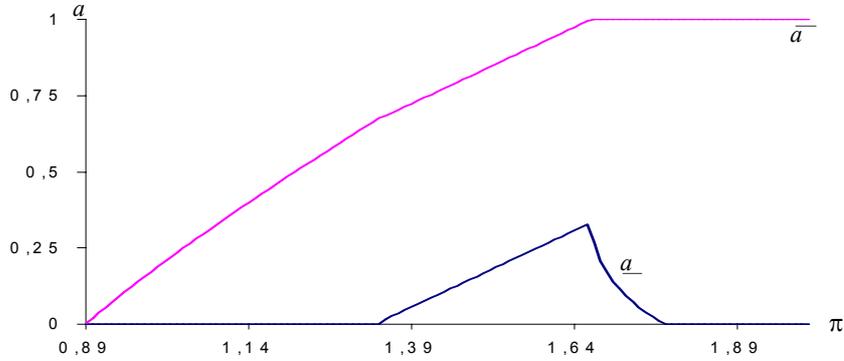


Figure 3: Set of Candidates ($e=4/9$)

indirect effect of the decreased $P(w | a_i)$ dominates over the direct effect of the increased $\pi - a$. Once $\pi = \frac{5}{3}$ is reached, all high-ability citizens already are candidates. Then a further increase in π no longer dilutes the low-ability citizens' prospects of being elected, thus stimulating them again to participate in politics. Once $\pi \geq \frac{16}{9}$ is reached, universal democracy prevails. As a result, candidates are incompetent when $\frac{8}{9} \leq \pi \leq \frac{4}{3}$, mediocre when $\frac{4}{3} < \pi < \frac{5}{3}$, and competent when $\frac{5}{3} \leq \pi < \frac{16}{9}$. The average quality of candidates first increases from zero until it reaches $\frac{2}{3}$ at $\pi = \frac{5}{3}$, then declines until it stays flat at $\frac{1}{2}$ when $\pi \geq \frac{16}{9}$.

4 Screening the Best Candidates

In the previous section the set of candidates was determined by the model, but the reward for office holders and campaigning costs remained exogenous. This then raises the question of where they come from. Although a thorough exploration on the issue is beyond the scope

of this study, we here briefly assess whether it is possible to design rewards and campaigning costs to screen only the citizens with the highest ability ($a = 1$) to run. Proposition 1 suggests that such a political system is impossible when campaigning is cheap. Neither is it possible to screen the best candidates when campaigning costs are high, as the following proposition verifies.

Proposition 3 *With low campaigning costs, maximum quality of candidates arises with universal democracy. With high campaigning costs, maximum quality of candidates arises when $\pi = 2 - \sqrt{1 - 2e}$. There is no combination of e and π that only the citizens with $a = 1$ would want to become politicians.*

Proof. With low campaigning costs, the set of citizens is, if democracy does not collapse, $[0, \bar{a}]$. The average quality is increasing in \bar{a} , reaching maximum with universal democracy. With high campaigning costs, first note from (A7) that \underline{a} is decreasing in π . Together with Lemma 4 this means that the maximum candidate quality occurs for high campaigning costs when $\pi = 2 - \sqrt{1 - 2e}$. Substituting $\pi = 2 - \sqrt{1 - 2e}$ for (A7) shows that $\underline{a} < \frac{1}{2}$. ■

Proposition 3 establishes that even by regulating both campaigning costs and the payoff from winning an election, it is not possible to induce only the highest-ability citizens to run for office. Nonetheless, the ability distribution of candidates can be improved by a suitable choice of e and π . Numerically, we can solve that the maximum ability of candidates arises when $e = 0.445$ and $\pi = 1.668$, resulting in $\underline{a} = 0.332$ and average ability 0.666.

Note that the findings here do not suggest that it would necessarily be socially desirable to attract the highest-ability citizens to politics. In our model the ability in politics is perfectly correlated with the earning potential in the private sector. The higher the ability of the elected official, the larger is the loss to the private sector. Thus, only if the marginal social benefit of talent in politics exceeds the social loss of it not being employed in the private sector, the most talented citizens should be politicians. Using the scope of an electoral

district as a proxy for social benefits from good politics, it seems that the expected quality of politicians should be maximum in national and state-level tasks. In contrast, it may be socially too costly to attract the most talented citizens to politics in small towns and school districts. This may be a reason why the reward typically rises with the scope of an electoral district. In the United States, for example, annual pay for state legislators ranges from \$99,000 plus per diem in California to mere \$200 for two-year term in New Hampshire without per diem (Book of States 2000/2001). Proper evaluation of the relative social benefits from politics and private sector activities would, however, require a general equilibrium environment and is left for future research.

