

**PRESSURE GROUPS AND POLITICAL ADVERTISING:
HOW UNINFORMED VOTERS CAN USE STRATEGIC RULES OF THUMB**

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ABSTRACT

This paper shows how uninformed but rational voters can respond intelligently to political advertising.

The paper models a situation where a candidate must rely on a pressure group for financing political advertising. The pressure group uses its power over the purse to influence the position chosen by the candidate. Nevertheless, when uninformed voters use a strategic rule of thumb, pressure-group contributions always move the outcome of the election closer to the median voter. By using such a rule of thumb, when there is advertising, uninformed voters can have the same influence on the election as informed voters.

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KEYWORDS: Candidates, pressure groups, elections, uninformed voters

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February 2, 2005

How should uninformed but rational voters respond to political advertising? Can pressure groups, with financial resources to fund political campaigns and information on the candidates not available to the uninformed voters, gain at the expense of the median voter? This paper seeks to answer these and related questions.

Building on the framework introduced by Baron (1994) and used extensively by others, we model the case where there are two types of voters: informed and uninformed. In the absence of political advertising, the uninformed voters do not know the relative positions of the candidates. We investigate two opposing assumptions regarding candidate preferences: (1) both candidates maximize the probability of winning; and (2) both candidates maximize expected policy implementation. We consider a “worst-case-scenario.” A pressure group has a monopoly on campaign funds and can make the following binding take-it-or-leave-it offer to one or both candidates: in exchange for the candidate taking a particular position, the pressure group will provide money for political advertising. Despite the extreme power of the pressure group, we show that pressure group contributions to political campaigns moves the outcome toward the most preferred position of the median voter.

There is an extremely large literature, which assumes that uninformed voters are simple automatons – the more money a candidate spends on advertising, the more votes the candidate receives.¹ The main conclusion of this literature is that, *on average*, pressure group donations make the outcome worse for the median voter – a conclusion opposite of that derived here. In our literature review, we will ignore work that assumes

¹ For a review of this literature see Morton and Cameron (1991) and Austen-Smith (1997).

automatons and instead concentrate on those articles that assume rational voting by uninformed voters.

Potter, Sloof and Van Winden (1997), Gerber (1999), Prat (2002A and 2002B) and Wittman (2003) consider the case where the voters know the positions of the candidates but not their relative quality (in contrast to the model considered here, where the uninformed voters do not know the candidates' positions and the candidates do not differ in quality).² The pressure group has inside information on the relative quality of the candidates and, in return for a more desirable position, may endorse one of the candidates as the high-quality candidate.³ There are other differences between our model and this literature. Gerber and Prat employ models of costly signaling -- the more money contributed to the campaign, the higher the quality of the candidate. There is no content to the advertising. Here, in equilibrium, advertising is informative. Prat (2002B) and Gerber assume that one of the positions is exogenous; here, both positions are endogenous. Despite these differences in assumptions, some of the results are similar (especially from the perspective of the voters as automatons literature). In particular, imperfectly informed voters cannot be systematically fooled. Not surprisingly, some of the results also differ. In all of the aforementioned models, pressure group donations move the candidates away from the median voter; here, pressure group contributions move the candidates toward the median voter. In Gerber and Prat, a pressure group with extreme preferences will capture all the benefits of its inside information and voter

² The Potter, Sloof and Van Winden paper is not embedded in a spatial model, and therefore we will concentrate our discussion on the other papers.

³ Lohmann (1998) and Grossman and Helpman (1999) view members of pressure groups as being more sensitive to candidate positions than individual voters. As a consequence, candidates pay more attention to pressure groups. In that sense, members of pressure groups correspond to our informed voters. Neither Lohmann nor Grossman and Helpman is concerned with how uninformed voters who are not members of pressure groups respond to political advertising.

welfare is made worse by the existence of the pressure group;⁴ here, advertising always improves the welfare of the median voter. The reason for these differing results appears to be due to the nature of the information provided. Information on relative quality helps the high-quality candidate; while information on relative position only helps the candidate closer to the median voter.

The aforementioned papers all assume that the candidates are only interested in winning. Coate (2001, 2002) assumes that political parties represent perfectly opposing ideological preferences (this need not be the case in our model). In his first paper, each party's candidate is either ideological (taking an extreme position) or pragmatic (taking a position closer to the median). The positions of the ideological and pragmatic candidates are exogenous and known by the voters (unlike our model), but the voters do not know whether the candidate is ideological or not. In his model, pressure groups endorse the party's pragmatic candidate, thereby moving the outcome towards the median voter. In Coate's second paper, the candidates differ in quality, which is unknown to the voters. He assumes that advertisements are truthful (in this paper, truth is shown to be an equilibrium strategy) and that the uninformed are rational predictors (in this paper, we show how the uninformed can use simple rules of thumb to generate optimal voting behavior). He also assumes that the positions of the candidates are exogenous but that favors to the pressure groups (in return for contributions) are endogenous. So again the analysis is quite different from that considered here.⁵ And again the results differ for much the same reasons that the Prat results differ. In his model, the pressure group extorts all the welfare gains from the added information. This is possible when the inside

⁴ The reasoning is as follows: The median voters prefer the high-quality candidate who yields Q more utility in quality and $Q - \epsilon$ less utility in position over the low-quality candidate at the median voter's most preferred position. But the median voter prefers to have no advertising and both candidates at the median voter's most preferred position with the high-quality candidate winning half the time.

⁵ Still further afield is the work by Ortuno-Ortin and Schultz (2001). They like Coate (2002), assume that the candidates have ideological preferences and that voters have rational expectations without showing how these expectations might be formed in practice. They do not consider the role of pressure groups. Instead they discuss public funding of information.

information is about quality, but it is not the case when the inside information is about position.

Austen-Smith (1987) assumes that political advertising is used to reduce the ambiguity about a candidate's position. In his model risk-averse voters are willing to vote for a candidate with an inferior expected position if the variance (ambiguity about the platform) is smaller. In turn, a pressure group is willing to fund such advertising if the candidate moves closer to the preferred position of the pressure group. Here, we show that knowledge of one candidate's position allows the uninformed voters to make intelligent inferences about the other candidate's position. Thus reducing ambiguity cannot result in a move away from the median uninformed voter's preferred position, as is the case in Austen-Smith's model.

We next consider the model in greater detail.

1. ASSUMPTIONS

(a) Let X be a one-dimensional issue space composed of N integer positions $[1, 2, \dots, N]$. x is an element of X .

(b) There are two candidates, 1 and 2, who choose positions x_1 and x_2 , respectively. Let P_1 be the probability that candidate 1 wins the election and P_2 be the probability that candidate 2 wins the election ($P_1 + P_2 = 1$). Both candidates have one of the following 2 objectives functions:

(i) Each maximizes her probability of being elected. That is, candidate i maximizes P_i . If a candidate has a zero probability of being elected, then the candidate will maximize vote share (if the loser does not demonstrate a credible showing, the political party in the next election may replace the candidate with someone who the party thinks will know the distribution of voter preferences better).

