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AND THE NATURE OF POLITICAL ADVERTISING**

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ABSTRACT

Candidates may vary in quality, where quality is some characteristic orthogonal to policy. This "simple modification" has for the most part defied integration into the Downsian framework. Here we add the following complicating factors. We consider the possibility that there are uninformed voters who are ignorant of the candidates' relative quality. However, a pressure group with inside information regarding the quality of the candidates may endorse one of the candidates as the high-quality candidate. We assume that the uninformed voters behave rationally in the presence of this endorsement. We show that campaign endorsements by the pressure group are generally welfare improving even though the pressure group takes advantage of its private information.

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KEYWORDS: Candidates, pressure groups, elections, uninformed voters

**CANDIDATE QUALITY, PRESSURE GROUP ENDORSEMENTS,
AND THE NATURE OF POLITICAL ADVERTISING**

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Political advertising presents the following conundrum: If voters are informed, then there is no need for advertising; and if voters are uninformed, then advertising may be dishonest and the voters would not be able to tell. So, why would voters pay any attention to political advertising?

To add substance to the puzzle, suppose that a pressure group has inside information on a candidate's integrity or some other characteristic that is valued by the voters independent of the policy position taken by the candidate.¹ The pressure group might agree to publicly endorse one of the candidates as the high-quality candidate even though this were not the case if the candidate's policy position were sufficiently close to the pressure group's preferred position to make up for the lower quality. So, again we are lead to ask why would the voters pay attention to such endorsements.²

This paper provides the following answer. Competition between the candidates results in a set of choices, such that the pressure group will always want to tell the truth about the relative quality of the candidates.

This paper also provides a different perspective on the role of pressure groups in the democratic process. In general, the role of pressure groups is viewed as negative. Here, we show

¹ These are sometimes termed valence properties. See Stokes (1992) who argues for the importance of these valence properties. The 2000 U.S. presidential election was often characterized as a choice between integrity and competence. Pressure groups are likely to know the valence characteristics of the candidates as the pressure groups have lobbyists that are actively engaged in the political process.

² An easy way of ducking the conundrum is to assume that the voters respond positively to advertising regardless of the true impact on their welfare. But our intent here is to deal with rational voters.

that pressure group endorsements are likely to improve the welfare of the median voter, and, under plausible assumptions, pressure group endorsements improve the welfare of *all* voters.

1. LITERATURE REVIEW

This paper differs from previous work on voting in the presence of pressure group endorsements or contributions.

Baron (1994), Mueller and Stramann (1994) and Grossman and Helpman (1996) assume functional (reduced) form behavior by uninformed voters -- uninformed voters have a higher probability of voting for the candidate doing more advertising (even if these voters would be better off voting for the other candidate). They find that pressure groups *on average* reduce the welfare of the median voter. Here, in contrast, the uninformed voter is fully rational and votes for the candidate who maximizes the voter's expected utility. The results are contrary, as well. In this paper, pressure groups are shown to generally aid the democratic process rather than harm it.

Lohmann (1998) shows that candidates respond more to informed voters than to uninformed voters. If informed voters tend to be members of pressure groups, then the power of pressure groups is explained. Unlike this paper, she does not deal with the role of endorsements or how the uninformed are influenced by such endorsements. Grossman and Helpman (1999) do deal with endorsements, but their analysis is confined to the effect of the pressure group's endorsements on its members and not on those uninformed voters who are not members of the pressure group. Because they do not deal with strategic behavior by uninformed voters whose interests are not allied with pressure groups, these last two papers (in comparison to the present paper) find that pressure groups have more power in the political process with more negative implications for the welfare of the median voter.

Enelow and Hinich (1982), Londregan and Romer (1993) and Groseclose (2001) model endogenous candidates who differ in quality and voters who are rational and informed. They do not consider pressure groups. Enelow and Hinich assume that the valence dimension may be positive or negative, but on average is 0, and therefore on average it has no effect. Londregan and Romer assume that candidates are interested in policy and that voters have concave probability of voting functions. Here, candidates are solely interested in winning and in equilibrium voters are perfectly informed so that there is no probabilistic voting. And, as already noted, here, we are concerned with the role of pressure groups.

Grofman and Norrander (1990) have a model of campaign endorsements, but both candidate positions are exogenous. In Cukierman (1991) uninformed voters rely on poll data to infer quality, but there are no pressure groups and again the candidate positions are exogenous.³ Here, the candidates' positions are endogenous. Ashworth (2004) and Wittman (2004) assume that the voters do not know the candidates positions – the issue of quality does not arise. Unlike the present paper, Ashworth assumes that all advertising is truthful rather than truth being an equilibrium outcome.

This paper is closest to Prat (2002A, 2002B) and Gerber (1999). They model rational voters, pressure group endorsements, and candidates who differ in quality. But there are significant differences in approach and results. They have models of costly signaling – there is no content to the advertising. To use Prat's phrase, the pressure group "burns money" to demonstrate its beliefs. The work presented here involves cheap talk – in equilibrium, the advertising is informative. In the Prat articles, voters may collectively obtain the truth after the pressure group has come to an agreement with the candidate(s). The nature of the agreement between the pressure group and the candidate depends on the likelihood of the voters obtaining the truth. Here, the voters have no independent way of ascertaining the truth, yet the outcome is better for the median voter. Signaling models have a continuum of equilibria. The Prat and Gerber models are no exception. Here there are only three possible cheap talk equilibria with consistent beliefs (a babbling equilibrium where there is no endorsements, and two other equilibria that have identical outcomes but opposing beliefs). In Prat (2002B), the voters are uniformly distributed, there are multiple policy dimensions, and only the incumbent's position can be influenced by pressure group contributions (the challenger always chooses the median voter). Here, the voter distribution is not so restricted, there is one policy dimension, and either candidate can receive funds and be influenced by the contributions of a pressure group (the same holds for Prat, 2002A). In Gerber (1999) the pressure group donates money to the challenger's campaign in return for favors if the candidate is elected (the incumbent's

³ Further afield is work by Sloof (1998) and Potters, Sloof, and Van Winden (1997). They assume two types of candidates, but the candidates do not take a position along a continuum. Instead, they assume that the incumbent's position is known and that the challenger's position is either better or worse (there is no difference in quality). Thus their work is only indirectly related to the issues raised here. Although Ansolobehere and Snyder (2001) model valence issues, their work too is only tangentially related. Austen-Smith (1987) considers rational voting and informative advertising when the voters are unsure about policy position. He does not deal with quality. Lupia (1992) does not consider quality either. In addition, Lupia assumes that one of the candidate's positions is exogenous.

position is treated as a given). These authors show that when pressure groups have extreme preferences, the median voter is worse off by the presence of pressure groups, contrary to the results obtained here.

Melding quality differences with a spatial model is not an easy task. As Groseclose (2001) has shown, when the voters are perfectly informed about both the candidates' positions and their relative quality, there is no pure-strategy equilibrium (that is why most of the literature has assumed that one or both of the candidates' positions are exogenous or that voting is probabilistic). The intuition behind the result is that the high-quality candidate wants to choose a position identical to the low-quality candidate, thereby getting all the votes. But the low-quality candidate wants to be sufficiently far away from the high-quality candidate so that some voters prefer the low-quality candidate because the low-quality candidate's closer position more than makes up for his lack of quality. Thus even the simple model presents difficulties.⁴ We are now complicating the model by making the voters uninformed and introducing a pressure group. Clearly the added complexity must come at some cost. We will have to make some simplifying assumptions about the voters' utility functions, but we believe that they are reasonable and justified. As we will show, this more complicated model yields a perfect Bayesian equilibrium in the negotiated offers.

The paper is organized as follows: Part 1 presents the basic model, where the candidates make offers to the one pressure group. Part 2 considers the effect of endorsement costs. Part 3 looks at the case when there are two or more pressure groups. Part 4 again considers the effect of endorsement costs, but this time in the context of there being two pressure groups. Part 5 deals with other variations. Part 6 is the conclusion.