5 Conclusion and Further Research

We find that the effects of campaigning costs and the reward for office holders on the candidate quality are surprisingly complicated. Depending the level of campaigning costs, an increase in the reward for office holders may increase or decrease the candidate quality. If the costs are high, it may be optimal to decrease the reward to screen the best candidates. When campaigning is cheap, there is no way to screen the best candidates, because the low-ability citizens have a comparative advantage in politics. The findings suggest that it is possible to design a political system so that the average ability of candidates exceeds that among all citizens. But even the most efficient system is far from providing perfect screening of only citizens with highest quality to enter politics.

Our model also indicates that corruption and lobbying can have different effects on the politicians' quality, depending on whether they primarily increase the reward for elected office holders or lower the campaigning costs of candidates. If campaigning costs are high, bribes to elected politicians can paradoxically deter low-ability citizens from running, moving political equilibrium from incompetent candidates to mediocre or even to competent

candidates (see Figure 2). If candidates are initially competent, however, the bribes can trigger the entry of low-ability citizens to politics, diminishing the average candidate quality. This may help to explain why bribery is generally condemned in developed countries with high levels of campaigning costs and rewards, while being often tolerated in developing countries. In a developing country where neither campaigning costs nor official rewards are high, bribery can help to attract citizens with higher skills to enter politics, perhaps at the cost of attracting also citizens with questionable ethics. In a variety of circumstances, campaign contributions can reduce the candidate quality. If campaigning costs are to large extent covered by special interest groups, they will no longer deter low-ability citizens from entering politics. Nonetheless, a thorough analysis of corruption and lobbying would require their careful modelling along the lines of Grossman and Helpman (1994) and Besley and Coate (2001).

Our simple and tractable model invites a number of extensions. Because uncovering the crucial role of campaigning costs in determining the quality of politicians is one of our key contributions, future research should in turn devote more attention to the determinants of campaigning costs. For example, one could assume that the level of campaigning costs is a choice variable and that the probability of a high signal conditional on the ability level is increasing in campaigning costs. Catering to special interest groups in exchange for campaign contributions can also generate an entry barrier to independent candidates or third parties in a similar manner as a polarized ideological issue or screening through the primaries of established parties. Studying campaign contributions and informative advertising is clearly an area that deserves further research. Combining our framework with the advances by Prat (2002), Coate (2003a, 2003b) and Schultz (2003) could turn out to be fruitful in this task. Further insights into equilibrium political structure could be obtained by incorporating some features from Poutvaara (2003) into our model. In his model potential party activists

decide whether to join a party based on previous party platforms. Party platforms for the subsequent election are then chosen by median party members. Even with the given party platforms, there is uncertainty of electoral outcome. Assuming that such uncertainty arises from electoral campaigning and differences in candidates' abilities as in this paper, one could let party members choose a candidate with a given ideological preference and an unknown ability. Electoral landscape would then be jointly determined by campaigning costs, political rewards, and ideological distribution of party activists and voters.

Following the citizen-candidate approach developed by Osborne and Slivinski (1996) and Besley and Coate (1997), we have viewed politics as a career choice, motivated by private returns from holding office. However, neither the reward for office holders nor the campaigning costs in our model are necessarily monetary. For example, the reward may include ideological concerns and psychological satisfaction from holding office that may be driven by "selfish" concerns of receiving fame and public recognition. The campaigning costs may also include psychological effects stemming, e.g., from searching journalism and negative campaigning.¹² Therefore, our model suggests that both ideological competition between parties and journalistic practices affect the set of citizens willing to become politicians. Consensus politics together with dull press keep the ideological rewards for office holders and campaigning costs low and, consequently, the high-ability citizens outside politics. Low quality of politicians from established parties may in turn leave the door open for populist movements. This leads to a bold interpretation of our findings: maintaining ideological tension between mainstream parties and providing an appropriate monetary reward for elected politicians together with a vigilant press may be used to attract high-ability candidates from established parties and preempt entry by populist movements.