(ii) Candidates value policy implementation. Let $V^i(x_j)$ be candidate i 's utility if candidate j wins the election and implements policy x_j ($i, j = 1$ or 2). $V^i(x_j)$ is strictly concave and symmetric with a maximum at \hat{v}_i . Candidate i maximizes expected utility

from implemented policy -- $P_1 V^i(x_1) + P_2 V^i(x_2)$. If a candidate's position has no effect on the outcome of the election, then the candidate prefers more voters to fewer.⁶

(c) Each voter i has a symmetric strictly-concave utility function, $U_i(x)$, with a maximum at $x = \hat{x}_i$, i 's most preferred position. There are n informed voters ($i = 1, \dots, n$) with a median most preferred position at integer \hat{x}_m^I , and m uninformed voters ($i = n + 1, \dots, n + m$) with a median most preferred position at integer \hat{x}_m^U . n is odd and m is even (which means that there are an even number of uninformed voters with a most preferred position at \hat{x}_m^U). There is at least one informed voter at every possible position. The number of voters strictly to the left of the overall median (\hat{x}_m^{I+U}) is equal to the number of voters strictly to the right of the overall median. The pressure group and the candidates know \hat{x}_m^I and \hat{x}_m^{I+U} .

(d) Let y_c be the amount of money donated by the pressure group to candidate c for political advertising. When the pressure group has donated money to only one candidate, we will at times refer to the candidate as the "endorsed" candidate. $U_p(x) - y_1 - y_2$ is the pressure group's utility function when x is the winning position. $U_p(x)$ is a symmetric and strictly concave with a maximum at $x = \hat{x}_p$, the pressure group's most preferred position. The pressure group knows the objective of the candidates. To avoid wasting time on useless details we will also make the following two assumptions. (i) It is costly for the pressure group to make offers and it is more costly for the pressure group to donate to 2 candidates than to donate to 1 candidate; and (ii) if pressure group donations move the outcome closer to the pressure group's preferred position, then the benefit of doing so outweighs the cost. Finally, we assume that if the outcome is the same, the pressure group prefers endorsing the winning candidate over endorsing the losing candidate.

(e) Uninformed voters do not observe x_1 , x_2 , or y_c . They do not observe the agreement (if there is one) between the pressure group and a candidate, nor do they know whether a candidate has rejected an offer or an offer has not been made in the first place. The uninformed do know their own \hat{x}_i , whether their most preferred position is to the left, to the right or at the overall median (\hat{x}_m^{I+U}), and whether \hat{x}_p (\hat{x}_m^{I+U}) is weakly to the left or

⁶ Other assumptions are possible. The argument is speeded along when the candidate prefers one out of many losing positions.

weakly to the right of \hat{x}_m^I . Through advertising they know which candidates have been endorsed.

Campaign contributors are often identified. In the United States such information is required by law. Furthermore, the candidate receiving funds often advertises that she has received support from various interest groups and sometimes the other candidate claims that the first candidate has been bought out by special interests.⁷ Certainly, it is no secret when the National Rifle Association supports one of the candidates in an election and it is no secret where the NRA stands on gun control. Hence, our assumption that uninformed voters know the relative position of \hat{x}_p seems justified.

Preference polls on issues are often reported in the papers and on television. So, it is not unreasonable to assume that the uninformed know the policy preference of the median voter.⁸ Knowledge of the median informed voter's most preferred position might be obtained by observing early poll data, where the uninformed are least likely to report an opinion. If the reader is uncomfortable with this latter assumption, one can substitute the following alternative assumption: advertising reveals which candidate is to the right of the other. For example, knowing that one candidate is supported by the National Rifle Association tells otherwise uninformed voters that the other candidate is more supportive of gun control. See the discussion following the proof for an explanation why this alternative assumption can be substituted for the assumptions regarding knowledge of the relative position of \hat{x}_m^I without changing the results.

⁷ For a discussion of the importance of pressure group endorsements, see Lupia (1994). Here, an endorsement is a signal from the pressure group. Banks (1990) has a different kind of signaling model where it is costly for candidates to move from their true position. His model does not deal with the kind of issues we are considering here

⁸ When I refer to the median voter, this means the median voter over all voters, informed and uninformed. McKelvey and Ordeshook (1985) show that the uninformed can learn a lot from poll data. In contrast to the work here, their article does not deal with pressure groups. Also, in contrast to the present paper, in their article voters make no inferences based on the objectives of the candidates. See also Cukierman (1991) and Grofman and Norrander (1991).

The game proceeds as follows:

(1) Nature chooses the distribution of informed voters' preferences, the distribution of uninformed voters' preferences, the pressure group's most preferred position, and then the preferences of the candidates, which are drawn from a symmetric distribution around \hat{x}_m^I .⁹

(2) The pressure group makes a one-time take-it-or-leave-it offer to one or both of the candidates. If candidate C agrees to choose position x^* , then the pressure group will provide y_C to the candidate for political advertising. If the agreement is accepted, it is binding on both sides.

This is a simplified version of a menu auction. Allowing the pressure group to make one-time offers to the candidates instead of vice-versa and without the possibility of the candidates making counter offers increases the power of the pressure group. If the pressure group has the same information as the candidates, then the candidates cannot take advantage of any inside information and the menu auction reduces to the take-it-or-leave-it offer considered here. With only one pressure group, instead of two or more, the power of the pressure group is maximized. These and other implicit assumptions create a worst-case scenario. If we can show that pressure group donations are welfare improving when the pressure group has all this power, then we have a very strong result, indeed.

(3) Each candidate knows the objective of the other candidate and whether the other side has received an offer and the value of x^* . They simultaneously decide whether to accept the offer (if one has been made) or choose another position. If no candidate accepts the offer, then the pressure group is out of the picture.

(4) The positions of the candidates are then made public to the *informed* voters. The candidate who received the donation then advertises.

(5) The voters choose.

⁹ We make such an assumption so that the uninformed voters cannot make useful inferences about the candidates' preferences and positions. If they could, they might no longer be uninformed. The variance of the distribution around \hat{x}_m^I may vary as \hat{x}_m^I varies.

Each informed voter observes the candidates' positions, x_1 and x_2 . Each informed voter then votes or abstains.

The uninformed voters first observe whether there has been advertising and absorb its content, if any. Each uninformed voter then either votes or abstains.

(6) The candidate receiving the most votes wins the election and implements x_c . The voters then receive utility $U_i(x_c)$.

We next consider a simple strategy by the uninformed and a possible counter strategy by the informed.

DEFINITION: The uninformed voters have a *strategic rule of thumb* if the following holds:

When neither candidate has been endorsed or both candidates have been endorsed, then the uninformed voters vote for each candidate with probability 1/2 or abstain.

When one and only one candidate has been endorsed and

the voter's most preferred position coincides with \hat{x}_m^{I+U} , then the uninformed voter abstains.

the pressure group's most preferred position, \hat{x}_p , is to the right (left) of \hat{x}_m^I and the voter's most preferred position is to the right (left) of \hat{x}_m^I and \hat{x}_m^{I+U} , then the uninformed voter votes for the endorsed candidate.

Otherwise, the uninformed voter votes for the unendorsed candidate.

DEFINITION: The informed voters have a *counter strategy* if the following holds:

An indifferent informed voter will vote for each candidate with probability one-half unless one and only one candidate has been endorsed and the candidates have identical positions. Under these circumstances

the informed voter will vote for the endorsed candidate if the outcome of the election is strictly better for the informed voter than the outcome in the absence of an endorsement

the informed voter will vote for the other candidate if the outcome of the election is strictly worse for the informed voter than the outcome in the absence of an endorsement

the informed voter will vote for each candidate with probability one-half if the outcome of the election would be the same in the absence of an endorsement.