1. THE BASIC MODEL

We start with a basic model where the structure of the argument is clearest. Later we will consider several complicating variations. The assumptions of the basic model are:

A. Let x be a position on a political continuum, $[A, B]$. $f(x) > 0$ is the continuous density function of the voters' most preferred positions, and $F(x)$ is the cumulative distribution. $F(B) = 100\%$ (I use this convention so that I can refer to the percent of votes). I assume a continuum of voters for

⁴ See Aragonés and Palfrey (2002) for the mixed-strategy solution.

mathematical convenience; similar results can be obtained with a finite number of voters. x^C is the position chosen by candidate C.

B. $U(x, x^C, Q^C) = -|x^C - x| + Q^C$ is the utility of a voter with most preferred position x when candidate C wins the election. That is, voters have identical linear loss functions on the spatial dimension (only their preferred positions differ) and identical weights for the quality dimension, Q^C .⁵ Letting L stand for the low-quality candidate and H stand for the high-quality candidate, for convenience, I will assume that $Q^L = 0$ and $Q^H = Q$.

This is the same functional form as used by Aragonés and Palfrey (2002), Prat (2002B) and Coate (2002). There is agreement on quality, but no agreement on what position is best. One could have a more general utility function, but that would greatly complicate the analysis and make welfare comparisons difficult. Later, I will explicitly consider a quadratic loss function; and still later on, I will consider a more general concave loss function.

C. If the voter is otherwise indifferent between two candidates, then the voter prefers the candidate closest to his most preferred position. Parts (B) and (C) together say that a voter is willing to trade-off quality for position, but when the benefit from a better position of one candidate is exactly compensated by higher quality of the other candidate, the voter will vote for the candidate with the preferred position. Here and elsewhere in the paper, there are alternative assumptions that yield similar results but at a cost of making the proofs longer.⁶

⁵ The slightly more general formulation $g(-D|x^C - x| + EQ^C)$ where g is a positive monotonic transformation would not change the argument but would make the exposition more complicated. Interesting tradeoffs between Q and position only take place if Q is not too large, say less than $[B-A]/4$.

⁶ When the voter is indifferent, convention suggests that the probability of voting for a candidate is 0, .5 or 1. We have chosen the last possibility to avoid dealing with suprema. A set of discrete positions would also enable us to assume that when the voter is indifferent between two candidates, the probability of voting for a candidate is .5.

D. The voters observe x^C but not Q^C . They do not know $f(x)$.⁷ Because the voters do not directly observe or know Q during the election, we should state that Q is the quality the voter expects to receive if the candidate that they think is high quality wins.

E. $W(p, x^C, Q^C) = -|x^C - p| + DQ^C$ is the utility function of the pressure group, P , with most preferred position p when candidate C wins the election. $D = 1$.

Because the pressure group is composed of voters, it seems natural that the pressure group member(s) would have the same type of utility function (but not necessarily the same preferences) as the voters. Note however that some of our results do not depend on the assumption that $D = 1$. If the voters are symmetrically distributed and $.5 < D < 1$, then the outcome is *identical* to the case where $D = 1$. For two or more pressure groups, we only require that $D > 0$. Prat assumes that $D = 0$. Later, after the basic model is explicated, I will consider a more complicated utility function where the pressure group takes into account the financial cost involved in endorsing a candidate.

F. The pressure group has the following lexicographical preferences: if the outcome of the election is the same regardless of whom the pressure group endorses as the high-quality candidate (but better for the pressure group than when there is no endorsement), then the pressure group prefers to endorse the candidate who will win the election.⁸ For example, if candidate 1 will choose position M and win whether the pressure group endorses candidate 1 or candidate 2, then the pressure group will want to endorse candidate 1.

This seems a reasonable assumption as it means that the pressure group will have additional access to the winner.⁹ For similar reasons, I assume that if P is otherwise indifferent between two

⁷ We assume that the voters do not know $f(x)$ to minimize the amount that the voters can infer. In general, if voters know too much, then they can make the necessary inferences about quality in the absence of pressure group endorsements. So the less that the voters can infer, the more that the pressure groups can manipulate, up to a point. If voters do not know enough, they may choose to ignore the pressure group endorsements completely in order to avoid bad outcomes.

⁸ Of course, much of the time endorsements would affect the outcome of the election and thus the conditional statement would not hold..

⁹ If the benefit of access was not lexicographic but instead part of the utility function, this would increase the power of the candidate vis-à-vis the pressure group. If the benefit of access were large enough, H would choose the median position. We consider the worst-case scenario to demonstrate that the results do not depend on strong assumptions.

candidates, then P will endorse the candidate who will have the greater probability of winning if endorsed. Later, I will consider an alternative assumption to F that explicitly includes the financial cost of endorsement.

G. Each candidate wants to maximize her probability of winning. And given two positions, each with the same probability of winning, the candidate will choose that position with the highest vote share. For example, if one candidate is sure to win, it prefers to win with 60% of the votes instead of 55%; and if the other candidate is sure to lose, it prefers to lose with 40% of the votes than with 30% of the votes.¹⁰ I also assume that candidates cannot engage in mixed strategies.

The election takes place in the following sequence:

1. The distribution of the voters' preferences is determined. Only the candidate and the pressure group know the distribution of voters, $f(x)$, and the median voter's most preferred position, M .
2. The pressure group's most preferred position, p , is drawn from the distribution of voters. For convenience, I will assume that $p > M + 2Q$.¹¹ That is, the pressure group is on the right. The candidates observe p . The proofs do not require that the voters know anything about the pressure group's preference. However, if the reader is uncomfortable with that, the reader can assume that the voters know that $p \geq M$.
3. One candidate tosses a coin. If it is heads, then the coin-tosser is the high-quality candidate (H) and the other candidate is the low-quality candidate (L); if it is tails, then the coin-tosser is the low-quality candidate. This toss is observed by the candidates and the pressure group. The voters do not observe the toss but know that a toss has taken place.

The election is divided into two stages: The negotiation stage and the election stage.

4. Negotiations take place according to the following procedure:

¹⁰ Later, I consider an alternative assumption to G and show that the results are strengthened by this alternative.

¹¹ For the sake of argument and to shorten the proofs, we only consider extremist pressure groups. Obviously less extreme pressure groups would not pull the candidates farther away from the median voter than more extremist pressure groups do.

A. Candidates H and L make simultaneous and binding offers (x_H and x_L) to the pressure group that they will choose a particular position in return for an endorsement.

B. The pressure group either endorses one of the candidates as the high-quality candidate or endorses neither. Both candidates know whether the other candidate has been endorsed (this assumption is not needed, but it makes the proofs shorter). The endorsement of one candidate as the high-quality candidate is equivalent to saying that the other-candidate is of low quality. So the model includes the possibility of negative advertising.

C. An unendorsed candidate is free to choose any election position (x^C). Note that offers are denoted by a subscript and election positions are denoted by a superscript. For the endorsed candidate, $x_C = x^C$. For the unendorsed candidate, x_C need not equal x^C .

The voters know that negotiations have taken place, but they do not observe the rejected offer(s). Furthermore, in the absence of an endorsement, they cannot infer from the positions alone which candidate is the high-quality candidate.

It is not unreasonable to believe that candidates try to make secret deals with the pressure groups, and if unsuccessful, choose positions more appealing to the voters. Thus, I have assumed that the unendorsed candidate can choose an election position different from its offer to the pressure group. However, one could also argue that candidates cannot so easily switch their positions and that $x_C = x^C$ whether or not the candidate is endorsed. In my working paper, I show that this alternative assumption combined with a different lexicographic ordering by the pressure group, results in the identical outcome. I believe that the characterization here provides more insight than the alternative characterization in the working paper. This is a major reason why the models are placed where they are rather than vice-versa. Since both sets of assumptions come to the same conclusion, it is not necessary for us to come to a definitive vote for one set here. In later theorems, in equilibrium, both candidates choose election positions coinciding with their offers.

5. Each voter observes the election positions of the candidates, x^H and x^L , and knows whether the candidate has been endorsed as the high-quality candidate. Each voter votes for the candidate who the voter believes will provide the voter with the highest utility. Ties are settled by a toss of the coin.

The extensive form representation of this game is drawn in Figure 1.

