Campaigns, Political Mobility, and Communication

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Abstract

We present a model of elections in which interest group donations allow candidates to shift policy positions. We show that if donations were prohibited, then a unique equilibrium regarding the platform choices of candidates would exist. Our game with financing of political campaigns exhibits two equilibria, depending on whether a majority of interest groups runs to support the leftist or rightist candidate. The equilibria generate a variety of new features of campaign games and may help identify the objective functions of candidates empirically.

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1 Introduction

Competitive political campaigns are still a very controversial issue. Disputes on this subject relate both to the influence of campaigns on political outcomes and to their impact on welfare.

In this paper we propose a model of political campaigns that allows us to study the interdependence between campaign expenditures, candidates' positions, and electoral outcomes. Our paper unites political behavior and donor behavior. We focus on the following often-observed political races. At the beginning of a political race for office, two candidates try to obtain campaign support from interest groups. They announce positions that will be perceived very inaccurately by the voters if they differ from positions announced in the past. Moreover, an incumbent may have a much clearer position than a challenger because he has been in office for a long time. Since voters are assumed to be risk-averse, the candidates will try to improve communication with voters during campaigns in order to reduce location uncertainty. Fund-raising is a necessary condition for getting messages across, so candidates will attempt to obtain campaign contributions at the beginning of the political race to gain mobility within the political spectrum.

We study the equilibria of this game and shed light on the role of political campaigns. Our main results are as follows: We first show that there is a unique equilibrium regarding the platform choices of candidates if interest group donations are prohibited. The game with interest group donations essentially brings forth two equilibria. Each candidate's chance of winning the election depends on the equilibrium that is realized. The winning candidate uniquely determined in one equilibrium normally receives contributions from a majority of donors. An important feature of our equilibria is the presence of a certain run on donors' contributions. A donor[1] may contribute money to one candidate in one equilibrium and support the other candidate in the other equilibrium. As a consequence, even if candidates' initial positions and the ideal points of interest groups are symmetrically distributed around the median, the political platforms chosen in equilibrium will be asymmetric.

Moreover, we demonstrate that donors may support a candidate whose position is not very close to their own ideal point in order to draw the platform of the winning candidate towards their own bliss points. Suppose, for example, that the rightist candidate wins the election. Then, in our model, donors to the right of the winning

[1]E.g. a donor located close to the median voter.

rightist candidate give money to the leftist candidate, as this pushes the equilibrium platform of the rightist candidate towards the left. Donors located around the median, however, will support the winning candidate. Constellations in which interest groups support the candidate on the other side of the political spectrum are observed in political races. For instance, in 1994 in Germany, industry organizations contributed a lare amount of campaign money to the left-wing Social Democrats (see Gersbach and Liessem (2002)).

Further, we find that the candidates do not adopt the same median position in all equilibria. Instead, campaigns lead to a partial convergence of platforms in comparison with the corresponding equilibria without political advertising. Campaigns thus induce the winning platform to move closer to the median ideal platform.

Our analysis could also enrich the incumbent/challenger discussion. A traditional argument suggests that incumbents are perceived with lower uncertainty than a challenger, which implies a disadvantage for challengers if voters are risk-averse (see e.g. Bernhardt and Ingberman (1985)). In our model, a risky challenger may defeat an incumbent if he is able to organize donors appropriety, because if donors believe that the challenger will win, a majority of donors will support him, thus confirming their expectations.

Finally, we will discuss in the final section how our results in comparison with other theoretical results could be used to draw inferences about whether candidates for public offices are more interested in policies or in winning elections.

While we perform our analysis in the framework with risk-averse voters where campaigns reduce uncertainty, it is important that the same results could be obtained by the framework suggested by Baron (1994), where voters are either informed about intentions of parties and candidates or not, and advertising is persuasive. Uninformed voters react to campaigns and a higher amount of money enables candidates to increase the share of voters for a given platform. Moreover, any model in which the share of votes reacts positively to higher campaign expenditures will produce the same results for our type of model.

The paper is organized as follows: In the next section we review the literature. In section three we outline the model. In section 4 we analyze the effects of campaigns. In section 5 we examine the donor and political equilibria. Subsequently, we discuss extensions of the model and propose some final conclusions.

2 Relation to the Literature

Three types of model have been proposed for political campaigns. First, Austen-Smith (1987) developed a model of *directly informative advertising*. Voters observe candidates' positions with noise, and campaign expenditures reduce the variance of that noise. Building on this assumption, Gersbach (1998) has developed a theory of campaigns in which the decision of an arbitrary number of interest groups on who they want to support is endogenized. Second, Potters, Sloof, and van Winden (1997), Gersbach (2004), and Prat (2002) use *non-directly informative advertising*. Each candidate is characterized by a non-policy dimension (valence) that lobbies can observe more precisely than voters. The amount of campaign money a candidate collects signals his valence to voters. Hence the role of campaign advertising is not to convey a direct message but to credibly "burn" campaign money.[2] New, interesting work based on the signalling approach can be found in Coate (2004a and 2004b) and Vanberg (2008). Third, Baron (1994), McKelvey and Ordeshook (1987), Grossman and Helpman (1996), and Ortuno Ortin and Schultz (2005) distinguish between informed and "uninformed" or "impressionable" voters. The informed electorate votes according to the policies proposed by the different political parties (or candidates). Impressionable voters are, however, poorly informed about the policies of the different parties, and their vote is directly influenced by campaign spending.[3] This type of campaign is therefore *persuasive advertising*.