¹²Such psychological costs can be even more effective than pure monetary costs if the rewards are also mainly psychological and if citizens differ in their private wealth. With diminishing marginal utility of private consumption, politics associated with predominantly monetary campaigning costs would not deter rich citizens with low abilities, but might deter poor citizens with high abilities.

Appendix.

Voters' beliefs

In this appendix we derive voters' belief from citizens' candidacy strategies. Let $f(a)$ denote the subjective density function that voters attach to a candidate being of ability a before a signal is received, and let \underline{a} and \bar{a} be the lowest and the highest expected ability of a candidate. Furthermore, we assume that citizens rationally anticipate that $f(a) = \frac{1}{\bar{a}-\underline{a}}$, as this turns out to be the case in equilibrium. The expected ability of a randomly selected candidate before a signal is revealed is $E(a) = \int_{\underline{a}}^{\bar{a}} f(a) \cdot a da = \frac{\bar{a}+\underline{a}}{2}$. The expected ability subject to signal H is, by Bayes' rule,

$$E(a_i | H) = \frac{\int_{\underline{a}}^{\bar{a}} f(a) \cdot a \cdot \Pr(s_i = H | a) da}{\Pr(s = H)}.$$

As $\Pr(s_i = H | a) = a$ and $\Pr(s = H) = \int_{\underline{a}}^{\bar{a}} f(a) a da = \frac{\bar{a}+\underline{a}}{2}$,

$$E(a_i | H) = \frac{\bar{a}^3 - \underline{a}^3}{3(\bar{a} - \underline{a})\frac{(\bar{a}+\underline{a})}{2}} = \frac{2(\bar{a}^2 + \underline{a}\bar{a} + \underline{a}^2)}{3(\bar{a} + \underline{a})}.$$

Correspondingly, the expected ability of candidate j signalling L is

$$E(a_j | L) = \frac{\int_{\underline{a}}^{\bar{a}} f(a) \cdot a \cdot \Pr(s_j = L | a) da}{\Pr(s = L)}.$$

As $\Pr(s_j = L | a) = 1 - a$ and $\Pr(s = L) = 1 - \Pr(s = H) = 1 - \frac{\bar{a}+\underline{a}}{2}$,

$$E(a_j | L) = \frac{3\bar{a} + 3\underline{a} - 2\bar{a}^2 - 2\underline{a}^2 - 2\underline{a}\bar{a}}{6 - 3\bar{a} - 3\underline{a}}.$$

The candidate with a high signal is of higher expected quality, if $E(a_i | H) > E(a_j | L)$. If $\bar{a} > \underline{a}$, this is equivalent to $3(\bar{a}-\underline{a})^2 > 0$. Therefore, we have established that when $\bar{a} > \underline{a}$, the

candidate signaling H has a higher expected ability than the candidate signaling L . Because a signal about a citizen's ability is emitted only if the citizen decides to enter primary elections and is selected as the official candidate of a party, voters' belief $\mu(I_i, I_j, s_i, s_j) \in \{1, -1, 0\}$ when $\bar{a} > \underline{a}$ can be described as follows: $\mu(1, 1, H, L) = 1$, $\mu(1, 1, L, H) = -1$, $\mu(1, 1, H, H) = 0$, and $\mu(1, 1, L, L) = 0$. If all candidates are of the same ability ($\bar{a} = \underline{a}$), the signals in principle will lose their informativeness, and we can not use Bayes' rule to calculate the voters' belief. Because this case is quite immaterial with continuous ability distribution we, for simplicity, assume that when $\bar{a} = \underline{a}$, $\mu(I_i, I_j, s_i, s_j)$ remains unchanged $\forall s_i, s_j$. Such equilibrium where voters pay attention to signals even if $\bar{a} = \underline{a}$ would also probably be the only one included in the set of trembling-hand perfect or sequential equilibria.

