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Campaign expenditures, contributions and direct endorsements: The strategic use of information and money to influence voter behavior

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Abstract

A costly signaling model is presented in which we show how campaign expenditures can buy votes. The model shows that the amount of campaign expenditures may convey the electorate information about the candidate's intended policy. When this model is extended to allow for a contributing interest group, it appears that for campaigning to be informative it is sometimes crucial that campaign funds are supplied by informed third parties. The extension also provides an explanation why interest groups contribute to the candidate's campaign, rather than using direct endorsements; they may need the candidate as an intermediary to filter their opposing interests.

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1. Introduction

When faced with the problem whom to vote for in an election, voters rely on several sources of information. Among these are: relevant past experience with the

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candidates or parties, political campaigns, and (in)direct endorsements by interest groups. Empirical evidence suggests that information from each of these sources influences voters' decisions. [1] Theoretically, the impact of past experience can be understood – and has indeed been modeled – from an adaptive behavior or learning perspective (see Calvert (1986) for a survey). The influence of campaigns and endorsements is not so clear, however. In an election campaign a candidate announces the policy (s)he suggests to implement. But the non-transparency of many policy proposals may cause voters not to understand the impact of these policies. In addition, they may think of policy promises as being non-credible. Hence, it is not completely clear what kind of information is transmitted through campaigning and, thus, why 'campaign spending buys votes', as is typically assumed in voting models with campaign expenditures. [2] Furthermore, since the campaign chest a candidate has at his (her) disposal is often larded by interest groups, the fact that a candidate is able to spend a lot on a campaign could indicate that (s)he received a large amount of contributions. In this respect Grossman and Helpman (1994) suggest that the size of contributions shows the candidate's ability as a fund-raiser and thus serves as a kind of indirect endorsement. [3] However, rather than contributing to the candidate's campaign, interest groups could also devote their money to direct endorsements. Such an endorsement may reveal information either because the endorser always reports honestly or, more realistically, because one has information about the interests of the strategically

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[1] Concerning past experience, see the overview and the results provided in Schram (1989). The influence of political campaigns follows from the empirically observed positive impact of campaign expenditures on the probability of winning (cf. Morton and Cameron, 1992). Endorsements are found to be influential by Lupia (1994a), Rapoport et al. (1991), Schneider and Naumann (1982), and to a lesser extent by Williams (1994).

[2] Most theoretical models that relate voters' decisions to campaign spending treat the transformation of money into votes as a black box by using a vote production function (see e.g. Baron, 1994; Magee et al., 1989; Grossman and Helpman, 1996; Helsley and O'Sullivan, 1994; Snyder, 1989). Exceptions are some theoretical studies where it is assumed that political campaigns convey useful information to the voter by decreasing the variance of perceived policy positions in a probabilistic voting model (see Austen-Smith, 1987; Hinich and Munger, 1989; Mayer and Li, 1994). However, in these models the technical relationship between expenditures and the variance of perceived policies is assumed and not explained.

[3] Helsley and O'Sullivan (1994) and Lohmann (1993) also suggest that the size of campaign contributions can be informative to voters. Alternatively, the size of a candidate's campaign chest can also be informative to other potential candidates. Epstein and Zemskey (1995) focus on the latter role of campaign contributions. In their signaling model the incumbent employs strategic fund-raising to deter strong challengers from entering the political fray. By raising a lot of funds, the incumbent tries to convince potential challengers that he is of 'high' quality, and thus very hard to beat in an election. As opposed to our setup, in the Epstein and Zemskey model contributors are not incorporated as explicit (strategic) actors.

acting endorser. [4] There is some evidence suggesting that in practice direct endorsements are taken to be less important in influencing election outcomes than campaign contributions, and are mostly used by labor unions (cf. Schlozman and Tierney, 1986).

In this paper we are interested in the following questions concerning the strategic use of information and money to influence voter behavior. First, how and when can campaign expenditures affect the information of a voter and thereby influence the voting decision? Second, are there circumstances under which political campaigns need contributions (indirect endorsements) from interest groups in order to be effective? Third, why would interest groups contribute to the campaign of a candidate or party when they can also reach out to the voters directly? Finally, under what circumstances are campaigns and endorsements in the interest of the different agents involved?

The goal of this paper is to provide some answers to these questions within a single analytical framework. To that purpose a simple model is presented concerning an election with an incumbent and a challenger competing for the vote of a representative voter. The incumbent's policy position is assumed to be known to the voter on the basis of the incumbent's past performance. The position of the challenger, however, cannot be established by the voter on the basis of past experience, nor can the content of the challenger's political campaign give the voter direct information in this respect. We show that the informational value of the challenger's campaign may lie solely in its costs. [5] In the benchmark model, that we consider first, the challenger relies on own resources for campaigning. Then the model is extended to account for the fact that campaign expenditures are funded by interest groups. In this extended model a donating interest group (donor) is introduced which is assumed to be informed about the policy position of the challenger. The voter, on the other hand, is supposed to be aware of the preferences of the donor. Finally, the extended model is compared with a model in

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[4] Endorsements by informed parties are incorporated into models of elections by McKelvey and Ordeshook (1985) and Grofman and Norrander (1990), and in models of direct legislation by Cameron and Jung (1992) and Lupia (1992). Only in Cameron and Jung (1992) the endorser acts strategically, but contrary to the approach taken in this paper, these endorsements are costless for the endorser. In Lupia and McCubbins (1994) and Epstein and O'Halloran (1995) strategic endorsements by interest groups are directed at the legislature rather than at the general voting public, and used by legislators to control the bureaucracy.

[5] In this respect the model differs from most other theoretical models of political campaigning. Chappell (1994), for instance, assumes that campaign advertising is completely informative about the candidate's policy position and, moreover, truthful. Harrington (1992) assumes that political campaigns are costless and explores under what conditions these cheap talk messages are informative. Finally, in Banks (1990) campaigns are only costly to the winning candidate. These costs are assumed to represent the candidate's loss of reputation due to lying and are increasing in the difference between the policy proposed in the campaign and the policy implemented. In this paper the costs of a campaign are independent of its content.

which the interest group can reach out to the voters directly by spending money on direct endorsements.

Our results explain why voters respond positively to campaign spending. As already hinted at by Austen-Smith (1991) and Calvert (1986, pp. 53–54), the amount of campaign expenditures provides information about the preferences of the candidate and, hence, her or his policy position. For campaign expenditures and information transmission to occur in equilibrium it is required, however, that the candidate's preferences are not too divergent from the voter's (cf. Cho and Sobel, 1990). This requirement explains why it can be crucial for the candidate that campaigns are financed by interest groups. If the candidate's preferences are too divergent but the donor's preferences are not, information transfer through campaigning is still possible when the campaign is financed by the donor. For similar reasons it turns out that, although it may not be possible for an interest group to influence the voting decision through (direct) endorsements, this may be feasible by using the indirect route of campaign contributions. The analysis shows under what circumstances the direct or the indirect route will be preferred. Although political campaigns and endorsements cannot make the voter worse off in our model – ex ante – only in specific cases they do provide the voter useful information. The resources spent on these activities may be a pure social waste, therefore.

The remainder of this paper is organized as follows. The analysis starts in Section 2 with a formal model describing the link between campaign expenditures and voting behavior, as suggested by Austen-Smith (1991). The model will be used as a benchmark in later sections. In Section 3 this model is extended by introducing a donating interest group. Section 4 addresses the question why interest groups may donate to a candidate's campaign instead of reaching out to the voters directly via endorsements. A concluding discussion is presented in Section 5. Apart from summarizing the main results, this section discusses some (comparative statics) results obtained from the model in light of existing empirical evidence. In addition, a number of interesting extensions of the model are discussed.

2. Campaign expenditures and voting

In this section the benchmark model with campaign expenditures as costly signals is presented. We consider a simple two-player signaling game with a challenger C and a voter V. [6] The voter must either vote for the incumbent or for

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[6] For notational convenience, voters and donors (introduced in Section 3) will be indicated as females, and incumbents and challengers as males.

the challenger. Using the incumbent's past voting record the voter is informed about the type of the incumbent, i.e. what kind of policy is to be expected once the incumbent is reelected. On the other hand, the voter is uncertain about the policy position of the challenger. A priori there are two possibilities (neglecting ties): either the policy position of the challenger fits the preferences of the voter better than the incumbent's position, or it fits her preferences worse. If the former holds the state of the world (t) is 'Better' and the challenger is said to be of the good type, if the latter holds the state of the world equals 'Worse' and the challenger is labeled to be of the bad type. In the first case the voter would want to elect the challenger (take action $x = C$), whereas in the second case she would prefer to vote for the incumbent ($x = I$). The prior probability that the challenger is of the good type equals p, with $0 < p < 1$. The goal of the challenger is to get elected, which gives him an incentive to make the voter believe that his policy is better, irrespective of whether in fact this is true or not. Hence, the challenger and the voter have partially conflicting interests.