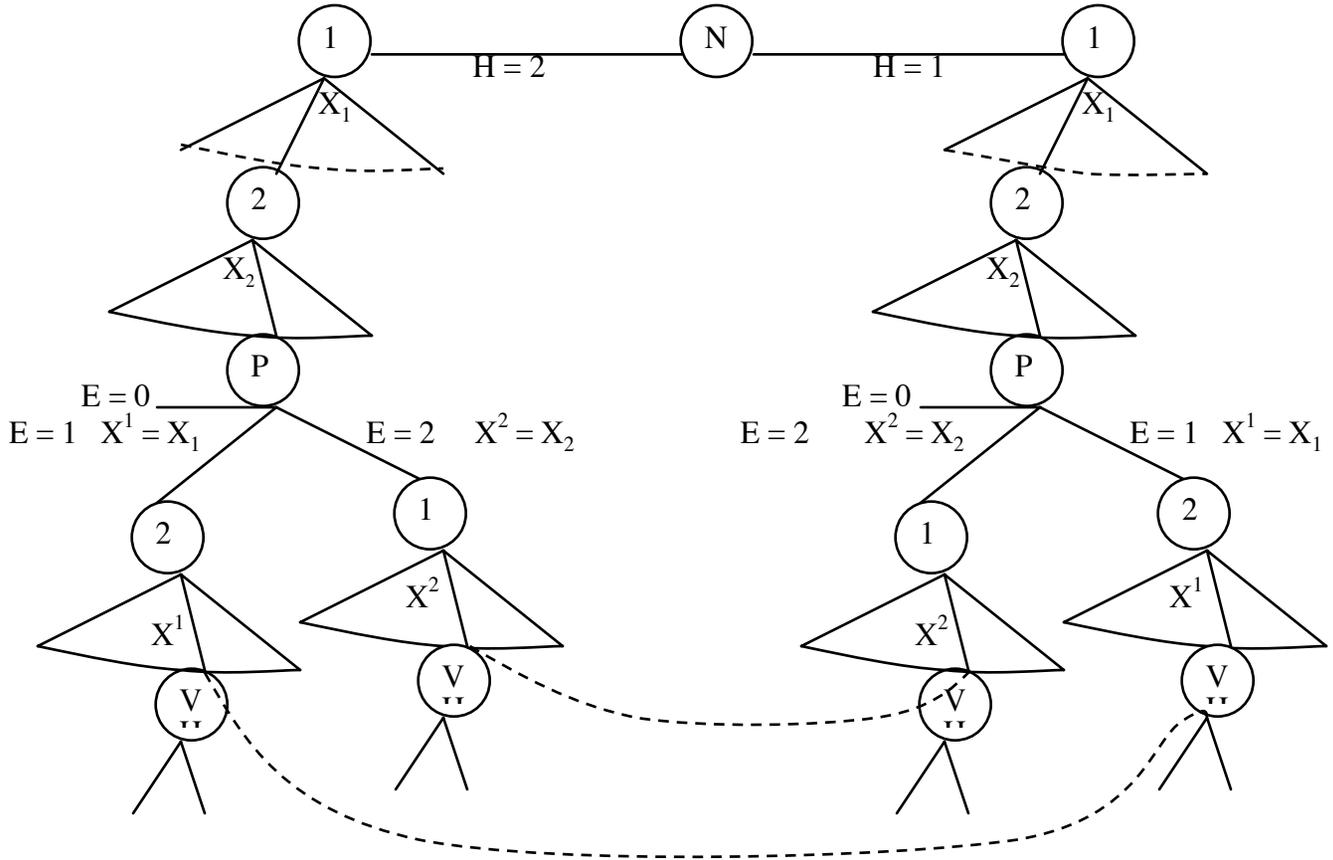


FIGURE 1: The extensive form representation of the game

In the first period, nature (N) decides whether candidate 1 or 2 is the high-quality candidate. The simultaneous offers by candidates 1 and 2 is represented by the sequence where candidate 1 goes first and candidate 2 goes second. 1's offer is somewhere on the policy continuum (represented by the arc). A dashed line means that candidate 2 does not know candidate 1's offer when candidate 2 makes his offer. The pressure group (P) then decides to endorse 1, 2 or neither ($E = 0$). We do not draw in the rest of the game tree if neither is endorsed). The non-endorsed candidate then chooses his election position. The voters (V) then vote. Note that the dotted line connects the two sides indicating that the voter cannot observe whether the candidate who is endorsed as the high-quality candidate is in fact the high-quality candidate.

I assume that voters do not have direct knowledge of the quality of the candidates. I use the word "direct" because, in the presence of campaign endorsements, uninformed voters may be able to infer quality. However, the voters do know the model. For example, the voters know that the candidates maximize their probability of winning and that the pressure group maximizes its utility.

PROPOSITION 1: Under the above conditions:

- i. In the absence of any endorsements, both candidates will be at the median voter's most preferred position, M , and each will win with probability $1/2$.
- ii. If voters believe the endorsement, then the non-endorsed candidate will always take a position Q away from the endorsed candidate's position.
- iii. H 's maximin strategy is to choose that x_H such that $F(x_H) = 100 - F(x_H - Q)$. L 's minimax strategy is to choose that x_L such that $F(x_L - 2Q) = 100 - F(x_L - Q)$. The Nash-equilibrium in offers, where both of these equations are satisfied, is then $x_L = x_H + Q$.
- iv. If the voters believe that the high-quality candidate gets the pressure group endorsement, then the low-quality candidate is never endorsed as the high-quality candidate by the pressure group. Hence, whenever there is an endorsement, the voters are fully informed about the quality of the candidates.
- v. If x has a symmetric distribution with mean $= M$, then a pressure group endorsement weakly improves every voter's welfare. The high-quality candidate will choose position $M + Q/2$.

Before proceeding with the proof, it is useful to understand its internal logic. We begin by assuming that the voters believe that the pressure group is telling the truth. We show how the candidates and pressure group act under this scenario. In particular, the candidates present a set of choices (ii and iii) such that the pressure group will want to tell the truth (iv). Hence there is a truth-telling equilibrium. It can be shown that this is a perfect Bayesian equilibrium. Alternatively, one could have started with a list of strategies and beliefs and shown that the particular choices are a PBE. The problem with such an approach is there is a continuum of choices and the underlying intuition would not be as transparent as the method we use. The approach used here allows one to construct and discover the truth-telling PBE.

In some ways, Proposition 1 is a worse case scenario. Despite the fact that there is no other pressure group to compete away rents, pressure group endorsements improve welfare (v). Later we will consider some variations. There may be two or more pressure groups with opposing interests, in which case every voter is made better off regardless of the form of the utility function. And some voters may ignore the endorsements of the pressure group, in which case the high-quality candidate moves closer to the median voter.

The proof has to take care of a lot of details. However, the intuition behind the proofs for points (ii), (iii) and (v) can be seen in Figures 2, 3 and 4.

PROOF:

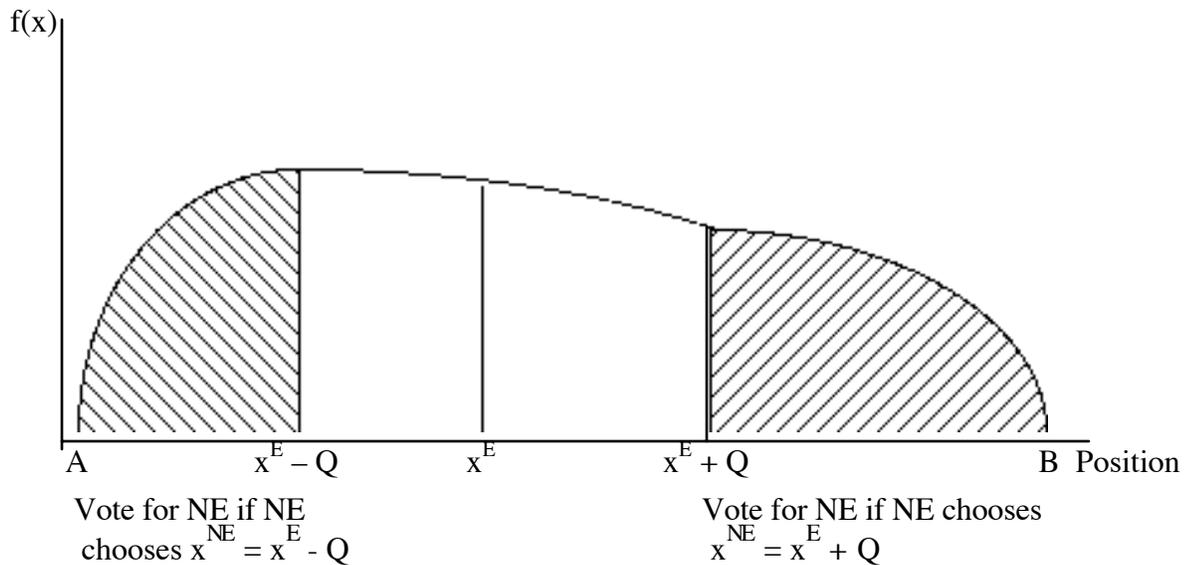
(i) No Endorsement:

If there is no endorsement, then voters only know the candidates' positions, not their relative quality. Both candidates will take the position of the median voter; that is, $x^H = x^L = M$. Each candidate will win with probability 1/2.