We assume that the candidates can use funds to increase the share of voters supporting them. This can be interpreted as persuasive advertising or as informative advertising, where candidates use money to reduce (risk-averse) voters' uncertainty about candidates' policy positions. We emphasize that any model in which the share of votes reacts positively to higher campaign expenditures will produce the same results as in this paper.

We allow for the fact that candidates' ability to affect voting by campaign expenditures will differ. In contrast to Gersbach (1998), who focuses on candidates with policy

[2] A different way of modeling campaign expenditures is found in Austen-Smith and Wright (1994) and Austen-Smith (1995). Here lobbies make contributions in exchange for access to politicians. Politicians care about the information that lobbies can provide them with. The extent of truthful information transmission increases in the preference congruence between a lobby and the politician (see Crawford and Sobel (1982)). Campaign contributions signal preference congruence and induce candidates to grant access to the lobbies.

[3] This type of campaign is similar to the persuasive advertising analyzed in economic literature, for example Shy (1995).

preferences, we assume that candidates maximize their votes. The results thus contrast with Gersbach (1998). In the concluding section, we discuss how this could help to test empirically different theories.

One of our central results is that interest group donations move the political outcome towards the median voter. The reason is that donors behave strategically. If a majority of interest groups expect that a candidate will win, he obtains the majority of interest group donations allowing him to move towards the center without being perceived as overly risky. This, in turn, makes the candidate attractive for a majority of voters, which confirms the assumptions of interest groups. This insight is complementary to the work of Wittman (2007 and 2008). Wittman (2008), for instance, has highlighted the importance of allowing uninformed voters to have counterstrategies when advertising is directed towards other voters. When those uninformed voters who do not receive targeted campaign adverstising respond optimally, any negative effect of pressure groups and political advertising is mitigated and the political outcome moves towards the median voter.

3 Political Competition without Campaigns

3.1 The basic model

Electoral processes exhibit many features, but they can be essentially broken down into four stages, which include political advertising. The time pattern can be described as follows:

Stage 1: Candidates attempt to obtain campaign support from politically active groups. Donors spend their money to enhance the expected utilities arising for them from election.

Stage 2: In the political strategy space, candidates choose positions that will remain fixed during the whole electoral contest. The positions are determined largely so as to maximize votes after their advertising efforts. The voters are only imperfectly aware of the initial locations of the candidates.

Stage 3: Candidates use their financial support to convince the voters of the relative advantage of their positions. In our context, this basically means that candidates are engaged in reducing the uncertainty concerning their announced positions and in improving their mobility.

Stage 4: Individuals cast their votes, and the electoral outcome is determined by a voting method that corresponds in our case to majority voting.

This sequential election procedure can be observed in many countries. Consider, for example, the primary elections in the U.S., where interest groups spend money to influence the choice of candidates or representatives in one party and hence the final party platform for the general election. Moreover, potential candidates for congressional elections in the U.S. receive money and engage in fund-raising even before they have announced their candidacy or have defined a political platform.

We assume that voters view two candidates (or parties) b and c as being located somewhere on a one-dimensional political space X with degrees of uncertainty about precisely where they are located.[4]

The positions of the candidates are denoted by x_b and x_c. Voters perceive the announcements of platforms by candidates as a noisy signal about the policies a winning candidate would pursue in office. Policies are perceived by voters as random variables with a mean equal to the platform of the winning candidate. The candidates' policies, i.e. the positions they would pursue in office if elected, are denoted by w_b and w_c, and differ, from the voters' point of view, from the initially announced platforms x_b and x_c by random variables z_b and z_c, $w_b = x_b + z_b$ and $w_c = x_c + z_c$ with $E(z_b) = E(z_c) = 0$.

We exclude idiosyncratic voter perceptions, but allow the variance to depend on the expected location of the candidate. We assume that there exists one location for each candidate where they have an absolute advantage concerning the certainty of their positions as perceived by voters. If candidates move away from their established positions, they will progressively lose the advantage based on voter perceptions. Parties, for instance, are often perceived via some form of ideological label. If a party or candidate changes position, the voters will have much greater difficulty in predicting the candidates' "true" positions. Moreover, as discussed in Bernhardt and Ingberman (1985), candidates can lose their reputation if they leave the "initial" position determined in the past, which, in turn, increases the uncertainty of voters regarding the true positions.

An important remark is appropriate. The model allows two different interpretations as to the rationality of voters. First, we can assume that voters – or a subset – are impressionable and not fully rational in the usual sense. They could infer the policies candidates would pursue if they knew, for instance, the pattern of campaign contributions or the ideal points of voters. Second, we can view voters as Bayesian

[4] X may be a single issue space or a single composite ideological dimension.

learners. In particular, when a candidate, say b, chooses a platform, he chooses an a-priori distribution with mean x_b and a given variance. Campaigns are sequences of draws for a given distribution with a known mean and unknown variance. At the end of the campaign, voters form a-posteriori beliefs (see e.g. DeGroot (1970)) and cast their votes based on their expected utilities.

We use by V^b and V^c to denote the variances of the positions of the two candidates b and c as perceived by the voters. The dependence on the effective position of the candidates is given by

$$\begin{aligned} V^b &= f_b + k_b(|x_b - \hat{x}_b|) \\ V^c &= f_c + k_c(|x_c - \hat{x}_c|) \\ f_b,\ f_c,\ k_b,\ k_c &> 0 \end{aligned} \tag{1}$$

x_b and x_c are the positions chosen by the candidates. $\hat{x}_b$ and $\hat{x}_c$ denote the most firmly established position of the candidates, that is, the location they are perceived to occupy with the lowest uncertainty. The variables f_b and f_c represent irreducible uncertainty, which we will call henceforth "floor uncertainty". k_b and k_c represent the mobility costs. Thus, if a candidate diverges from his established point, he will generate greater uncertainty, the higher values k_b or k_c are, respectively. Since voters are risk-averse, this makes spatial movements costly to vote-maximizing candidates so that in fact, k_b and k_c represent mobility costs.

