Strategic Restraint in Contests

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Abstract

Economic policy is modelled as the outcome of a (political) game between two interest groups. The possible ex-post (realized) outcomes in the game correspond to the proposed policies. In the literature policy proposals are exogenous. We extend such games by allowing the endogenous determination of the proposed policies. In a first stage the groups decide which policy to lobby for and then, in a second stage, engage in a contest over the proposed policies. Our main result is that competition over endogenously determined policies induces strategic restraint that reduces polarization and, in turn, wasteful lobbying activities.

Keywords: Interest groups, endogenous lobbying targets, voluntary restraint, polarization, voluntary restraint.

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I. Introduction

Economic policy is often the outcome of a (political) game-contest between interest groups. Moreover, the contest between interest groups frequently involves a struggle between one group that defends the status-quo and other groups that challenge it by fighting for alternative policies. For example, a tax reform may involve a struggle between different industries. Existing pollution standards may be defended by the industry and challenged by an environmentalist interest group. A monopoly can face the opposition of a customers coalition fighting for appropriate regulation. Capital owners and a workers union can be engaged in a contest that determines the minimum wage, and so on. The outcome of the contest depends on the stakes of the contestants and, in turn, on their exerted (fighting, lobbying, rent-seeking) efforts. The realized, ex-post, payoff configuration of the interest groups depends on the policy proposal that actually emerges as the winner of the contest.

In the literature, special cases of the above setting are studied. See, for example, Baik (1999), Ellingsen (1991) and Schmidt (1992) who analyzed the welfare effect of consumer opposition to the existence of monopoly rents. In these studies policy proposals are exogenous. Furthermore, the status-quo policy and the policy proposed by a single challenger are assumed to coincide with the contestants' optimal policies under certainty conditions where there is no opposition. Although these scholars have recognized that interest groups' awareness to the existence of an opposition may affect their efforts, they disregarded the possible effects of such awareness on their proposed policies. An interest group may prefer a proposal that reduces its (certain) benefit in case of winning the contest, if it anticipates a sufficient increase in the winning probability of that more moderate proposal, thus increasing its expected payoff. In particular, the challenger of the status-quo may be induced to propose a policy which is closer to the status-quo policy and the defender of that policy may prefer to propose a new policy that to some extent compromises with the optimal strategy of the challenger.

The main purpose of this study is to extend the analysis of economic policy determination by allowing the endogenous formation of the proposed policies – the lobbying targets. In our proposed general setting, in a first stage interest groups decide which policy to lobby for and, then, in a second stage, engage in a contest over the proposed policies. Using as a benchmark a status-quo policy which is the preferred policy of one interest group (the status-quo defender) when there is no

opposition, we establish that the status-quo is not an equilibrium strategy of "the defender". Likewise, the equilibrium proposal of "the challenger" differs from his optimal proposal when he does not face any opposition. Both interest groups choose more moderate positions. Hence, competition over endogenously determined policies reduces polarization and, in turn, wasteful lobbying activities. Such competition cannot result, however, in a (strategic) compromise where the two interest groups share the same equilibrium proposal and so entirely avoid the expenditure of wasteful resources. The extended competition over the endogenously determined proposals can therefore still be inefficient relative to a real compromise.

Our attempt to endogenize the proposed policies and therefore the contestants' payoffs is related to the literature on optimal contest design. In contrast to that literature, however, where a contest designer (a bureaucrat or an elected politician) is assumed to control the contestants' payoffs, Appelbaum and Katz (1987), Kohli and Singh (1999) and Epstein and Nitzan (2002a), in our model the contestants themselves determine their payoffs. Chung (1996) and Gradstein (1993) also analyze the endogenous determination of payoffs. Their setting is different and somewhat restrictive, first because the payoffs of the contestants are symmetric and, second because the variability of the contested prize is only reached via its dependence on the aggregate efforts of the contestants. See also Ursprung (1990) and Sun and Ng (1999). Our result is also related to the studies of Cairns and Long (1991), Glazer and McMillan (1992), and Leidy (1994) on voluntary price regulation. Using different settings inspired by Becker's (1983) pressure model, these authors show that, within a monopoly context, the threat of price regulation due to an effective political opposition by consumers may induce the monopolist to price below the unregulated price. Finally, our result is also related to Epstein and Nitzan (2002b) that focuses on the social cost of monopoly within a more restricted framework and to Graichen, Requate and Dijkstra (2001) that examines the optimal policy of a monopoly when it faces an environmentalist pressure group.

In the next section we present the extended two-stage game and establish the main result. Section III contains a brief summary and concluding remarks on the welfare implications of our result.