(ii) If voters believe the endorsement, then, the candidate who is not endorsed will always choose an election position exactly Q units away from the endorsed candidate's position; that is, $x^{NE} = x^E \pm Q = x^E \pm Q$, where E stands for endorsed and NE stands for non-endorsed.

The intuition behind the argument is easily demonstrated in Figure 2 where the endorsed candidate has chosen $x_E = x^E$ (note that the distribution of voter preferences in Figure 2 is not symmetric). Supposed that the unendorsed candidate is originally strictly to the right of $x^E + Q$ say at $x^E + Q + z$ (not illustrated). By moving left until $x^{NE} = x^E + Q$, the unendorsed candidate will not lose any voters to the right but will gain all those voters whose most preferred position are weakly between $x^E + Q$ and $x^E + Q + .5Z$ who would have voted for the endorsed candidate if the unendorsed candidate had remained at $x^E + Q + z$. The unendorsed candidate will not move strictly to the left of $x^E + Q$ (unless the unendorsed candidate is weakly to the left of $x^E - Q$) because then all of the voters would prefer the endorsed candidate. A similar argument shows that the non-endorsed candidate will not take a position strictly to the left of $x^E + Q$. Note that the shaded portion on the right (left) is the percent of votes for the unendorsed candidate when the unendorsed candidate takes position $x^E + Q$ ($x^E - Q$).

Figure 2: The non-endorsed candidate (NE) will be Q away from the endorsed candidate (e)



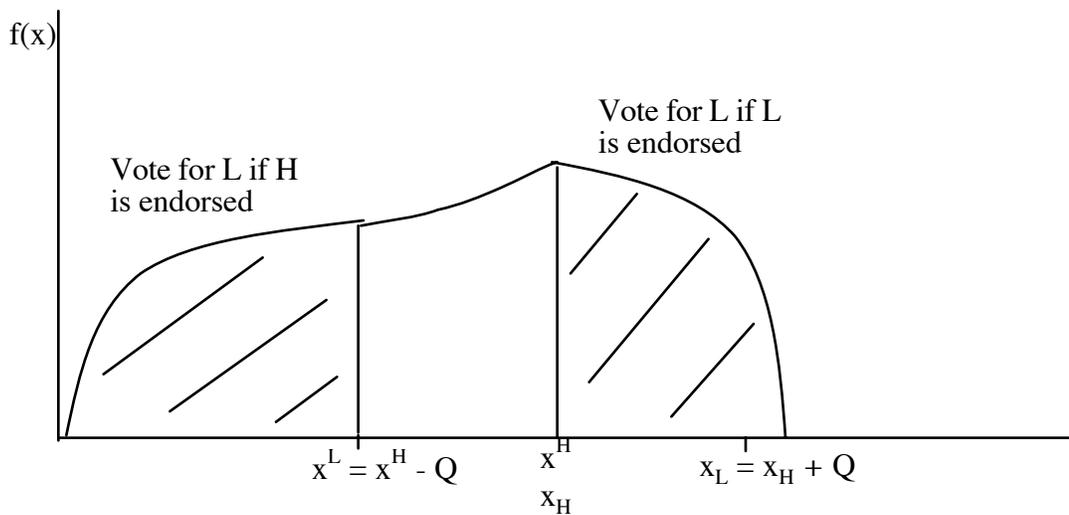
The area under the curve is 100%. If the non-endorsed candidate chooses $x^E - Q$, then the vote share of the non-endorsed candidate is the shaded area on the left. If the non-endorsed candidate chooses $x^E + Q$, then the vote share of the non-endorsed candidate is the shaded area on the right.

NE will get 0 votes if x^{NE} is less than Q away from x^E .

If $x^{\text{NE}} < x^E - Q$, then NE will get more votes by moving right to $x^E - Q$. NE will not lose any voters to its left but will gain voters on its right by such a move.

If $x^{\text{NE}} > x^E + Q$, then NE will get more votes by moving left to $x^E + Q$. NE will not lose any voters to its right but will gain voters on its left by such a move.

FIGURE 3: H's maximin strategy: choose x_H such that the shaded areas are of equal size



H offers x_H and L offers $x_L = x_H + Q$.

If L is endorsed as the high quality candidate:

Then H will choose $x^H = x_L - Q = x_H + Q - Q = x_H$,
and all of the voters to the right of x^H will vote for L

If H is endorsed as the high quality candidate:

Then L will choose $x^L = x_H - Q = x^H - Q$,
and all of the voters to the left of x^L will vote for L

(iii) *H maximize its minimum vote share.*

Once again the intuition behind a rather complicated analysis is easily demonstrated in a diagram. In the graphic analysis, we consider the case where H minimizes L's maximum share of votes. Looking at Figure 3 (where the distribution of voter preferences is again not symmetric), H has offered x_H and L has offered $x_L = x_H + Q$. If L is endorsed as the high-quality candidate, then H will choose $x^H = x_L - Q = x_H + Q - Q = x_H$. L will get all the votes to the right of $x^H = x_L - Q$. This is the shaded area on the right. On the other hand, if H is endorsed as the high-quality candidate, then L will take a position $x_L = x_H - Q$. In this way, L will receive all of the votes to the left of $x_H - Q$. This is the shaded portion on the left. H's optimal strategy is to make these two portions equal.

The two equal portions do not add up to 100% as the area between $x^H - Q$ and x^H is non-zero. Thus H will win if endorsed.

(iv) *In equilibrium, the voters' beliefs are justified.*

If P endorses H as the high-quality candidate, then H will win with position x^H . If P endorses L as the high-quality candidate, then H will also win with position x^H . We have assumed that, other things being equal, the pressure group will want to endorse the winning candidate. Therefore given the choice between endorsing H and endorsing L, P will endorse H. If P endorses neither, then both candidates will be at M and H will win half the time. So P would be worse off on both position and expected quality if P endorsed neither candidate. Therefore P endorses H. Of course H prefers to win all of the time rather than half the time. So H will make the offer. As we have seen, L will be unsuccessful at gaining an endorsement. In equilibrium, P tells the truth, and the voters' belief that P tells the truth is justified. We have a truth-telling equilibrium where the voters are fully informed.

In this cheap-talk model, there are two other equilibria with consistent beliefs. If voters did not pay attention to the endorsements, there would be a babbling equilibrium with both candidates at the median voter (if the pressure group were to make an endorsement, it would be completely uninformative). The other equilibrium, which might be hard to implement in practice, is that the voters believe that P lies, and P always endorses the low-quality candidate as being of high quality. The election outcome would still be the same – H would win on platform $M + Q/2$.

It is easy (but time consuming) to demonstrate that if the voters believe that the pressure group is telling the truth then there are no other equilibria. Suppose first that $x_L > M + 3Q/2$. Then H would offer $x_H < x_L - Q$ in order to insure that L was endorsed; the unendorsed H would then take a position

exactly Q to the left of the endorsed L in the election and win with a larger plurality than otherwise. But if H 's offer were more than Q to the left of L 's offer but strictly greater than $M + Q/2$, then L would then want to move left so that it was exactly Q to the right, starting the whole process over again.