This counter-strategy is plausible. Those informed voters who are hurt by endorsements would try to discourage endorsements by voting against the endorsed candidate, if the candidates were otherwise identical; while those informed voters who benefit from the existence of endorsements would try to encourage endorsements by voting for the endorsed candidate, if they the candidates were otherwise the same. This counter-strategy assumption is actually not necessary to obtain our basic results. But if we instead assume that indifferent informed voters vote for each candidate with probability $1/2$, then the candidates will engage in mixed strategies, which involves a more complicated analysis. This mixed-strategy equilibrium gives similar but not identical results to the pure-strategy equilibrium that is obtained when indifferent informed voters engage in the counter strategy. Furthermore as the number of informed voters increases this mixed-strategy equilibrium approaches the pure-strategy equilibrium that results under the counter-strategy behavior.

2. PROPOSITIONS

The following two propositions, which give no role to pressure groups, will serve as benchmarks for comparison. Because the results are well known, they will be presented without proof.

PROPOSITION A: Suppose that there are no pressure groups. If candidates maximize the probability of winning (assumption B.i), then both candidates will be at the median of the informed voters, \hat{x}_m^I .

PROPOSITION B: Suppose that there are no pressure groups and that the candidates maximize their expected utility from policy implementation (assumption B.ii). If the candidates' most preferred positions are on opposite sides of the median informed voter, then both candidates will be at \hat{x}_m^I . If the candidates' most preferred positions are on the same side of \hat{x}_m^I , then both candidates will be at the most preferred position of the candidate whose preferences are closest to the median informed voter.

The proof of Proposition 1 will be shortened by making use of the following lemma.

LEMMA 1: Assume that indifferent informed voters engage in the counter-strategy. Suppose that the pressure group makes an offer to one candidate (candidate 1) and not to the other candidate (candidate 2) and that the offer is accepted. Suppose further that candidate 2 knows that the offer will be accepted. If the candidates maximize their probability of winning (in this case, vote share), then, under the above assumptions:

If $x_1 = x^* > \hat{x}_m^I$, then $x_2 = x_1 - 1$; if $x_1 = x^* < \hat{x}_m^I$, then $x_2 = x_1 + 1$; and if $x_1 = x^* = \hat{x}_m^I$, then $x_2 = x_1 = \hat{x}_m^I$.

PROOF:

Because the uninformed voters do not observe the candidates' choices, candidate 2's actual (as opposed to inferred) choice has no effect on the uninformed voters. Therefore, candidate 2 will only pay attention to the informed voters. If candidate 2 were to move away from the position that maximizes the number of informed voters voting for candidate 2 to another position (for example, \hat{x}_m^U), the uninformed would not respond any differently (after all, they are the uninformed voters) but the candidate would lose votes from the informed.

If $x_1 = x^* > \hat{x}_m^I$, then the vote maximizing strategy of candidate 2 is to choose $x_2 = x_1 - 1 \geq \hat{x}_m^I$. By moving right to $x_1 - 1$ from \hat{x}_m^I , candidate 2 does not lose any of the informed voters on her left, but does capture those informed voters between \hat{x}_m^I and x_1 who previously (loosely) preferred x_1 .

If $x_2 = x_1 = x^*$ instead of $x_2 = x_1 - 1 = x^* - 1$, then candidate 2 would not capture any additional votes from the informed voters, but it might lose some. This is because all of the informed voters weakly to the right of x^* will vote for the endorsed candidate when they are otherwise indifferent. Hence, a move right will not capture any informed voters to the right. On the other hand, those voters to the left of $x_2 = x_1 = x^*$ (who would vote for candidate 2 if $x_2 = x_1 - 1 = x^* - 1$) will either vote for the endorsed candidate (candidate 1) if they prefer x^* over \hat{x}_m^I or abstain if they are indifferent between \hat{x}_m^I and x^* . When $x^* > \hat{x}_m^I + 1$, there will always be at least one informed voter who satisfies such a condition (we have assumed that there is at least one informed voter at each position). When $x^* = \hat{x}_m^I + 1$, candidate 2 will receive the same number of voters at $x_2 = x_1 - 1 = x^* - 1$ as the candidate does at $x_2 = x_1 = x^*$. So to keep track of things, we will just assume that candidate 2 chooses $x^* - 1$ in this case, as well.

It is obvious that candidate 2 would get fewer votes if $x_2 > x_1$.

A similar analysis holds for $x_1 = x^* < \hat{x}_m^I$, where 2's optimal strategy is to choose $x_2 = x_1 + 1$.

If $x_1 = x^* = \hat{x}_m^I$, then candidate 2's optimal strategy is to choose $x_2 = x_1 = \hat{x}_m^I$.

Q.E.D.

We are now ready to show that pressure group donations move the outcome closer to the median voter.

PROPOSITION 1: Assume that uninformed voters employ the strategic rule of thumb, informed voters employ the counter strategy, all the participants know this to be the case, and candidates maximize their probability of winning. If $\hat{x}_p \geq \hat{x}_m^I$, then under the above conditions:¹⁰

- (i) If $\hat{x}_m^I < \hat{x}_p \leq \hat{x}_m^{I+U}$, then $x^* = \hat{x}_p$. Candidate 1 will accept the offer and win the election.
- (ii) If $\hat{x}_m^I < \hat{x}_m^{I+U} < \hat{x}_p$, then $x^* = \hat{x}_m^{I+U}$. Candidate 1 will accept the offer and win the election.
- (iii) If $\hat{x}_m^I = \hat{x}_p$, then the outcome will be at the pressure group's most preferred position even without an endorsement.
- (iv) If $\hat{x}_m^{I+U} \leq \hat{x}_m^I < \hat{x}_p$, then any offer that the pressure group would like to make would be rejected by the candidate(s).
- (v) The strategic rule of thumb is a best strategy for every uninformed voter.
- (vi) The pressure group will make an offer to at most one candidate (candidate 1).

In a nutshell, pressure group offers will only be accepted if the outcome is closer to the median voter, overall.

PROOF:

¹⁰ Since the uninformed know the relative positions of \hat{x}_p and \hat{x}_m^I , we assume for convenience that \hat{x}_p is to the right of the median informed voter.

(i) Suppose that $\hat{x}_m^I < \hat{x}_p \leq \hat{x}_m^{I+U}$, that candidate 1 has agreed to $x^* = \hat{x}_p$, and that the pressure group has made no offer to candidate 2. If candidate 2 knew that candidate 1 accepted the offer and chose \hat{x}_p , then, by Lemma 1, candidate 2 would choose $\hat{x}_p - 1$.

We will next establish that candidate 1 will always win when she accepts the pressure group offer of $x^* = \hat{x}_p$. All the uninformed voters strictly to the right of \hat{x}_m^{I+U} plus all of the informed voters weakly to the right of \hat{x}_p will vote for candidate 1. This is more than half of all voters who actually vote. So candidate 1 will win if the uninformed voters act according to this rule. Candidate 1 is obviously happy with this state of affairs. If she rejected the offer, she could no longer guarantee that she would win. Accepting the offer is a dominant strategy for candidate 1; setting $x_2 = x_1 - 1 = x^* - 1 = \hat{x}_p - 1$ is best for candidate 2 given $x_1 = x^* = \hat{x}_p < \hat{x}_m^{I+U}$. Hence, we have a Nash equilibrium.