The voter is assumed to be completely informed about the preferences of both the good and the bad type challenger. To capture in a simple way the idea that voters may find it difficult to assess the implications and/or credibility of policy proposals, campaigning is modeled such that the content of a proposal provides no direct information to the voter. The voter can use the observable campaign expenditures, though, as indirect information concerning the policy stance (type) of the challenger. The mere fact that the challenger spends a lot of money on his campaign may indicate that he will implement a policy the voter likes. We assume that to run an effective campaign the challenger has to spend a fixed amount of money $y^+ > 0$. The challenger can thus either decide to campaign at cost y^+ or not to campaign at all (at zero costs).

The order of moves in the model is summarized as follows. First nature picks the type of the challenger $t \in \{$Worse, Better$\}$, with the probability that the good type is selected $p = P(t = \text{Better}) = 1 - P(t = \text{Worse})$. Only the challenger observes his type. Then the challenger decides whether to spend the fixed amount of money y^+ on campaigning, or to spend no money at all. Finally, the voter observes the level of campaign expenditures (0 or y^+) and either elects the incumbent ($x = I$) or the challenger ($x = C$). Without loss of generality we can normalize the payoffs over action–state pairs such that they are given by the following matrix:

	$t = $ Worse			$t = $ Better		
$x = I$	v_1	0	0	0	0	0
$x = C$	0	c_1	d_1	v_2	c_2	d_2

The first entry in each cell refers to the voter's payoff and the second to the challenger's gross payoff, where it is assumed that $v_i, c_i > 0$ for $i = 1, 2$ (the third entry will not be used until the next section). The challenger's net payoff follows

by subtracting the campaign costs from his gross payoff. Since the voter should actually prefer the candidate she is hypothesized to prefer, v_1 and v_2 are taken to be strictly positive. Regarding these preferences two cases can be distinguished: the case in which the voter, on the basis of the prior, would elect the incumbent (requiring that $p < v \equiv v_1 / [v_1 + v_2]$), and the opposite case where she is a priori inclined to choose the challenger ($p > v$). The assumption that the challenger wants to get elected is reflected by assuming both c_1 and c_2 to be positive. The setup of the game and the payoff matrix are common knowledge, i.e. known to both the voter and the challenger.

As the focus of this paper is on the effect of campaign spending on voting behavior via its impact on the voter's information, we are interested in how much information can be revealed in equilibrium. In order to compare and classify different (perfect Bayesian) equilibria by the amount of information which is revealed, we use the following standard terminology:

1. In a *pooling* equilibrium both challenger types choose to run a costly campaign with the same probability.
2. In a *hybrid* equilibrium either both challenger types choose to run a costly campaign with positive, but nonequal, probabilities, or both challenger types choose to refrain from campaigning with positive, but nonequal, probabilities (or both).
3. In a *separating* equilibrium one challenger type chooses to run a costly campaign with certainty, whereas the other challenger type always chooses not to campaign at all.

In a pooling equilibrium each challenger type employs exactly the same strategy and the voter does not get additional information from observing (the absence of) the challenger's campaign. That is, in such an uninformative equilibrium the voter does not get useful information to update her prior belief. In a hybrid equilibrium some, but not all information is revealed. Since in this kind of equilibrium there is a level of campaigning (0 or y^+) which both challenger types choose with positive probability, the observation of this level of campaigning does not lead to a decisive answer concerning the challenger's type. However, due to the fact that both types choose this level with different probabilities, some inferences can be made to improve upon the prior belief. In a separating equilibrium all information is revealed since the strategies of the challenger types are completely opposed. After campaigning the voter knows the type of the challenger for sure and she takes the same decision as in case she knew the challenger's type beforehand (complete information model).

We now want to explore under what conditions an informative, i.e. hybrid or separating, equilibrium exists. The following proposition is due to Potters and Van Winden (1992) and Ainsworth (1993). (Proofs of propositions are available upon request).

Proposition 1. [7]
   (a) *A pooling equilibrium always exists.*
   (b) *A necessary and sufficient condition for a hybrid equilibrium to exist is:*

     (i) *$p < v$ and $y^+ < c_1 < c_2$ or* (ii) *$p > v$ and $\max\{y^+, c_1\} < c_2$.*

   (c) *A necessary and sufficient condition for a separating equilibrium to exist is: $c_1 < y^+ < c_2$.*

Corollary 1.   A necessary and sufficient condition for information revelation to be possible in equilibrium is given by the 'Information Revelation by CAmpaigning' (IRCA) condition: $\max\{y^+, c_1\} < c_2$.

The first part of the proposition shows that the class of uninformative equilibria is rather robust, for this class is never empty. [8] The corollary, obtained from combining parts (b) and (c) of the proposition, makes clear that information revelation is only possible when two conditions are satisfied. Firstly, and rather trivially, information revelation requires that the cost of campaigning is not prohibitive for the good type challenger. Intuitively, when it is always too expensive for the good type challenger to run a campaign, the observation of such a campaign is a clear signal of the challenger being of the bad type. But, the bad type wants to conceal his identity and thus will never run a costly campaign when this leads to all information being revealed. So, when $c_2 < y^+$ only pooling on no-campaigning can occur in equilibrium.

Secondly, and more interestingly, a certain sorting condition ($c_1 < c_2$) on the challenger's preferences must be met. For campaigning costs to possess informational value the challenger should value his election more highly when the voter is satisfied with her decision ex post. Such a sorting condition, requiring a degree of consonance between the objectives of the decision maker (the voter) and the agent affected by the decision (the challenger) is characteristic for models concerning the strategic transmission of information (cf. Cho and Sobel, 1990). The intuition for the sorting condition is as follows. In case the sorting condition does not hold the bad type challenger always has an incentive to exactly mimic the behavior of the good type challenger. When $c_1 > c_2$ the bad type has a larger stake in persuading the voter to elect him than the good type challenger. As a consequence,

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[7] Here, and in the sequel, we disregard border cases like $p = v$, $c_1 = c_2$ and $y^+ = c_i$ for $i = 1, 2$.
[8] This part of the proposition is valid mainly because we do not employ a refinement concept that reduces the number of plausible equilibria. For instance, the statement does not hold when we use an equilibrium refinement like universal divinity (cf. Potters and Van Winden, 1992); when $p < v$, this refinement deletes the unique pooling equilibrium whenever the (IRCA) condition holds. Since equilibrium refinements typically only restrict out-of-equilibrium beliefs, they do not delete equilibria in the signaling game considered here in which some (or all) information is revealed.

when the good type is motivated to run a costly campaign in order to get elected, the bad type is motivated to campaign as well. Under these circumstances, campaigning cannot be informative.

There are several reasons why the sorting condition might hold. It is reasonable to assume that the challenger has an easier time during his term of office when his policy position is in harmony with the voter's preferences. The power of elected office may be positively related to the politician's popularity (cf. Harrington, 1992). Another justification could be given by reelection considerations. When the voter is satisfied with her decision ex post the winner of the current election fits the preferences of the electorate rather well and has a higher chance of reelection in the next election. The latter justification resembles the one given by Kihlstrom and Riordan (1984) and Milgrom and Roberts (1986) for a similar sorting condition concerning the greater willingness of high quality producers of an experience good to spend money on directly uninformative advertisements, compared with low quality producers. They justify that assumption by referring to repeated purchases by consumers. Only high quality producers will induce repeated purchases and, thus, have higher expected sales.

Proposition 1 also makes clear that a separating equilibrium only exists when the costs of campaigning are prohibitive for the bad type, but not for the good type challenger. In the unique separating equilibrium the good type runs a costly campaign with certainty, whereas the bad type rationally refrains from campaigning. In the hybrid equilibria the campaigning strategies of the two challenger types are partially, but not completely, distinct. When the voter is a priori inclined to vote for the incumbent ($p < v$), the good type always campaigns and the bad type only now and then campaigns (i.e., plays a mixed strategy; the precise equilibrium strategies are specified in the appendix). The absence of a campaign provides the voter conclusive evidence that the challenger is of the bad type, which induces her to elect the incumbent. After observing a costly campaign by the challenger, however, the voter will elect either candidate with positive probability. In the opposite case ($p > v$), the bad type never runs a costly campaign and the good type only sometimes campaigns. A costly campaign induces the voter to elect the challenger with certainty, whereas silence is followed by electing either candidate with positive probability. Lastly, in a pooling equilibrium either (i) the challenger never campaigns, or (ii) the challenger always campaigns. The first pooling equilibrium always exists, the second only when the voter is a priori inclined to vote for the challenger ($p > v$). Note that when this latter case applies, i.e. $p > v$, all three types of equilibria may exist at the same time (viz. if $c_1 < y^+ < c_2$).