Next suppose that $M < x_H < M + Q/2$. If $x_L > x_H + Q$, then L would want to move within ε of $x_H + Q$. In this way, L would still be endorsed, but L would gain a larger plurality than if remained farther right. But then it would pay H to move her offer right toward $M + Q/2$ because then H would be endorsed and do better in the election than if L were endorsed at a position $x_L < M + 3Q/2$. In turn, L would offer a position $Q + \varepsilon$ to the right of H , starting the whole process over again.

The other possibilities can be analyzed in a similar fashion. When voters believe that the pressure group is telling the truth, the only equilibrium pair is $x_H = M + Q/2$, $x_L = M + Q/2$.

(v) If x has a symmetric distribution, then every voter's welfare is improved when the pressure group makes endorsements. H will choose position $M + Q/2$.

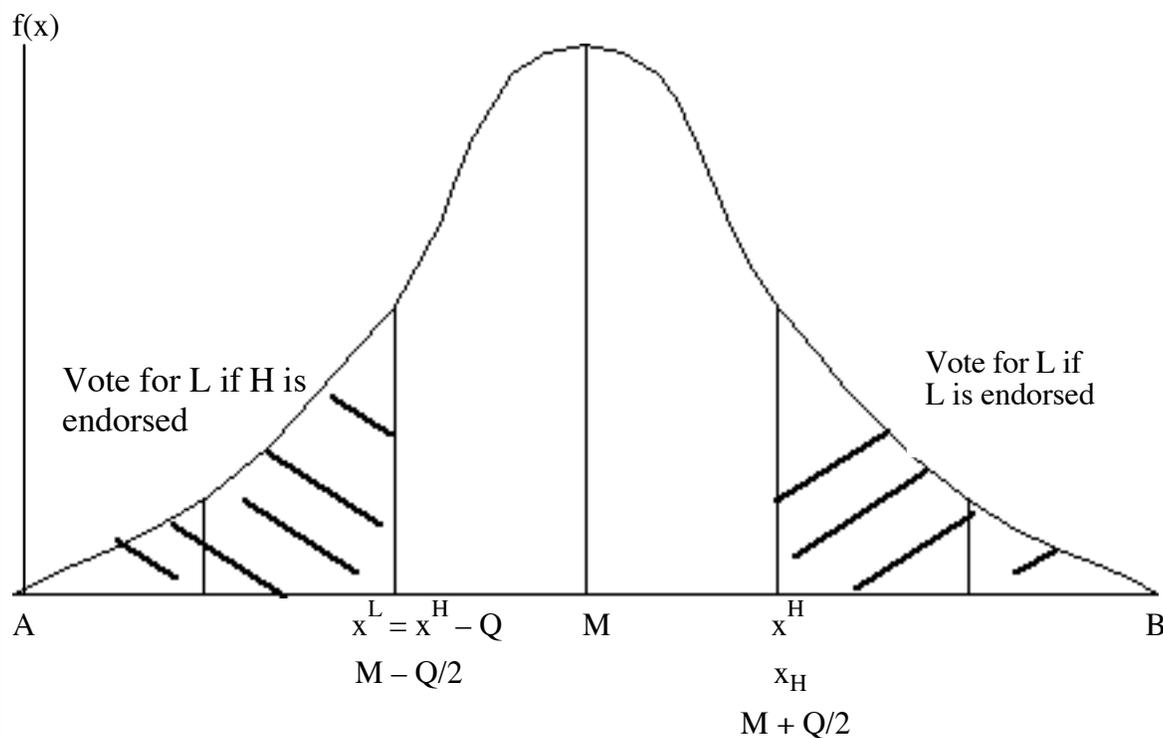
From (iii) we know that the area to the right of x_H equals the area to the left of $x_H - Q$. For a symmetric distribution, this must mean that $x_H = M + Q/2$. Thus H will offer position $x_H = M + Q/2$; L will offer position $x_L = M + 3Q/2$; H will be endorsed, and L will take position $x^L = x_H - Q = M - Q/2$. H will win with position $x^H = M + Q/2$. This can be seen in Figure 4. The shaded area on the left is the share of votes going to L when H is endorsed as the high-quality candidate. The shaded area on the right is the share of votes going to L when L is endorsed. Once again, H 's minimax strategy is to make these two areas equal. And once again, the pressure group will endorse H as the high-quality candidate.

Voters weakly to the left of the median will lose $Q/2$ in position, but gain $Q/2$ in quality in comparison to the non-endorsement expected outcome. So net, those voters weakly to the left of the median are indifferent between a regime of no endorsements and a regime with endorsements. Those voters strictly to the right of the median will have a net gain. Those to the right of $M + Q/4$ will gain on both position and quality. Those between the M and $M + Q/4$ will gain more on quality ($Q/2$) than they lose on position (a maximum of $Q/2$).

Hence, welfare is weakly improved for all voters by campaign endorsements.

q.e.d.

FIGURE 4: When the distribution around M is symmetric, then $x^H = M + Q/2$



The two shaded areas (percentage of voters voting for L) are equal and Q apart.

H will offer $x_H = M + Q/2$ and L will offer $x_L = M + Q/2 + Q$ (not drawn).

If L is endorsed, then H will choose $x^H = x_L - Q = x_H$ and H will win.

If H is endorsed, then L will choose $x^L = x_H - Q = M - Q/2$ and H will win.

P will therefore prefer to endorse H since the outcome is the same, but P will gain access.

H will receive the same percentage of votes whether or not H is endorsed.

Note that a consideration of corner solutions only strengthens the results. For example, suppose that the voters were distributed within $[0, 1]$, $M = .5$, $Q = 1.5$. Since the rightmost position is $x_H = 1$, even if H were to take the rightmost position, everyone would be better off with the endorsed outcome as the loss in terms of position would be $.5$ while the gain in expected quality would be $.75$.

Staying with the symmetry assumption, suppose that $D = .6$ instead of 1 so that $W(p, x^C, Q^C) = -|x^C - p| + .6Q^C$. H would again offer $M + Q/2$. Even if L were to offer $M + Q/2 + .6Q$, P would again endorse H. If P were to endorse L, H would run on platform $M + .1Q$ and win. This would be worse for P than endorsing H with position $M + Q/2$. Clearly, the same argument holds for all D such that $.5 < D < 1$.¹²

If the distribution of voters is not symmetric, then, depending on the shape of the distribution, $x_H = x^H$ may be anywhere between M and $M + Q$. Recall from Figures 3 and 4 that H chooses a position x^H such that the area under the curve to the right of x^H equals the area under the curve to the left of $x^H - Q$. Now let us alter the symmetric distribution drawn in Figure 4. Suppose that the area under the curve to the left of $M - Q/2$ is increased by the same amount that the area between $M - Q/2$ and M is decreased. In this way M remains the same, but the area under the curve to the left of $M - Q/2$ is now greater than the area under the curve to the right of $M + Q/2$. As a result, H would move left toward M so that the areas in the two tails would again be equal. In this situation, the welfare of all voters would be strictly increased when the pressure group enters into the picture.¹³ In contrast, if the distribution of voters to the right of M is shifted to the right of $M + Q/2$ (and all other preferences are held equal), then x^H will shift right, as well. Voters to the right of $M + Q/2$ would benefit from the pressure group endorsements. The other voters would be worse off by a maximum of $Q/2$. In a nutshell, the distribution of voters in the tails of the distribution is a key variable in determining the degree of benefit or harm that is induced by pressure group contributions.

¹² For $0 < D < .5$, as D converges towards 0, x^H converges toward $M + Q$.

¹³ If endorsements required costly advertising underwritten by the pressure group, then welfare comparisons would require that the cost of the advertising be subtracted from the election benefit. Since pressure groups are only interested in their own welfare and they pay for the advertising, the net welfare increase would almost always still be positive. Pressure groups don't care about the cost or benefits to other voters, but as we have shown the other voters still benefit.

Proposition 1 assumes a linear utility function. Suppose instead that the utility function is:

$$B'. U(x, x^C, Q^C) = - [x^C - x]^2 + Q^C$$

PROPOSITION 2: Given the above utility function, but keeping symmetry and the rest of the assumptions presented earlier, a majority of voters prefer the pressure group outcome to the no endorsement outcome.