We next determine whether this strategic rule of thumb is best for the uninformed voters. All of the uninformed voters strictly to the right of \hat{x}_m^{I+U} have voted correctly; similarly all of the uninformed voters strictly to the left of \hat{x}_p have voted correctly. The uninformed voters weakly between \hat{x}_p and \hat{x}_m^{I+U} have voted incorrectly, but their preferred candidate has won. So there is no cost to their mistake.

The pressure group has obtained its most preferred position. Clearly, it would not want to choose another position. So if the cost of the campaign contribution is less than the benefit of improved outcome (as we have assumed), the pressure group will enter into an agreement with the candidate. Clearly, there is no advantage to contributing to both candidates' campaigns. Since the cost is greater, we will not observe this to be the case.

Suppose, contrary to the above argument, that the pressure group had chosen $x^* < \hat{x}_m^I$. Further suppose that candidate 1 accepted the offer. Then by Lemma 1, candidate 2 would choose $x^* + 1 \leq \hat{x}_m^I$. Under these circumstances, the uninformed voters, using their strategic rule of thumb, would vote incorrectly; in particular, the uninformed to the right

of the median would vote for the endorsed candidate when they should vote for the other candidate. But these circumstances would not arise; so when (i) holds the uninformed can use their strategic rule of thumb without fear that it could lead them astray.

(ii) Suppose that $\hat{x}_m^1 < \hat{x}_m^{I+U} < \hat{x}_p$.

First consider the case where the pressure group has made the following offer to candidate 1: $x^* = \hat{x}_m^{I+U}$. Using the exact same logic as was used in (i) we can demonstrate both that candidate 1 will win with certainty if she accepts the offer and that the strategic rule of thumb is a best strategy for the uninformed voters. Once again, the pressure group will make an offer to only one candidate.

However, the pressure group would like to be closer to its most preferred position. Hence, it might want to choose an $x^* > \hat{x}_m^{I+U}$. So let us next consider the case where $x^* > \hat{x}_m^{I+U}$ and $\hat{x}_m^{I+U} - \hat{x}_m^1 < x^* - \hat{x}_m^{I+U}$. By symmetry of the loss function, all of the voters weakly to the left of the median voter prefer \hat{x}_m^1 to x^* . The unendorsed candidate can guarantee that it will have at least a 50% chance of winning by choosing \hat{x}_m^1 . If candidate 1 has agreed to the offer, all of the uninformed voters strictly to the left of \hat{x}_m^{I+U} and all of the informed voters weakly to the left of \hat{x}_m^{I+U} will vote for candidate 2, while only those voters strictly to the right of \hat{x}_m^{I+U} will vote for candidate 1. Candidate 1 will lose with certainty. If instead candidate 1 rejects the offer, the best that candidate 1 can do is to choose \hat{x}_m^1 , where the candidate will have a 50% chance of winning. Candidate i will want to reject the offer and choose \hat{x}_m^1 if the other candidate has chosen \hat{x}_m^1 . This is the unique Nash Equilibrium given this particular x^* . Because making offers are costly to the pressure group and it can do better by setting $x^* = \hat{x}_m^{I+U}$, such an offer will not be made in the first place.

We next check whether this strategic rule of thumb makes sense. Suppose that the candidate had accepted the offer. Some of the uninformed voters weakly to the right of the median voter might either mistakenly abstain (if they were at the median) or

mistakenly vote for the endorsed candidate when they should have voted for the unendorsed candidate. But their mistakes are inconsequential as the unendorsed candidate would win in any event. The uninformed voters to the right of \hat{x}_m^{I+U} should not abstain. If they did, then the outcome would be to the left of \hat{x}_m^{I+U} even though the pressure group is to the right of \hat{x}_m^{I+U} as well.

We can immediately see that the median voter cannot be made worse off by the presence of the pressure group. We next show an even stronger result.

Now consider the case where $x^* > \hat{x}_m^{I+U}$ and the median voter weakly prefers x^* over \hat{x}_m^I . If a candidate accepts the offer, the other candidate will win if it chooses any position within $(2\hat{x}_m^{I+U} - x^* + 1, x^* - 1)$. This is because the loss functions are symmetric and both $2\hat{x}_m^{I+U} - x^* + 1$ and $x^* - 1$ are closer to \hat{x}_m^{I+U} than x^* is to \hat{x}_m^{I+U} . So a candidate would not accept the offer 100% of the time. In Appendix 1, Lemma 2 shows that the mixed-strategy equilibrium is worse for the pressure group than choosing $x^* = \hat{x}_m^{I+U}$. Hence, when $\hat{x}_m^I < \hat{x}_m^{I+U} < \hat{x}_p$, the pressure group will choose $x^* = \hat{x}_m^{I+U}$.

(iii) If $\hat{x}_m^I = \hat{x}_p$, then the outcome will be at the pressure group's most preferred position even without an endorsement. For convenience, we have assumed that the pressure group would not undertake the cost of an endorsement in this case. But even if it did, the outcome would be the same.

(iv) The final possibility is that $\hat{x}_m^{I+U} \leq \hat{x}_m^I < \hat{x}_p$.

If $x^* > \hat{x}_m^I$, candidate 1 accepts the offer and candidate 2 chooses \hat{x}_m^I , then candidate 1 would be sure to lose. All of the informed voters weakly to the left of \hat{x}_m^I and all of the uninformed voters strictly to the left of \hat{x}_m^{I+U} would vote for the unendorsed candidate. This is a majority of those voting and does not include any of the informed voters who are to the right of \hat{x}_m^I but still prefer \hat{x}_m^I to x^* and therefore would also vote

for candidate 2. Since the argument is symmetric, both candidates would reject the offer and choose \hat{x}_m^1 if the offer were made to both. The pressure group would therefore not make such an offer in the first place.

We again check that the rule of thumb is a best strategy for an uninformed voter. Suppose that the candidate had accepted the endorsement. Some of the uninformed to the right of \hat{x}_m^{I+U} may incorrectly vote for the endorsed candidate, but this mistake is costless since the unendorsed candidate wins despite their mistake.

If $x^* < \hat{x}_m^1 - 1$ and candidate 1 accepts the offer, then the winning outcome would be less than \hat{x}_m^1 regardless of how the uninformed vote. If $x^* = \hat{x}_m^1 - 1$ and candidate 1 accepts the offer, then the winning outcome would not be greater than \hat{x}_m^1 regardless of how the uninformed vote. So, clearly, the pressure group would not want to make such an offer in the first place as it would be better off by choosing an $x^* \geq \hat{x}_m^1$ and still better off by not making an offer at all. If the pressure group did make such an offer and the candidate accepted it, then the uninformed voters would vote incorrectly. But this circumstance will never arise.¹¹

In all of these cases, it never makes sense for pressure group to endorse more than one candidate. Hence, we have proven point (v).

Q.E.D.

