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Abstract

This paper studies the effects on electoral competition of political parties relying on monetary donations and volunteer labour for their electioneering activities. It also examines whether a recorded decline in party activism increases special-interest influence on party policy platforms. Parties are shown to choose differentiated platforms in equilibrium when activists are present, despite factors drawing them together. Special-interest influence on platforms increases when a decline in activism stems from a fall in their motivation, following parties relying less upon them. This reduces procedural welfare, and potentially reduces voter welfare on policy outcomes, thus calling for more strict electoral laws.

JEL-Code: D710, D720.

Keywords: activism, special-interest politics, political participation, collective action, electoral competition, electoral financing laws, welfare.

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1 Introduction

This paper examines the implications of parties relying on both volunteer labour and monetary contributions to wage electioneering activities, which serve to persuade voters. It also investigates the consequences of a documented decline in *high-intensity participation*, or *party activism*, on the influence of special interests in the determination of electoral policy platforms. It asks whether or not this influence increases, and what are its consequences for voter welfare. It then considers normative prescriptions for electoral laws.

The analysis serves to highlight the role of party activists in enticing parties to offer differentiated platforms. The existence of "policy cleavages" (that is, parties offering differentiated policy platforms in equilibrium) attributable to activists, while previously documented, is newly shown to persist despite a decrease in the parties' reliance on activists, and the presence of a special-interest group with a converging influence. The novelty of this paper's approach is also to *jointly* consider monetary and non-monetary contributions to the electioneering activities of parties, respectively provided by a special-interest group and party activists, and how they differently affect policy platform choices in a model of electoral competition. This happens through the trade-offs associated with catering to voters at large or to contributors specifically. Finally, this essay also emphasizes the roles of both special interests and activists in distorting the choice of electoral policy platforms, and how normative policy responses (e.g., electoral laws) must strike a balance between both influences.

This essay also asks what the recent trends in party activism, which show a decline in participation, entail for special-interest influence on policy. These trends, surveyed extensively by Whiteley and Seyd (2002) for the United Kingdom, concern high-intensity participation, precisely defined as the volunteering of labour for participation in a political party's policy-determination and electioneering activities. These respectively include (but are not limited to) spending time attending party policy meetings and conventions, and canvassing voters. (In contrast, low-intensity participation includes activities such as displaying party posters or signing a petition supported by the party.) For instance, in a comparison of panel surveys of party participation for the British Labour Party between the years 1990 and 1999, Whiteley and Seyd find both a large reduction in the time volunteered for the party by the average member, and an increase in the number of inactive members. Such trends are also found in earlier panel surveys for the British Conservative Party (1992-1994) and the Labour Party (1990-1992).

This decline is attributed both to changes in the parties' *demand* for activists, a result of how technological changes altered party organization and electioneering, and changes in the *supply* of activist labour, a result of evolving incentives and perceptions of political ef-

fectiveness. Researchers who emphasize demand-side factors say that parties appear to have undergone a transformation from being *mass parties* (hereafter: MP), relying on large numbers of members to perform electioneering work, to becoming *electoral-professional parties* (henceforth: EP), relying instead on professional staff (e.g., pollsters, fundraisers, advertisers, etc.) to wage election campaigns (Panebianco, 1988; Kavanagh, 1995). At the root of this transformation is technological change, particularly the appearance of television campaigning and other means of mass communication. On the other hand, researchers who emphasize supply-side explanations, such as Scarrow (1996) and Whiteley and Seyd (2002), point out that despite technological changes, activist labour is now just as crucially needed for parties to win elections, as it still cannot be (perfectly) substituted for remunerated labour.[1] They nonetheless concede that demand may explain in part why incentives to participate have fallen so.

While the two explanations are resolutely empirically entwined (Norris, 2007), this essay's theoretical approach can assess the effect of a decline in activism on special-interest influence by explicitly disentangling demand- and supply-side explanations. It can therefore establish the role of both, either in isolation or jointly. A fall in the motivation of activists, following the transformation of parties from MP to EP, is thus found to increase special-interest influence. This result is of some importance, as the underlying mechanism is consistent with the most empirically-plausible explanations for declining activism.

This paper's detailed methodology and results are as follows. The analysis focuses exclusively on the electioneering use of party activists, and considers how parties relying on both activist labour and monetary contributions from a special-interest group choose equilibrium electoral policies. Electoral competition follows the lines of the spatial, unidimensional Downsian model (cf. Downs, 1957; Enelow and Hinich, 1984; Mueller, 2003), with two parties seeking to maximize votes. As in Baron (1994) and Grossman and Helpman (1996), voters are in part informed and in part uninformed, and electioneering resources are used to convince the latter portion of voters. Full turnout is assumed, so electioneering only matters here as far as *persuasion* is concerned. Parties are therefore constrained in their vote-maximizing behaviour by the resources amassed. Finally, activists are themselves endogenously recruited from the population of informed voters through the parties' policy choices.

In the game, the parties simultaneously move first by making their choice of policy, anticipating the special interest's contributions and the activist support that are conditioned

[1] "It is certainly the case that electioneering in constituencies now involves a wide range of labor-saving devices, including opinion polling, telephone canvassing, direct mail shots, and electronic mail communications. [...] Nevertheless, the role of local activists remains important, even in the case of the nationally targeted marginal constituency campaigns, *because their skills cannot be entirely purchased*." (Whiteley and Seyd, 2002, p. 32, emphasis added)

upon that choice. The special-interest group and activists simultaneously move second, having observed the policy platforms of both parties. The special interest decides how much to contribute to parties; activists individually decide whether to participate or not, for which party, and to what extent. Finally, the election is held, voters cast their ballots, and the game ends.

Parties offer differentiated platforms in equilibrium. These policy cleavages generally *persist* despite parties becoming less reliant upon activists, the result of a technological shift from perfectly-complementary to perfectly-substitutable electioneering inputs, deemed to correspond to the transition from MP to EP. It cannot be argued that an increase in special-interest influence necessarily results from a decrease in activism driven by demand-side factors alone. Neither can this be necessarily concluded from the influence of supply-side factors alone, in the case of the mass party. However, a decline caused by supply-side factors necessarily increases special-interest influence on policy in the case of the electoral-professional party. When a transition from MP to EP precedes, and potentially triggers, a decline in the motivation of activists, the decline in activism that results can therefore be argued to increase special-interest influence.

An increase in special-interest influence on policy is found to diminish procedural welfare, measured by a utilitarian criterion, by biasing further party platforms away from their symmetrically-located ideal points, and towards the special interest's bliss point. It can also potentially reduce utilitarian voter welfare based on policy outcomes, assuming parties fully commit to their platforms when elected. This occurs whenever the special-interest group is the greater distortion on electoral competition, relative to an unbiased benchmark – the other distortion being activists. If the special interest has an ideal policy that is more extreme than either of the equilibrium platforms offered by parties when relying only on activists, an increase in its influence then decreases voter welfare. From both a procedural and outcome-based welfarist view, a decline in high-intensity participation therefore increases the incentive to limit large monetary contributions to campaigns through the use of electoral financing laws.

In its consideration of party activism, the present paper draws particularly from the brief economic literature on the matter. With regard to the motivations underlying the activists' decisions, two articles by John Aldrich (Aldrich, 1983*a*,*b*) were particularly seminal in establishing a "calculus of participation", made to resemble Riker and Ordeshook's (1968) "calculus of voting". Those articles, as well as those of Poutvaara (2003) and Mueller (2007), find that activists cause policy cleavages between parties, whenever parties care about their motivation. The present paper's findings both mirror and strengthen these results, by showing that it holds even in the presence of a special-interest group, and as the participation of activists declines.

In contrast to some recent works in political economy centering on activism and emphasizing its effect on *turnout* (e.g., Mueller, 2007), this essay focuses on the effects of electioneering activities on *persuasion*. There has been a long-standing debate in political science on the effects of political campaigns and electioneering activities on turnout and persuasion. The conventional wisdom was that canvassing by activists in local ridings only affected turnout (and had a large effect on it, cf. Gerber, Green and Larimer, 2008; Green and Gerber, 2008), while having no effect whatsoever (or even a negative effect) on persuasion. This view has however recently been challenged by claims that differentiated local campaigns can be used to turn swing or target constituencies (Norris, 1997, as cited by Denver and Hands, 2002, p. 108). In such constituencies, both turnout *and* persuasion matter. Canvassing by volunteer party activists and hired resources can have a positive effect on both, through the use of new technologies and campaigning techniques.[2]

The paper's focus on activism also relates it to seminal works on the topics of individual behaviour within organizations, and collective action. The former topic is best epitomized by the work of Hirschman (1970). Due to the lack of co-ordination between individual activists, they have limited means of pressuring a party in yielding to their demands: their only paths of action are thus "voice" (i.e., expressing one's discontent while still remaining loyal to the organization) and "exit" (i.e., withholding the supply of one's labour to the party, or leaving the party altogether). Exit is however the only option formally modelled in this paper, as voice would require considering the policy-making activities of activists.

With regard to the topic of collective action, the current essay is indebted to the work of Olson (1965). It first described the failure of an organization to provide its members with a collective benefit due to free-riding, when participation is voluntary. Later works, particularly in political science (cf. Granik, 2005, for a survey of this literature), set about reconciling Olson's rational approach to voluntary participation in collective organizations with the high levels of participation observed in practice, which clash with the predicted extent of free-riding in such organizations. They build on the rational choice model of participation, but also include useful sociological and psychological aspects that it lacks. This yields the all-encompassing general incentives model of participation (Whiteley and Seyd, 2002, pp. 51-57), described therein. This paper also makes use of the behavioural political and economic literature on collective enterprises, and the view that agents exhibit a "collective rationality" best approximated by "calculating Kantian" behaviour (cf. Finkel, Muller and Opp, 1989;

[2]These include the use of personal computers in the production of professional-looking party leaflets and other literature at the local level, as well as the utilization of more detailed databases of swing voters, built in-between campaigns with the help of direct mail surveys and telephone canvassing. The latter two techniques are then employed during campaigns to persuade these swing voters to cast a ballot for the party in question (Denver and Hands, 2002).

Finkel and Muller, 1998; Bordignon, 1990, 1993).

Finally, the present essay is related and contributes to the literature on campaign financing and its regulation, which notably includes two works on electoral financing laws by Stephen Coate (Coate, 2004*a*,*b*).

The remainder of the paper is organized as follows. In Section 2, first the model is presented, which is to say the formal timing of the game, the motivations of each agents and their optimal choices, and the equilibrium definition. What follows is the determination of the electoral equilibrium for both electioneering technologies being considered, that is perfect complements and perfect substitutes. Section 3 then analyzes the change in the influence of the special-interest group as the participation of activists declines, both due to demand- and supply-side factors. Implications for welfare and policy close that section. Finally, Section 4 concludes.

2 The model

How the game of political competition plays out is considered first, before turning to the motivations and decisions of each type of agent.

2.1 Timing of the game

The timing of the game is as follows:

1. The two political parties simultaneously choose and announce platforms to the electorate and their contributors, anticipating the latter's donations to their electioneering activities.

2. Voters choose either to become activists for one of the parties, determining in the process the extent of their engagement, or to remain inactive. The special-interest group decides how much to contribute to each party.

3. The election is held and voters cast a ballot, either on the basis of observed policy platforms or of electioneering activities.

Since a subgame-perfect Nash equilibrium of this game (to be defined later) is found by backward induction, the precise objectives of voters are characterized first, followed by those of contributors, and finishing with those of parties.