The proof is in Appendix 1.

2. COSTLY ENDORSEMENTS

Until now I have not explicitly considered the cost, Y , that the pressure group incurs when it donates money to a candidate's election campaign to advertise the endorsement. Let us redefine the pressure group's utility function to account for this cost.

E'. $W(p, x^C, Q^C) = - |x^C - p| + DQ^C - Y$ is the utility function of the pressure group, P , with most preferred position p when candidate C wins the election and it has endorsed one of the candidates at cost Y . $D > .5$.

For mathematical closure, I will assume that if a candidate is otherwise indifferent between being at the median voter and being at another position, the candidate prefers to be at the median voter (the opposite assumption could be made without changing anything except for making a weak inequality into a strict one)

Again, I will consider the case where the voters are distributed symmetrically.

I will first show that when Y is small (that is, $Q/2 + .5DQ \geq Y$) the outcome will be the same as before. Recall that when there is an endorsement, H wins with position $x_H = x^H = M + Q/2$ and that when there is no endorsement both candidates are at M with H winning half the time. If P endorses H when H offers $x_H = M + Q/2$, then P 's expected utility is $M + Q/2 - p + DQ - Y$ (the first three terms are the utility loss from the position not being at the pressure group's most preferred position, p ; the next term is the pressure group's gain from quality; and the third term is the financial cost of the endorsement). If P endorses neither candidate, then P 's expected utility is $M - p + .5DQ$. P will

endorse H if the benefits outweigh the costs—that is, P will endorse H if $Q/2 + .5DQ \geq Y$.¹⁴ Thus when Y is small, the analysis is identical to our earlier analysis, which ignored the monetary cost of endorsements.

Next I consider the case where Y is large ($Q + .5DQ \leq Y$). In this case there are no endorsements. Let us first look at the case where $Q + .5DQ < Y$. The only time that it is worthwhile for P to make an endorsement is when H has offered a position to the right of $M + Q$ (where H is sure to lose and therefore H would not make such an offer in the first place) or L has offered a position to the right of $2Q + .5DQ$ and H then chooses a position Q to the left and wins (but L would not make such an offer in the first place as L would have more votes if L had made no offer to the pressure group). When $Q + .5DQ = Y$, x_H would have to equal $M + Q$. If endorsed, H would win only half the time. But by assumption, H would prefer to be unendorsed at M and win half the time. Thus when the cost of endorsements is high, there are no endorsements.

We are thus left with the following possibility: $Q/2 + .5DQ < Y < Q + .5DQ$. In this situation, the greater the cost to P, the farther to the right H will be. In particular, $x_H = x^H = M + Y - .5DQ$. The logic is as follows. The pressure group's utility is $M + Y - .5DQ - p + DQ - Y = M + .5DQ - p$ if it endorses H and $M + .5DQ - p$ if it does not endorse H. By assumption, the pressure group will endorse H, the winning candidate, if the pressure group is otherwise indifferent. If H were to choose a position to the left of this point, H would not be endorsed and at best H would have a 50% chance of winning the election. If H were to move right of this point, then x^L would be further to the right as well, and H would have a smaller plurality. So H will indeed choose $x_H = M + Y - .5DQ$, be endorsed by the pressure group, and win the election. But H's plurality will not be as large as it would be in the absence of the financial constraint.

3. TWO OR MORE PRESSURE GROUPS

I have dealt with the extreme case where there is only one pressure group. Even though the pressure group has a monopoly on endorsements and inside information on quality, when the voters have linear loss functions and the distribution of voters is symmetric everyone is at least weakly better off (if the financial cost of endorsement is not too high). Although some might argue that the one pressure group model is an accurate assessment of the political world, where consumers, for example,

¹⁴ Recall that we have assumed that if the pressure group is otherwise indifferent (now after including endorsement costs), the pressure group will endorse the winning candidate.

are less likely to organize into pressure groups than producers, it is still useful to see what happens when there are two (or more) pressure groups with opposing interests. As I will now show, when there are two-opposing pressure groups, H will choose the median voter's most preferred position and be endorsed as the high-quality candidate. In this way every voter is strictly better off than in the no-endorsement outcome. This result holds even if the pressure groups care very little about the quality of the candidate (that is, D is close to 0)

I make the following slight alterations to the assumptions made for Proposition 1:

B". $U(x, x^C, Q^C) = -g(|x^C - x|) + Q^C$ is the utility of a voter with most preferred position x when candidate C wins the election. $g'' \geq 0$, which means that the utility function is concave in x .

E". $W(p, x^C, Q^C) = -|x^C - p_j| + DQ^C$ is the utility function of pressure group, j , with most preferred position p_j when candidate C wins the election. $0 < D \leq 1$.

2". Pressure group 1's most preferred position is less than $M - 2Q$ while pressure group 2's most preferred position is greater than $M + 2Q$. We keep the pressure groups this distance apart so we do not have to deal with the details of a less interesting case.

4A". Candidates H and L make simultaneous and binding offers (x_H and x_L) to the pressure groups that the candidate will choose a particular position in return for an endorsement. That is, each candidate offers the same position to both pressure groups -- it cannot make two different binding offers.

If the outcome of the election is the same, a candidate will offer the same position as it intends to run on in the election. That is, if the non-endorsed candidate will run on position x^{NE} in the election, then the candidate will offer $x_{NE} = x^{NE}$ if that does not worsen the election outcome from the non-endorsed candidate's point of view.

4B". Each pressure group endorses one of the candidates as the high-quality candidate or endorses neither.

Finally, I assume that if the pressure groups endorse different candidates as the high-quality candidate, then the voters will ignore the endorsements entirely and base their vote solely on position.

This is a reasonable assumption. The voters have no additional information to infer which endorsement is truthful. If the voters did have the requisite information to make the proper inferences, then endorsements would not be needed in the first place.

PROPOSITION 3: Under the above assumptions, when the voters are distributed symmetrically, the high-quality candidate will offer M , be endorsed by both pressure groups, and win the election. The low quality candidate will offer either $M + Q$ or $M - Q$ and run on the same position in the election.

H offering $x_H = M$ and both pressure groups endorsing H is an equilibrium. If L offers a position strictly to the right of M , H will win whether the right-wing pressure group endorses L, endorses neither, or endorses H. So the right-wing pressure group will not be motivated to endorse L, and of course neither will the left-wing pressure group. If L offers M and is endorsed by the right-wing pressure group, the right-wing pressure group is worse off since the pressure group prefers that H wins at M all the time rather than half the time. Again, the same holds for the left-wing pressure group. If otherwise indifferent, we have assumed that both pressure groups prefer to endorse the winning candidate rather than endorsing neither.

Offering M is a maximin strategy for H. Because L will not be endorsed, there is no need for H to move toward L's offer to prevent an endorsement. Further, any move from M by H would result in L getting more votes in the election. So H will not want to change its strategy. L will offer $M + Q$ or $M - Q$ and run on the same position in the election.

Again, truth-telling by the pressure groups is an equilibrium outcome. Now everyone is strictly better off when there are two pressure groups instead of none, but only a majority, $F(M + Q/4)$, are strictly better off when there are two pressure groups instead of only one.

4. ENDORSEMENT COSTS WHEN THERE IS MORE THAN ONE PRESSURE GROUP

Once again we consider the role of endorsement costs, Y , on the outcome, but this time in the context of there being more than one pressure group. We will see that endorsement costs play a similar role when there are two-pressure groups as endorsement costs play when there is only one pressure group. When Y is small, the results are similar to the case where Y is zero in that H will choose M , be endorsed as the high-quality candidate, and win the election. When Y is large, there will be no

endorsements. And when Y is moderate, greater endorsement costs move H farther away from the median.