When information is transferred the voter modifies her decision as compared with her decision solely based on prior information. In equilibrium the voter responds positively to campaign spending. That is, in equilibrium the voter will never adjust her prior belief p downwards when she observes campaign expenditures by the challenger. This adjustment is rational given that in equilibrium the good type challenger is at least as likely to engage in campaigning as the bad type

challenger. Consequently, in equilibrium campaign expenditures by the challenger increase – or better, do not decrease – his probability of election.

Due to the existence of multiple equilibria, general comparative statics results are difficult to obtain from the model. Some results are worth mentioning, however. We focus on the informative equilibria. [9] First, consider the impact of the challenger's campaign. When $p < v$ the probability that the voter elects the challenger after observing a campaign is weakly increasing in y^+ and weakly decreasing in c_1. In a sense, the voter discounts the informational value of a campaign, depending on the stake (c_1) the bad type has in misinforming her relative to the cost of campaigning. A similar result holds when $p > v$ since in this case the gain from campaigning, measured by the increase in the probability of election, is weakly increasing in y^+ and weakly decreasing in c_2. The additional informational value of a campaign to the voter is discounted using the stake (c_2) the good type has in informing the voter relative to the cost of campaigning. Besides, campaigning always results in election when $p > v$, but not necessarily so when $p < v$. In other words, the voter responds more favorable to a political campaign when she is already a priori inclined to elect the challenger. Secondly, the expected occurrence of a campaign is weakly increasing in c_1 and weakly decreasing in y^+ when $p < v$. Together with the fact that only pooling on no-campaigning may occur when c_2 drops below y^+, this result suggest that campaigns are more likely when the cost decreases or when the stake increases. Interestingly, the frequency of a campaign equals p/v in the hybrid equilibrium when $p < v$, and thus is highest when p is close to v. This suggests that campaigns are more likely when elections are expected to be close, in which case the voter only needs a small push to elect the challenger.

Finally, some payoff comparisons will be made. We first want to establish whether the voter benefits from the information extracted from the political expenditures made by the challenger. Of course, the full information revealing (separating) equilibrium yields the voter the highest expected utility. Perhaps a bit surprisingly, it appears that the voter is not worse off in the pooling equilibria compared to the more informative hybrid equilibria. So, the voter does not benefit in expected utility terms from additional, but incomplete or partial information. In this context, it should be realized that the strategic transmission of information

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[9] When $p < v$ the informative equilibrium is unique, and either hybrid or separating. In that case the comparative statics results follow from changes in the equilibrium strategies of the unique equilibrium, or from a switch from the hybrid (separating) to the separating (hybrid) equilibrium. When $p > v$ a hybrid and a separating equilibrium may exist side by side. In that case we focus on the comparative statics of the hybrid equilibrium as its existence is implied by the existence of the separating equilibrium, whereas the reverse does not hold. Focusing on the separating equilibrium does not give substantially different results, however.

involves that the voter is sometimes misled. In the hybrid equilibrium when $p < v$ the voter is sometimes misled by the costly campaign of the bad type challenger. In the other hybrid equilibrium (only possible when $p > v$) the voter is now and then misled by the absence of a costly campaign from the good type challenger. On the other hand, in these equilibria the voter is sometimes completely informed; namely when she does not observe costly campaigning in case $p < v$, or does observe a costly campaign when $p > v$. Overall, in a hybrid equilibrium the expected loss from sometimes being misled and the expected gain from now and then being fully informed cancel out, and the voter receives the same expected utility as in case campaign expenditures (information transmission) were not possible.

Next we turn to the welfare implications for the challenger. We compare the expected utility for the challenger in the informative campaigning equilibria with his expected utility in case the voter's decision is based on a priori information (i.e., when campaigning is not possible). Rather intuitively, both challenger types appear to be better (not worse) off having the option to campaign when the voter is a priori inclined to vote against the challenger ($p < v$). However, in the opposite case ($p > v$) the challenger would rather see that campaigning were not possible. So, from an ex ante perspective, the challenger only values the option to campaign in case the voter is a priori inclined to elect the incumbent.

In the pooling or non-informative equilibria the behavior of the voter is unaffected by the challenger's campaign expenditures. Hence, when expenditures are made in these equilibria they constitute a pure social waste. The challenger would be better off and the voter would not be worse off if campaigning were not possible. Note, however, that such a wasteful pooling equilibrium only exists in case the voter is already a priori inclined to elect the challenger.

3. Campaign contributions and voting

Electoral campaigns are often financed by the contributions of interest groups. In the U.S. candidates running for a seat in Congress typically rely on funds provided to them by donors. In this section we account for this observation by extending our benchmark model of the previous section. Specifically, we introduce a third player, the donor D, which may contribute to the candidate's campaign.

The literature provides two, not mutually exclusive, motives for why interest groups contribute to a candidate's campaign (cf. Morton and Cameron, 1992). Interest groups may either try to get their favored candidates elected, or they may try to influence the policy positions of the candidates. Theoretical models of campaign contributions can be divided, by and large, along this motivational line. So-called position-induced or support models focus on the electoral motive of contributions (e.g. Austen-Smith, 1987; Baron, 1994; Magee et al., 1989), service-induced or exchange models on the 'quid pro quo' motive of supplying

campaign funds (e.g. Baron, 1989; Grossman and Helpman, 1994). [10] In our extension of the benchmark model we focus on the electoral motive of campaign contributions. Campaign contributions are used by the donor to enable the challenger to transmit information to the voter through costly campaigning. In this way, the donor tries to get the challenger elected. [11]

The extended model has the following setup. First the donor D decides whether to contribute a fixed amount y^+ (>0) to the campaign of the challenger or not, before the challenger takes his campaign decision. It is assumed that the donor knows the type of the challenger, and that the challenger is entirely dependent on the contributions of the donor to cover his campaign cost. In the model considered here the voter only observes campaign expenditures; donations are not observed. The voter is assumed to be aware of the fact that the donor knows the type of the challenger. She also realizes that all campaign money spent by the challenger is provided by the donor. Since the voter knows the preferences of the donor and the challenger in each possible state of the world she can use campaign expenditures as a signal of the challenger's type.

To give the challenger a substantive role it is assumed that he can use the donation for other purposes than his campaign, and that these alternative uses yield direct utility. In this context one may think of expensive dinners, luxurious trips, and so on. Another justification might be that the challenger wants to save for future elections or has to retire campaign debts from previous elections (cf. Grossman and Helpman, 1994). When the voter does not observe campaign efforts, she cannot be sure whether this is due to the fact that the challenger did not receive contributions, or decided to use the contributions for other purposes. When the challenger does not receive any contributions he is restricted to not campaigning. In short, the order of moves in this three player game is as follows. Nature picks the type of challenger $t \in \{\text{Worse}, \text{Better}\}$ with $p = P(t = \text{Better}) = 1 - P(t = \text{Worse})$, and this type is revealed to both the challenger and the donor. Since the donor possesses the same information as the challenger, she is said to be of the same type; the donor who knows that the challenger is of the good (bad) type is referred to as the good (bad) type donor. After observing her type the donor decides whether to contribute or not and, subsequently, the challenger decides whether to spend any contributions on a campaign or not. For simplicity, it is assumed that the challenger either has to spend the contributions on his campaign or on other purposes; he cannot split contributions between these two alternatives. Finally, the voter observes (the absence of) campaign expenditures and elects either the challenger or the incumbent.

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[10] The recent model of Grossman and Helpman (1996) combines aspects of both types of models.

[11] As pointed out by a referee, to the extent that campaign contributions are motivated by 'quid pro quo' considerations, and recognized as such by voters, the informational value of contributions will likely to be attenuated. Thus, our focus on the electoral motive of campaign contributions may somewhat overstate their informational role.

The normalized payoffs over action–state pairs are given by the matrix presented in the previous section. The first entry in each cell again refers to the voter's payoff, the second to the challenger's gross payoff, and the third entry now refers to the donor's gross payoff. To get the challenger's net payoff one must add the contributions that are not used for campaigning. The donor's net payoff follows by subtracting her donation from the gross payoff. A priori we do not put any restrictions on d_1 and d_2. Four different cases can be distinguished, based on the donor's preferences:

(I)   No conflict with the voter's' interests: $d\_1 < 0 < d\_2$.
(II)   Full conflict with the voter's interests: $d\_2 < 0 < d\_1$.
(III) Partial conflict with the voter's interests, and incumbent preferred: d_1, $d\_2 < 0$.
(IV)   Partial conflict with the voter's interests, and challenger preferred: d_1, $d\_2 > 0$.