2.2 The voters

Voters are denoted by subscript i, and are of mass V, which is normalized to $V = 1$. They have single-peaked preferences over policy, with their individually-preferred policy or "bliss point" being denoted by v_i. Policy is constrained over the policy space $X = [0, 1]$, and so is v_i for all i. As a simplifying assumption, the voters' bliss points are uniformly distributed over the policy space. The voters' heterogeneity in preferences can be interpreted broadly to represent different ideologies,[3] or more narrowly to mean preferences over a single policy variable. Their utility functions are given by:

$$U_i(x_P) = 1 - (x_P - v_i)^2 \tag{1}$$

where $x_P \in X$, $P \in \{L, R\}$ is the policy chosen (and eventually implemented should the election be won, assuming full commitment) by each of the two parties, labelled L and R to represent Left and Right. By assumption, there is full turnout: this simplifying assumption serves to focus on the persuasion effects, rather than the mobilization effects, of electioneering activities.

Voters differ in their access to information. Let $\iota \in (0, 1)$ denote the proportion of voters who are informed: they can fully observe the policies chosen by each party, and thus make an informed choice as to whom to vote for. Informed voters cast a ballot thus, where π_{iL} denotes the probability for voter i of voting for party L (i.e., $\pi_{iR} = 1 - \pi_{iL}$):

$$\begin{cases} U_i(x_L) > U_i(x_R) & \Longrightarrow \quad \pi_{iL} = 1 \\ U_i(x_L) = U_i(x_R) & \Longrightarrow \quad \pi_{iL} = 1/2 \\ U_i(x_L) < U_i(x_R) & \Longrightarrow \quad \pi_{iL} = 0 \end{cases}$$

The pivotal voter, among those who are informed, has bliss point $\hat{v}$, and is indifferent between both parties (i.e., votes for either with probability 1/2):

$$\begin{aligned} U_{\hat{v}}(x_L) &= U_{\hat{v}}(x_R) \\ \hat{v} &= \frac{x_L + x_R}{2} \end{aligned} \tag{2}$$

This corresponds to the midpoint between both parties' positions. Since voters are uniformly distributed (and both informed and uninformed voters are assumed to retain the distributional properties of voters as a whole), the proportion of informed votes received by party

[3] Characterized over some bundle of policies, under very strong aggregation assumptions, which in most cases do not hold.

L is $\hat{v}$ when $x_L \neq x_R$, since everyone with ideal point $v_i < \hat{v}$ is closer to the Left party's position. When party platforms converge, all informed voters have the same probability of voting for either party.

Proportion $1 - \iota$ of voters, on the other hand, cannot appreciate where the parties are located on the policy space. In the absence of persuasive influences coming from electioneering activities, their votes split equally between parties. In a manner similar to Baron (1994) and Grossman and Helpman (1996), some proportion of uninformed voters is ultimately swayed to vote for one party over the other by virtue of the electioneering activities of both. The proportion of uninformed votes received by party L can consequently be represented by the following reduced-form equation:

$$\frac{1}{2} + h \cdot (S_L - S_R) \in [0, 1] \tag{3}$$

where S_L and S_R denote the electioneering activities of each party, and $h > 0$ is an efficacy parameter.

2.3 The special-interest group

It is a widely-recognized fact that various organized groups try to sway political parties towards their desired policies by contributing to their campaigns. Political parties in turn rely on such contributions to wage them: they serve to fund electioneering activities. In the context of the model, there is only one special-interest group: this serves to focus attention on its (correspondingly-strong) influence. To analyze the question of its influence and actions, one must start by specifying its objective function.

The special interest's utility is unimodal in s. Both parties are assumed to be aware of the special interest's bliss point and full optimization problem, and hence are deemed to be able to anticipate how its contributions will depend on their platforms in relation to s.

The special-interest group has here primarily an electoral motive: it seeks to bring to power the party whose platform is closest to its bliss point. Its objective function is to maximize a form of subjective expected utility that depends upon its expectations of seeing a platform adopted by the winning party, once in office. A specific function, the proportion of votes received by each party, is chosen to represent the special interest's subjective probability of each party winning the election *and* implementing its policy platform. *Ceteris paribus*, it is continuous and monotonically increasing in the contributions promised by the special interest to one given party. That the function is smoothly increasing in the proportion of votes received, rather than discontinuous like the true probability of election (which takes values 0, 1/2, or 1), could denote the special interest's perception of the legislative hurdles

to implementing certain policies.

This subjective expected utility also depends on the distance between the chosen policy platforms relative to s, net of the costs of contributions. These are assumed to have strictly convex (quadratic) utility costs. The special interest's objective function and problem is then given by:

$$\max_{C_L, C_R \geq 0} E(U_s(x)) = \Pi_L U_s(x_L) + \Pi_R U_s(x_R) - \frac{1}{2}\left(C_L^2 + C_R^2\right)$$

where:

$$U_s(x_P) = 1 - (x_P - s)^2$$

In equilibrium, it will therefore only contribute a positive amount to at most one party, if any: that is, to the party whose platform is closest to s. This is consistent with empirical observations, such as the findings of Poole and Romer (1985).

2.4 The activists

2.4.1 The general incentives model

In their consideration of activist decision-making, Whiteley and Seyd (2002) make use of the general incentives model of high-intensity participation, a synthesis of the rational choice and social-psychological approaches for explaining participation in collective organizations. This model first includes *policy goals* as an incentive to participate. These are classified as "collective goods" due to the propensity of inactive members and party supporters at large to benefit from the monetary and psychic gains that result from the adoption of the desired policies. These policy goals as incentives for participation are either mitigated or exacerbated by perceptions of *political efficacy*: the extent to which one's participation is perceived to influence the outcome of the election, and the adoption of one policy platform over another.

Intrinsic benefits, or *selective incentives*, are also included in the general incentives model to motivate activist participation. They fall into three categories: 1) *process incentives*, which are derived from the process of participation itself, either a) through the enjoyment of politics for its own sake or b) through meeting similar people; 2) *ideological incentives*: it can generally be claimed that ideological radicalism increases active political involvement; and finally, 3) *outcome incentives*: whereby one achieves some personal and professional advancement, for instance by becoming a member of parliament or a high-ranking party official.[4] Also included are *perceptions of costs*, especially the opportunity cost of the time spent volunteering.[5]

[4]Due to the model's static character, thereby restricting the very possibility of outcome incentives to rationally motivate participation, the focus will be on the former two.

[5]Group incentives, expressive incentives, and social norms (Seyd and Whiteley, 2002, p. 106) are other

Whiteley and Seyd note that nearly all types of incentives included in the general incentives model have evolved over time, in survey data, in a way that would imply a decrease in participation. This is most notable with respect to selective incentives and, most interestingly, with *perceptions of political efficacy*.

In what follows, activism is modelled in a way that goes beyond the rational choice approach, by making use of general incentives model and notions of collective rationality. This is specifically done by including process incentives and a different notion of perceived political efficacy, based on calculating Kantian behaviour.

2.4.2 Optimization decisions: becoming an activist and exerting effort

Only informed voters may here become activists. Each informed voter therefore either becomes an activist for a *single* party, or stays put. Active members then decide how much effort to exert, that is to say how much time to spend volunteering for their chosen party.

In consequence, someone who does not have marked preferences for one party over the other is unlikely to become active in either. One should therefore expect to find in this context, i.e. in the absence of alienation at the ends of the policy space, at *most* three well-defined intervals of the policy space over which the informed voters are (going from left to right) either active for party L, inactive, or active for party R. As in the population, party activism would be the preserve of the more intensely-motivated informed voters: those who are more radical with respect to certain policy goals, and who also have more to gain in terms of social interaction benefits, conditionally on the party members not being too diverse in their opinions and other characteristics. This is illustrated in the figure below.

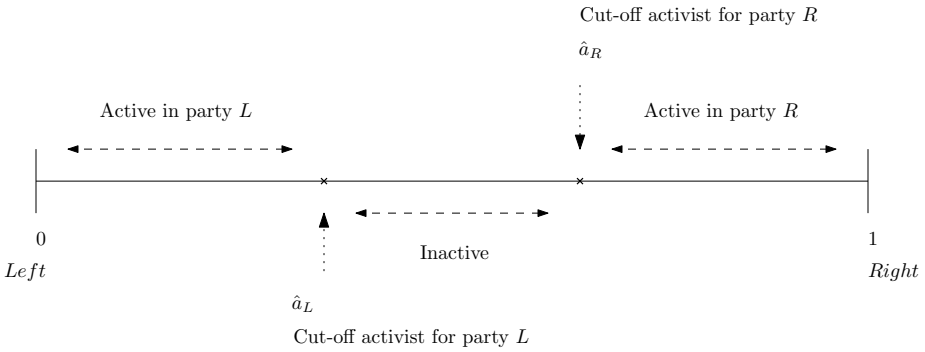


Figure 1: Possible ranges of activists for both parties, drawn from the informed voters' ideal points over the policy space $X = [0, 1]$

As for the effort choice problem, it can be modelled as the following (globally concave)

considerations included in the general incentives model, but that do not enter this essay's analysis.

optimization problem, expressed here for an activist in party L:

$$\max_{e_{jL}} EU_j(e_{jL}) = p(e_{jL})U_j(x_L) + (1 - p(e_{jL}))U_j(x_R) + \nu(e_{jL}) - c(e_{jL}) \tag{4}$$

where $p(e_{jL})$ ($p' > 0$, $p'' \leq 0; \forall e_{jL} \geq 0$) is a measure of *perceived* effectiveness in influencing the outcome of the election – a measure of *political efficacy*; $\nu(e_{jL})$ ($\nu' > 0, \nu'' \leq 0; \forall e_{jL} \geq 0;$) are the intrinsic benefits from participation – the *process incentives* – that do not depend on policy; and $c(e_{jL})$ ($c' > 0, c'' > 0$; strictly convex in effort) are the *opportunity costs* of time spent volunteering for the party. Utility U_j is still single-peaked as it corresponds to the preferences over policy of an informed voter. This serves to include *policy goals* as an incentive for participation.

2.4.3 Perceived political efficacy and policy goals

Just like the act of voting, the decision to actively participate in politics is part of a collective process. This leads to a *decoupling* between the act of casting a ballot or participating actively in party politics, and influencing the outcome of the election, for the link between individual means and desired ends is then conditional on the actions of others. Any *instrumental* motivation for political participation is thus undermined, due to the ineffectualness of individual actions in a collective setting (Aldrich, 1997). This is at the root of the "paradox of participation", just as it concerns the "paradox of voting". This paradox can be avoided by finding non-instrumental motives for participation, for instance *expressive* motivations (cf. Fiorina 1976; Brennan and Hamlin 2000; Schuessler 2000; and recently Poutvaara, 2003 for activism). Alternatively, it can be sidestepped by emphasizing either the role of intrinsic benefits of participation, or of perceptions of political efficacy that depend upon a notion of *collective* rationality, or both. The focus here is on the latter, which means that the choice of the function $p(\cdot)$ needs to be clarified and justified.