We use the same pressure-group utility function as was used in section 3 (assumption E") but subtract the cost of endorsement, Y . For heuristic reasons we will revert back to the assumptions that (a) the voters' (as well as the pressure groups') utility functions are triangular (that is, they are decreasing linear functions of the absolute distance of the implemented policy from the most preferred policy), (b) the distribution of voter preferences is symmetric around M , and (c) $D = 1$. Again for heuristic purposes, we also assume that (d) if a pressure group is otherwise indifferent (after including the cost of endorsement), it will choose to endorse the winning candidate (otherwise, we would have to work with epsilons), and (e) other things being equal, H prefers to be at M rather than at $M + Q$ or $M - Q$ (this allows for mathematical closure). Finally, we assume that the candidates make their offers to opposing pressure groups. For simplicity, we will assume that H makes her offer to the right-wing pressure group and L makes his offer to the left-wing pressure group.

PROPOSITION 4: Under the above conditions:

(i) Suppose that $Y \leq .5Q$. Then $x_H = M$, $x_L = M - Q$, the right-wing pressure group endorses H , the left-wing pressure group makes no endorsement, $x^L = x_L$, and H wins the election is an equilibrium outcome.¹⁵

(ii) Suppose that $.5Q < Y < Q + .5Q$. Then $x_H = M + Y - .5Q$, $x_L = M + Y - 1.5Q$, the right-wing pressure group endorses H , the left-wing pressure group makes no endorsement, $x^L = x_L$, and H wins the election is an equilibrium outcome.

(iii) Suppose that $Y \geq Q + .5Q$. Then no endorsements are made, $x^L = x^H = M$, and each candidate wins with probability $.5$.

PROOF:

(i) $Y \leq .5Q$.

¹⁵ Note that this proof does not rule out the possibility that there are other equilibria (besides the babbling equilibrium and the equilibrium where everyone believes that the pressure group is lying and it does lie). However, it does not appear that there are other equilibria.

We will establish that $x_H = M$, $x_L = M - Q$, the right-wing pressure group endorsing H, the left-wing pressure group making no endorsement, $x^L = M - Q$, and H winning is an equilibrium outcome.

Suppose first that the right-wing pressure group is endorsing H at M. If $x_L < M$ and the left-wing pressure group endorses L, then H will win because voters will vote on position when they get contradictory endorsements and H is at the median voter's most preferred position. Hence the left-wing pressure group is worse off by endorsing L as it has incurred a cost, but the outcome is the same as it would be if it had not endorsed L. If $x_L = M$, then the left-wing pressure group would again be worse off if it endorsed L because quality would be reduced without an improvement in position. So, the left-wing pressure group will not endorse L. Given that it will not be endorsed regardless of its choice, L will choose $x_L = x^L = M - Q$.

Suppose next that the left-wing pressure group is not endorsing L. If the right-wing pressure group does not endorse H at M, then in the election both candidates will choose position M. The right-wing pressure group will save Y in endorsement costs but lose $.5Q$ because H is no longer elected all of the time. But by assumption, $Y \leq .5Q$. So the right-wing pressure group would prefer to endorse H. Recall that we have assumed that when otherwise indifferent (including endorsement costs), the pressure group will endorse the candidate; hence, even if the equality holds, the right-wing pressure group will still endorse H.

Of course, H will not want to choose a different position because M maximizes the minimum amount of votes it gets.

Thus $x_L = x^L = M - Q$ and $x_H = x^H = M$.

(ii) $.5Q < Y < Q$.

We will establish that $x_H = M + Y - .5Q$, $x_L = M + Y - 1.5Q$, the right-wing pressure group endorses H, the left-wing pressure group makes no endorsement, $x^L = x_L$, and H wins the election is an equilibrium outcome.

Suppose first that the right-wing pressure group is endorsing H at $x_H = M + Y - .5Q$. Then the left-wing pressure group will not want to endorse L regardless of the position that L offers. The logic is as follows. If the left-wing pressure group's does not endorse L, then an endorsed H will win regardless of L's position (since $x_H = M + Y - .5Q$ and $M < M + Y - .5Q < M + Q - .5Q = M + .5Q$

$< M + Q$). The left-wing pressure group's utility is thus $P_L - M - Y + .5Q$. The left-wing pressure group would only want to endorse L, if L wins and the benefit to the left-wing pressure group is greater than the cost. This means that $P_L - x_L - Y \geq P_L - M - Y + .5Q$. This implies that $M \geq x_L + .5Q$. If this is a strict inequality, then x_L is further away from M than x_H is, and therefore L will lose even if endorsed. If this is a strict equality, then L will only win half the time. So the benefit will not be greater than the cost. Hence L will not be endorsed. Given that L will not be endorsed, $x_L = M + Y - 1.5Q = x^L$.

Next suppose that L is not being endorsed. We will now show that the right-wing pressure group will want to endorse H. If the right-wing pressure group endorses H, then the right-wing pressure group's utility is $-P_R + M + Y - .5Q + Q - Y = -P_R + M + .5Q$. If the right-wing pressure group does not endorse H, then the right-wing pressure group's utility is $-P_R + M + .5Q$. The right-wing pressure group is indifferent and therefore by assumption will endorse H, the winning candidate.

H prefers a hundred-percent chance of winning over a fifty-percent chance of winning. And given that it will win, H prefers a higher share of the vote to a lower share of the vote. Therefore, H will choose the above strategy. If x_H were to the left, the right-wing pressure group would no longer endorse H and H would win only fifty percent of the time. If x_H were to the right, x^L would be to the right as well, and H would receive fewer votes.

$$(iii) Y \geq Q + .5Q$$

We have established in (ii) that in order for the right-wing pressure group to endorse H, H will have to offer at least $x_H = M + Y - .5Q$. If $Y \geq Q + .5Q$, then $x_H \geq M + Q$. Suppose first that the inequality is strict. This implies that H will lose even if endorsed if L takes position M for the election. Therefore, H will not make such an offer in the first place. If $x_H = M + Q$, H will have a 50% chance of winning. Therefore, H is indifferent between taking this position and being endorsed or not being endorsed and taking position M. We have assumed that H prefers the latter. An even stronger argument holds for L. In a nutshell, when the financial cost of endorsing is high, a platform that would compensate a pressure group for the cost of the endorsement would always lose. So an offer would not be made in the first place. Neither candidate will be endorsed and both will choose M in the election.

q.e.d.

5. OTHER VARIATIONS

In this section, I briefly consider further variations on the basic model.

I have followed the literature in assuming that all voters value quality (for example, both pro-abortion and anti-abortion voters would prefer that the economy be well run). Nevertheless, it is possible that some voters on the extreme left (right) would prefer that the right-wing (left-wing) candidate would be of low quality because the candidate would be less capable of implementing right-wing (left-wing) policies. Allowing for this possibility does not change the analysis if such voters are in the tails (more than $3Q/2$ away from the M); they are already voting for the candidate that is closest to them. And if the voters are not in the tails, this just weakens the power of the pressure group(s).

Until now, I have assumed that the candidates make the offers to the pressure groups. But suppose that the opposite is the case -- the pressure group(s) make the offers to the candidates. If there is only one pressure group, then the pressure group will offer to endorse H only if it takes a position $M + Q - \epsilon$. Under these circumstances, H will accept the offer and the median voter's welfare is reduced in comparison to the situation where there are no pressure groups. Although the approach is different, the conclusion is similar to that obtained by Prat (2002A) in that pressure group contributions makes the median voter worse off. However, this welfare deterioration result is not robust. When there are opposing pressure groups, the equilibrium result is that H is at M and is endorsed as the high-quality candidate (see Appendix 2 for the proof).¹⁶ This is the same result as when the candidates make the offers. Once again, if the voters believe that pressure groups tell the truth, in equilibrium their beliefs are justified.

Whether pressure groups make offers to candidates or candidates make offers to pressure groups is an empirical question that cannot be answered here. But let me provide the following food for thought in the mean time. Candidates and political parties specialize in knowing what the voters

¹⁶ This result differs from Prat's multi-pressure group model (2002B). It is hard to pinpoint the reason for the differing results because the models are so different. In his model, only the incumbent can receive campaign contributions, the challenger's position is always at the median voter's most preferred position, and there are multiple dimension. The most likely reason for the different results appears to be as follows: In Prat's model the pressure group on the "left" has fewer financial resources than the pressure group on the "right." Voters measure quality by the size of the campaign chest and do not account for the fact that the right-wing pressure group has more resources. Therefore there is a bias to the right.