For tractability, the single-peaked utility function of voter i is given by

$$u_i(w) = d_i - (w - x_i)^2 \tag{2}$$

$d_i > 0$ represents the maximum utility obtainable by i, and x_i his own most-preferred point on the dimension X.

We assume that $\hat{x}_b \leq x_b < x_m = 0 < x_c \leq \hat{x}_c$, which implies that we have a leftist and a rightist candidate as in most two-candidate elections. x_m is the ideal point of the median voter.

Voters believe candidates to the extent that their point estimations are x_b and x_c.[5] The corresponding utilities for two candidates' positions x_b and x_c as expected by voter i

[5] In the next section, we will discuss the significance of this assumption.

is given by

$$E\big[u_i(x_b)\big] = d_i - (x_b - x_i)^2 - V^b$$
$$E\big[u_i(x_c)\big] = d_i - (x_c - x_i)^2 - V^c \tag{3}$$

Voter i will prefer b to c if and only if $E\big[u_i(x_b)\big] > E\big[u_i(x_c)\big]$, which implies

$$x_i < \frac{x_c + x_b}{2} + \frac{V^c - V^b}{2(x_c - x_b)} \tag{4}$$

3.2 Candidate equilibrium

We here deduce candidate equilibrium without advertising. The candidates maximize their votes. We define the position of the voter who is indifferent to the two candidates' positions as

$$x_i^{ind} = \frac{x_c + x_b}{2} + \frac{V^c - V^b}{2(x_c - x_b)} \tag{5}$$

Vote maximization requires that the goals of the candidates be $\max x_i^{ind}$ (candidate b) and $\min x_i^{ind}$ (candidate c).

Now we deduce the Nash equilibrium of the political game. The first-order condition for the choice x_c, given some position x_b, requires that

$$\frac{\partial x_i^{ind}}{\partial x_c} = 0 \tag{6}$$

By calculation of the corresponding first-order condition for candidate b, we obtain (see Appendix 1)

$$x_c = \frac{f_c - f_b + k_b\hat{x}_b + k_c\hat{x}_c + \frac{1}{4}(k_b + k_c)^2}{k_b + k_c} \tag{7}$$

$$x_b = \frac{f_c - f_b + k_b\hat{x}_b + k_c\hat{x}_c - \frac{1}{4}(k_b + k_c)^2}{k_b + k_c} \tag{8}$$

and

$$x_c = \frac{1}{2}(k_c + k_b) + x_b \tag{9}$$

We note that the candidates choose different positions despite the single-peakness utility function of the voters. This result is caused by the fact that there is an incentive to deviate from a common position, e.g. the median position. It is true that a spatial movement toward more extreme positions will attract fewer voters by reason of the distance effect. But by approaching his established position a candidate reduces uncertainty and gains in reputation. This will overrule the distance effect if the candidates are very close.

If the candidates quickly forfeit clarity by leaving established positions (i.e. if k_c and k_b are high), the candidates will be very separately located in equilibrium. If, however, $f_b = f_c$, $\hat{x}_b = -\hat{x}_c$ and $k_c = k_b$, we will arrive at $x_c = \frac{1}{4}(k_b + k_c)$ and $x_b = -\frac{1}{4}(k_b + k_c)$. For very small values of k_b, k_c, we obtain the classical median voter result $x_b = x_c = 0$.

Finally we spell out the conditions under which this equilibrium holds. We have assumed that $\hat{x}_b \leq x_b$ and $x_c \leq \hat{x}_c$. The first condition implies

$$f_c - f_b + k_c(\hat{x}_c - \hat{x}_b) - \frac{1}{4}(k_b + k_c)^2 \geq 0 \tag{10}$$

Similarly, we obtain the second condition:

$$f_c - f_b + k_b(\hat{x}_b - \hat{x}_c) + \frac{1}{4}(k_b + k_c)^2 \leq 0 \tag{11}$$

Next we turn to the investigation of campaigns.

4 The Effects of Campaigns

4.1 The impact of campaigns

As discussed in Section 3.1, our main assumption is that campaign expenditures affect voting behavior. We can justify this assumption either by reference to informative advertising in the sense of Austen-Smith (1987), where a sequence of costly messages can reduce the variance of policies, or by interpreting campaigns as persuasive advertising (see Baron (1994) or Grossman and Helpman (1996)), where voters are either informed about intentions of candidates or not. Uninformed voters react to campaigns, and a higher amount of money enables candidates to increase the proportion of uninformed voters for a given platform. We emphasize that any model in which the share of votes reacts positively to higher campaign expenditures will produce the same results as in this paper.

4.2 Campaigns and political outcomes

To define the contributions of donors, we first have to investigate the effects of campaigns on the political equilibrium. Accordingly, we focus on the political outcome arising from a reduction of mobility costs. The reduction of uncertainty can occur in two ways. First, the floor uncertainty represented by the constants f_b and f_c can be reduced. Second, the direct mobility costs can be diminished if a candidate leaves his established position. Both eventualities lead to greater mobility for the candidates.

We restrict detailed examination to the second way of improving the clarity of the candidates' positions, since it is clear that both ways produce essentially the same results. Campaigns in favor of candidate b decrease k_b and f_b, whereas support for candidate c decreases k_c and f_c.