REMARK 1: In Proposition 1, knowledge of the relative positions of \hat{x}_m^1 and \hat{x}_p allows the uninformed voters to infer the relative positions x_1 and x_2 . Identical results occur if the voters do not know \hat{x}_m^1 , but advertising is truthful regarding relative position. That is, political advertising truthfully informs the uninformed voters whether $x_1 < x_2$ or vice

¹¹ Since the uninformed know when the median overall is to the left of the median of the informed, the uninformed could choose not to employ their strategic rule of thumb in this case. It makes no difference because in any event there will be no endorsement.

versa. For example, the National Rifle Association truthfully states that candidate 2 is more in favor of gun control (a bad from the viewpoint of the NRA) than candidate 1. Uninformed voters can also make the proper inferences when there are two pressure groups with opposing interests even when advertising has no content and the uninformed voters do not know \hat{x}_m^I . Hence the strategic rule of thumb works under these alternative scenarios, as well.

REMARK 2: In equilibrium, the candidates will tell the truth. If there is an endorsement, the endorsed candidate will win when she tells the truth. So there is no advantage to lying. If there is no endorsement, the uninformed can infer some of the truth (that the candidates are both located at the median voter, whose exact position may not be known by the uninformed voter). So again there is no advantage to lying.

REMARK 3: If uninformed voters paid no attention to political advertising (say by abstaining regardless of preference) and pressure groups knew this to be the case, then the equilibrium outcome would be no political advertising. This equilibrium is unlikely on empirical and theoretical grounds. We do observe political advertising, suggesting that “paying no attention” is not the strategy undertaken by the uninformed voters. Furthermore, this kind of abstention would not be sequentially rational – if there were an endorsement, then it would make no sense for the uninformed voters to ignore it. The strategic rule of thumb is better for both the pressure group and the median voter.¹²

REMARK 4: Political advertising can only have the desired effect on uninformed voters if they neither know too little or too much. Slight variations in the amount of knowledge held by the voters can undermine the power of pressure groups. Consider the following two opposing possibilities: (i) If uninformed voters know the relative position of the

¹² If the uninformed voters had the contrary rule of thumb (voting against the endorsed candidate if the voter is strictly to the right of the median voter, etc.) and the pressure group and candidate knew this to be the case, then the pressure group and candidate might be able to engage in a contrary advertising campaign, as well. The outcome would be the same even though there would be lying.

candidates in the absence of political advertising, then advertising can have no effect on the outcome of the election – the voters already have the requisite information. Consequently, there is no need for pressure group donations that fund such advertising.

(ii) If the uninformed voters do not know the relative positions of \hat{x}_m^1 and \hat{x}_p (they think that \hat{x}_p is equally likely to be on the left or right of \hat{x}_m^1) and advertising does not directly reveal the relative positions of x_1 and x_2 , then all of the uninformed voters will vote against the endorsed candidate because both candidates have the same mean (\hat{x}_m^1) but the variance of the endorsed candidate is higher than the variance of the unendorsed candidate (since pressure group financing pulls the endorsed candidate farther away from \hat{x}_m^1) and voters are risk averse. Therefore, the candidate would not accept money from the pressure group in the first place.

REMARK 5: Suppose that $x\%$ of the uninformed do not use the strategic rule of thumb, but instead abstain. If the surveys of voter attitudes towards policies are based on those who are likely to vote, then the $(100 - x)\%$ of the uninformed who do not abstain would alter their strategic rule of thumb to vote for the endorsed candidate if the voter is to the right of the median of those voters *who are likely to vote*. Pressure group donations would still move the outcome toward the median voter, overall, but just not as close.

There are other possible variations of the model. For example, we have not considered the case where the pressure group gains access to the winning candidate (although the assumed lexicographic preferences of the pressure group may be interpreted this way). Also we have not considered the case where there is more than one pressure group. These variations are likely to strengthen the results. What we have here is a worst-case scenario – one pressure group that does not value access. Nevertheless, the outcome is that the pressure group donations move the outcome from the median of the informed to the median over all voters. Having more than one pressure group eliminates the monopoly power of the pressure group and introduces competition. Gaining access increases the power of the vote-maximizing candidates vis a vis the pressure group. Such changes are unlikely to make things worse for the median voter. Indeed it is relatively easy to show that if there are two pressure groups, each on the opposite side of the median voter, then both candidates would always be at the median voter, overall.

However, this result is not surprising, and the assumption of two opposing but equally powerful pressure groups may be less realistic than the assumption of one pressure group (e.g., consumer pressure groups, if they exist, may be no match for producer pressure groups).

Fedderson and Pesendorfer (1998) also consider a situation where the uninformed have different preferences from the informed voters, but their model is quite different from that considered here. In their article, the uninformed are uninformed about something that is of value to all voters. For example, all voters prefer that a proposed bridge expansion be inexpensive to build, but perhaps only those who are heavy users of the bridge know whether this is likely to be the case. In this paper, the voters are unsure as to which candidate wants to build the bridge. Most important, in their work, there are no maximizing candidates and pressure groups that create the choice set for the voters, as is the case here. This narrowed choice set means that the strategic rule of thumb will not mislead the uninformed voters. An endorsement thus allows the uninformed to make the appropriate inferences so that the “uninformed” are no longer uninformed. Despite these differences between the Fedderson and Pesendorfer article and this paper, there is an underlying similarity. The strategic rule of thumb makes the median informed player the pivot; so by voting, the uninformed are implicitly leaving the decision to the more informed, a result in tune with their paper.

We next turn our attention to the case where candidates have policy positions.

PROPOSITION 2: Suppose that the uninformed voters employ the strategic rule of thumb, informed voters employ the counter strategy, and all the participants know this to be the case. If candidates maximize expected policy outcome, then campaign advertising financed by the pressure group will shift the outcome toward the median voter. The strategic rule of thumb is best for each uninformed voter.

The proof is found in the appendix. The logic is reminiscent of the proof for Proposition 1, but there are many details to consider. Here we will outline the argument for the case where $\hat{x}_m^I < \hat{v}_2 < \hat{x}_m^{I+U} < \hat{x}_p, \hat{v}_1$. Despite the fact that both the pressure group and candidate 1 prefer to be to the right of the median voter, the winning position will be

at the median voter's most preferred position. That is, the pressure group will choose $x^* = \hat{x}_m^{I+U}$, and candidate 1 will accept the offer and win.

Suppose first that $x^* = \hat{x}_m^{I+U}$ and that candidate 1 has accepted the offer. If $x_2 < \hat{x}_m^{I+U}$, then all of the uninformed voters strictly to the right of \hat{x}_m^{I+U} and all of the informed weakly to the right of \hat{x}_m^{I+U} will vote for the endorsed candidate. This is a majority of those voting. So candidate 1 will win and implement \hat{x}_m^{I+U} .

Once again we check whether the rule of thumb used by the uninformed is sensible. Since $x_2 < \hat{x}_m^{I+U}$, some of the uninformed to the left of \hat{x}_m^{I+U} may have incorrectly voted for candidate 2, but candidate 1 would win despite their mistake.

If $x_2 = \hat{x}_m^{I+U}$, then the counter-strategy of the informed means that all of the informed voters weakly to the right and possibly some to the left of \hat{x}_m^{I+U} will vote for the endorsed candidate. Hence, the endorsed candidate will win in this case too. Note that even if the indifferent informed voters did not use the counter-strategy and instead voted for each candidate with probability 1/2, then the winning outcome would still be \hat{x}_m^{I+U} .

Because the candidates have policy preferences, candidate 2 would not choose an $x_2 > \hat{x}_m^{I+U}$. If candidate 2 does so, then candidate 2 will lose and \hat{x}_m^{I+U} will again be implemented (which is better for candidate 2 than candidate 2 winning on such a platform). Candidate 2 will receive fewer votes than if it had chosen $x_2 \leq \hat{x}_m^{I+U}$. Given its lexicographic preferences, candidate 2 would not want to choose $x_2 > \hat{x}_m^{I+U}$.