It must be realized that, although the donor always has the same type as the challenger, she may prefer the incumbent. Possessing the same information as the challenger does not imply having the same interests as the challenger. To investigate whether the scope for information transfer by campaign expenditures is altered, and in what direction, we employ the same approach as in the previous section. Different types of equilibria for the extended (donor) model are classified using the same standard terminology. However, rather than just focusing on the (campaigning) strategy of the challenger, we now look at the combined behavior of the donor–challenger combination. The probability that the good (bad) type donor–challenger combination runs a costly campaign is given by the probability that the good (bad) type donor contributes times the probability that the good (bad) type challenger spends this money on his campaign. The classification of equilibria for the extended model is based on the differences in the campaigning strategies of the two types of donor–challenger combinations. In a pooling equilibrium the campaigning strategies do not differ between the two types, in a hybrid (separating) equilibrium these strategies are partially (completely) opposed. Conditions for the existence of the three types of equilibria are given in Proposition 2, which is similar to Proposition 1.

Proposition 2.
(a) *A pooling equilibrium always exists.*
(b) *A necessary and sufficient condition for a hybrid equilibrium to exist is:*
    (i) $p < v$ and $y^+ < \min\{c_1, d_1\} < \min\{c_2, d_2\}$, or
    (ii) $p > v$ and $\max\{y^+, \min\{c_1, d_1\}\} < \min\{c_2, d_2\}$.
(c) *A necessary and sufficient condition for a separating equilibrium to exist is:* $\min\{c_1, d_1\} < y^+ < \min\{c_2, d_2\}$.

Corollary 2. A necessary and sufficient condition for information revelation to be possible in equilibrium is given by the 'Information Revelation by COntributions' (IRCO) condition: $\max\{y^+, \min\{c_1, d_1\}\} < \min\{c_2, d_2\}$.

The corollary shows that contributions and subsequent campaign expenditures possibly influence voter's information only when a certain (IRCO) condition on both the donor's and the challenger's preferences is satisfied. As was the case with the benchmark model of the previous section this restriction incorporates two separate conditions. The first condition ($y^+ < \min\{c_2, d_2\}$) entails that contributing and campaigning are not too costly for the good type donor and the good type challenger, respectively. When it is never rational for either the good type donor to contribute or for the good type challenger to run a campaign, the observation of a campaign is a clear signal of the combination being of the bad type. Since the bad type challenger does not want to reveal his identity (due to the assumption that $c_1 > 0$), he will never spend any contributions received in this case, making it irrational for the bad type donor to contribute. Consequently, when the donor's interests fully conflict with the interests of the voter (case II) or when she prefers the incumbent (case III) – in which cases $d_2 < y^+$ – the donor will not contribute to the challenger's campaign. No information can be revealed in these situations.

The more interesting second condition of IRCO – $\min\{c_1, d_1\} < \min\{c_2, d_2\}$ – concerns a generalized sorting condition. Necessarily, either the preferences of the challenger ($c_1 < c_2$) or the preferences of the donor ($d_1 < d_2$) must satisfy the sorting condition. For the donor–challenger combination it is required that the preferences of at least one of the agents carry information in the right direction, which means that the good type should have the largest stake to persuade the voter. Perhaps surprisingly, this latter condition is not sufficient. For instance, when $d_2 < c_1 < d_1 < c_2$ the sorting condition for the challenger is satisfied ($c_1 < c_2$), but the generalized sorting condition for the donor–challenger combination is not met and information transfer is not possible. When the sorting condition is satisfied for both the donor and the challenger, however, the generalized sorting condition is also satisfied.

Reasons why the sorting condition ($c_1 < c_2$) could hold for the challenger have already been given the previous section. The case $d_1 < d_2$ could represent a situation in which an on-going relationship with a politician is valued more highly when the electorate would be satisfied with him ex post. A popular politician may have more discretion in providing specific benefits to interest groups. Another justification could be given by assuming the interest group to be encompassing, and hence more aligned from the voter's perspective (cf. Olson, 1982).

The intuition for the generalized sorting condition runs as follows. In an informative equilibrium the good type donor–challenger combination necessarily campaigns with a strictly larger probability than the bad type combination. When the generalized sorting condition is not met, the bad type combination always wants to campaign with certainty when the good type combination campaigns with

positive probability. In the example with $d_2 < c_1 < d_1 < c_2$, if the gains d_2 and the probability that the challenger spends the funds received are large enough for the good type donor to contribute to the challenger, the stake for the bad type challenger c_1 is certainly large enough to justify the spending of contributions on a campaign (as $d_2 < c_1$). Since $d_2 < d_1$, however, this induces the bad type donor always to contribute to the challenger and, thus, the bad type combination to campaign with certainty. This cannot lead to an informative equilibrium, but only to a pooling equilibrium in which both types of the donor–challenger combination always campaign.

Proposition 2 shows that the IRCO condition is also sufficient for an informative equilibrium to exist. Due to the existence of other, non-informative equilibria the condition is not sufficient for information transfer actually to occur in equilibrium, though. In these non-informative pooling equilibria either (i) the donor never contributes, or (ii) the donor always contributes and the challenger always spend the contributions received on his campaign. Contrary to the first pooling equilibrium, the second pooling equilibrium only exists when the voter is a priori inclined to vote for the challenger ($p > v$).

The unique separating equilibrium requires not only that the costs of contributing are prohibitive for the bad type donor or campaigning is a dominated choice for the bad type challenger, but also that the costs of contributing are not prohibitive for the good type donor and campaigning is an undominated choice for the good type challenger. The hybrid equilibria resemble those of the benchmark model in the previous section in which the challenger has to rely on his own resources. More specifically, the combined behavior of the donor–challenger combination in the present extended model with a donor is similar to the behavior of the challenger which has to rely on his own funds. When $p < v$ a hybrid equilibrium may exist in which the bad type donor always donates though the challenger sometimes keeps the money, or a hybrid equilibrium in which the bad type donor does not always provide funds although the challenger always uses the funds for his campaign. In either case, the good type combination campaigns with certainty. When $p > v$ the bad type donor–challenger combination never campaigns in the hybrid equilibria. Either the good type donor or the good type challenger (or each of them) mixes between the pure strategies, but a campaign from the good type challenger always occurs with the same positive probability.

It should be noted that in any pooling, hybrid or separating equilibrium the good type donor is at least as likely to contribute to the challenger as the bad type donor. Moreover, in equilibrium the voter is at least as likely to observe campaign expenditures by the challenger in case the challenger fits her preferences better as in the opposite case. This implies that in equilibrium the voter will never respond negatively to campaign spending by electing the challenger with a lower probability.

The comparative statics results obtained for the benchmark model also hold for the extended model. Instead of focusing on the stake for the challenger (c_i) in

getting elected, we now have to consider the stake for the donor–challenger combination. The latter is given by $\min\{c_i, d_i\}$, that is, the stake of the agent in the combination who has the weakest incentive to get the challenger elected. For instance, it is obtained that the impact of a campaign is weakly increasing in y^+ and weakly decreasing in $\min\{c_1, d_1\}$ when $p < v$, and that $p > v$ is required to be assured of election after campaigning. On the other hand, a campaign (and thus a donation) is again more likely when the costs are lower, the stakes of both the donor and the challenger are higher, and when the electoral contest is expected to be close (p close to v).

It is immaterial to the voter whether the campaign is funded by either a donor or by the challenger himself, given that the same amount of information is being revealed. So, using the results of the benchmark model, it can be concluded that the voter will not lose from the possibility of contributions, and only gains from a donor funded campaign when separation is possible. Both the donor and the challenger (weakly) value the possibilities for information revelation when $p < v$. So, from an ex ante perspective the donor and challenger value the possibility of making contributions in this case. When $p > v$ the donor may either like the possibilities for information transfer (bad type donor when $d_1 < 0$) or dislike them. In the latter case the voter is already inclined to take the decision preferred by the donor, and information transfer is only costly for the donor. As the prior belief of the voter favors the challenger when $p > v$, the challenger (weakly) dislikes the possibility of information transfer and would rather see that campaigning, even with the funds of others, were not possible. In the hybrid equilibria, for instance, the gain from sometimes pocketing the contributions received does not offset the loss due to the voter sometimes electing the incumbent. Of course, given that the two ways of financing a campaign lead to the same amount of information being revealed, the challenger would rather campaign with the money of others. However, the type of funding may render different opportunities for information revelation, as will be discussed now.