Coate (2002) also models a situation where there are two opposing pressure groups. Again the results differ (Coate finds that the median voter may be made worse off by advertising) and again it is hard to compare models because the approaches are so different. In his model advertising is assumed to be truthful (while here we show that it is truthful in equilibrium). In his model voters are distributed according to the uniform distribution; here there is no restriction on the distribution of voters. The most likely reasons for the differing results appears to be that in his model each candidate has some interest in policy as well, so the pressure groups are stuck with the candidate closest to the pressure group.

want and predicting the electoral support for various policies. It makes sense that candidates would decide what positions to take rather than have policy positions dictated by the pressure groups, which are less knowledgeable in this regard. Pressure groups also face a serious coordination problem. There are many pressure groups that donate to each candidate. Each pressure group would have to decide the kind of offer to make based on what the pressure group thinks the other offers will be. This would be like consumers collectively setting the price for the monopolist (or individually setting price schedules if we treated the monopoly as a common agency problem). Not surprisingly, we treat monopolists and duopolists rather than the consumers as the price or quantity setters. For all these reasons, it seems plausible that the candidates set the terms of agreement rather than the pressure groups. Consequently, it makes sense to investigate the ramifications of such a model.

6. CONCLUDING REMARKS

In this paper, I have embedded quality, pressure group endorsements, and uninformed voters into the standard Downsian framework. Quality differentials cause divergence in the candidate positions. The greater the quality differential (equivalently, the more voters weight quality), the greater the divergence and the higher proportion of votes for the high-quality candidate. In principle, these results should be testable with the appropriate data.

Initially, I considered the case where a pressure group has extreme power: the pressure group has inside information on the quality of the candidates; there are no other pressure groups to compete away any rents, neither candidate is able to credibly transmit information on its quality to the uninformed voters, and the pressure group endorsement cannot be independently verified. The pressure group takes advantage of this power to improve its own welfare. Nevertheless, when the distribution of voters is symmetric, the by-product is improved welfare for a majority of voters. When voters have linear-symmetric loss functions, pressure group endorsements are weakly welfare improving for *all* voters. The competition between the candidates for an endorsement by the pressure group results in the high-quality candidate moving away from the median voter toward the position of the pressure group. But the degree of distortion away from the median voter is compensated by the improvement in candidate quality.

Later, I considered the case where there are two or more pressure groups with opposing interests. If the financial costs of endorsement are low, there will be no distortion whatsoever – the high-quality candidate will be endorsed at the median voter's most preferred position. So all voters will be strictly better off (in comparison to a situation without pressure groups), whatever the shape of the voters' loss functions or the distribution of voters. As the cost of informing voters increases, the high-

quality candidate moves away from the median towards a pressure group's most preferred position in order to compensate the pressure group for the cost of the endorsement.

In many democratic countries the role of pressure groups in the democratic process is a major political-economic issue. In the United States, the recent passage of the McCain-Feingold bill was hailed by some as a welcome reduction in the influence of pressure groups. In the contentious debate regarding pressure group influence, this paper argues that pressure groups are limited in their power to distort the democratic process and, if they anything, their actions are likely to improve the welfare of the median voter.

Voters can be uninformed in different ways, and the interaction among candidates, pressure groups and rational voters can take various forms. So far, only a few papers have modeled how uninformed but rational voters can make appropriate inferences about the political process. Much work remains to be done before we get a complete picture. The present paper is a move in that direction.

APPENDIX 1: QUADRATIC LOSS FUNCTIONS

PROPOSITON 2: Given $U(x, x^C, Q^C) = - [x^C - x]^2 + Q^C$, but keeping symmetry and the rest of the assumptions presented in Proposition 1, a majority of voters prefer the pressure group outcome to the no endorsement outcome.

PROOF:

The logic is the same as presented earlier, only the cutoff point changes. In our earlier analysis, when H took position x^H and L took position $x^H + Q$, then the voters at $x^H + Q$ (and beyond) were indifferent between H and L. Similarly, we need to find for our quadratic loss function that distance between the candidates, Z , such that the voter whose most preferred position is at x^L is indifferent between x^H and x^L .

Let $x^L = x$ and $x^H = x + Z$ or $x - Z$. Then x 's utility when L wins is $U(x, x^L, Q^L) = U(x^L, x^L, Q^L) = U(x^L, x^L, 0) = 0$, while x 's utility when H wins is $U(x^L, x^H, Q^H) = U(x^L, x^L + Z, Q) = -Z^2 + Q$. Therefore, $U(x, x^L, Q^L) = U(x, x^H, Q^H)$ when $Z^2 = Q$ or $Z = Q^{1/2}$.

Hence, $x_H = M + [Q^{1/2}]/2 = x^H$, $x_L = M - 3[Q^{1/2}]/2$, and $x^L = M - [Q^{1/2}]/2$.

We next determine how far to the left of M a voter is such that the voter is indifferent between the non-endorsed outcome at M and the endorsed outcome at $M + [Q^{1/2}]/2$. That is, we will determine that value of D such the following equality holds:

$$-D^2 + Q/2 = -(D + [Q^{1/2}]/2)^2 + Q = -D^2 + 3Q/4 - DQ^{1/2}$$

D is the distance the voter is to the left of the median voter, M . If there is no endorsement, then both candidates will be at M and the voter will lose D^2 in position but gain Q half the time when H wins. This is the left-hand side of the equality. We next turn to the expression between the equal signs. If there is an endorsement, then the high-quality candidate will always win, but H will be $D + [Q^{1/2}]/2$ away from the voter. The voter's positional loss will be this last expression squared.

Making use of the above equalities we get the following equivalent expression:

$$Q/4 = DQ^{1/2} \text{ or } D = Q^{1/2}/4 > 0.$$

Clearly, a majority of voters (those whose most preferred positions are to the right of $M - .25Q^{.5}$) prefer the endorsement outcome to the outcome when there is no endorsement.

q.e.d.

APPENDIX 2: THE PRESSURE GROUPS MAKE THE OFFERS

In this appendix, I assume that the pressure groups make the offers to the candidates. We now substitute the following assumption for our original assumption 4.

4^{'''}. Negotiations take place according to the following procedure:

- A. The pressure group offers to endorse one or both candidate as the high-quality candidate and to provide the necessary funds for advertising in return for the candidate taking position x^* .
- B. Both candidates are aware of the offer to the other candidate if such an offer has been made.
- C. The candidates simultaneous decide which position to take by either accepting the offer (if one has been made) or choosing a position without being endorsed.

The voters know that negotiations have taken place, but they do not observe the rejected offer(s). Furthermore, in the absence of an endorsement, they cannot infer from the positions alone which candidate is the high-quality candidate.

PROPOSITION 5: Suppose that the same assumptions as were originally made for Proposition 3 hold, except that assumption 4^{'''} is substituted for 4 (this is the assumption that the pressure groups makes the offers). Then both pressure groups offering $x^* = M$ to H is a Nash equilibrium. H will accept the offer and win the election.

PROOF:

Suppose that the left-wing pressure group has offered to endorse H as the high-quality candidate if H takes position M. Then the best that the right-wing pressure group can do is to make the same offer to the high-quality candidate. If the right-wing pressure group offers to endorse H as the high-quality candidate in return for the candidate taking a position different from M, then H will reject the offer. If the right-wing pressure group offers to endorse L in return for taking a position different from M, then L will lose the election whether the candidate accepts the offer or not; hence the right-wing pressure group would be better off endorsing H at M. If the right-wing pressure group, endorses L in return for L taking position M, then the pressure group is worse off than if the pressure group made no endorsement, as it prefers the higher-quality candidate to win if both candidates have the same

position. On lexicographic grounds, the pressure group prefers to endorse the winning candidate rather than not endorsing the winning candidate. Thus the right-wing candidate will also offer to endorse H if H takes position M. The high-quality candidate will agree to both offers. The symmetric argument holds for the left-wing pressure group as well. A similar logic shows that there is no other equilibrium.

q.e.d.

Just as in proposition 3, the proof holds for D such that $1 \geq D > 0$.

The set of propositions in the paper suggest that pressure group contributions are welfare improving unless there is only one pressure group and it is the pressure group that makes the offer.

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