Active party members tend to take collective achievements in stride, and are motivated by a belief that they can influence politics. They tend to conflate their actions and influence with the group's, a phenomenon deemed to correspond to some "collective rationality" or "calculating Kantian" behaviour: "Belief in either a strategic unity principle or in a moral duty to participate may lead individuals to calculate their expected benefits based on the likelihood of *group* success." (Finkel, Muller and Opp, 1989, p. 886, original emphasis)

This calculating Kantian behaviour[6] implies that activists behave in the way that they

[6]The model's calculating Kantian character differs from the most recent literature on Kantian motives, characterized for instance by the work of Roemer (2010). A Kantian equilibrium is there defined as an allocation of "contributions" such that *no* player would like *all* players to modify their contributions by some identical *multiplicative factor*.

would like – and believe – others to behave in. This behavioural assumption, while strong, is also made in other contexts where observed behaviour is not well explained by selfishly-rational individuals, such as voluntary contributions to public goods (e.g., Bordignon, 1990, asks if Kantian behaviour might lead to optimal levels of voluntary provision) or income tax evasion (Bordignon, 1993; Boadway, Marceau and Mongrain, 2007). When such Kantian behaviour is posited, free-riding reduces to a secondary concern. Precisely, the assumption here is that the behaviour of activists follows Bordignon's (1990) first Kantian rule:

> ... "provide the absolute amount of contribution that you would like everyone else to provide" [, which] is equivalent to the statement "select an amount of contribution on the basis of the hypothesis that everybody else will provide what you decide to provide".
>
> (p. 346)

This amounts to projecting one's policy preferences onto others, and choosing e_{kP} for all other party members accordingly. This is identical to choosing e_{jP} on the basis that all others do too, i.e. $e_{jP} = e_{kP}\ \forall k \neq j$. It is in turn equivalent to having $p(\cdot)$ only be a function of e_{jP}.

For a Left-party activist, the first-order necessary and sufficient condition for a maximum is the following:

$$p'(e^{\star}_{jL})\left(U_j(x_L) - U_j(x_R)\right) + \nu'(e^{\star}_{jL}) = c'(e^{\star}_{jL}) \tag{5}$$

Expressed verbally, this expression means that an activist increases his effort contribution to the party until the marginal benefit of contributing more (the left-hand side of equation 5, the sum of the marginal expected benefits from policy goals and process incentives), equals the marginal cost of doing so (the right-hand side of the same equation).

By setting $e^{\star}_{jL} = 0$, the pivotal activist for party L (with preferences over policy denoted by $\hat{a}_L$) can be determined from the above equation. This is equivalent to determining a participation condition, where $c(0)$ is the cost of entry incurred by a potential activist.[7]

$$\hat{a}_L \;=\; \hat{v} + \frac{1}{2}\left(\frac{c'(0) - \nu'(0)}{p'(0)\cdot(x_L - x_R)}\right), \forall x_L \neq x_R \tag{6}$$

As long as the marginal cost of effort at zero exceeds the marginal intrinsic benefit at zero (and for all $x_L < x_R$), the cut-off activist for party L is to the *left* of the pivotal (informed) voter $\hat{v}$, as the second term of equation 6 is then *negative*.

For simplicity, assume that $p'\left(e_{jL}\right) = p\ \forall e_{jL} \geq 0$ (i.e., the perception of political efficacy involves a constant marginal product of effort), and the following functional forms for intrinsic

[7] Formally speaking, the first-order condition for a maximum when $e^{\star}_j = 0$ is: $p'(e^{\star}_j)\left(U_j(x_L) - U_j(x_R)\right) + \nu'(e^{\star}_j) \leq c'(e^{\star}_j)$. Hence, the solution is: $\hat{a}_L \geq (1/2)(x_L + x_R) + (1/2)((c'(0) - \nu'(0))/p'(0)\cdot(x_L - x_R))\forall x_L \neq x_R$, since $x_L - x_R < 0$. Without loss of generality, the focus is on the lower bound of the inequality.

benefits and costs of effort: $\nu(e_{jL}) = \nu \cdot e_{jL}, \nu > 0$ (i.e., similarly for the process incentives exhibiting constant marginal benefits), and $c(e_{jL}) = c \cdot (1 + e_{jL} + e_{jL}^2/2), c > 0$ (i.e., costs being convex in effort). Then, $e_{jL}^\star$ can be expressed explicitly as:

$$e_{jL}^\star = \frac{p\left(U_j\left(x_L\right) - U_j\left(x_R\right)\right) + \nu - c}{c}$$

Furthermore, assume (again for tractability[8]) that $c = \nu$: the cost of entry just equals the marginal intrinsic benefit of participation. The optimal choice of effort on the part of party L activists then reduces to:

$$e_{jL}^\star = \kappa\left(U_j(x_L) - U_j(x_R)\right)$$

where $\kappa \equiv p/c$, the ratio of the marginal measure of effectiveness to the marginal cost at zero effort; the term between parentheses is the difference in utility between the parties' platforms. Meanwhile, due to the assumption that the cost of entry, $c(0) = c > 0$, is equal to the marginal intrinsic benefit from participation, ν, the cut-off activist reduces to the pivotal informed voter:

$$\hat{a}_L = \hat{v} = \frac{x_L + x_R}{2}$$

This is indubitably too strong a participation criterion to be plausible in strict empirical terms, a result driven by the simplifying assumption $c = \nu$: it overstates the level of activist involvement among the population of informed voters, and includes more policy moderates (i.e., voters whose bliss points are closer to the midpoint of policy space X) than would be the case for $c > \nu$. A caveat of this simple form is therefore that it lessens the distortion caused by activists on equilibrium party platforms.

The marginal activist for party L *is not* exerting *any* effort (i.e., $\hat{e}_L^\star = 0$), yet everyone else but him is. Graphically, this could be seen in Figure 1 on page 10, where the range of inactive informed voters would now have disappeared save for the pivotal informed voter.

Repeating the steps above for party R yields:

$$\hat{a}_R = \frac{x_L + x_R}{2}$$

[8]Complications in finding a closed-form solution emerge whenever $(x_L - x_R)$ appears in the denominator of $\hat{a}_L$, justifying this simplification.

Aggregate activist labour supplies for both parties are in turn given by:

$$A_L = \iota \cdot \int_0^{\hat{a}_L} e_L^\star(a_j)\, da_j = \iota\kappa \left(\frac{1}{2}(x_L + x_R)\right)^2 (x_R - x_L) \tag{7}$$

$$A_R = \iota \cdot \int_{\hat{a}_R}^1 e_R^\star(a_j)\, da_j = \iota\kappa \left(1 - \frac{1}{2}(x_L + x_R)\right)^2 (x_R - x_L) \tag{8}$$

Only informed voters may become activists, which is why the total effort exerted by activists for either party (the sum of individual activists' effort over the full distribution of policy preferences, represented here by an integral) is preceded by ι, the proportion of informed voters. As to the bounds of integration, they represent the bounds of the distribution of informed voters and the cut-off activist for each party.

2.5 The parties

As stated earlier, there are two parties, labelled by L to denote the Left party, and R to denote the Right party. Both parties are (constrained) vote maximizers, in accordance with what the literature on electoral competition usually assumes.[9] That is, they simultaneously choose their policy platforms, given the distribution of the electorate's preferences (known to both parties), and subject to expected electioneering resources (theirs and the other party's), so as to garner the most votes from informed and uninformed voters. Uninformed voters are persuaded through electioneering activities; waging them requires parties to amass contributions through their choice of platform. Informed voters are swayed directly through policy choice. The simultaneity of platform choices implies that the other party's platform is taken as given. Furthermore, while the special interest's contribution schedules to both parties are common knowledge, each party is assumed to only know its own membership, and hence to only be able to anticipate its own activist labour supply.

The proportion of votes received by party L is then given by:[10]

$$\Pi_L = \iota \left(\frac{x_L + x_R}{2}\right) + (1 - \iota)\left(\frac{1}{2} + h \cdot (S_L - S_R)\right) \tag{9}$$

[9] For a discussion of other objectives that might be motivating parties, refer for instance to Strom (1990). To see how strategies optimally chosen by parties may not generally coincide when they maximize expected vote share and the probability of victory, refer for instance to Peter H. Aranson, Melvin J. Hinich and Peter C. Ordeshook (1974) or more recently to Patty (2007).

[10] Conversely, the Right party receives proportion $\Pi_R = 1 - \Pi_L$.

where:

$$\begin{aligned} S_L &= S(C_L,\ A_L) \\ S_R &= S(C_R,\ A_R) \end{aligned}$$

To summarize, party L's problem would therefore be to choose x_L, anticipating $C_L,\ C_R,\ A_R$ and taking x_R and A_R as given, so as to maximize the above function.

The technologies underpinning electioneering activity constraints (and production functions) S_L and S_R are considered next, in light of the transition from MP to EP.

2.6 Party demand for activists and electioneering technology

The basis of a decline in the demand for activists is not that they are now ineffective (cf. Scarrow, 1996; Whiteley and Seyd, 2002), or even less effective than modern market-bought means of communication and persuasion, such as television campaigning. This is buttressed by evidence from Denver and Hands (2002) regarding telephone canvassing and the increased professionalism of local party literature. Butler and Ranney (1992) also put forward the parties' systematic reliance on telephone canvassing performed by activists as the best example of the continued importance and efficacy of volunteer labour.

Rather, the decline in the parties' demand for activists is attributed to the arrival of market-bought electioneering inputs, chiefly through the appearance and use of television campaigning (and other forms of mass communication) as a means of persuasion. This has resulted in an increased degree of substitutability between volunteer activists and monetary donations, as particularly emphasized by Ware (1987) and Panebianco (1988), as well as corroborated by later works in political science (cf. e.g., Butler and Ranney, 1992; Norris, 2002). Parties, which were formerly constrained in relying chiefly on activists, could now dispense from using them to a greater extent than before, as long as their budgetary constraints allowed them to do so. Evidence of this technological change's impact can be found in how parties are organized, which affects how they wage election campaigns, and vice versa. Parties thus went from being chiefly *mass-membership organizations* relying extensively on activists (Duverger, 1963), with a "stress on ideology, [and the] central role of the believers within the organization" (Panebianco, 1988, p. 264), to becoming *electoral-professional* organizations potentially relying a lot more on market-bought electioneering inputs, and "financing through interest groups and public funds" (*ibid*, p. 264).

On the basis of this depiction of mass and electoral-professional parties, the mass party is modelled here by setting a minimum reliance on activists, jointly with requiring a perfect complementarity between non-market and market-bought inputs once this reliance is

met. In contrast, the electoral-professional party is approximated by perfectly-substitutable electioneering inputs.

The equilibrium is considered next: first its formal definition, then its derivation.

2.7 Subgame-perfect Nash equilibrium: definition

Definition 1. The subgame-perfect Nash equilibrium of this game is defined as a set of policy platforms, $\{x_L^\star, x_R^\star \mid x_L^\star \leq x_R^\star\}$; individual choices of effort for activists of both parties, $\{e_{jL}^\star, e_{jR}^\star\}\forall j$; and a set of policy-contingent contributions by the special interest to each party, $\{C_L^\star, C_R^\star\}$, such that:

- each party's chosen platform maximizes votes given the other party's chosen platform, subject to the optimal contribution made by the special interest to that party and the resources optimally provided by the party's own activists;
- similarly, the special interest's contributions maximize its net expected utility, given the parties' optimal choice of policies;
- the activists' choice of effort maximizes their expected utility, given the parties' optimal choice of policies;
- informed voters cast a ballot for the party whose policy platform maximizes their utility, with uninformed voters splitting according to the electioneering resources deployed by both parties.

The symmetry of the parties' optimization problems, and their lack of ideology, justifies the focus without loss of generality on equilibria satisfying $x_L^\star \leq x_R^\star$. All other equilibria simply involve a change in party labels, and are thus equivalent.