In order to determine whether the scope for information transfer depends on the supplier of campaign funds we compare the situation that the challenger has resources of his own with the situation that the funds are supplied by an interest group. Comparing Corollaries 1 and 2, it is easily seen that the conditions IRCA and IRCO are not overlapping. The fulfillment of IRCA does not entail the satisfaction of IRCO, nor does the reverse hold. The fact that the challenger is dependent on the funds of the donor sometimes enlarges the scope for information transfer. For instance, when $y^+ < d_1 < c_2 < c_1 < d_2$ the challenger's sorting condition is not met and campaigning by using own resources has no impact on the voter's information. Information transfer is only possible when the challenger campaigns with the money supplied by the donor. In this case the challenger exploits the fact that the preferences of the supplier of funds do satisfy the sorting condition. On the other hand, the dependence on the donor's money may also reduce the possibilities for information transfer. When $y^+ < d_2 < d_1 < c_1 < c_2$, for

instance, the IRCA condition holds but the IRCO condition does not. The only way for campaigning to be informative is that the challenger has his own resources. The donor's interests are too opposed to the voter's interests in this case to make information transfer through contributions possible. Thus, it can be concluded that the challenger sometimes needs the fact that funds are supplied by a donor in order to transfer information, and in other cases needs money of his own. More generally, the scope for information transfer is altered by introducing a donating interest group, but not in an unequivocal way.

4. Direct endorsements versus campaign contributions

Up till now we have assumed that the donor can only contribute to the challenger's campaign. In this section we extend the analysis by considering the possibility that the donor can either contribute to the challenger's campaign, or endorse the challenger by sending a costly signal directly to the voter. For ease of exposition, we draw our conclusions from comparing the results of two separate models; the contributions model presented in Section 3, and a model discussed below in which only (costly) endorsements are possible. However, as follows from the more general model considered in the appendix, exactly the same results are obtained when the interest group's choice between endorsing and contributing is actually made endogenous. First, the endorsement model will be discussed. As with campaigns, it will be shown that the informative value of endorsements may lie in their costs. Then endorsements are compared with contributions.

Suppose, first, that the donor has only the option of direct endorsements. Like political campaigns, we assume that the content of an endorsement does not provide the voter direct information. Rather, the voter may use the observable (fixed) costs of an endorsement as indirect information concerning the challenger's policy stance. This leads to a model that is formally equivalent to the model of Section 2. We just have to replace the challenger by the donor in the description of the two player signaling game. Hence the analysis of that section is applicable. Substituting d_i for c_i, Proposition 1 can be used for the case $d_1, d_2 > 0$ (case IV as defined in the previous section). [12] From this proposition we know that, in case the donor prefers the challenger, direct endorsements can only be informative when the condition $\max\{y^+, d_1\} < d_2$ is satisfied. Under full conflict of interests between the voter and the donor (case II), no information revelation will occur by using direct endorsements. [13] In case III, in which the donor prefers the incum-

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bent, the donor would never recommend the voter to vote for the challenger. Direct endorsements would only be used to support the incumbent (although endorsements are assumed to be directly uninformative, from her knowledge of the donor's preferences, the voter is able to infer that in this case $(d_1, d_2 < 0)$ an endorsement is meant to support the incumbent). Finally, when there is no conflict of interests between the donor and the voter (case I), information transfer is, of course, possible only if the costs of endorsing are not prohibitive for at least one type of donor, i.e. when $y^+ < \max\{-d_1, d_2\}$. [14] In this case the donor may either endorse the incumbent (bad type donor) or the challenger (good type donor). Since we are interested in the comparison of using different routes to support the same candidate, viz. the challenger, we ignore the possibility that the donor directly endorses the incumbent. [15] This leads to the following corollary:

Corollary 3. A necessary and sufficient condition for information revelation to be possible in equilibrium is given by the 'Information Revelation by Direct Endorsements' (IRDE) condition: $\max\{y^+, d_1\} < d_2$.

Again, for endorsements to be potentially informative a sorting condition on the donor's preferences must be met $(d_1 < d_2)$. Only when the preferences of the donor and the voter are sufficiently aligned, direct endorsements can be informative. To the extent that direct endorsements are indeed meant to inform voters, this result is in line with Snyder who finds that ''..moderate interest groups should be more likely than extremist interest groups to try to bring their issue to the attention of the general public'' (Snyder, 1991, p. 105).

Next, suppose the donor has, besides the option of direct endorsements, also the option of contributing to the challenger's campaign. From Corollaries 2 and 3 (and the fact that pooling on campaigning is excluded when $d_2 < y^+$) it follows that under full conflict of interests between the voter and the donor (case II) and in case the incumbent is preferred by the donor (case III) neither contributions nor endorsements will be used to support the challenger. Consequently, it suffices to explore the cases I and IV. The next proposition compares the possibilities for

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[14] Note that in this case both endorser types want to inform rather than misinform the voter. When the costs of an endorsement are not prohibitive for the good type endorser, this type is prepared to make a costly endorsement in equilibrium when only a costly endorsement induces the voter to choose the challenger. In this equilibrium the bad type donor remains silent, where silence is followed by the voter electing the incumbent. When the costs are not prohibitive for the bad type, a similar equilibrium exists with the bad type making a costly endorsement to support the incumbent and the good type remaining silent. When the costs of an endorsement are prohibitive for both types, none of them is prepared to make a costly endorsement with positive probability.

[15] This amounts to depriving the (type i) donor with $d_i < 0$ of the possibility of sending a costly endorsement message. When $d_i > -y^+$ for $i = 1, 2$ this restriction is immaterial because in that case the donor will never endorse the incumbent; either the donor prefers the challenger $(d_i > 0)$, or the donor prefers the incumbent but an endorsement is too expensive $(-y^+ < d_i < 0)$.

information revelation by using either channel for these two cases, and is a direct corollary of Propositions 1 and 2.

Proposition 3.

   (a) *In case of no conflict of interests between the donor and the voter* (*case I*) *it holds that: when* (*full*) *information transfer is possible by funding the campaign of the challenger, full information revelation is possible by using direct endorsements. The reverse does not hold.*

   (b) *When the donor prefers the challenger* (*case IV*) *it holds that:*

   if (i) $d_1 < d_2$:   *when information transfer is possible through campaign contributions, information revelation is also possible by direct endorsements. The reverse does not hold.*

   if (ii) $d_1 > d_2$:   *information transfer is certainly not possible through direct endorsements, but may be possible through contributing to the challenger's campaign.*

The first part of the proposition shows that direct endorsements have a larger scope for information transfer than contributions when there is no conflict of interests. In this case the donor does not need the challenger as an intermediary to transfer information, and under certain conditions the challenger cannot serve as such an intermediary (for instance if $c_2 < y^+$). The second part indicates when contributions to the campaign of the challenger are more informative for the voter than endorsements. When the sorting condition $d_1 < d_2$ holds for the donor, contributions are only more informative when separation is possible by using contributions, but not by using direct endorsements. This is the case when $c_1 < y^+ < c_2, d_1, d_2$ and $d_1 < d_2$, that is, when only the bad type challenger is not willing to spend contributions on a campaign. Otherwise, endorsements are at least as informative as contributions and subsequent campaigning. In case the sorting condition does not hold for the preferences of the donor ($d_1 > d_2$), the indirect route is more informative whenever information transfer is possible by using contributions, i.e. whenever the IRCO condition holds. These considerations indicate that under a range of circumstances information transmission (and, thus, influence on voter behavior) is possible only by using contributions, though both direct endorsements and contributions are options open to the donor. Although in this case the donor's preferences carry information in the wrong direction for using direct endorsements, the donor can exploit – by using the indirect route – the fact that the challenger's preferences do satisfy the sorting condition.

   When the donor prefers the challenger (case IV) and both routes are potentially informative (i.e. both IRCO and IRDE are satisfied), the scope for complete information revelation is larger when using contributions. This follows directly from the conditions for the existence of the separating equilibria. Intuitively,

separation by contributions is possible when the bad type donor or the bad type challenger has a dominated choice (cf. Proposition 2c), whereas separation by endorsements only occurs when the bad type donor has a dominated choice.

Proposition 3 does not yet establish when the donor prefers contributions over direct endorsements. It is to this topic that we turn next. For that purpose we compare the expected utility obtained in equilibrium from using direct endorsements to support the challenger with the expected utility obtained from employing contributions. As is clear from Propositions 1 and 2 multiple equilibria for both routes exists, which makes a strict preference ordering over the two routes cumbersome. [16,17] Note, in this context, that in both the endorsement and the contribution model pooling on no expenditures by the donor types is always an equilibrium. In these cases the voter takes her decision solely based on prior information, yielding the donor exactly the same expected utility for both routes. Likewise, the separating endorsement and contribution equilibria yield the donor exactly the same equilibrium payoff. Hence the use of either route can yield the donor exactly the same utility in equilibrium.