We begin by examining how a reduction of k_c or f_c affects the political equilibrium. If candidate c can reduce the uncertainty surrounding his position, k_c or f_c will be lowered in the third stage. Thus, we obtain a new political equilibrium with the same characteristics as in equations (7), (8), and (9), but now featuring new parameters.

From the candidate equilibrium derived in the last section we deduce in the second appendix:

$$\frac{\partial x_b}{\partial k_c} = \frac{k_b(\hat{x}_c - \hat{x}_b) - f_c + f_b - \frac{1}{4}(k_b + k_c)^2}{(k_b + k_c)^2} \tag{12}$$

Because of condition (11) we immediately obtain

$$\frac{\partial x_b}{\partial k_c} \geq 0 \tag{13}$$

From equation (9) we obtain

$$\frac{\partial x_c}{\partial k_c} = \frac{1}{2} + \frac{\partial x_b}{\partial k_c} > 0 \tag{14}$$

Obviously, $\frac{\partial x_c}{\partial f_c} = \frac{\partial x_b}{\partial f_c} > 0$.

Moreover, it will also be shown in the second appendix that

$$\frac{\partial x^{ind}}{\partial k_c} \geq 0 \tag{15}$$

Thus, if candidate c can reduce mobility costs, we will have a new equilibrium in which c will be closer to the median because his increased mobility allows him to gain more voters by approaching the median voter position. In general, candidate b will be forced to take a more extreme position.

Similarly, we will obtain symmetrical results if candidate b is able to inform the electorate more efficiently. Now we need to investigate the political equilibrium in the case of a reduction of k_b or f_b. Again, the formal details are found in the second appendix:

$$\frac{\partial x_c}{\partial k_b} = \frac{k_c(\hat{x}_b - \hat{x}_c) - f_c + f_b + \frac{1}{4}(k_b + k_c)^2}{(k_b + k_c)^2} \tag{16}$$

Because of condition (10) we get

$$\frac{\partial x_c}{\partial k_b} \leq 0 \tag{17}$$

Additionally, we obtain

$$\frac{\partial x_b}{\partial k_b} = \frac{\partial x_c}{\partial k_b} - \frac{1}{2} < 0 \quad \text{and} \quad \frac{\partial x_b}{\partial f_b} = \frac{\partial x_c}{\partial f_b} < 0 \quad \text{and} \quad \frac{\partial x^{ind}}{\partial k_b} \leq 0 \tag{18}$$

Hence, if candidate b can improve communication, his position will be drawn toward the center, and he will win more votes. Thus every candidate has a strong incentive to reduce the uncertainty of his platform as perceived by the voters.[6]

5 Donor and Political Equilibrium

5.1 The donor game

We now turn our attention to the incentives faced by political donor groups in the first stage of the electoral game. We assume that the ideal point of each donor group can be characterized by the preferred point of a typical group member equated with the donor. We use x_j ($j = 1, \ldots, N$) to denote the corresponding ideal points. The

[6] This incentive contrasts with some versions of dynamic political competition in which there may be a preference for ambiguity (Glazer 1990).

level of support provided by a donor is determined by the contributions of the number of politically active members and is represented as b_j. We use b_{jb} (b_{jc}) to denote the support that candidate b (c) receives from group j. A donor will spend money on the candidate who is more likely to improve the donor's wealth than the other competitor. Thus we obtain two campaign functions that depend solely on the aggregate support levels received by each candidate:

$$k_c\left(\sum b_{jc}\right) \quad \text{and} \quad k_b\left(\sum b_{jb}\right) \tag{19}$$

The first derivatives k_c' and k_b' are negative because more campaign support enables the candidates to reduce more uncertainty.

We follow a standard assumption that contributors or interest groups are better informed than voters. For simplicity, we assume that donors are fully informed about the policies candidates will pursue in office. Hence, contributors observe x_a and x_b. Accordingly, if and only if the contribution of candidate b leads to a political outcome that is closer to the preferred point than the one arising from support for candidate c, the donor group will support b.

5.2 The value of campaign contributions

Let us now define the Boolean function $F(k_c, k_b)$ indicating the political outcome:

$$F(k_c, k_b): \ \mathbb{R} \times \mathbb{R} \ \longrightarrow \ \{0, 1, 2\} \tag{20}$$

Value 2 (0) indicates that candidate b (c) will win the election, given the parameters k_b and k_c representing the mobility of the candidates. $F(k_c, k_b) = 1$ is determined by the condition $x^{ind}(k_b, k_c) = 0$ in the last section, which characterizes the pairs (k_b, k_c) for which each candidate gets half of the votes.[7] Because of the characteristics of $x^{ind}(k_b, k_c)$ derived in the last section, $F(k_c, k_b)$ is weakly monotonically increasing (decreasing) with k_c (k_b).

We consider four cases. First we assume that candidate b wins the election with or without the contribution of a donor j, given the contributions of the other donor, i.e. $F(k_c, k_b) = 2$ remains unchanged by the individual donor's decision. The value of

[7] In this case, the political outcome may depend on personal characteristics of the candidates.

campaigns for an individual donor j is denoted by $I_j(b)$[8] and calculated as the difference between the utility arising from support b and c, given the decision of the other donors. Thus

$$\begin{aligned} I_j(b) &= u_j(x_b') - u_j(x_b) \\ &= d_j - (x_b' - x_j)^2 - \big(d_j - (x_b - x_j)^2\big) \\ &= x_b^2 - {x_b'}^2 + 2x_j(x_b' - x_b) \\ &= (x_b' - x_b)(-x_b - x_b' + 2x_j) \end{aligned} \tag{21}$$

If donor j supports candidate b (c), x_b' (x_b) will be the political outcome. From the last section we know that $x_b' > x_b$. Thus $I_j(b)$ is monotonically increasing with x_j, and $I_j(b)$ becomes zero for $x_j = \frac{x_b'+x_b}{2}$. Hence we conclude that all donors with an ideal point greater than $\frac{x_b'+x_b}{2}$ will support candidate b.