2.8 Equilibrium in the presence of *mass parties*: perfect complements with a dependence upon activists

Considered first is the case of the mass party, approximated by an electioneering technology exhibiting a perfect complementarity between non-market and market-bought inputs, coupled with a minimum requirement for activist support before which monetary contributions are not sought out. This case is thus, by construction, one where parties rely extensively upon activists so that the demand for non-market inputs is strong. This dependence upon activists, coupled with the participation of activists being reliant on platform differentiation between

parties, will imply that policy cleavages exist in equilibrium, as they do in most models where activists are present.

To solve for the subgame-perfect Nash equilibrium of this game, one proceeds by backward induction. The voters and the activists' problems are as solved earlier. The special interest's and the parties' optimization problems, meanwhile, reflect the presence of the electioneering technology, which affects vote share. Deviating from the reverse order of play and turning first to parties, party L's optimization problem can be written so:

$$\max_{x_L} |_{x_R, A_R} \Pi_L = \iota \left(\frac{x_L + x_R}{2} \right) + (1 - \iota) \cdot \left(\frac{1}{2} + h \cdot (S_L - S_R) \right)$$

subject to:

$$\begin{aligned} S_L &= \min \{C_L + \beta_L, A_L\}, \beta_L > 0 \\ S_R &= \min \{C_R + \beta_R, A_R\}, \beta_R > 0 \end{aligned}$$

The parameter β_P represents a party's dependency on activist labour: the higher it is, the more activist labour matters for electioneering activities. This can be thought to capture asymmetries between Labour/Social-democratic parties and Conservative parties in their relationship with activist labour.

Here, the common-rationality assumption is that each party believes the other to be using its resources efficiently, and thus seeks to do the same. This is possible to the extent that it can predict what contributions its opponent will receive from the special-interest group, in conjunction with the assumption that parties are in the same technological paradigm, and therefore know the other's production function. Hence, it justifies the inclusion of both parties' electioneering production functions as constraints in one's optimization problem. Algebraically, this means that party L will want to set $C_L + \beta_L \geq A_L$ in order to (just, when the constraint binds) achieve productive efficiency, while also including the constraint $C_R + \beta_R \geq A_R$ in the problem (with only C_R and β_R being known). Note that parties' constraints also reflect their primary concern with attracting non-market inputs: the right-hand side is where the parties are potentially constrained, while monetary donations could be freely disposed of, if there is some slackness. The Left party's problem can be rewritten as:

$$\max_{x_L} |_{x_R, A_R} \Pi_L = \iota \left(\frac{x_L + x_R}{2} \right) + (1 - \iota) \cdot \left(\frac{1}{2} + h \cdot (C_L - C_R) \right)$$

subject to:

$$\begin{aligned} C_L &\geq A_L - \beta_L \\ C_R &\geq A_R - \beta_R \end{aligned}$$

The constraints $C_L \geq A_L - \beta_L$ and $C_R \geq A_R - \beta_R$, which are binding in equilibrium (see below and footnote 11), give an idea of how well factors are matched. Let ϕ_L be the multiplier on the former constraint (with ϕ_R being the multiplier on the latter), such that the more binding is this constraint (i.e., the greater the marginal benefit in terms of vote share of lowering a party's dependence on activists, by lowering β_P), the more positive is ϕ_L.

The special interest's problem must also take into account the production technology, to the extent that it determines vote share. It is thus given by:

$$\max_{C_L, C_R} E(U_s) = \Pi_L \cdot (1 - (s - x_L)^2) + \Pi_R \cdot \left(1 - (s - x_R)^2\right) - \frac{1}{2}(C_L^2 + C_R^2)$$

subject to:

$$\begin{aligned} C_L &\geq 0 \\ C_R &\geq 0 \\ C_L &= A_L - \beta_L \\ C_R &= A_R - \beta_R \end{aligned}$$

with $\theta_L,\ \theta_R$ being the multipliers on the positivity constraints, and ϕ_L and ϕ_R again being the multipliers on the complementarity constraints.[11] This a concave objective function subject to linear constraints: it reaches a constrained global maximum. The optimal contribution schedules are therefore characterized by:

$$\begin{aligned} C_L^\star(x_L, x_R) &= 2h(1-\iota)(x_R - x_L)\left(\frac{x_R + x_L}{2} - s\right) + \theta_L^\star - \phi_L^\star \geq 0 \qquad (10) \\ &\quad \theta_L^\star,\ \phi_L^\star \geq 0 \\ C_R^\star(x_L, x_R) &= 2h(1-\iota)(x_R - x_L)\left(s - \frac{x_R + x_L}{2}\right) + \theta_R^\star - \phi_R^\star \geq 0 \qquad (11) \\ &\quad \theta_R^\star,\ \phi_R^\star \geq 0 \end{aligned}$$

Using these along with each party's respective activist support, taking the other's as given, and solving both parties' optimization problems for an interior solution yields the following

[11] The inclusion of the multipliers on complementarity constraints ensures that the special interest's contributions are not made in excess of what parties can use efficiently.

best-response (or reaction) functions. The reaction function for party L is:

$$4h^2(1-\iota)^2(s-x_L^\star) - 2h(\phi_L^\star - \phi_R^\star)(1-\iota)(s-x_L^\star) + \frac{1}{4}\iota(2-\kappa\phi_L^\star(3x_L^\star - x_R)(x_L^\star + x_R)) = 0 \quad (12)$$

while the reaction function for party R can be expressed as:

$$4h^2(1-\iota)^2(s-x_R^\star) + 2h(\phi_L^\star - \phi_R^\star)(1-\iota)(s-x_R^\star) - \frac{1}{4}\iota(2-\kappa\phi_R^\star((3x_R^\star - x_L)(x_R^\star + x_L) - 4(2x_R^\star - 1))) = 0 \quad (13)$$

The parties' problems consist of a concave objective function, subject to convex constraints: they both reach constrained global maxima.[12] Yet there are no general closed-form solutions for $x_L^\star$ and $x_R^\star$ from the above reaction functions. That is, without restricting s to take certain values, $x_L^\star(s)$ and $x_R^\star(s)$ cannot be found. However, since it is known that, by construction, this technological extreme must satisfy certain characteristics, one can still describe the possible equilibria for different values of s. The following propositions and corollaries summarize the findings that: 1) party platforms do not converge – by construction – for any *efficient* use of electioneering resources; and 2) equilibria may be either symmetric or asymmetric about s, conditional on symmetries or asymmetries in the parties' dependencies on activists, captured by β_P, and on the value of s.

Proposition 1. *There does not exist any equilibrium where party platforms* converge *(i.e. $x_L^\star = x_R^\star$), and which is characterized by an* efficient use *of electioneering resources by both parties, whenever electioneering inputs are perfect complements and $\beta_L, \beta_R > 0$.*

Proof. Suppose not. That is, consider any candidate for a converging equilibrium of the form $x_L^\star = x_R^\star$, $\forall s$, and assume at the outset that it is efficient. Since parties are equidistant to the special interest's position, they both receive zero contributions from it. Since their platforms are undifferentiated, they also fail to garner any support from activists. Together, these results imply that any such candidate fails to satisfy the conditions for the efficient use

[12] The second-order condition for the constraints of both parties' problems to be strictly convex yields a restriction on h:

$$h > \max\left\{\frac{\iota\kappa}{(1-\iota)}\left(1 - \frac{1}{4}(3x_R^\star + x_L)\right), \frac{\iota\kappa}{4(1-\iota)}(3x_L^\star + x_R)\right\}$$

of electioneering resources for all $\beta_L, \beta_R > 0$, namely:

$$\begin{aligned} C_L^\star + \beta_L &\neq A_L^\star \\ C_R^\star + \beta_R &\neq A_R^\star \end{aligned}$$

whenever $C_L^\star = C_R^\star = A_L^\star = A_R^\star = 0$. This yields a contradiction with the initial assumption of efficiency, which proves the above proposition.

Proposition 2. *When electioneering inputs are perfectly complementary, there exists a symmetric equilibrium where party policy platforms are characterized by* $x_L^\star = 1 - x_R^\star$. *For different values of* s, *it gives:*

$$\begin{cases} \{x_L^\star = 1 - s,\, x_R^\star = s\} & \forall\, s \in \left(\frac{1}{2}, \frac{3}{4}\right) \\ \{x_L^\star = s,\, x_R^\star = 1 - s\} & \forall\, s \in \left(\frac{1}{4}, \frac{1}{2}\right) \end{cases}$$

while the case where $s = 1/2$ *is characterized by:*

$$\left\{ x_L^\star = \frac{1}{2} - \frac{\iota\kappa\phi^\star - 2\iota}{16h^2\left(1-\iota\right)^2 + 4\iota\kappa\phi^\star},\, x_R^\star = \frac{1}{2} + \frac{\iota\kappa\phi^\star - 2\iota}{16h^2\left(1-\iota\right)^2 + 4\iota\kappa\phi^\star} \right\}$$

with $\phi^\star \geq 2/\kappa$.

Proof. See Appendix A.1 on page 39.

Corollary 1. *In the presence of perfectly-complementary inputs, and for* $s \in [0, 1/4] \cup [3/4, 1]$, *party platforms* must be asymmetric *about each other and the policy space in equilibrium.*

Comparative statics

Having characterized equilibria with perfectly-complementary electioneering inputs, and having found that the efficient use of resources requires policy platforms to diverge in equilibrium, comparative statics are considered next. These are *partial* comparative statics in the sense that they represent how each party's reaction function shifts *locally* in the (x_L, x_R)-space when one parameter varies, keeping everything else constant, including the multipliers on the factor-matching constraints that would need to re-adjust in equilibrium. However, these comparative statics with respect to s are the relevant measure of influence to consider. Indeed, while strategic interactions between parties will change the equilibrium platforms thereafter, the initial shift in reaction functions is the true measure of the special interest's *direct* influence.

The first proposition, below, establishes the slope of each party's reaction function in the (x_L, x_R)-space. The second proposition establishes how each reaction function shifts when

there is a change in s.

Proposition 3. *An out-of-equilibrium move by one party causes the other party to move* in the same direction*, i.e.,*

$$\frac{\partial x_L^\star}{\partial x_R} > 0, \frac{\partial x_R^\star}{\partial x_L} > 0$$

as long as $x_L \leq x_R$ *, and* $(\phi_L^\star - \phi_R^\star)$ *takes intermediate values.*

Proof. See Appendix A.2 on page 40.

In other words, both parties' reaction functions are locally upwards-sloping at the equilibrium point: each one optimally reacts to an out-of-equilibrium move by the other party's platform by moving in the same direction, this for intermediate values of $(\phi_L^\star - \phi_R^\star)$.

Consider for instance party R moving out-of-equilibrium to the *right* of the policy space. For party L to respond by moving to the *right*, it must be that the gain in informed votes at least outweighs any loss in uninformed votes arising from a loss of electioneering resources. In the contrary case, where party R moves out of equilibrium to the *left* of the policy space, the reverse must be true: the gain in electioneering resources and hence uninformed votes must at least outweigh the loss in informed votes for party L. Both just hold, because along a party's reaction function, the chosen platform is optimal given the other party's choice: the marginal benefits and costs in terms of informed and uninformed votes are therefore equalized. The same logic holds for out-of-equilibrium moves by party L in either direction.

Also, the difference between the multipliers can be interpreted to mean that *both parties'* resource constraints are similarly binding, which implies that they have similar levels of dependence on activist support. Negative values of $(\phi_L^\star - \phi_R^\star)$ imply that party R's resource constraint is more binding than party L's, and reciprocally for positive values of $(\phi_L^\star - \phi_R^\star)$.