Since both models incorporate the same 'no-expenditures' pooling possibility, we take this equilibrium as a benchmark for comparing endorsements with contributions. For each model we investigate whether the possibilities for information transfer lead to an improvement for the donor over this 'nothing happens' pooling equilibrium. This benchmark is also useful when one wants to address the question whether the donor can gain at all from making direct endorsements or contributions. First we have to establish whether the donor gains from information revelation anyway. Of course, this depends on the case we consider (case I versus case IV) and on the action the voter takes based on her prior belief ($p < v$: elect the incumbent, $p > v$: elect the challenger). If information revelation is profitable for the donor, it is assumed that she will prefer to use the route where information revelation is indeed possible. In case both contributions and endorsements are

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[16] Again, we want to emphasis that this problem is not caused by the fact that in the main text we consider the contribution and endorsement model in isolation. For every specific choice of the parameters, every equilibrium path described in an equilibrium of one of the two separate models can be sustained as an equilibrium in the more general model in which the choice between endorsing and contributing is endogenous (see the appendix). Although in a specific equilibrium of this model the donor reveals an unambiguous preference for the use of a specific route (or is indifferent), a strict ordering over the two routes is still cumbersome due to the fact that equilibria revealing conflicting preferences (i.e. an equilibrium in which only endorsements are used and another where only donations are used) may exist side by side. This problem (partly) remains even when we apply a universal divinity-like refinement concept.

[17] In this respect the assumption that endorsing and contributing are equally costly is also rather restrictive. When we drop this assumption it may appear to be easier to construct a strict preference ordering. However, such a preference ordering would not only be based on differences in information revelation possibilities, which is the focus of this paper, but also on cost differences between endorsements and contributions.

potentially informative, the route with the most profitable hybrid (partially informative) equilibria and the largest possibilities for separation will be preferred. On the other hand, when the donor wants to conceal her identity the route with fewer possibilities for information revelation is preferred. This will also be the case when the voter's prior belief induces her to take the action preferred by the donor, for in that case information transfer is only costly to the donor. Proposition 3 can then be used to establish the most preferable route for the donor. When we follow this procedure for the cases I and IV, respectively, Proposition 4 results.

Proposition 4.
  (a) *In case of no conflict of interests between the donor and the voter* (*case I*) *it holds that:*

> *if* (i) $p < v$:   *the donor prefers to use endorsements.*
>
> *if* (ii) $p > v$:   *when IRCO holds the bad type donor prefers to use contributions ∧ the good type donor prefers to use endorsements, if not the reverse holds.*

  (b) *When the donor prefers the challenger* (*case IV*) *it holds that:*

> *if* (i) $p < v$:   *when the IRCO condition holds the donor prefers to use contributions, whereas in case IRCO does not hold, but IRDE does, endorsements are preferred.*
>
> *if* (ii) $p > v$:   *when the IRCO condition holds the donor prefers to use endorsements, whereas in case IRCO does not hold, but IRDE does, contributions are preferred.*

Part (a) of the proposition states that in case I, when $p < v$, the donor prefers the use of direct endorsements from an ex ante perspective. That is, not knowing the type of the challenger and which equilibrium will result by using either contributions or endorsements, the donor wants to focus on endorsements. The challenger only stands in the way here. However, when the voter a priori prefers the challenger ($p > v$), no definite conclusion can be drawn from an ex ante viewpoint. Part (b) of the proposition says that when there is a partial conflict of interest between the voter and the donor, and the voter is a priori inclined to elect the incumbent, the donor prefers to use contributions when these are potentially informative. This follows because the bad type donor does not lose from information transfer whereas the good type donor gains from information transfer. Since under the IRCO condition the possibilities for separation are the largest when contributions are used, contributions are preferred from an ex ante perspective. Only when contributions cannot reveal any information, the donor prefers endorse-

ments when these are potentially informative. On the other hand, when the voter a priori prefers the challenger the donor prefers *not* to use contributions when these may be informative, whereas in case contributions cannot reveal any information, but endorsements can, the donor prefers the use of contributions (to avoid informative equilibria with wasteful expenditures).

Due to the assumption of rational (Bayesian) decision making, ex ante the voter can never be made worse off by the possibility of expenditures on campaigning or direct endorsements. Hence according to this model the voter would prefer that both endorsements and political campaigns are possible, for this maximizes the opportunities for separation. From Proposition 3 it follows that, generically, the voter does not prefer the one above the other.

5. Concluding discussion

Our analysis has provided some answers to the questions that were posed in the introduction. The main points can be summarized as follows. First, the simple benchmark model presented in Section 2 gives a theoretical explanation for the empirical observation that campaign expenditures increase the probability of election. The model shows that the amount of campaign expenditures may convey useful information about the candidate's type, that is, whether or not the challenger will be better for the voter than the incumbent. This transmission of information is only possible when there is some congruence between the voter's and the candidate's interests. In particular, a challenger must value the vote more highly when his policy stance serves the voter's interests better than the incumbent's does. Second, the extended model shows that if there is not enough congruence of interests between the candidate and the voter, campaigns may still be influential provided that the money for the campaign is donated by a donor who indeed has preferences that are congruent with the voter's. If the voter can have more faith in the donor than in the candidate, the fact that the campaign money is contributed by the donor may reassure her about the candidate's position. Thirdly, the model gives an explanation why interest groups may donate to an election campaign of a candidate, rather than reaching out to the voter directly by means of endorsements. When the preferences of the donor and the voter are not sufficiently aligned, direct information transmission to the voters is not possible. In that case the donor may exploit the stronger congruence between the preferences of the voter and the candidate.

An important feature of the model is that, in contrast with earlier models, the influence of campaign expenditures and contributions on voting behavior does neither rest on the assumption that campaigns are informative, nor on any exogenous cost of lying, nor on the assumption that donors act non-strategically. In our model the influence of campaign expenditures and contributions is endogenously derived. Moreover, although the model is rather simple, it yields some

interesting welfare implications and comparative statics, which we will briefly summarize here.

In the model the possibility of campaigning and/or endorsing never makes the voter worse off ex ante. The candidate, on the other hand, may either benefit or lose when campaigning is possible. Campaigning does never harm and sometimes improves his case with the voter. However, when the voter is a priori already inclined to vote for the candidate, the cost of campaigning may make the candidate worse off as compared to the case where campaigning would not be possible. In this situation, campaign expenditures constitute a pure social waste when they do not convey useful information to the voter, as happens in a pooling equilibrium. Similar results hold for the donor. If the voter needs to be persuaded, spending money to do so may be beneficial. However, if the prior intentions of the voter are already favorable for the donor, the possibility to spend money on contributions or endorsements is not attractive. In addition, it could be shown that there is no unambiguous preference for either channel of political influence. Under a specified range of circumstances the donor prefers to contribute to a candidate's campaign, at other instances she is better off by reaching out to the voter directly. The comparative statics results of the model suggest that campaigns and direct endorsements become more likely the lower the costs of these activities, the higher the stakes for the candidate and/or donor in getting the candidate elected, and the closer the electoral contest is expected to be. Moreover, the impact of a campaign or an endorsement appears to be positively related to ratio of the costs of these activities and the stakes the agents have in persuading the voter to elect the candidate.

For an assessment of the relevance of our model from an empirical point of view, a number of empirical findings can be mentioned that are suggestive in this respect. First, the model reveals that contributions are more likely to be addressed to challengers which are on the same side as the donor (i.e., when $d_1, d_2 > 0$). This result is in line with empirical evidence indicating that donors often give along ideological and partisan lines (e.g., Chappell, 1982; Poole and Romer, 1985). Second, the model predicts that campaign expenditures and contributions are highest when the election is expected to be close. This result is well documented in the empirical literature (e.g., Kau and Rubin, 1982; Poole and Romer, 1985). Third, a finding concerning endorsements – albeit not very robust – is that business interests receive a less favorable hearing from voters than ideological and labor groups (Kau and Rubin, 1979; Lupia, 1994a; Schneider and Naumann, 1982). The latter type of groups are perhaps more encompassing and, for that reason, their preferences may be more aligned with the interests of a representative voter. In terms of the model of Section 4 this might be reflected by the fact that the IRDE condition holds for these groups, whereas it does not hold for the business groups. The observation that endorsements are typically used by labor unions (cf. Schlozman and Tierney, 1986) may point in a similar direction.

Furthermore, a recent experimental study by Lupia (1992, 1994b) provides

some support for the contention that the amount of campaign expenditures may provide the voter information about the policy position of the candidate. In his model incompletely informed voters use the observation that an agenda setter has paid a certain amount of money to contest an election (in order to change the commonly known status quo) as a cue for the content of an unobserved alternative. In case the agenda setter does not contest the election and, hence, makes no expenditures, the status quo prevails. The Lupia model is linked to our benchmark model of Section 2 for the case $p < v$, where the agenda setter replaces the challenger and the status quo is substituted for the incumbent's policy position. The experiments showed that the observation that the setter paid a substantial amount in order to contest the election was an effective substitute for complete information.