The situation is completely analogous if given the contributions of the other donors, candidate c wins the election with (position x_c') and without (position x_c), i.e. the campaign support of a donor. The value of campaigns is then given by

$$\begin{aligned} I_j(c) &= u_j(x_c') - u_j(x_c) \\ &= d_j - (x_c' - x_j)^2 - \big(d_j - (x_c - x_j)^2\big) \\ &= x_c^2 - {x_c'}^2 + 2x_j(x_c' - x_c) \\ &= (x_c - x_c')(x_c + x_c' - 2x_j) \end{aligned} \tag{22}$$

From equation (14) we know that x_c' will be smaller than x_c. All donors with most-preferred points less than $\frac{x_c'+x_c}{2}$ will select candidate c over b for campaign support.

The third and fourth cases concern scenarios where a single donor can affect the political outcome. These cases will be discussed later.

5.3 Existence of equilibria

Now we are able to deduce the subgame-perfect equilibria. We define two critical candidate positions that do characterize the donor and the political equilibrium. We claim that the following strategies constitute a political and a donor equilibrium:

[8] The variable b indicates that candidate b wins the election in every case.

$$x_b^* = \frac{f_c - f_b + k_1^* \hat{x}_b + k_2^* \hat{x}_c - \frac{(k_1^* + k_2^*)^2}{4}}{k_1^* + k_2^*} \tag{23}$$

$$x_c^* = \frac{f_c - f_b + k_1^* \hat{x}_b + k_2^* \hat{x}_c + \frac{(k_1^* + k_2^*)^2}{4}}{k_1^* + k_2^*}$$

with

$$k_b^* = \sum_{j \in \{j | x_j > x_b^*\}} b_j, \quad k_c^* = \sum_{j \in \{j | x_j < x_b^*\}} b_j \tag{24}$$

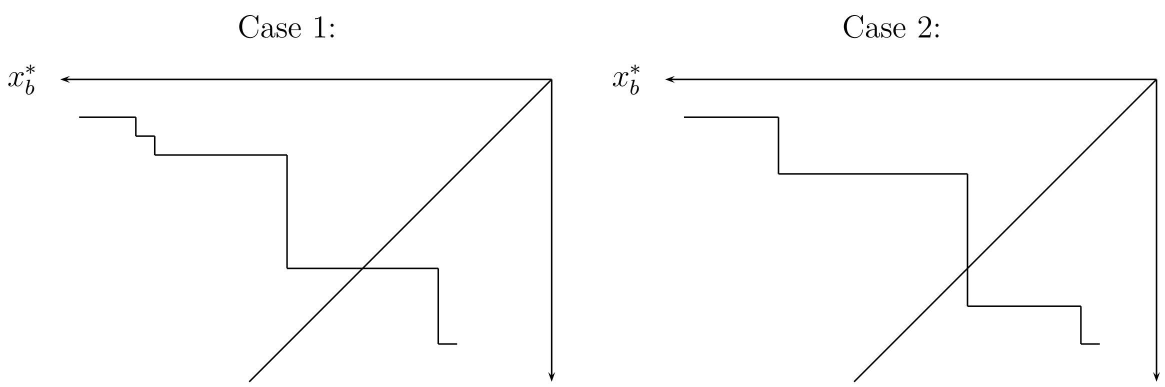
Equation (24) defines two step-functions $k_b^*(x_b^*)$ and $k_c^*(x_b^*)$, where $k_b^*(x_b^*)$ is weakly monotonically increasing in x_b^* while $k_c^*(x_b^*)$ is monotonically decreasing in x_b^*.

Thus the above equations can be rewritten as

$$x_b^* = x_b(x_b^*)$$
$$x_c^* = x_c(x_b^*)$$

We first observe that x_b^* and x_c^* are uniquely determined. The left side of (23) is clearly strictly increasing with x_b^*. The right side is monotonically decreasing with x_b^*, since we know that the lower k_c is (or the higher k_b), the lower any equilibrium position of candidate b will be, which is represented by the right side of formula (23). The arguments are similar for x_c^*.

We thus obtain two different cases for the intersection of the left-hand side of equation (23) with the right-hand side, represented by the following figure:



In the second case, x_b^* does not coincide with any ideal point of a donor. Thus, by our definition of x_b^* and k_c^*, every donor supports one candidate only. In the first case,

x_b^* is exactly the ideal point of a donor whose contributions are not yet included in the campaign functions k_b and k_c. As this donor is totally satisfied with the political equilibrium, we assume that he will refraim from providing any support.[9]

x_b^* and x_c^* characterize a situation in which candidate b receives campaign contributions from all donors with an ideal point greater than x_b^*, whereas candidate c will only be supported by the rest of the donors.

We now introduce two assumptions[10] that ensure existence:

Assumption 1
Given the political equilibrium strategies and the donor decisions involved in x_b^* and x_c^*, candidate b will win the election, i.e. $F(k_c^*, k_b^*) = 2$.

Note that, under Assumption 1, candidate b will receive campaign contributions from a majority of donors if donors are symmetrically distributed around the median voter.