Proposition 4. *A change in the special interest's position may cause parties to locally shift their best-response functions either away or towards the special interest's platform, taking the other party's platform as given. This result hinges on the parties' relative dependence on activist support. This can be represented graphically:*

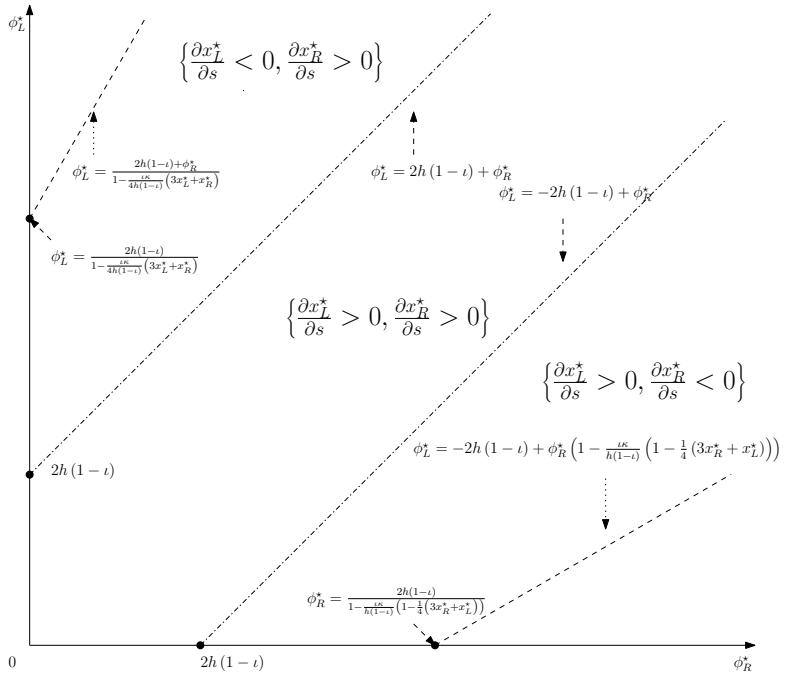


Figure 2: Comparative statics with respect to the special interest's position, in the $(\phi_R^\star, \phi_L^\star)$-space, when inputs are perfectly complementary

Proof. See Appendix A.3 on page 41.

When $|\phi_L^\star - \phi_R^\star| \geq 2h\left(1-\iota\right)$, a change in s causes *only one* of the two parties to locally shift its best-response function in the same direction as s. Precisely, whenever the above threshold holds with equality, then one of the parties' reaction function is left unchanged. Furthermore, whenever it holds with strict inequality, one of the parties' best-response function shifts in the direction *opposite* to the change in the special interest's position. This is in sharp contrast to the other party's reaction function, which then shifts in the same direction as the special interest.

This result is dictated by how electioneering resources are being used by both parties: whether a party's resource constraint is more or less binding relative to the other party's. For instance, the more binding is party L's resource constraint relative to party R's (that is, $(\phi_L^\star - \phi_R^\star) \geq 2h\left(1-\iota\right)$), then party L's reaction function does *not* shift in the same direction as s. This denotes the greater dependence of party L on activist labour, compared with party R. For L, moving towards the special interest's position given any choice of platform for R thus makes no sense: it would not be able to put (supplementary) monetary contributions to good use. This is obviously not the case for party R: its reaction function shifts in the direction of the special interest's move, for it is less dependent upon activist labour and more able to match (supplementary) monetary contributions. The same reasoning applies for the case when $(\phi_L^\star - \phi_R^\star) \leq -2h\left(1-\iota\right)$, only with the party labels being reversed.

Whenever $(\phi_L^\star - \phi_R^\star)$ takes median values, it means that the parties' resource constraints are similarly binding (such that both parties rely similarly on activist labour, and are thus both susceptible to courting the special interest for gaining an edge over each other). Both parties' reaction functions then shift in the same direction as a result of a change in the special interest's position.

2.9 Equilibrium in the presence of *electoral-professional parties*: perfectly-substitutable electioneering inputs

Considered next is the case of the electoral-professional party. It is a simpler problem than for the mass party, due to it being approximated by perfectly-substitutable electioneering inputs.

Party L's problem is now given by:

$$\max_{x_L} |_{x_R, A_R} \Pi_L = \iota \left(\frac{x_L + x_R}{2} \right) + (1 - \iota) \cdot \left(\frac{1}{2} + h \cdot (S_L - S_R) \right)$$

subject to

$$\begin{aligned} S_L &= A_L + C_L \\ S_R &= A_R + C_R \end{aligned}$$

Note that there are, by assumption, no diminishing returns to either input.

With perfectly-substitutable inputs, the optimal contributions offered by the special interest are now given by:

$$C_L^\star (x_L, x_R) = 2h (1 - \iota) (x_R - x_L) \left(\frac{x_R + x_L}{2} - s \right) + \theta_L^\star \geq 0 \tag{14}$$

$$C_R^\star (x_L, x_R) = 2h (1 - \iota) (x_R - x_L) \left(s - \frac{x_R + x_L}{2} \right) + \theta_R^\star \geq 0 \tag{15}$$

where $\theta_L^\star$ and $\theta_R^\star$ are the respective optimal values of the multipliers on positivity constraints concerning the special interest's choice of $C_P \; \forall P$.

The objective functions of both parties now being globally concave,[13] there exists a unique global maximum. Solving this problem for an interior solution yields the following best-

[13]The second derivative of party L's objective function with respect to x_L is given by:

$$\frac{\partial^2 \Pi_L}{\partial x_L^2} = -4h (1 - \iota) \left(\frac{1}{8} \kappa \iota (3x_L + x_R) + h (1 - \iota) \right) < 0$$

response functions. Party L's reaction function is:

$$4h^2(1-\iota)^2(s-x_L^\star) - \frac{1}{4}h\iota\kappa(1-\iota)(3x_L^\star - x_R)(x_L^\star + x_R) + \frac{1}{2}\iota = 0 \tag{16}$$

while the reaction function for the Right party is given by:

$$4h^2(1-\iota)^2(s-x_R^\star) + \frac{1}{4}h\iota\kappa(1-\iota)((3x_R^\star - x_L)(x_L + x_R^\star) - 4(2x_R^\star - 1)) - \frac{1}{2}\iota = 0 \tag{17}$$

Once again, there are no closed-form solutions to this system of equations, for $x_L^\star$ and $x_R^\star$ as functions of s.

Nevertheless, it can be shown that party platforms do *not* generally converge in equilibrium, and it is still possible to perform comparative statics using each party's reaction function. It is also possible to characterize some solutions explicitly by imposing a symmetric equilibrium candidate, and otherwise compute numerical approximations of equilibrium platforms for various values of s.

The following proposition establishes the existence of a symmetric equilibrium where $s = 1/2$, and provides a proof that it cannot be so for $s \neq 1/2$, which can be found in the Appendix.

Proposition 5. *For a symmetric equilibrium to exist, the special interest's position needs to coincide with the median voter's, that is* $s = 1/2$. *There* cannot *be a symmetric equilibrium whenever* $s \neq 1/2$.

Being equidistant from the special interest's position, both parties receive zero contributions. This yields the following equilibrium platforms:

$$\begin{aligned} x_L^\star &= \frac{1}{2} - \frac{h\iota\kappa(1-\iota) - 2\iota}{4h(1-\iota)(4h(1-\iota) + \iota\kappa)} \\ x_R^\star &= \frac{1}{2} + \frac{h\iota\kappa(1-\iota) - 2\iota}{4h(1-\iota)(4h(1-\iota) + \iota\kappa)} \end{aligned}$$

This equilibrium is also fully characterized by:

$$\begin{aligned} &C_L^\star = C_R^\star = 0 \\ &A_L^\star = A_R^\star = \iota\kappa\left(\frac{1}{2}\right)^2\left(\frac{h\iota\kappa(1-\iota) - 2\iota}{2h(1-\iota)(4h(1-\iota) + \iota\kappa)}\right) \geq 0 \\ &\Pi_L^\star = \Pi_R^\star = \frac{1}{2} \end{aligned}$$

Proof. See Appendix A.4 on page 42.

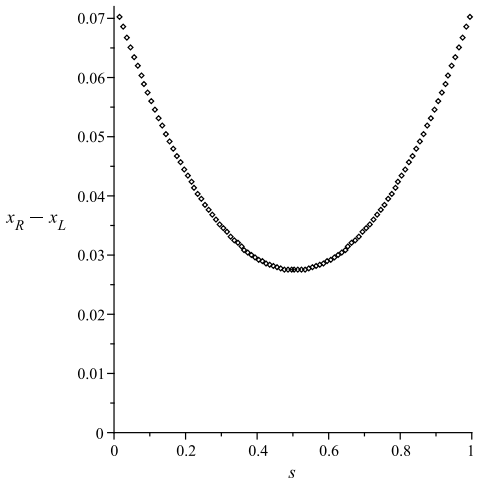
Corollary 2. *In the presence of both a special interest and activists whose contributions are perfect substitutes, and whenever* $s = 1/2$ *and* $h > \hat{h} = 2/(\kappa(1-\iota))$*, party platforms* diverge *(i.e.,* $x_L^\star < x_R^\star$*) in the symmetric equilibrium.*

Meanwhile, whenever $s = 1/2$ *and* $h \leq \hat{h}$*, party platforms* converge *in the symmetric equilibrium to* $x_L^\star = x_R^\star = 1/2$*.*

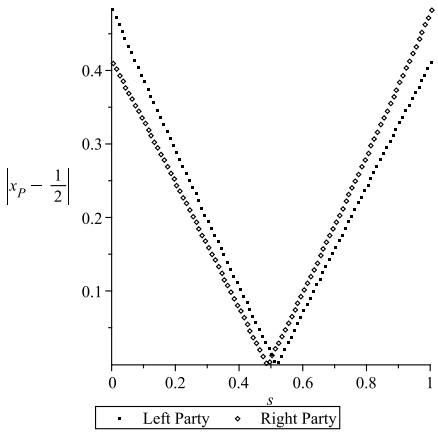
For platforms to diverge in equilibrium, it must therefore be that the efficacy of electioneering resources exceeds a certain threshold.

Corollary 3. *In the presence of perfectly-substitutable electioneering inputs, whenever* $s \neq 1/2$ *and* $h > \hat{h}$*, equilibrium party platforms are* asymmetric *in equilibrium.*

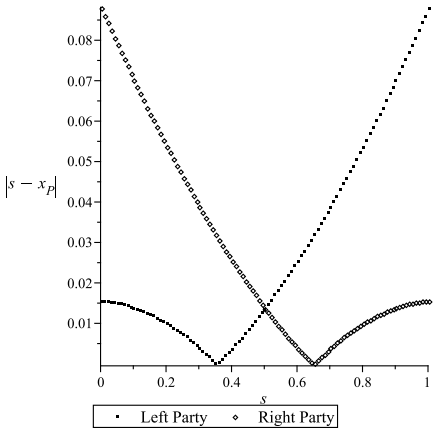
These results are illustrated in the figures that follow, which plot numerical solutions for $x_L^\star$ and $x_R^\star$ against s.