At the end of the paper, we would like to point at a number of extensions which would make the model more realistic. We first consider the role of the incumbent. This role could be made more prominent, for example, by allowing the incumbent to engage in campaign expenditures as well. Preliminary results of such a 'two-senders model' (Austen-Smith and Wright, 1994; Potters, 1992) indicate that an incumbent will particularly focus on 'counter-campaigning'. If, a priori, the vote is likely to be in his favor, the incumbent will mainly spend money to counteract the campaign of the challenger. (Gerber and Lupia (1995) extend the Lupia (1992) model discussed above by adding an opponent (incumbent) to the agenda setter (challenger). Their assumption that the incumbent can only engage in counter-campaigning is justifiable in the light of this result.) Hence, the expenditures of the challenger are a major determinant of the expenditures of the incumbent (cf. the empirical evidence in Jacobson (1980)). Incidentally, these results provide a rationale for the focus in this paper on the explanation of the challenger's expenditures. These results are only preliminary, however, as they do not incorporate the possibility that donations from interested parties are a (main) source for the expenditures of both the challenger and the incumbent.

Secondly, the model would become more realistic if the level of campaign expenditures and donations were a continuous decision variable of the challenger and the donor, respectively. Allowing for levels between 0 and y^+ would not change much, however. As long as the upper bound (y^+) satisfies the conditions that are derived in the text (Corollaries 1–3), the existence of various types of equilibria remains essentially unchanged. Only if no upper bound is put on the level of expenditures, the scope for information transmission is enlarged (specifically, y^+ drops out of the conditions in Corollaries 1–3 on the existence of informative equilibria). Hence, the existence of upper bounds on campaign donations may in effect reduce the scope for information transfer and an informed decision by the voter (cf. Palda and Palda, 1985). Since voters typically a priori prefer incumbents ($p < v$ in our model), such upper bounds may limit the challengers' electoral opportunities.

A third extension relates to the assumption that the state of the world is

exogenously fixed. Although it is quite reasonable to assume that a challenger is either better or worse for the voter than the incumbent, it would be more realistic to assume that the challenger's type is partly determined by the candidate himself (and the incumbent). Hence, an interesting extension would be to make the role of the challenger more substantive by making his policy stance endogenous (cf. Lupia, 1992).

Another extension concerns the voter in the model. For simplicity, it was just assumed that the voter could be considered as being 'representative' or 'decisive'. It would be interesting to consider, for example, a spectrum of voters who differ according to the prior probability (p) with which they believe the challenger to be the best choice. Another, but related possibility, would be to consider a spectrum of voters who differ according to the stake (v_1, v_2) they have in selecting the best candidate available. An extension along these lines would allow the decisive (median) voter to be determined endogenously.

Finally, it would be nice to account for the fact that candidates typically receive funds from a large number of donors. When campaign contributions serve the purpose of getting the favored candidate elected by informing voters, a free rider problem may exist among the supporters of a particular candidate. A severe free rider problem among the candidate's potential donors, then, may affect the candidate's campaign funds and hence his (her) possibilities for electoral success. On the other hand, rational voters should take into account the different incentives for supporters to contribute to the campaign of their candidate, and thus the electoral consequences of the free rider problem may be attenuated (cf. Lohmann, 1995). When a spectrum of donors is considered who differ in respect to their stake (d_1, d_2), it might be possible to assess whether the effect of the free rider problem on the level of information transmission dominates the greater potential for information transmission due to the existence of multiple senders.

Acknowledgements

Appendix A

In this appendix we state all the equilibria for the following game. First, nature draws the type of the donor–challenger combination $t \in \{\text{Worse}, \text{Better}\}$, with

$P(t = \text{Better}) = p$. Next the donor chooses from two or three options. The donor decides either to contribute y^+ to the challenger (unobservable to the voter), or to spend y^+ on direct endorsements (observable to the voter), or not to spend money at all. In case the donor prefers the incumbent ($d_i < 0$), only the first and third option are available for the donor. Then the challenger decides whether to spend the contributions received on his campaign or not. The voter either observes an endorsement, a campaign by the challenger, or none of these, and subsequently chooses between the incumbent and the challenger. The equilibria for the models of Sections 2 and 3 follow from the equilibria of this more general game.

In the description of the equilibria we refer to the voter as player V, to the challenger as player C and to the donor as player D. The strategy of player V is denoted as $v(m)$. Here $v(m)$ gives the (conditional) probability that the voter will elect the challenger, given that she has received 'message' m, i.e. $v(m) = P(x = C \mid \text{message } m \text{ received})$ for $m \in \{0, y^+, z^+\}$. In our notation $m = y^+$ indicates that the challenger runs a costly campaign, $m = z^+$ indicates that the donor makes a direct and costly endorsement in support of the challenger, and $m = 0$ indicates the absence of both an endorsement and a campaign. Note that endorsements and donations are equally costly to the donor; both have y^+ as cost. We denote the state $t = \text{Worse}$ as t_1 and the state $t = \text{Better}$ as t_2. Let $c(t_i)$ denote the (conditional) probability that the challenger engages in campaigning – sends message $m = y^+$ – given that his type equals t_i and that he received contributions from the donor. More formally, $c(t_i) = P(m = y^+ \mid y = y^+, t = t_i)$ for $i = 1, 2$, where y denotes the amount of funds received from the donor. The challenger's strategy when he did not receive any contributions is trivially determined by the fact that in that case he has only one option to choose, namely not to campaign. Hence $P(m = y^+ \mid y = 0, t = t_i) = 0$ for $i = 1, 2$ in all equilibria. In subsequent specifications of equilibria only the challenger's strategy when contributions are received will be mentioned. Lastly, the strategy of the donor depends on her type and is given by the two-tuple $(d(t_i), e(t_i))$, for $i = 1, 2$, with $d(t_i)$ the probability that the donor will contribute y^+ to the challenger, and $e(t_i)$ the probability that the amount y^+ is spent on an endorsement. Since the donor can either donate or endorse (and not both) we have $0 \leq d(t_i) + e(t_i) \leq 1$. Due to this assumption, $1 - d(t_i) - e(t_i)$ gives the probability that no money is spent. In addition, since the donor cannot endorse the incumbent we have $e(t_i) = 0$ when $d_i < 0$. The prior probability that the state of the world t equals t_2 is given by $P(t = t_2) = p$. We use γ to denote $\gamma = \{p(1 - v)\}/\{(1 - p)v\}$. It holds that $p < v \Leftrightarrow \gamma < 1$.

Concerning the payoffs of the agents we make the same initial assumptions as in the text: $v_i, c_i > 0$, for $i = 1, 2$, $y^+ > 0$, and no 'knife-edge' cases. [18] When

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[18] More specifically, the 'no-knife-edge cases' (NKE) assumption entails: $y^+ \neq c_i$; $y^+ \neq d_i$; $c_j \neq d_i$ for $i, j = 1, 2$; $c_1 \neq c_2$; $d_1 \neq d_2$ and $p \neq v$.

Bayes' rule does not apply for message m in equilibrium there is freedom in choosing the voter's posterior belief $q(m)$, and thus her strategy $v(m)$. Due to this freedom, a specific equilibrium path may be compatible with various out of equilibrium strategies and beliefs. Since every equilibrium path is sustainable by choosing $q(m) = v(m) = 0$ for each out of equilibrium message m, we assume that out of equilibrium actions and beliefs take this specific form. In order to describe the equilibria in a neat way, we will use the indicator function $I_{\{A\}}$, which equals one if A holds, and zero otherwise. We now list the equilibria of the game described above. [19]

Pooling equilibria:

(a) no further restrictions

PE1: $d(t_i) = e(t_i) = c(t_i) = 0$ for $i = 1, 2$, $v(z^+) = v(y^+) = 0$, $v(0) = I_{\{p > v\}}$.

(b) $y^+ < \min\{c_1, c_2, d_1, d_2\}$ and $p > v$

PE2: $d(t_i) = 1$, $e(t_i) = 0$ and $c(t_i) = 1$ for $i = 1, 2$, $v(z^+) = 0$, $v(y^+) = 1$ and $v(0) = 0$.

(c) $y^+ < \min\{d_1, d_2\}$ and $p > v$

PE3: $d(t_i) = 0$, $e(t_i) = 1$ and $c(t_i) = 0$ for $i = 1, 2$, $v(z^+) = 1$ and $v(y^+) = v(0) = 0$.

(d) $y^+ < \min\{c_2, d_1, d_2\}$ and $p > v$

PE4: [20] $c(t_i)d(t_i) + e(t_i) = 1$ for $i = 1, 2$, with $\gamma e(t_2) \geq e(t_1)$, $\gamma d(t_2) \geq d(t_1)$, $d(t_2) > 0$, $e(t_2) > 0$, $c(t_1) = I_{\{y^+ < c_1\}}$, $c(t_2) = 1$, $v(z^+) = v(y^+) = 1$ and $v(0) = 0$.