Proof of Lemma 1. For citizens willing to run with a probability strictly between zero and one, the left-hand side of (11) would have to equal zero. Otherwise, citizens would find it optimal to play a pure strategy of running with a probability of either zero or one. Differentiating the left-hand side of (11) with respect to a yields $\frac{1}{2}(\pi + A - 1) - a_i$. This is positive (negative) when $\frac{1}{2}(\pi + A - 1) > (<)a_i$. Thus, the left-hand side of (11) is zero in at most two points in the interval $[0, 1]$ and, consequently, the measure of citizens indifferent between running and staying outside politics is zero. ■

Proof of Lemma 2. When all citizens are potential candidates, the average ability of potential candidates A equals $\frac{1}{2}$. After substituting $A = \frac{1}{2}$ for (13) we see that the citizen with the lowest ability ($\underline{a} = 0$) is willing to become a candidate if, and only if,

$$\pi \geq 4e. \tag{A1}$$

Similarly, substituting $A = \frac{1}{2}$ for (14) and simplifying shows that the citizen with the highest

ability ($\bar{a} = 1$) is willing to become a candidate if, and only if,

$$\pi \geq 1 + \frac{4}{3}e. \quad (\text{A2})$$

Equations (A1) and (A2) suggest that all citizens are candidates if $\pi \geq \max(4e, 1 + \frac{4}{3}e)$. The proof is completed by noting that the condition $4e \stackrel{\geq}{\leq} 1 + \frac{4}{3}e$ is equivalent to the condition $e \stackrel{\geq}{\leq} \hat{e}$. ■

Proof of Lemma 3. When the citizens with an intermediate ability seek candidacy, the solutions of (12) give the candidates with the highest and lowest ability. From (13) and (14) we then get that $A = \frac{\bar{a} + \underline{a}}{2}$ is equivalent to $A = \frac{\pi + A - 1}{2}$. As a result, the average quality of potential candidates reads as

$$A = \pi - 1. \quad (\text{A3})$$

Substituting (A3) for (13) and (14) gives the threshold levels for the candidates' abilities

$$\underline{a} = \pi - 1 - \sqrt{1 - 2e} \quad (\text{A4})$$

and

$$\bar{a} = \pi - 1 + \sqrt{1 - 2e}. \quad (\text{A5})$$

Note that the terms under square roots are always non-negative as $e \leq \frac{1}{2}$. Equation (A4) shows that $\underline{a} > 0$ only if $\pi > 1 + \sqrt{1 - 2e}$ and (A5) shows that $\bar{a} < 1$ only if $\pi < 2 - \sqrt{1 - 2e}$. On the other hand, $2 - \sqrt{1 - 2e} \geq 1 + \sqrt{1 - 2e}$ only if $e \geq \hat{e}$. The equilibrium where the citizens with an intermediate ability become candidates thus exists only if $\pi \in (1 + \sqrt{1 - 2e}, 2 - \sqrt{1 - 2e})$ and $e \in [\hat{e}, \frac{1}{2}]$. ■

Proof of Lemma 4. When the citizens with the lowest ability choose a career in the private sector, the average quality of the candidates is $A = \frac{1 + \underline{a}}{2}$. Equation (13) can then be

rewritten as

$$\underline{a} = \frac{1}{2} \left[\pi - 1 + \frac{1 + \underline{a}}{2} - \sqrt{\left(\pi + 1 - \frac{1 + \underline{a}}{2} \right)^2 - 8e} \right].$$

Simplifying yields

$$2\pi - 1 - 3\underline{a} = 2\sqrt{\left(\pi + \frac{1 - \underline{a}}{2} \right)^2 - 8e}. \quad (\text{A6})$$

Squaring both sides of (A6) and solving the resulting second-order equation for \underline{a} gives

$$\underline{a} = \frac{1}{2} \left[\pi - 1 \pm \sqrt{(\pi + 1)^2 - 16e} \right].$$

The smaller root,

$$\underline{a} = \frac{1}{2} \left[\pi - 1 - \sqrt{(\pi + 1)^2 - 16e} \right], \quad (\text{A7})$$

is greater than zero only if $\pi < 4e$. The larger root can be excluded, as it would be positive also when $\pi \geq 4e$. That would violate the condition that the citizen with $a = 0$ is unwilling to be a candidate. By using (A7), we see that the average quality of the potential candidates $A = \frac{1 + \underline{a}}{2}$ is given by

$$A = \frac{1}{4} \left[\pi + 1 - \sqrt{(\pi + 1)^2 - 16e} \right]. \quad (\text{A8})$$

We next confirm that the citizen with the highest ability is willing to be a candidate, i.e., that $\bar{a} = 1$. From (13) we see that this holds if

$$\frac{1}{2} \left[\pi + A - 1 + \sqrt{(\pi + 1 - A)^2 - 8e} \right] \geq 1. \quad (\text{A9})$$