Assumption 2
Given x_b^* and x_c^*, no donor can ensure unilaterally that the winning candidate will change.

Both assumptions can be expressed by exogenous parameters of the model if we assume a specific distribution for ideal points of voters. We obtain

Proposition 1
Suppose that Assumptions 1 and 2 hold. Then x_b^* and x_c^* constitute a donor and a political equilibrium. Candidate b wins the election, and the political outcome is x_b^*

Proof of Proposition 1:

For x_b^* and x_c^* to be an equilibrium, we have to show that no donor has an incentive to deviate. By changing his support, a donor with $x_j < x_b^*$ would make the political outcome (still x_b) greater than x_b^* and hence further away from his own preferred point. For the same reason, a donor with $x_j > x_b^*$ will not want to switch his support from b to c. Therefore, given the contributions of the other donors, each donor will be worse off if he deviates. Since x_b^* and x_c^* are also political equilibrium, x_b^* and x_c^* constitute

[9]If he still wants to spend some money, he will have to split his contributions among the candidates in order to ensure that the political equilibrium is not disrupted by his contribution.

[10]The assumptions are discussed and weakened in the next section.

a donor and a political subgame-perfect equilibria. The political outcome is x_b^*.

■

The intuition for the equilibrium behavior of donors runs as follows: Suppose donors expect the leftist candidate b to win the election. Then donors to the left of the winning leftist candidate will give money to the rightist candidate, as this pushes the equilibrium platform of the leftist candidate towards the left. Donors located to the right of the winning platform will support the winner, as this pushes his platform to the right.

The second political and donor equilibrium is determined by

$$x_b^{**} = \frac{f_c - f_b + k_1^{**}\hat{x}_b + k_2^{**}\hat{x}_c - \frac{(k_1^{**}+k_2^{**})^2}{4}}{k_1^{**} + k_2^{**}}$$
$$x_c^{**} = \frac{f_c - f_b + k_1^{**}\hat{x}_b + k_2^{**}\hat{x}_c + \frac{(k_1^{**}+k_2^{**})^2}{4}}{k_1^{**} + k_2^{**}} \qquad (25)$$

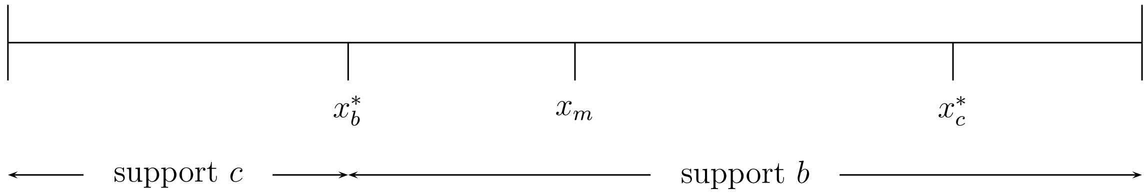
$$k_b^{**} = \sum_{j \in \{j | x_j > x_c^{**}\}} b_j, \quad k_c^{**} = \sum_{j \in \{j | x_j < x_c^{**}\}} b_j$$

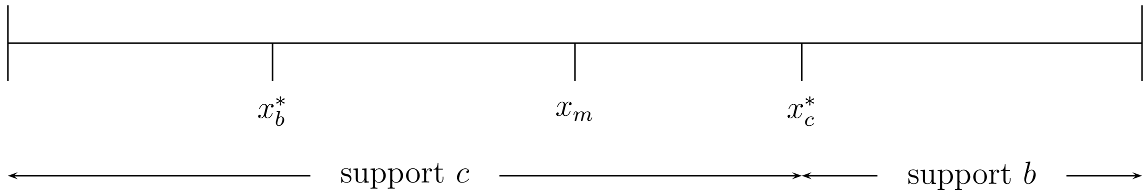
Again x_c^{**} and x_b^{**} exist and are unique. We now introduce the complementary Assumptions $1'$ and $2'$. Assumption $1'$ requires that $F(k_c^{**}, k_b^{**}) = 0$ and Assumption $2'$ requires that no donor can affect the political outcome individually, given the contributions of the other donors. We obtain

Proposition 2

Suppose Assumptions $1'$ and $2'$ hold. Then x_b^{**} and x_c^{**} constitute a political and donor subgame-perfect equilibrium. Candidate c wins the election, and the political outcome is x_c^{**}.

The proof of Proposition 2 follows the same lines as Proposition 1. The characteristics of the equilibria are summarized in the following figure, which represents the donors' ideal points, the median voter, and the political equilibrium, as well as the donors' decisions based on their own ideal points.





Before we consider further features of these equilibria, we shall first discuss the assumptions and the uniqueness issue.

5.4 Discussion of the assumptions and uniqueness

It is easy to demonstrate that, under the assumptions of the last section, the derived equilibria are unique. Let us consider, for instance, a potential donor and a political equilibrium, say x_b and x_c, in which candidate b wins the election. If any donor with an ideal point less than x_b supports candidate b, he can increase his utility by supporting c, which drives the political outcome toward his ideal point. Similarly, a donor with $x_j > x_b$ can do no better than to support candidate b in order to reduce the distance between the political outcome and his preferred point. Thus under the two assumptions the derived equilibria are unique.

Next we discuss what happens if one assumption does not hold.