(a) Difference in party platforms and s



(b) Bias in platforms and s



(c) Distance to s

FIGURE 3 – Numerical solutions for $x_L^\star$, $x_R^\star$ for parameters: $h = 2\hat{h}, \kappa = 2, \iota = 1/2$, $s =$ 0..1, 0.01 intervals

Comparative statics

Having established that when electioneering resources are perfect substitutes, party platforms generally diverge in equilibrium, comparative statics are now performed on both parties' reaction functions. Knowing how the platforms of both parties react optimally to changes in the other party's platform again specifies the slope of the parties' reaction functions. And the special interest's influence is assessed by considering once more how changes in the special interest's position, s, affect the parties' reaction functions by shifting them in the (x_L, x_R)-space.

Proposition 6. *An out-of-equilibrium move by one party brings the other party to move its optimal choice of platform in the* same direction*, when inputs are perfectly substitutable. That is,*

$$\begin{aligned}\frac{\partial x_L^\star}{\partial x_R} &= \frac{\kappa\iota\left(x_R - x_L^\star\right)}{\iota\kappa\left(3x_L^\star + x_R\right) + 8h\left(1-\iota\right)} > 0,\ \forall x_R > x_L^\star \\ \frac{\partial x_R^\star}{\partial x_L} &= \frac{\kappa\iota\left(x_R^\star - x_L\right)}{\iota\kappa\left(4 - \left(3x_R^\star + x_L\right)\right) + 8h\left(1-\iota\right)} > 0,\ \forall x_R^\star > x_L\end{aligned}$$

The intuition behind this result remains the same as for perfect complements.

The effect of a change in the special interest's position on the parties' reaction functions is now being considered.

Proposition 7. *A change in the special interest's position causes both parties' best-response functions to shift* in the same direction*, when inputs are perfectly substitutable. That is,*

$$\begin{aligned}\frac{\partial x_L^\star}{\partial s} &= \frac{8h\left(1-\iota\right)}{\iota\kappa\left(3x_L^\star + x_R\right) + 8h\left(1-\iota\right)} > 0 \\ \frac{\partial x_R^\star}{\partial s} &= \frac{8h\left(1-\iota\right)}{\iota\kappa\left(4 - \left(3x_R^\star + x_L\right)\right) + 8h\left(1-\iota\right)} > 0\end{aligned}$$

The above proposition establishes just how influential the special interest is in shaping equilibrium policy choices by parties. If its position were to shift, then both parties' optimal choice of platforms would follow suit, *ceteris paribus*, and regardless of the efficacy of electioneering inputs $h > 0$.

The above propositions inform the essay's inquiry into the consequences of a decline in activism on special-interest influence, considered next.

3 The decline in high-intensity participation, and special-interest influence

3.1 Changes in technology, changes in motivation, and special-interest influence

The noted decline in activist participation is deemed to be rooted both in changes in the parties' demand for activists, and in the supply of activist labour. By building upon the model's theoretical results, this section seeks to disentangle the effects of such demand- and supply-side factors on how the special-interest group influences party platforms. It first addresses the effects of the demand- and supply-side factors considered in isolation, and then discusses their joint effects.

Demand-side factors

As discussed previously, a technological shift triggered by the appearance of new methods of mass communication (i.e., television campaigning) is deemed to have transformed parties. Mass parties – relying *inflexibly* both on monetary contributions from large groups (e.g., trade unions, companies) often representing special interests, and volunteer labour from highly active members – have given way to electoral-professional parties, for which the professional human resources (pollsters, fundraisers, advertisers, etc.) necessary for the conduct of electoral campaigns are now often hired rather than recruited. In the former case, both inputs are highly complementary once a minimum activist requirement is met, whereas in the latter, everything can potentially be bought, implying near-complete substitutability. Consequently, one might be worried that with such a shift comes a heightened influence of the special-interest group on policy platforms.

Compare the results of Propositions 7 and 4, which both relate to the effect of a change in the special interest's position, s, on the parties' best-response functions, *ceteris paribus*. In the case of perfectly-complementary electioneering inputs, the special interest's influence may be mitigated by a requirement that parties satisfy a minimum reliance on activist labour, and that monetary contributions exceeding this requirement be matched one-to-one with activist support. However, for low minimum dependencies on activists, and whenever activist support is easily earned, the special-interest group may still be influential. In contrast, the special interest's influence on party platforms is undisputed when inputs are perfectly substitutable. It may therefore be that a shift from MP to EP translates, or not, in an increase of special-interest influence on policy platforms. For a low-enough reliance upon activists, the perfect complementarity between non-market and market-bought inputs may indeed mean that a

greater special-interest influence is being felt in the case of the mass party, compared with the electoral-professional party. Formal conditions are found in the proposition below.

Proposition 8. *An increase in the substitutability of inputs* may or may not *increase the influence of the special interest on policy. For:*

$$(\phi_L^\star - \phi_R^\star) \in (-2h\,(1-\iota)\,, 2h\,(1-\iota))$$

both parties are swayed by the special interest's influence in the presence of perfectly-complementary inputs (MP). This is always so *in the case of perfect substitutes (EP). The influence of the special-interest group on a party's reaction function, in the case of the mass party,* decreases *as* $\phi_P^\star/h\,(1-\iota)\,,\ P \in \{L, R\}$ increases.

The fraction $\phi_P^\star/h\,(1-\iota)$ determines the size of the intervals in which one party P does not shift its reaction function in the direction of a change in the special interest's position, when electioneering inputs are perfect complements. The more binding is the electioneering resource constraint (which translates into higher values of $\phi_P^\star$), the lower is the efficacy of electioneering resources h, and the higher is the proportion of informed voters ι, then the less influential the special interest is likely to be. An increase in the substitutability of inputs is then more likely to result in an increase of the special-interest group's influence.

Supply-side factors

To consider supply-side factors in isolation, cross-partial derivatives of $x_L^\star$ with respect to s and κ must be examined, both in the case of perfect complements and perfect substitutes. It is found that while a decrease in participation may in both cases increase special-interest influence, that result is unconditional only in the case of the electoral-professional party.

Perfect complements In the case of the mass party, explicit cross-partial derivatives of $x_L^\star$ and $x_R^\star$ with respect to s and κ are found in the Appendix. They inform the proposition below.

Proposition 9. *When electioneering inputs are perfectly complementary, a decrease in the activists' motivation (captured by* κ*) causes the special interest's influence on policy to* unambiguously increase, *provided that:*

$$(\phi_L^\star - \phi_R^\star) \in (-2h\,(1-\iota)\,, 2h\,(1-\iota))$$

It is then found that:

$$\frac{\partial}{\partial \kappa}\left(\frac{\partial x_L^\star}{\partial s}\right) < 0, \frac{\partial}{\partial \kappa}\left(\frac{\partial x_R^\star}{\partial s}\right) < 0$$

Otherwise, its effect on special-interest influence is ambiguous.

Proof. See Appendix A.6 on page 43.

This implies that when the difference in the parties' dependence upon activist labour is small, thus making neither party much more likely to be influenced than the other, and with both still competing for the special interest's contributions, then both are directly influenced by the latter.

Perfect substitutes In an analogue fashion, we arrive at the proposition below.

Proposition 10. *When electioneering inputs are perfectly substitutable, a decrease in the activists' motivation causes the special interest's influence on policy* to unambiguously *and* unconditionally increase*, which is to say that:*

$$\frac{\partial}{\partial \kappa}\left(\frac{\partial x_L^\star}{\partial s}\right) < 0, \frac{\partial}{\partial \kappa}\left(\frac{\partial x_R^\star}{\partial s}\right) < 0$$

for all admissible parameter values.

Proof. See Appendix A.5 on page 43.

Both factors jointly considered

Consideration of demand- and supply-side factors in isolation is performed for analytical clarity. It remains the case, however, that demand-side transformations may affect the supply of activist labour, and vice-versa. For instance, a reduced demand for activists may in time lower their own perceptions of effectiveness, thus decreasing κ via p. Conversely, an increase in the opportunity costs of volunteering one's time may reduce κ via c, thus making activists harder to recruit and therefore favouring the adoption of new electioneering technologies by parties. Such interactions cannot be captured endogenously in this model, due to exogenous functional forms both for technology and for κ, the parameter representing activist motivation. The joint effect of demand- and supply-side factors may nonetheless be considered by looking at the table below.

Table 1: Effect of demand- and supply-side factors on special-interest influence

	Perfect complements (MP)	*Perfect substitutes (EP)*
Directly influential? $(\partial x_P^\star/\partial s > 0)$	Maybe	Yes
$\downarrow$*Motivation* $\Longrightarrow$ $\uparrow$ *Influence?* $(\partial\left(\partial x_P^\star/\partial s\right)/\partial\kappa < 0)$	Maybe	Yes

It thus appears that the effect of neither of the two factors taken in isolation (i.e., demand-side: left-to-right transition between columns in the first line; supply-side: either of the columns of the second row) is particularly conclusive. With both factors at work simultaneously (i.e., reading the table horizontally along the second row, or diagonally starting from the top left cell), the effects are again unclear. Both would require quantifying the effect, for all possible equilibria, to get precise results: a daunting task.

Thankfully, more can be said solely on the basis of this table. As seen above, demand-side factors alone may or may not increase special-interest influence. Similarly, supply-side factors in isolation have ambiguous effects in the case of perfect complements. Yet, it is also noticeable that the effect of supply-side factors is clear in the case of perfect substitutes. It can therefore be said that while a transition from MP to the EP alone cannot be argued to generally increase special-interest influence on policy, a fall in motivation that follows such a transition can. This is so because the transition from MP to EP *clarifies* the effect of a fall in motivation on the special interest's influence on policy platforms. This corresponds to the empirically-plausible case of a technological change leading to a decline in perceived effectiveness. In contrast, the converse case offers no such insight: an increase in substitutability that follows a decline in motivation cannot be said to generally increase special-interest influence on policy. Indeed, a decline in motivation does nothing to clarify how the transition from MP to EP alters influence, aside from having itself an initial (ambiguous) effect on special-interest influence. To summarize:

Proposition 11. *A decline in activist motivation unambiguously increases special-interest influence if it follows, or if it is triggered by, a technological shift from the mass party to the electoral-professional party.*

The effect of a fall in motivation for discrete values of κ also translates in a reduced distance of equilibrium platforms to the special interest's bliss point, in the case of the electoral-professional party. This is illustrated below for the Left party.