If $x_2 > \hat{x}_m^{I+U}$, then the strategic rule of thumb would be misleading; but, as we have shown in the previous paragraph, such a situation will not arise.

When candidate 1 has agreed to $x^* = \hat{x}_m^{I+U}$, candidate 1 will win the election regardless of candidate 2's choices. So candidate 2's lexicographic preference would be to choose $\hat{x}_m^{I+U} - 1$.

If candidate 2 has chosen $\hat{v}_2 \leq x_2 < \hat{x}_m^{I+U}$, then candidate 1 cannot improve the outcome by rejecting the offer. If candidate 1 rejects the offer and chooses any $x_1 > x_2$, candidate 1 will lose the election with certainty and the policy outcome will be $x_2 < \hat{x}_m^{I+U}$, which is inferior to \hat{x}_m^{I+U} from candidate 2's viewpoint. If candidate 1 chooses $x_1 = x_2 < \hat{x}_m^{I+U}$, then the outcome would again be less than \hat{x}_m^{I+U} . And if $\hat{v}_2 \leq x_1 < x_2 < \hat{x}_m^{I+U}$, then the outcome would be even worse from candidate 1's point of view. For obvious reasons, neither candidate would want to choose $x_i < \hat{v}_2$.

Now suppose that $x^* > \hat{x}_m^{I+U}$ and candidate 1 has accepted the offer. Then candidate 2 would choose the larger of the following two, \hat{v}_2 and $2\hat{x}_m^{I+U} - x^* + 1$ and win the election. Recall that all of the voters have symmetric loss functions. $2\hat{x}_m^{I+U} - x^* + 1$ is closer to the median voter than x^* ; so, the median voter and all of the voters to the left of the median prefer $2\hat{x}_m^{I+U} - x^* + 1$. Hence, all of the informed weakly to the left of \hat{x}_m^{I+U} and all of the uninformed strictly to the left of \hat{x}_m^{I+U} would vote for the unendorsed candidate (candidate 2). This is at least a majority of those voting. If $2\hat{x}_m^{I+U} - x^* + 1 < \hat{x}_m^{I+U}$, then the pressure group and candidate 1 would be better off if $x^* = \hat{x}_m^{I+U}$ and the outcome is \hat{x}_m^{I+U} . If $2\hat{x}_m^{I+U} - x^* + 1 = \hat{x}_m^{I+U}$, then the pressure group would be better off on lexicographic grounds (other things equal, it prefers to endorse the winning candidate) if it had set $x^* = \hat{x}_m^{I+U}$. When $x^* > \hat{x}_m^{I+U}$, then $2\hat{x}_m^{I+U} - x^* + 1$ cannot be greater than \hat{x}_m^{I+U} .

When candidate 1 has agreed to $x^* = \hat{x}_m^{I+U}$, candidate 1 will win the election regardless of candidate 2's choices. So, as argued earlier, candidate 2's lexicographic preference would be to choose $\hat{x}_m^{I+U} - 1$, which gives candidate 2 the largest vote share.

For a more complete analysis see Appendix 2.

REMARK: Consider the following variation in the basic model: candidate 2 has to make his decision before knowing the value of x^* , and candidate 1 has to make her decision before knowing candidate 2's choice. Then candidate 2 would choose $x_2 = \hat{x}_m^{1+U} - 1$, the pressure group would set $x^* = \hat{x}_m^{1+U}$, and candidate 1 would accept the pressure group's offer and win in this alternative version of the game.

C. DISCUSSION

In this paper, as is the case for special-interest voting models in general, the problem of credible commitments has been assumed away. Of course, candidates can renege on their promises to special interests or voters.¹³ If candidates renege on their promises to special interests, special interests will not contribute to campaigns. If candidates renege on their promises to voters, voters will ignore promises.

I have presented a model where the pressure group provides valuable information. Under such circumstances, it is possible that the pressure group provides too much valuable information! The right-wing pressure group asks itself whether the benefit to its members from a move to the right by the candidate compensates for the cost of the campaign contributions. The pressure group does not consider the cost to others of this move right. So *including the cost of advertising*, the move right may not be welfare improving. In our analysis, the move right improves the welfare of a majority of voters (which the pressure group does not consider in its own benefit calculations either); so, even if the cost of advertising is included, it is still likely to be welfare improving since more people benefit than lose from the move. While pressure groups have been accused of many things, providing too much valuable information is not one of them. In the rest of the paper, I have ignored the opportunity cost of advertising and instead have concentrated on the median voter result.

¹³ But see Alesina (1988), Lott and Reed (1989) and Harrington (1992) for various ways candidates and political parties establish credible commitments.

The discussion has been in terms of candidates, but the word “political party” can be exchanged for the word “candidate” without doing damage to the model. The model therefore can also be used to analyze the politics of Great Britain where the political party has more control than in the United States.

D. CONCLUDING REMARKS

We have assumed that uninformed voters use a simple rule of the thumb. Because in equilibrium this rule of thumb works in favor of each voter who employs it, no uninformed voter will want to defect from using this rule of thumb. Indeed, we have shown that even if the uninformed voter were to become fully informed, the uninformed voter could not improve the electoral outcome from his point of view. Thus we would expect this rule of thumb to survive. Given the information structure described in the paper, other rules of thumb do not do very well and thus are unlikely to be implemented. If uninformed voters abstain (or flip a coin), then the (expected) outcome will be at the median of the informed rather than the median of all voters; if the uninformed always vote for (against) the endorsed candidate, then the outcome will be worse than if the uninformed abstained when the endorser is closer to (further away from) the informed voter median than the uninformed voter median. Of course, there may be other information structures where the set of facts known and the set of facts not known by the uninformed voters differ from the sets characterized here. For each, information structure, a different rule of thumb may be appropriate. This paper thus opens up a whole new research enterprise.

We have modeled the behavior of uninformed voters when campaigns are financed by special interests in the context of a spatial model where both candidates' positions are endogenous. In particular, we have shown how uninformed but rational voters can make intelligent inferences and act strategically with simple rules of thumb. The work here thus extends the basic Downsian model to the case where there are pressure groups and uninformed voters.

Contrary to the view of many, the models presented here suggest that even uninformed voters can respond rationally to political advertising and that campaign

donations and endorsements by special interests tend to move the outcome toward, instead of away from, the median voter.

The following question naturally arises. If, as argued in this paper, campaign contributions by pressure groups aid the democratic process, then why do we see so many attempts like the McCain-Feingold bill to put limits on campaign financing? The answer lies in this paper, also. As we have seen, pressure group contributions to political campaigns hurt some of the participants – informed voters on average and those informed voters whose preferences run contrary to the median uninformed voter in particular, as well as those policy-preferring candidates whose preferences are more aligned with the median informed voter than with the median uninformed voter. It is not surprising that these actors and their supporters would be against unlimited campaign financing.