First, we have assumed that the position x_b^* (x_c^{**}) will gain a majority of voters. If this condition is not fulfilled, we will have only one equilibrium. The reason is that as candidate b (c) receives more donor support in the case of x_b^* (x_c^{**}), so we then have $x_b^{**} < x_b^*$ and $x_c^{**} < x_c^*$. So if, for instance, candidate b gains no majority with x_b^*, candidate c is sure of winning the election in the situation x_b^{**}, x_c^{**}. Therefore we have at least one equilibrium.

The second condition assumed in the last section states that given the constellation x_b^*, x_c^* or x_b^{**}, x_c^{**}, no donor can change the political outcome by changing his decision. If, in an equilibrium characterized by x_b^* and x_c^*, a donor with $x_j > x_c^*$ can ensure that candidate c will win the election with his donations, he will, of course, select candidate c over b. So, in this case x_b^*, x_c^* cannot be an equilibrium. Thus, in general, if a donor is pivotal in a potential equilibrium, the political equilibrium will not be a donor equilibrium. But again, if for instance, in x_b^*, x_c^* the majority of voters in favor of candidate b is very small, which will enable one donor to change the political outcome, the equilibria x_b^{**}, x_c^{**}, will in general imply a substantial majority for candidate c. So, as a rule we expect in this case again one equilibrium to hold if we have enough donors.[11]

5.5 Implications

The derived donor and political equilibria have some remarkable consequences. We now discuss several important features of the case when all assumptions hold and both equilibria exist.

Both candidates have a chance of winning the election that depends on the realization of the equilibrium. Members of the donor group will support a candidate whose position is not closest to their own ideal point. In an equilibrium x_b^*, x_c^* on the other hand, donors with $x_j < x_b^*$ will support candidate c, whereas a donor with $x_j = x_c^*$ will contribute to funding of candidate b's campaign. In any case, however, donors located around the median will support the winning candidate. If he coincides with the median voter, the median donor will always contribute to the candidate whose position is closest to his.

Campaign support increasing the mobility of both candidates leads to a convergence of the candidates' positions in the political equilibrium since

$$x_c = \frac{k_c + k_b}{2} + x_b$$

and k_c and k_b decrease due to advertising.[12]

This convergence does not end at the median or in equal locations, but the positions with campaigns are closer than those without campaigns.

Moreover, symmetrical political and support constellations yield asymmetrical outcomes. Suppose prospective campaign funds are symmetrically distributed around the median position and $\hat{x}_c = -\hat{x}_b$, $f_c = f_b$, and $k_c = k_b$ without advertising. Then, in a donor and a political equilibrium, the candidates do not take up symmetrical positions.

[11] Precise conditions can be given when distributions of voters and donors are specified.

[12] This will not be true if the uncertainty floors b and c are lowered by campaigns, because in this case the distance between candidate b and c remains unchanged.

By contrast, in equilibrium one candidate c will win and attract the majority of donors despite the fact that both candidates are equally attractive at the outset.

A property of the equilibria is that small differences in candidate positions without campaigns do not destroy the incentives for donors to contribute, because a reduction of uncertainty affects the equilibrium platforms. Political controversy is not a necessary condition for fundraising, which gives an important twist to the literature (e.g. Congleton 1989).

The increase of mobility by campaigns does not necessarily imply that voters perceive lower uncertainty in equilibrium. Let us consider a constellation in which candidate b is located in his established point $\hat{x}_b$ without campaigns and wins the election. In the donor and political equilibrium in which b wins, voters will perceive higher uncertainty, since b is drawn toward the center, which is associated with higher uncertainty compared to the outcome without campaigns. Thus campaigns that reduce uncertainty can heighten uncertainty in a donor and political equilibrium.

It has been argued that consistent incumbents are perceived as a lottery with smaller variance than any challenger (e.g. Bernhardt and Ingberman (1985) and Anderson and Glomm (1992)). This fact can be easily incorporated into our framework. Suppose candidate c is the incumbent. We assume that $\hat{x}_c = -\hat{x}_b$, $f_c < f_b$, and $k_c < k_b$ without any campaign support. Then the incumbent will win the election without campaigns, since equations (5), (7), and (8) imply that $x_i^{ind} < 0 = x_m$. But our model shows that despite this initial advantage there may be an equilibrium in which the challenger will win the election if he wins over the major part of the donors. This suggests another way of looking at incumbent/challenger competition characterized by the difficulty of defeating the incumbent. If and only if the challenger is able to organize donor support much better than the incumbent, will he be able to defeat the incumbent. Hence the electoral advantage for the incumbent can be suddenly outweighed by a new organization of donors by the challenger.

6 Concluding Remarks

We have examined a simple model of campaigns in which contributers support candidates who can then engage in costly campaigning. We have argued that campaigns may induce a run by a number of interest groups to support one candidate.

The results in this paper constitute a set of testable propositions pertaining to the relationships among a set of endogenous variables (candidates' policies, contribution decisions, amount of contributions, electoral outcomes, etc.) and a set of exogenous variables (incumbency advantage, distribution of voters and donors). Moreover, the model presented in this paper can be extended in several directions. The model could be complemented by other aspects of campaigns. For instance, interest groups may contribute money because they receive services or get access to politicians when a candidate takes office. This would tend to increase the incentives of interest groups to support the winning candidate and would reinforce the run phenomenon. Finally, we have assumed that candidates only care about winning the election. Suppose we assumed instead that candidates have policy preferences. As shown by Gersbach (1998), this produces a very different distribution of campaign expenditures across winners and losers. Comparing both models with empirical data could be used to test the objective functions of candidates, i.e. which objective functions of candidates are consistent with empirical campaign patterns.