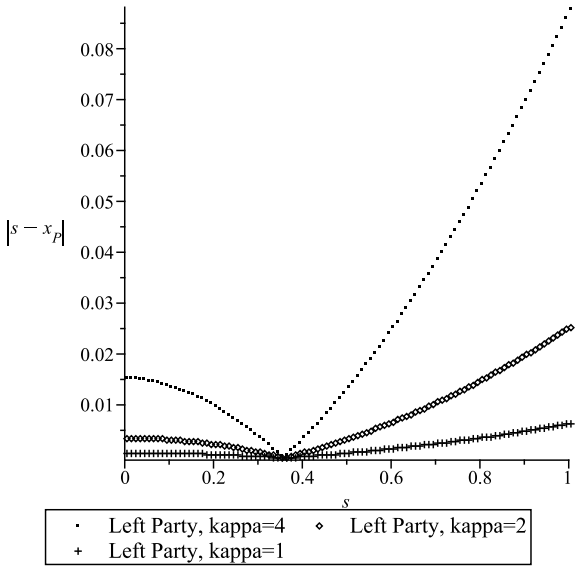


Figure 4: Distance of the Left party's platform to the special interest's position, perfect substitutes, for different values of κ, and $h = 2\hat{h}$, $\iota = 1/2$, $s = 0 \ldots 1$, 0.01 intervals

3.2 Implications for welfare and policy

It is tempting to consider the effect on welfare of an increase in special-interest influence, such as that found in Proposition 11 on the preceding page. But whose welfare, and determined by what? The model features three groups of optimizing agents, but that can take four types. Parties and the special-interest group are all single agents. Informed voters can also become activists by volunteering their time for a political party, and indeed all but the pivotal voter (counter-factually) here do. The agents' utility can therefore potentially both come from: the parties' choice of policy platforms within the context of the electoral race; and the policy implemented by the winning party when in office. The first kind of utility can be termed *procedural welfare*, while the second is based on *policy outcomes.*

3.2.1 Procedural welfare

Formally analyzing procedural welfare, and how special-interest influence affects it, requires considering what it entails. Since both parties are deemed to be single agents, and so is the special-interest group, they are negligible compared with the mass of voters and activists. When considering social welfare of any type, not only procedural, their utility can therefore be abstracted from, as the weight put on it by a utilitarian social planner would approach zero. Thus, procedural welfare can be expressed as the choice, by a social planner, of both

parties' platforms, so as to maximize the well-being of either *informed voters*[14] or *activists*, or both. These are the same agents, but their different roles potentially call for different optimal policies, given that they derive procedural welfare from both the act of casting a ballot and from their participation.

Consider first the activists. If one chooses a utilitarian welfare criterion, their welfare is given by:

$$\begin{aligned}\max_{x_L,x_R} W^{AP} &= \iota \int_0^{\frac{x_L+x_R}{2}} \left[p(e^\star_{iL})(U_i(x_L)-U_i(x_R))+U_i(x_R)+\nu(e^\star_{iL})-c(e^\star_{iL})\right] dv_i \\ &\quad +\iota \int_{\frac{x_L+x_R}{2}}^1 \left[p(e^\star_{iR})(U_i(x_R)-U_i(x_L))+U_i(x_L)+\nu(e^\star_{iR})-c(e^\star_{iR})\right] dv_i\end{aligned}$$

Due to the symmetric nature of the game, it is clear that the optimum platforms will also be symmetric about each other, i.e. $x^\star_L = 1 - x^\star_R$. This means that the pivotal voter and activist is one whose bliss point is $\hat{v} = 1/2$, i.e. it is the median voter. Taking the first-order condition of the transformed problem with respect to x_L, evaluated at the procedurally-optimal platforms, and simplifying it using earlier assumptions on p, ν, and c, as well as the problem's symmetry yields:

$$x^\star_L = 1 - x^\star_R = \frac{1}{4}\frac{3c-4p^2}{3c-2p^2}$$

Maximizing the procedural welfare of activists from one party involves setting both platforms so that the marginal gains of participation, summed over all activists, are equal to the sum of the marginal costs. The marginal gains of participation for any activist consist of the sum of the marginal policy gains and the marginal intrinsic benefits of participation. The marginal costs are the opportunity costs of participation.

For all activists of either party, the marginal costs of participation are equal to their marginal intrinsic benefits, meaning that they – and their sum – cancel out. The marginal policy gains, summed over all activists, must then be zero. That is, a change in platforms must have a first marginal effect – policy benefits times the marginal change in perceived efficacy and in effort, summed over all activists – offset by a second – the marginal change in policy benefits times the perceived efficacy, again summed over all activists. This is achieved by spacing platforms appropriately. The lower is p, the greater apart they are: effort is perceived to matter little in the maximization of procedural welfare, which is then guided by the choice of policies maximizing differential policy gains. Thus, for the limiting case $p \to 0$, one obtains: $x^\star_L = 1/4$, $x^\star_R = 3/4$. At the other extreme, for p sufficiently high, welfare maximization depends little on the marginal effects of platform choice on differential policy

[14] One cannot consider the procedural welfare of informed voters, for they do not observe policy platforms.

gains, and most on effort levels. The limiting case involves choosing $x_L^\star = 1/2$, to which corresponds $p \to \sqrt{3c/8}$.

Meanwhile, procedural welfare for informed voters involves choosing party platforms such that the utility of voters casting a ballot for either party is maximized (i.e., minimizing the distance between the platforms and the voters' bliss points). This is represented by:

$$\max_{x_L, x_R} W^{VP} = \iota \int_0^{\frac{x_L+x_R}{2}} U_i(x_L) dv_i + \iota \int_{\frac{x_L+x_R}{2}}^1 U_i(x_R) dv_i$$

It yields:

$$x_L^\star = \frac{1}{4},\ x_R^\star = \frac{3}{4}$$

It is therefore only when $p \to 0$ that maximizing the procedural welfare of both informed voters and activists involves choosing the same policy platforms.

So what is the effect of an increase in special-interest influence on procedural welfare? The special-interest group's influence is to bias party platforms by pulling them towards s. In the case of electoral-professional parties, where a symmetric equilibrium does not exists except for $s = 1/2$, special-interest influence therefore causes platforms to be asymmetrically located across the policy space, i.e. $x_L \neq 1 - x_R$. An increase in this influence can only worsen this situation, by drawing both parties closer to s and further away from the ideal symmetric platforms, $x_L^\star = 1 - x_R^\star$, which maximize either or both measures of procedural welfare.

Qualitatively, an increase in influence triggered by a decrease in activist motivation, following a transition from MP to EP, will therefore unambiguously *decrease* procedural welfare, seen from the perspective of both activists and informed voters.

3.2.2 Policy welfare

In contrast to procedural welfare, policy welfare concerns only voters, as they alone care about policy outcomes.[15] Under an assumption of full commitment, parties implement their electoral platform when in office. By construction, the outcome of unbiased Downsian electoral competition, which is to say competition without contributors, is then optimal. Indeed, it yields the median voter's preferred policy ($x = 1/2$), which coincides with the policy that maximizes a utilitarian voter welfare criterion given by:

$$W(x) = \int_0^1 U_i(x) dv_i$$

[15]So does in fact the special-interest group: however, as noted earlier, its presence can be discounted due to its small weight relative to voters. All voters are here considered.

From the perspective of policy outcomes, both the presence of activists and of a special interest distort the efficiency of political competition. Which of these distortions is worse for voter welfare can generally be established by comparing ex-ante expected voter welfare in the case where only a special interest is present, with that where only activists are present. In the model where only the special-interest group is present, both parties converge to its preferred policy, s, provided that the benefit of courting uninformed voters is sufficiently high; otherwise, the median-voter outcome prevails. In the presence of activists only, platforms are located symmetrically about the policy space (i.e., $x_L^\star = 1 - x_R^\star$), and the size of the policy wedge depends on the efficiency of electioneering activities, or equivalently on the benefits of courting uninformed voters. Below a certain efficacy threshold on h, $h < \hat{h} = 2/\kappa(1-\iota)$, parties revert to the median voter's position. Voter welfare in each of these special cases of the model, assuming a high-enough efficacy of electioneering resources, is then respectively given by:

$$\begin{aligned} W(s) &= \left(\frac{2}{3} + s - s^2\right) \\ E\left[W(x)\right] &= \left(\frac{2}{3} + x_L^\star\left(1 - x_L^\star\right)\right) = \left(\frac{2}{3} + \left(1 - x_R^\star\right)x_R^\star\right) \end{aligned}$$

It is then plain to see that if $s < x_L^\star$ or $s > x_R^\star$, that is if the special interest holds more extreme positions than that of *either* party in the equilibrium with only activists, then the distortion imposed by its presence is more damaging. Furthermore, unless there is party convergence to the median voter's position, ex-ante expected welfare is here also strictly inferior to the utilitarian planner's benchmark.

3.2.3 Special-interest influence and the design of electoral laws

It has been established qualitatively that an increase in special-interest influence unambiguously reduces procedural welfare (both for the acts of volunteering one's time and that of casting a ballot), while also potentially decreasing outcome-based voter welfare. It therefore appears that it should be countered by appropriate policy remedies involving the design of electoral laws.

The most obvious remedy is an added emphasis on electoral financing laws. Starting from the premise that the electoral-professional party is the prevailing type of party organization, then as both electioneering factors are fairly substitutable, limiting the supply of one (here: monetary contributions from the special interest) would cause a decline in the influence of the said factor on equilibrium policy, as parties seek to recruit more of the other (activist labour) to compensate. Also worthy of consideration, but not modelled, is the fact that highly-

active party members contribute roughly two-and-a-half times as much as inactive members in monetary donations (cf. Whiteley and Seyd, 2002, p. 208; this amounts to £50 for highly-active members, on average). A decline in high-intensity participation could therefore lead to great financial difficulties for parties, thus making special-interest contributions even more alluring. Conversely, recruiting more activists could make up for a shortfall in large monetary donations from special-interest groups, replaced by a multitude of small ones from active party members.

It should be emphasized that within the (limited) context of this model, the need for more stringent electoral laws is also motivated by the "arms-race" character of competing for electioneering resources: an identical escalation by both sides leads to no greater benefit to either party, while it also serves no useful social purpose. Indeed, communications are assumed to be merely persuasive, and thus not necessarily informative. This arms-race character is shared by both types of resources so that activist labour, especially if it imposes a sizable distortion, could be considered under such laws. The arms race for uninformed voters also prevents one from recommending public subsidies to parties, which would be entirely wasteful in this context.

That said, the call for more stringent electoral financing laws does not target directly the lack of motivation of potential activists, and the decline in high-intensity participation. Such a decline could have a deleterious effect on politics should only the most bloody-minded and extremely ideological voters then volunteer their time for political parties. On the supply side, this calls for incentives for participation, either in the form of monetary subsidies (such as the public monies subsidizing political parties in many countries: some proportion could be earmarked towards the recruitment of activists), or through socialization and civic education.

4 Conclusion

This essay presented a model of electoral competition where electioneering resources, provided in the form of volunteer labour by activists and monetary contributions from a special interest, were used to sway uninformed voters towards voting for one party over the other. In so doing, it contributed to the literature on political competition by further emphasizing the policy cleavages induced by activists, this time despite the presence of converging influences coming from a special-interest group and a technologically-induced decrease in the parties' reliance on activists. It also sought to establish what are the implications of a decline in party activism, as highlighted by recent trends, for the influence of a special-interest group on the parties' choice of electoral policy platforms. Its potential impact on procedural and outcome-based welfare was also assessed.

Precisely, it was established that party platforms generally did not converge in equilibrium, even as electioneering inputs went from being perfect complements to perfect substitutes. Such a technological shift was deemed to correspond to the transformation from mass parties to electoral-professional parties, the demand-side explanation for recent declining trends in activism. It was found that neither such demand-side explanations considered in isolation, nor supply-side factors alone (in the case of complementary inputs) were entirely conclusive that a decline in high-intensity participation led to an increase in special-interest influence. However, a decrease in the motivation of activists that followed the transformation of mass parties into electoral-professional parties was found to necessarily increase special-interest influence. This worsens procedural welfare while potentially reducing voter welfare based on policy outcomes, both relative to utilitarian benchmarks at the optimal policy choice(s).

Such conclusions therefore call for more stringent electoral financing laws, limiting the amounts that special-interest groups can contribute to political parties, and even for incentives to counter the decline in high-intensity participation by encouraging activism. This suggests a useful course of action in the event that the influence of special interests is deemed sufficiently detrimental to societal welfare, and democracy at large.

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A Appendix: Proofs

A.1 Proof of Proposition 2 on page 20

First consider the case where $s > 1/2$. Only party R receives contributions from the special interest, as it is then closer to its preferred policy than party L. This means that $C_R^\star > 0$.