Pressure groups have often been viewed as the bad guys of democracy. But “special interests” is just a pair of words meaning self interest, and from Adam Smith onward, we know that “it is not from the benevolence of the butcher or the brewer ... that we expect our dinner, but from their regard to their own interest.” Here I have argued that the invisible hand works for pressure groups also. Instead of viewing pressure groups as undermining the democratic process, it may be more enlightening to view them as institutions that reduce transaction costs.¹⁴ Just as speculators (who were once thought of as the bad guys of financial markets) are now seen as transaction-cost reducers, pressure groups need to be seen in a similar light. Once we have altered our perspective, we are primed for a new research agenda. For example, why efficiency would lead special interests to be organized in the way that they are and how or why they are different from political parties.

Perhaps even more important than the change in perspective on pressure groups is the added understanding on how uninformed voters can rationally respond to political advertising. This paper has shown how uninformed voters can make intelligent inferences based on their knowledge of the relevant actors’ motivations and how the uninformed can

¹⁴ See Coughlin, Mueller and Murrell (1990) for a discussion of how pressure groups transmit information to the candidates. This area of research is quite an interesting one but in a different direction from the question considered here -- does political information provided by pressure group donations misguide uninformed voters.

make use of optimal rules of thumb that cannot be manipulated by candidates or pressure groups. Future work will no doubt consider still different information sets available to the uninformed and how the strategy of the uninformed voters changes in response to the changes in the information available.

APPENDIX 1 (can be dropped in published version)

In this appendix, we consider the mixed-strategy equilibrium that arises when a majority of voters prefer \mathbf{x}^* over $\hat{\mathbf{x}}_m^I$ and $\mathbf{x}^* > \hat{\mathbf{x}}_m^{I+U}$. Note that we will use the bold typeface when discussing $\mathbf{x}^* > \hat{\mathbf{x}}_m^{I+U}$ and the normal typeface when discussing $\mathbf{x}^* = \hat{\mathbf{x}}_m^{I+U}$.

LEMMA 2: The pressure group prefers $\mathbf{x}^* = \hat{\mathbf{x}}_m^{I+U}$ over any $\mathbf{x}^* > \hat{\mathbf{x}}_m^{I+U}$.

PROOF: We have already eliminated any \mathbf{x}^* such that a majority of voters strictly prefer $\hat{\mathbf{x}}_m^I$ over \mathbf{x}^* . So let us consider any $\mathbf{x}^* > \hat{\mathbf{x}}_m^{I+U}$ such that a majority of voters weakly prefer \mathbf{x}^* over $\hat{\mathbf{x}}_m^I$.

First consider the case where $\mathbf{x}^* > \hat{\mathbf{x}}_m^{I+U}$ and a majority of voters strictly prefer \mathbf{x}^* over $\hat{\mathbf{x}}_m^I$. The matrix of possibilities is then the following:

PROBABILITY THAT CANDIDATE 1 WILL WIN THE ELECTION¹⁵

		CANDIDATE 1				
		-----DON'T ACCEPT-----				
ACCEPT		$\hat{\mathbf{x}}_m^I$	$2\hat{\mathbf{x}}_m^{I+U} - \mathbf{x}^*$	$2\hat{\mathbf{x}}_m^{I+U} - \mathbf{x}^* + \mathbf{1}$	$\mathbf{x}^* - \mathbf{1}$	\mathbf{x}^*
	Candidate 2					
	$\hat{\mathbf{x}}_m^I$	50%	0%	0%	0%	100%
	$2\hat{\mathbf{x}}_m^{I+U} - \mathbf{x}^*$	100%	50%	0%	0%	50%
	$2\hat{\mathbf{x}}_m^{I+U} - \mathbf{x}^* + \mathbf{1}$	100%	100%	50%	0%	0%
	$\mathbf{x}^* - \mathbf{1}$	100%	100%	100%	50%	0%
	Accept \mathbf{x}^*	0%	50%	100%	100%	50%

¹⁵ It can be shown that the other possible positions are dominated by the strategies listed.

We will now consider the game matrix in greater detail.

When both candidates choose the same position, they each have a 50% chance of winning. Thus we have explained the diagonal values. Henceforth we will consider the case where the candidates have chosen different positions.

Suppose that there are no endorsements, then the uninformed cannot distinguish between the candidates and the candidate closest to the median informed voter will win. When there are no endorsements, the uninformed either do not vote or vote for each candidate with probability $1/2$ (if the latter is the case, then the relevant entries should be $100 - \varepsilon$ instead of 100 or $0 + \varepsilon$ instead of 0 with ε approaching 0 as the number of uninformed voters increases toward infinity). The outcome of the election therefore depends on the informed voters. The unendorsed candidate who is closest to \hat{x}_m^1 will win the election. Hence all of the off-diagonal elements above the diagonal and to the left of the accept column are 0% because candidate 1 is further away from the median informed voter. For similar reasons, all of the off-diagonal elements below the diagonal and above the accept row are 100% .

If candidate 1 accepts the endorsement and chooses \mathbf{x}^* and candidate 2 chooses \hat{x}_m^1 , then a majority of those voting will vote for candidate 1. All of the informed weakly to the right and all of the uninformed voters strictly to the right of \hat{x}_m^{1+U} (a majority of those voting) plus some of the informed voters to the weakly to the left of \hat{x}_m^{1+U} will vote for candidate 1. So candidate 1 will win with certainty. It is possible that some of the uninformed voters mildly to the left of \hat{x}_m^{1+U} mistakenly vote for candidate 2, but there is little cost to their mistake as their preferred candidate (candidate 1) wins despite their mistake.

If candidate 1 accepts the endorsement and chooses \mathbf{x}^* and candidate 2 chooses $\mathbf{x}^* - 1$, then a majority of those voting will vote for candidate 2 (all of the uninformed

voters strictly to the left of \hat{x}_m^{I+U} plus all of the informed voters weakly to the left of $\mathbf{x}^* - \mathbf{1}$ vote for candidate 2). So candidate 2 will win with certainty. It is possible that some of the uninformed voters mildly to the right of \hat{x}_m^{I+U} vote for the wrong candidate, but again there is little cost to their mistake as their preferred candidate wins.

Recall that the voter's utility functions are symmetric. Thus, the median voter is indifferent between $2\hat{x}_m^{I+U} - \mathbf{x}^*$ and \mathbf{x}^* (which are equidistant from \hat{x}_m^{I+U}) and strictly prefers $2\hat{x}_m^{I+U} - \mathbf{x}^* + \mathbf{1}$ over \mathbf{x}^* . By a similar logic to the previous paragraph, we can show that candidate 1 will lose if she accepts the endorsement and candidate 2 chooses $2\hat{x}_m^{I+U} - \mathbf{x}^* + \mathbf{1}$.

Finally, if one candidate accepts the offer and the other candidate chooses $2\hat{x}_m^{I+U} - \mathbf{x}^*$, the median voter is indifferent. Then the median informed voter will vote for each candidate with probability 1/2 and the median uninformed voter will abstain (this is appropriate since they are indifferent between the two choices). All voters strictly to the right of the median voter will correctly vote for the endorsed candidate, while all voters strictly to the left of the median voter will correctly vote for the other candidate. Each candidate will have a 50% chance of winning.

It is easy to see that $\mathbf{x}^* - \mathbf{1}$ is dominated by $2\hat{x}_m^{I+U} - \mathbf{x}^* + \mathbf{1}$.