Appendix 1

First we deduce the candidate equilibrium from equation (5)

$$x_i^{ind} = \frac{x_c + x_b}{2} + \frac{V^c - V^b}{2(x_c - x_b)}$$

and from the candidate goals $\max x_i^{ind}$ (candidate b) and $\min x_i^{ind}$ (candidate c).

Given some position x_b, the first order condition for the choice x_c is given by

$$\frac{\partial x_i^{ind}}{\partial x_c} = \frac{1}{2}\left(1 - \frac{f_c - f_b - k_c x_c + k_c \hat{x}_c - k_b x_b + k_b \hat{x}_b}{(x_c - x_b)^2} - \frac{k_c}{x_c - x_b}\right) = 0$$

Similarly, the first-order condition for x_b is

$$\frac{\partial x_i^{ind}}{\partial x_b} = \frac{1}{2}\left(1 + \frac{f_c - f_b - k_c x_c + k_c \hat{x}_c - k_b x_b + k_b \hat{x}_b}{(x_c - x_b)^2} - \frac{k_b}{x_c - x_b}\right) = 0$$

By adding these two equations we obtain

$$1 - \frac{k_c + k_b}{2(x_c - x_b)} = 0$$

which leads to

$$x_c = \frac{1}{2}(k_c + k_b) + x_b$$

Thus the candidates take different positions in equilibrium, depending on the mobility costs.

We insert $x_c - x_b = \frac{1}{2}(k_c + k_b)$ into the first first-order condition and obtain

$$1 - \frac{f_c - f_b + k_c \frac{1}{2}(k_b + k_c) + k_c\left(\hat{x}_c - x_b - \frac{1}{2}(k_b + k_c)\right) - k_b(x_b - \hat{x}_b)}{\frac{1}{4}(k_c + k_b)^2} = 0,$$

which implies

$$\frac{1}{4}(k_c + k_b)^2 = f_c - f_b - x_b(k_b + k_c) + k_c \hat{x}_c + k_b \hat{x}_b.$$

Thus we find that

$$x_b = \frac{f_c - f_b + k_b \hat{x}_b + k_c \hat{x}_c - \frac{1}{4}(k_b + k_c)^2}{k_b + k_c}$$

Because of $x_c = \frac{1}{2}(k_c + k_b) + x_b$ we obtain

$$x_c = \frac{f_c - f_b + k_b\hat{x}_b + k_c\hat{x}_c + \frac{1}{4}(k_b + k_c)^2}{k_b + k_c}$$

Appendix 2

Here we calculate the derivative of x_b with respect to k_c:

$$\begin{aligned}\frac{\partial x_b}{\partial k_c} &= \frac{(k_b + k_c)\hat{x}_c - \frac{1}{2}(k_b + k_c)^2 - f_c + f_b - k_b\hat{x}_b - k_c\hat{x}_c + \frac{1}{4}(k_b + k_c)^2}{(k_b + k_c)^2} \\ &= \frac{k_b(\hat{x}_c - \hat{x}_b) + f_b - f_c - \frac{1}{4}(k_b + k_c)^2}{(k_b + k_c)^2}\end{aligned}$$

By using $\frac{\partial x_c}{\partial k_c} = \frac{1}{2} + \frac{\partial x_b}{\partial k_c}$ we derive

$$\begin{aligned}\frac{\partial x^{ind}}{\partial k_c} &= \frac{\partial}{\partial k_c}\left(\frac{1}{2}(x_c + x_b) + \frac{V^c - V^b}{2(x_c - x_b)}\right) \\ &= \frac{1}{2}\left\{\frac{\partial x_b}{\partial k_c} + \frac{1}{2} + \frac{\partial x_b}{\partial k_c} + \frac{\partial}{\partial k_c}\left(\frac{f_c + k_c(\hat{x}_c - x_c) - f_b - k_b(x_b - \hat{x}_b)}{x_c - x_b}\right)\right\} \\ &= \frac{\partial x_b}{\partial k_c} + \frac{1}{4} + \frac{f_b - f_c + \frac{\partial x_b}{\partial k_c}(-k_c - k_b)(k_b + k_c) - x_b(k_b + k_c - k_b - k_c)}{(k_b + k_c)^2} \\ &\quad + \frac{\hat{x}_c(k_c + k_b - k_c) - k_b\hat{x}_b - \frac{1}{2}k_c(k_c + k_b) + \frac{1}{2}k_c(k_c + k_b) - \frac{1}{2}(k_c + k_b)^2}{(k_b + k_c)^2} \\ &= \frac{f_b - f_c + k_b(\hat{x}_c - \hat{x}_b) - \frac{1}{4}(k_c + k_b)^2}{(k_b + k_c)^2}\end{aligned}$$

The last expression coincides exactly with $\frac{\partial x_b}{\partial k_c}$.

Thus $\frac{\partial x^{ind}}{\partial k_c} = \frac{\partial x_b}{\partial k_c} \geq 0$.

Similarly, we obtain

$$\begin{aligned}\frac{\partial x_c}{\partial k_b} &= \frac{(k_b + k_c)\hat{x}_b + \frac{1}{2}(k_b + k_c)^2 - f_c + f_b - k_b\hat{x}_b - k_c\hat{x}_c - \frac{1}{4}(k_b + k_c)^2}{(k_b + k_c)^2} \\ &= \frac{k_c(\hat{x}_b - \hat{x}_c) + f_b - f_c + \frac{1}{4}(k_b + k_c)^2}{(k_b + k_c)^2}\end{aligned}$$

$$\frac{\partial x^{ind}}{\partial k_b} = \frac{\partial x_c}{\partial k_b} \leq 0$$

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