Upon some manipulation, (A9) can be simplified to

$$(2 - A)(\pi - 1) - 2e \geq 0. \quad (\text{A10})$$

After substituting (A8) for (A10) and some laborious algebra, the condition can be re-expressed as

$$(\pi - 1)^2(\pi - 3) - 2e(\pi - 1)(\pi - 4) - 4e^2 \geq 0. \quad (\text{A11})$$

We can now characterize the equilibria where only the most competent citizens present themselves as candidates. Although (A11) is highly non-linear in π , it is easy to show that it holds only if $\pi \geq 2 + \sqrt{1 - 2e}$ or when $\pi \in [2 - \sqrt{1 - 2e}, 2e + 1]$. When $e \leq \frac{1}{2}$, $2 + \sqrt{1 - 2e} \geq 2e + 1 \geq 4e$. Because, by (A7), $\underline{a} > 0$ only if $\pi < 4e$, the relevant parameter range is $\pi \in [2 - \sqrt{1 - 2e}, 4e)$ which is a non-empty set only if $e > \hat{e}$. In sum, the equilibrium where $C(e, \pi) = [\underline{a}, 1]$ exists for $e \in [\hat{e}, \frac{1}{2}]$ when $\pi \in [2 - \sqrt{1 - 2e}, 4e)$. ■

Proof of Lemma 5. When the citizens with the highest abilities choose a career in private sector, the average quality of the potential candidates is $A = \frac{\bar{a}}{2}$. Assuming that $\bar{a} < 1$ and substituting $\frac{\bar{a}}{2}$ for A in (14) gives

$$\bar{a} = \frac{1}{2} \left[\pi - 2 \pm \sqrt{(\pi + 2)^2 - 16e} \right]. \quad (\text{A12})$$

Since the smaller root of (A12) is strictly less than (14), we observe that only the larger root is relevant. The larger root of (A12),

$$\bar{a} = \frac{1}{2} \left[\pi - 2 + \sqrt{(\pi + 2)^2 - 16e} \right], \quad (\text{A13})$$

satisfies our assumption that it is less than unity only if $\pi < 1 + \frac{4}{3}e$. We next confirm that the citizen with the lowest ability is also willing to be a candidate, i.e., that $\underline{a} = 0$. From (14) we see that this holds if

$$0 \geq \pi + A - 1 - \sqrt{(\pi + 1 - A)^2 - 8e}.$$

After some algebra, this can be expressed as

$$\pi(1 - A) \geq 2e. \tag{A14}$$

A necessary condition is thus that $\pi \geq 2e$. Substituting $A = \frac{\bar{a}}{2}$ and (A13) into (A14), and simplifying yields, after tedious algebra,

$$(\pi - 2e)(\pi^2 - 2\pi + 2e) \leq 0. \tag{A15}$$

Since $\pi \geq 2e$, (A15) holds when $\pi \in [1 - \sqrt{1 - 2e}, 1 + \sqrt{1 - 2e}]$, which is non-empty with all $e \leq \frac{1}{2}$. Because $2e \geq 1 - \sqrt{1 - 2e}$ and $\pi \geq 2e$, the relevant range of parameter values is $\pi \in [2e, 1 + \sqrt{1 - 2e}]$. Because, by (A13), $\bar{a} < 1$ only if $\pi < 1 + \frac{4}{3}e$, we need to check out when $\sqrt{1 - 2e} \leq \frac{4}{3}e$. This occurs when $e \geq \hat{e}$. Thus, the equilibrium where $C(e, \pi) = [0, \bar{a}]$ exists for $e \in [\hat{e}, \frac{1}{2}]$ when $\pi \in [2e, 1 + \sqrt{1 - 2e}]$, and for $e \leq \hat{e}$ when $\pi \in [2e, 1 + \frac{4}{3}e)$. ■

Proof of Lemma 6. i) If $\pi < e$, no citizen is willing to campaign even if being assured of winning. ii) Let us make the counter-assumption that both parties are able to nominate a candidate in the region $\pi \in [e, 2e)$ with probability one. Because $\pi < 2e$, the expected payoff from candidacy cannot be positive, even without opportunity costs, unless the expected probability of winning the general election is more than $\frac{1}{2}$. This cannot hold for candidates of both parties. ■

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