There are no pure-strategy equilibria. It is easy to see that the only symmetric mixed-strategy equilibrium is for each candidate to choose $2\hat{x}_m^{I+U} - \mathbf{x}^*$ half the time and to choose \mathbf{x}^* the other half of the time. But this means that \mathbf{x}^* will win half the time and $2\hat{x}_m^{I+U} - \mathbf{x}^*$ will win half the time, with an expected value of \hat{x}_m^{I+U} . Since the pressure group has a strictly concave utility function, it would prefer the sure thing of \hat{x}_m^{I+U} , which it can achieve by setting $x^* = \hat{x}_m^{I+U}$.

The last possibility is that the median voter is indifferent between \hat{x}_m^I and \hat{x}_m^{I+U} . This means that $\hat{x}_m^I = 2\hat{x}_m^{I+U} - \mathbf{x}^*$. The game matrix is the same as before except the first

row and column are eliminated and the new first row and column are labeled $\hat{\mathbf{x}}_m^I = 2\hat{\mathbf{x}}_m^{I+U}$ - \mathbf{x}^* . The analysis is just the same as before.

Q.E.D.

Admittedly, the concept of endorsing both candidates does not make much sense, but we want to deal with the possibility that the pressure group implicitly threatens each candidate that if the candidate does not accept its conditions, the other candidate will be in an advantageous position. Perhaps a good substitute for “endorsing” is “providing campaign funds for advertising.”

APPENDIX 2 (can be dropped in published version)

PROPOSITION 2: Suppose that the uninformed voters employ the strategic rule of thumb informed voters employ the counter strategy, and all participants are aware of this being the case. If candidates maximize expected policy outcome, then campaign advertising financed by the pressure group will shift the outcome toward the median voter. The strategic rule of thumb is best for each uninformed voter.

PROOF: To minimize confusion, we will assume that the preferred position of candidate 2 is weakly to the left of candidate 1's preferred position (that is, $\hat{v}_2 \leq \hat{v}_1$). Once again we assume that $\hat{x}_m^I \leq \hat{x}_p$. Recall that in the absence of a pressure group offer, the outcome will be at \hat{v}_2 .

(i) If $\hat{x}_m^I, \hat{v}_2 < \hat{x}_p \leq \hat{v}_1 < \hat{x}_m^{I+U}$, then the pressure group will choose $x^* = \hat{x}_p$, candidate 1 will accept the offer, and \hat{x}_p will be implemented.

Suppose first that candidate 1 has accepted the offer. If $x_2 \leq \hat{x}_p$, then all of the uninformed voters strictly to the right of \hat{x}_m^{I+U} and all of the informed weakly to the right of \hat{x}_m^{I+U} will vote for the endorsed candidate. This is a majority of those voting. So candidate 1 will win and implement \hat{x}_p . Because the candidates have policy preferences, candidate 2 would not choose an $x_2 > \hat{x}_p$. If candidate 2 did, then candidate 2 would lose and \hat{x}_p would again be implemented (which is better for candidate 2 than candidate 2 winning on such a platform). \hat{x}_p will be implemented regardless of the value of x_2 . If we want to pin down the value of x_2 , we would invoke the lexicographic preference ordering for candidate 2 and assume that candidate 2 chooses $x_2 = \hat{x}_p - 1$ (the logic would be the same if $x_2 = \hat{v}_2$).

If candidate 2 has chosen $x_2 = \hat{x}_p - 1$ (or any other value between \hat{v}_2 and $\hat{x}_p - 1$), then candidate 1 cannot improve the outcome by rejecting the offer. If it rejects the offer and chooses any $x_1 > x_2 = \hat{x}_p - 1$, candidate 1 will lose the election with certainty and the policy outcome will be $\hat{x}_p - 1$, which is inferior to \hat{x}_p from candidate 2's viewpoint. If candidate 1 chooses $x_1 = x_2 = \hat{x}_p - 1$, then the outcome would again be $\hat{x}_p - 1$. For obvious reasons, candidate 2 would not want to choose $x_1 < \hat{x}_p - 1$.

Thus given the pressure group offer $x^* = \hat{x}_p$, candidate 1 accepting the offer and candidate 2 setting $x_2 = \hat{x}_p - 1$ is a Nash equilibrium (we leave to the reader to prove that the equilibrium value for candidate 1 is unique). There would be no need for the pressure group to make offers to both candidates. Clearly, this is the best outcome for the pressure group (having assumed that the benefit of improved position is greater than the cost of financing the political advertising).

(ii) If $\hat{x}_m^I, \hat{v}_2 < \hat{v}_1 < \hat{x}_p \leq \hat{x}_m^{I+U}$, then an offer x^* will be made to candidate 1 and accepted by candidate 1 if and only if $\hat{v}_1 < x^* \leq \hat{x}_p$ and $\hat{v}_1 - \hat{v}_2 \geq x^* - \hat{v}_2$.

If candidate 1 accepts the offer, candidate 1 will win the election by a logic similar to that use in (i.) Candidate 1 will accept the offer only if her utility is at least as great as would occur under no endorsement; since the utility functions are symmetric, this is equivalent to requiring $\hat{v}_1 - \hat{v}_2 \geq x^* - \hat{v}_2$. The pressure group will want to maximize its utility given this constraint; hence, x^* will be as close to \hat{x}_p as possible, subject to the constraint. $\hat{v}_1 - \hat{v}_2 \geq x^* - \hat{v}_2$.

(iii) If $\hat{x}_m^I < \hat{v}_2 < \hat{x}_m^{I+U} < \hat{x}_p, \hat{v}_1$, then the pressure group will choose $x^* = \hat{x}_m^{I+U}$, candidate 1 will accept the offer, and \hat{x}_m^{I+U} will be implemented. This has already been demonstrated in the text.

(iv) If $\hat{x}_m^I, \hat{v}_2 < \hat{v}_1 < \hat{x}_m^{I+U} < \hat{x}_p$, then an offer will be made and accepted if and only if (a) $\hat{v}_1 < x^*$ and $\hat{v}_1 - \hat{v}_2 \geq x^* - \hat{v}_2$ and (b) $x^* \leq \hat{x}_m^{I+U}$.

Point (a) was demonstrated in (ii) and point (b) was demonstrated in (iii).

(iv) If $\hat{x}_m^{I+U} < \hat{x}_m^I, \hat{v}_2 < \hat{v}_1 < \hat{x}_p$, then no offer will be made.

Suppose to the contrary. If $x^* > \hat{v}_2$, candidate 1 accepts the offer, and candidate 2 chooses \hat{v}_2 as his position, then all of the uninformed voters strictly to the left of \hat{x}_m^{I+U} and all of the informed voters weakly to left of \hat{v}_2 would vote for candidate 2. This is a majority of those voting. Since the outcome is not changed and offers are costly, the pressure group would not make such an offer in the first place. The same holds for $x^* = \hat{v}_2$.

If $x^* > \hat{v}_2$, candidate 1 accepts the offer, and candidate 2 chooses \hat{v}_2 , then those uninformed voters between the median and $(\hat{v}_2 + x^*)/2$ would either incorrectly vote for candidate 1 or abstain when they should vote for candidate 2. But once again their mistake would be inconsequential as candidate 2 would win despite their mistake.

The pressure group would not want to set $x^* < \hat{v}_2$ because then the best thing that could happen is that $x_2 = \hat{v}_2$ and candidate 2 wins. So the pressure group would not make such an offer in the first place (note that once again that the strategic rule of thumb would lead the uninformed voters astray in a situation that never arises).

A similar logic holds for the remaining permutations.

Q.E.D.

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