Evaluating equations 12 and 13 at $x_L^\star = 1 - x_R^\star$, and solving for $x_R^\star$, $\phi_L^\star$, and $\phi_R^\star$, yields that:

$$\begin{aligned} x_L^\star &= 1 - s \\ x_R^\star &= s \\ \phi_R^\star &= \frac{\iota}{2\iota\kappa\left(\frac{3}{4} - s\right)} \end{aligned}$$

Yet this must imply $s < 3/4$, for $\phi_R^\star \geq 0$ to hold. The equilibrium is therefore characterized by:

$$\begin{aligned} C_L^\star &= 0 \iff \theta_L^\star = \frac{\phi_L^\star}{2h\left(1-\iota\right)} + 4\left(s - \frac{1}{2}\right)^2 > 0 \\ C_R^\star &= 4h\left(1-\iota\right)\left(s - \frac{1}{2}\right)^2 - \phi_R^\star > 0 \\ \theta_R^\star &= 0 \\ \beta_L &= \frac{1}{2}\iota\kappa\left(s - \frac{1}{2}\right) > 0 \\ \beta_R &= \frac{1}{2}\iota\kappa\left(s - \frac{1}{2}\right) - 4h\left(1-\iota\right)\left(s - \frac{1}{2}\right)^2 + \phi_R^\star > 0 \end{aligned}$$

This is an equilibrium provided that $s \in (1/2, 3/4)$, with h lying in the open interval:

$$h \in \left(\frac{\phi_R^\star}{4(1-\iota)\left(s - \frac{1}{2}\right)^2}, \frac{\phi_R^\star}{4(1-\iota)\left(s - \frac{1}{2}\right)^2} + \frac{\iota\kappa}{8(1-\iota)\left(s - \frac{1}{2}\right)} \right)$$

for $C_R^\star > 0$ and $\beta_R > 0$ to simultaneously hold.

The case where $s < 1/2$ is symmetric to the one above, and thus omitted.

Finally, the case where $s = 1/2$ is solved by evaluating equations 12 and 13 at $x_L^\star = 1 - x_R^\star$, and $\phi_L^\star = \phi_R^\star = \phi^\star \geq 0$, thus finding $x_R^\star$ and $\phi^\star$.

A.2 Proof of Proposition 3 on page 21

From equation (12), the partial derivative of $x_L^\star$ with respect to x_R is given by:

$$\frac{\partial x_L^\star}{\partial x_R} = \frac{\iota\kappa\phi_L^\star\left(x_R - x_L^\star\right)}{\mathrm{A}}$$

The analogous result for party R, using (13) instead, is:

$$\frac{\partial x_R^\star}{\partial x_L} = \frac{\iota\kappa\phi_R^\star\left(x_R^\star - x_L\right)}{\mathrm{B}}$$

where:

$$\begin{aligned} \mathrm{A} &\equiv \iota\kappa\phi_L^\star\left(3x_L^\star + x_R\right) + 8h^2\left(1-\iota\right)^2 - 4h\left(1-\iota\right)\left(\phi_L^\star - \phi_R^\star\right) \\ \mathrm{B} &\equiv \iota\kappa\phi_R^\star\left(4 - \left(3x_R^\star + x_L\right)\right) + 8h^2\left(1-\iota\right)^2 - 4h\left(1-\iota\right)\left(\phi_R^\star - \phi_L^\star\right) \end{aligned}$$

Restricting attention to the case where multipliers take intermediate values, such that each party reacts in the same way to the other party's out-of-equilibrium move, yields:

$$\left\{\frac{\partial x_L^\star}{\partial x_R} > 0, \frac{\partial x_R^\star}{\partial x_L} > 0\right\} \text{ if } \phi_L^\star \in \left(-2h\left(1-\iota\right) + \phi_R^\star\left(1 - \frac{\iota\kappa}{h\left(1-\iota\right)}\left(1 - \frac{1}{4}\left(3x_R^\star + x_L\right)\right)\right), \frac{2h\left(1-\iota\right) + \phi_R^\star}{1 - \frac{\iota\kappa}{4h(1-\iota)}\left(3x_L^\star + x_R\right)}\right)$$

with the restriction that:

$$h > \max\left\{\frac{\iota\kappa}{\left(1-\iota\right)}\left(1 - \frac{1}{4}\left(3x_R^\star + x_L\right)\right), \frac{\iota\kappa}{4\left(1-\iota\right)}\left(3x_L^\star + x_R\right)\right\} \tag{18}$$

for $\phi_L^\star, \phi_R^\star \geq 0$ to hold.

A.3 Proof of Proposition 4 on page 21

From equation (12), the partial derivative of $x_L^\star$ with respect to s is given by:

$$\frac{\partial x_L^\star}{\partial s} = \frac{8h\left(1-\iota\right)\left(h(1-\iota) - \frac{1}{2}\left(\phi_L^\star - \phi_R^\star\right)\right)}{\mathrm{A}}$$

while for party R, using equation (13), it yields:

$$\frac{\partial x_R^\star}{\partial s} = \frac{8h\left(1-\iota\right)\left(h\left(1-\iota\right) - \frac{1}{2}\left(\phi_R^\star - \phi_L^\star\right)\right)}{\mathrm{B}}$$

Their signs are determined by the conditions below:

$$\begin{cases} \left\{\frac{\partial x_L^\star}{\partial s} > 0, \frac{\partial x_R^\star}{\partial s} < 0\right\} & \text{if } \phi_L^\star \in \\ & \left(-2h\left(1-\iota\right)+\phi_R^\star\left(1-\frac{\iota\kappa}{h(1-\iota)}\left(1-\frac{1}{4}\left(3x_R^\star+x_L\right)\right)\right),\right. \\ & \left.-2h\left(1-\iota\right)+\phi_R^\star\right) \\ \left\{\frac{\partial x_L^\star}{\partial s} > 0, \frac{\partial x_R^\star}{\partial s} = 0\right\} & \text{if } \phi_L^\star = -2h\left(1-\iota\right)+\phi_R^\star \\ \left\{\frac{\partial x_L^\star}{\partial s} > 0, \frac{\partial x_R^\star}{\partial s} > 0\right\} & \text{if } \phi_L^\star \in \left(-2h\left(1-\iota\right)+\phi_R^\star, 2h\left(1-\iota\right)+\phi_R^\star\right) \\ \left\{\frac{\partial x_L^\star}{\partial s} = 0, \frac{\partial x_R^\star}{\partial s} > 0\right\} & \text{if } \phi_L^\star = 2h\left(1-\iota\right)+\phi_R^\star \\ \left\{\frac{\partial x_L^\star}{\partial s} < 0, \frac{\partial x_R^\star}{\partial s} > 0\right\} & \text{if } \phi_L^\star \in \left(2h\left(1-\iota\right)+\phi_R^\star, \frac{2h(1-\iota)+\phi_R^\star}{1-\frac{\iota\kappa}{4h(1-\iota)}\left(3x_L^\star+x_R\right)}\right) \end{cases}$$

with the same restriction as before (equation 18) on h.

A.4 Proof of Proposition 5 on page 24

Suppose not, that is suppose that there exists a symmetric equilibrium for a value of $s \neq 1/2$. Evaluating equation 16 at $x_L^\star = 1 - x_R^\star$ yields that:

$$0 = 4h^2\left(1-\iota\right)^2\left(x_R^\star+s-1\right)+h\iota\kappa\left(1-\iota\right)\left(x_R^\star-\frac{3}{4}\right)+\frac{1}{2}\iota$$

Yet evaluating equation 17 also at $x_L^\star = 1 - x_R^\star$ gives that:

$$0 = 4h^2\left(1-\iota\right)^2\left(x_R^\star-s\right)++h\iota\kappa\left(1-\iota\right)\left(x_R^\star-\frac{3}{4}\right)+\frac{1}{2}\iota$$

Both equations do not yield the same value for $x_R^\star$ unless $s = 1/2$, which yields a contradiction with the initial assumption.

A.5 Proof of Proposition 10 on page 29

The cross-partial derivatives of $x_L^\star$ and $x_R^\star$ with respect to s and κ are given by:

$$\begin{aligned}\frac{\partial}{\partial\kappa}\left(\frac{\partial x_L^\star}{\partial s}\right) &= \frac{-4h\iota\left(1-\iota\right)}{\left(\kappa\iota\left(3x_L^\star+x_R\right)+8h\left(1-\iota\right)\right)^3}\left[\iota\kappa\left(\left(3x_L^\star+x_R\right)^2+4\left(x_R\right)^2\right)\right.\\ &\quad\left.+16h\left(1-\iota\right)\left(3x_L^\star+x_R\right)\right]<0\\ \frac{\partial}{\partial\kappa}\left(\frac{\partial x_R^\star}{\partial s}\right) &= \frac{-4h\iota\left(1-\iota\right)}{\left(\iota\kappa\left(4-\left(3x_R^\star+x_L\right)\right)+8h\left(1-\iota\right)\right)^3}\left[\iota\kappa\left(\left(4-\left(3x_L+x_R^\star\right)\right)^2\right)\right.\\ &\quad\left.+4\iota\kappa\left(1-x_L\right)^2+16h\left(1-\iota\right)\left(4-\left(3x_R^\star+x_L\right)\right)\right]<0\end{aligned}$$

which are both unambiguously negative.

A.6 Proof of Proposition 9 on page 28

The cross-partial derivatives of $x_L^\star$ and $x_R^\star$ with respect to s and κ are given by:

$$\begin{aligned}\frac{\partial}{\partial\kappa}\left(\frac{\partial x_L^\star}{\partial s}\right) &= \frac{\mathrm{C}}{\mathrm{A}^3}\left[\iota\kappa\phi_L^\star\left(\left(3x_L^\star+x_R\right)^2+4\left(x_R\right)^2\right)\right.\\ &\quad\left.+16\left(3x_L^\star+x_R\right)h\left(1-\iota\right)\left(h\left(1-\iota\right)-\frac{1}{2}\left(\phi_L^\star-\phi_R^\star\right)\right)\right]\\ \frac{\partial}{\partial\kappa}\left(\frac{\partial x_R^\star}{\partial s}\right) &= \frac{\mathrm{D}}{\mathrm{B}^3}\left[\iota\kappa\phi_R^\star\left(\left(4-\left(3x_R^\star+x_L\right)\right)^2+4\left(1-x_L\right)^2\right)\right.\\ &\quad\left.+16\left(4-\left(3x_R^\star+x_L\right)\right)h\left(1-\iota\right)\left(h\left(1-\iota\right)+\frac{1}{2}\left(\phi_L^\star-\phi_R^\star\right)\right)\right]\end{aligned}$$

where:

$$\begin{aligned}\mathrm{C} &\equiv -2h\iota\left(1-\iota\right)\phi_L^\star\left(h\left(1-\iota\right)-\frac{1}{2}\left(\phi_L^\star-\phi_R^\star\right)\right)\\ \mathrm{D} &\equiv -2h\iota\left(1-\iota\right)\phi_R^\star\left(h\left(1-\iota\right)+\frac{1}{2}\left(\phi_L^\star-\phi_R^\star\right)\right)\end{aligned}$$

Both are *strictly negative* whenever $\left(\phi_L^\star-\phi_R^\star\right)\in\left(-2h\left(1-\iota\right),2h\left(1-\iota\right)\right)$. Otherwise, the signs of both cross-partial derivatives are ambiguous.