Hybrid equilibria:

(1) $p < v$:

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[19] We do not use equilibrium refinements. Applying a refinement concept similar to (universal) divinity leads for every choice of parameters to a unique type of equilibrium when $p < v$. The pooling equilibrium does not exist when information transfer is possible, and the hybrid equilibrium HE4 does not exist when separation (SE1) is possible. When $p > v$, however, even after applying this refinement the type of equilibrium is not unique.

[20] Although PE4 is strictly speaking not a pooling equilibrium – as by using the equilibrium strategies of the agents the voter may improve upon her prior belief concerning the challenger's type – the updated belief in PE4 never leads to a decision different from the decision based on the voters prior belief, in contrast to the hybrid equilibria (HE) specified below. Moreover, the combined campaigning and endorsing strategy $(c(t_i)d(t_i) + e(t_i))$ of the two types of donor–challenger combinations is the same in this equilibrium. Strictly speaking, it would be best to characterize PE4 as a non-influential or essentially uninformative equilibrium.

(e) $y^+ < c_1 < \min\{c_2, \gamma d_1, d_2\}$

HE1: $d(t_1) = d(t_2) = 1$, $e(t_1) = e(t_2) = 0$, $c(t_1) = \gamma$, $c(t_2) = 1$, $v(z^+) = 0$, $v(y^+) = y^+/c_1$ and $v(0) = 0$.

(f) $\max\{y^+, \gamma d_1\} < c_1 < \min\{c_2, d_1, d_2\}$

HE2: $d(t_1) = \gamma d_1/c_1$, $d(t_2) = 1$, $e(t_1) = e(t_2) = 0$, $c(t_1) = c_1/d_1$, $c(t_2) = 1$, $v(z^+) = 0$, $v(y^+) = y^+/c_1$ and $v(0) = 0$.

(g) $y^+ < d_1 < \min\{c_1, c_2, d_2\}$

HE3: $d(t_1) = \gamma$, $d(t_2) = 1$, $e(t_1) = e(t_2) = 0$, $c(t_1) = c(t_2) = 1$, $v(z^+) = 0$, $v(y^+) = y^+/d_1$ and $v(0) = 0$.

(h) $y^+ < d_1 < d_2$

HE4: $d(t_1) = d(t_2) = 0$, $e(t_1) = \gamma$, $e(t_2) = 1$, $c(t_1) = c(t_2) = 0$, $v(z^+) = y^+/d_1$ and $v(y^+) = v(0) = 0$.

(i) $y^+ < d_1 < \min\{c_1, c_2, d_2\}$

HE5: $d(t_1) = \gamma d(t_2) > 0$, $e(t_1) = \gamma e(t_2) > 0$ and $d(t_2) + e(t_2) = 1$, $c(t_1) = c(t_2) = 1$, $v(z^+) = v(y^+) = y^+/d_1$ and $v(0) = 0$.

(2) $p > v$:

(j) $\max\{y^+, \min\{c_1, d_1\}\} < c_2 < (1 - 1/\gamma)d_2$

HE6: $d(t_1) = 0$, $d(t_2) = 1$, $e(t_1) = e(t_2) = 0$, $c(t_1) = I_{\{c_2 < c_1\}}$, $c(t_2) = (1 - 1/\gamma)$, $v(z^+) = 0$, $v(y^+) = 1$ and $v(0) = 1 - y^+/c_2$.

(k) $\max\{y^+, \min\{c_1, d_1\}, (1 - 1/\gamma)d_2\} < c_2 < d_2$

HE7: $d(t_1) = 0$, $d(t_2) = (1 - 1/\gamma)d_2/c_2$, $e(t_1) = e(t_2) = 0$, $c(t_1) = I_{\{c_2 < c_1\}}$, $c(t_2) = c_2/d_2$, $v(z^+) = 0$, $v(y^+) = 1$ and $v(0) = 1 - y^+/c_2$.

(l) $\max\{y^+, \min\{c_1, d_1\}\} < d_2 < c_2$

HE8: $d(t_1) = 0$, $d(t_2) = (1 - 1/\gamma)$, $e(t_1) = e(t_2) = 0$, $c(t_1) = I_{\{d_2 < c_1\}}$, $c(t_2) = 1$, $v(z^+) = 0$, $v(y^+) = 1$ and $v(0) = 1 - y^+/d_2$.

(m) $\max\{y^+, d_1\} < d_2$

HE9: $d(t_1) = d(t_2) = 0$, $e(t_1) = 0$, $e(t_2) = (1 - 1/\gamma)$, $c(t_1) = c(t_2) = 0$, $v(z^+) = 1$, $v(y^+) = 0$ and $v(0) = 1 - y^+/d_2$.

(n) $\max\{y^+, d_1\} < d_2 < c_2$

HE10: $d(t_1) = e(t_1) = 0$, $d(t_2) + e(t_2) = (1 - 1/\gamma)$ and $d(t_2) > 0$, $e(t_2) > 0$, $c(t_1) = I_{\{d_2 < c_1\}}$, $c(t_2) = 1$, $v(z^+) = 1$, $v(y^+) = 1$ and $v(0) = 1 - y^+/d_2$.

(o) $\max\{y^+, c_1, (1 - 1/\gamma)d_1\} < c_2 < d_1 < d_2$

HE11: $d(t_1) = 0$, $d(t_2) = (1 - 1/\gamma)d_1/c_2$, $e(t_1) = \gamma\{1 - (1 - 1/\gamma)d_1/c_2\}$, $e(t_2) = 1 - (1 - 1/\gamma)d_1/c_2$, $c(t_1) = 0$, $c(t_2) = c_2/d_1$, $v(z^+) = 1 - (y^+/c_2) + (y^+/d_1)$, $v(y^+) = 1$ and $v(0) = 1 - y^+/c_2$.

Separating equilibria:

(p) $\min\{c_1, d_1\} < y^+ < \min\{c_2, d_2\}$

SE1: $d(t_1) = 0$, $d(t_2) = 1$, $e(t_1) = e(t_2) = 0$, $c(t_1) = I_{\{y^+ < c_1\}}$, $c(t_2) = 1$, $v(z^+) = 0$, $v(y^+) = 1$ and $v(0) = 0$.

(q) $d_1 < y^+ < d_2$

SE2: $d(t_1) = d(t_2) = 0$, $e(t_1) = 0$, $e(t_2) = 1$, $c(t_1) = c(t_2) = 0$, $v(z^+) = 1$ and $v(y^+) = v(0) = 0$.

(r) $d_1 < y^+ < \min\{c_2, d_2\}$

SE3: $d(t_1) = e(t_1) = 0$, $d(t_2) + e(t_2) = 1$ with $d(t_2) > 0$ and $e(t_2) > 0$, $c(t_1) = I_{\{y^+ < c_1\}} = c(t_2) = 1$, $v(z^+) = v(y^+) = 1$ and $v(0) = 0$.

In some equilibrium specifications above in which the donor both contributes and endorses with positive probability, in fact a continuum of equilibria are described (i.e. PE4, HE5, HE10 and SE3). These equilibria, however, do not differ in an essential way. When a specific donor type is indifferent between donating and endorsing, she may have some leeway in choosing one of the two options,

leading to a large number of equilibria. More generally, note that the restrictions on the parameters for the existence of specific types of equilibria overlap each other; for a large range of parameter values there are multiple equilibria.

The equilibria of the model of Section 2 are obtained from the equilibria above by considering only those equilibria which satisfy $e(t_i) = 0$ for $i = 1, 2$ (i.e. no endorsements), and for which the implication $c(t_i) > 0 \Rightarrow d(t_i) = 1$ for $i = 1, 2$ is satisfied (that is, whenever the challenger intends to spend money he is assured of funds). The latter implication can be established by letting $d_i \to$. For the campaigning equilibria we only have to interpret $c(t_i)$ slightly different; $c(t_i)$ now represents the probability that the challenger engages in costly campaigning, given that his type equals t_i. The equilibria of the benchmark model are given by PE1, PE2, HE1, HE6 and SE1.

The equilibria of the contributions model of Section 3 are obtained by focusing on those equilibria where no endorsements are made, which are the equilibria with $e(t_i) = 0$ for $i = 1, 2$. This leaves PE1, PE2, HE1, HE2, HE3, HE6, HE7, HE8, and SE1. Lastly, the equilibria of the model where only endorsements are possible are given by those equilibria that satisfy $d(t_i) = 0$ for $i = 1, 2$. An alternative way to obtain these equilibria is to set $c_i = 0$ (for $i = 1, 2$), that is, by making contributions to the challenger's an unattractive option since he will never spend them on a campaign). The endorsement equilibria are given by PE1, PE3, HE4, HE9 and SE2.

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