II. The Model

An overview

Suppose that a status-quo policy is challenged by one interest group and defended by another group. This policy can be the price of a regulated monopoly, the maximal degree of pollution the government allows or the existing tax structure. The defender of the status-quo policy (henceforth interest group *d*) prefers the status-quo policy I_s to any alternative policy. The challenger of the status-quo policy (interest group *c*) prefers the alternative policy I_a. Without any loss of generality, it is assumed that $I_s \leq I_a$ and that the policy I_s (I_a) is the optimal policy proposal of the defender (the challenger), provided that his supported policy gains *certain approval*. That is, disregarding the possibility that his proposed policy can be rejected, in which case the policy proposed by the rival interest group is assumed to be approved. For example, in the contest over monopoly regulation studied in Baik (1999), Ellingsen (1991) and Schmidt (1992), the monopoly firm defends the status-quo, lobbying for the profit-maximizing monopoly price (against any price regulation), while the consumers challenge the status-quo lobbying for the competitive price (a tight price cap).

The actual implemented policy depends on the contest between the interest groups on the approval of their proposed policies. These proposed policies that are endogenously determined in our extended setting are denoted I_c and I_d. The outcome of the political contest is given in terms of the probabilities Pr_c and Pr_d that the interest groups *c* and *d* win the contest. The outcome of the contest depends on the stakes of the contestants and, in turn, on their proposed policies and on their exerted lobbying or rent-seeking efforts. In contrast to Epstein and Nitzan (2002a), the government is not introduced as a player in the policy-determination game. However, the important role of the political environment (the form of the government, its motivation and the decision rule it applies) is represented by the commonly used contest success function that specifies the relationship between the outcome of the contest and the proposed policies or the efforts of the interest groups

Equilibrium

The interest groups make two types of decisions. In the first stage of the game they non-cooperatively select their proposed policies, the lobbying targets, I_c and I_d. In the second stage they engage in a contest over the approval of the proposed policies. The

interest groups are assumed to pre-commit on their proposed policies.[1] [2] The means of the interest groups to affect the outcome of the contest, viz. their winning probabilities, in the second stage of the game is their lobbying or rent-seeking efforts x_c and x_d .[3] Given the policy proposals I_c and I_d and the utility functions U_c and U_d, the stakes of the interest groups are

$$(1) \qquad N_c(I_c, I_d) = U_c(I_c) - U_c(I_d) \quad \textit{and} \quad N_d(I_c, I_d) = U_d(I_d) - U_d(I_c)$$

The utility functions U_c and U_d are assumed to be monotonic, continuous and twice differentiable on the interval $[I_s, I_a]$ and recall that they are maximized, respectively, at the policies I_a and I_s, $I_s \leq I_a$. Notice that when $I_c = I_d$ both stakes are equal to zero and that $\partial N_c / \partial I_d < 0$ *and* $\partial N_d / \partial I_c > 0$ on the interval $[I_s, I_a]$.

The expected net payoff (surplus) of the risk neutral challenger and defender are, respectively, given by [4]

$$(2) \qquad E(u_c) = U_c(I_d) + \Pr_c N_c(I_c, I_d) - x_c$$

and

$$(3) \qquad E(u_d) = U_d(I_c) + \Pr_d N_d(I_c, I_d) - x_d$$

For any given pair of policy proposals, we assume that the probabilities $\Pr_d$ *and* $\Pr_c$ have the following structure: $Pr_c = 1 - Pr_d$ and the expenditures, (x_c, x_d) determine the probabilitys such that (see Skaperdas, 1992) $\Pr_i(x_i, 0) = 1 \; \forall \; x_i > 0$,

$$0 < \Pr_i(x_i, x_j) < 1 \; \forall \; x_i, x_j > 0, \quad \Pr_i(0,0) = 0.5, \quad \frac{\partial \Pr_i(x_i, x_j)}{\partial x_i} > 0, \quad \frac{\partial \Pr_i(x_i, x_j)}{\partial x_j} < 0$$

[1] For different rent-seeking games with an explicit time structure that allow for such commitment, see Baik and Kim(1997) ,Baik and Shogren (1992) , Baye and Shin (1999), Dixit (1987) and Leininger (1993).

[2] We assume that the commitments are feasible and are fully implemented after the contest. For example, in the case of a regulated monopoly the price commitment is enforced by the regulator.

[3] x_c and x_d are total lobbying efforts. An implicit assumption is thus made that the interest groups are able to fully overcome the free riding effects.

[4] Notice that $E(u_j) = \Pr_i U_j(I_i) + \Pr_j U_j(I_j) - x_j$. Thus
$E(u_j) = U_j(I_i) + \Pr_j N_j(I_j, I_i) - x_j$ *for* $i \neq j$ *and* $i, j = c, d$.

and $\frac{\partial^2 \Pr_i(x_i, x_j)}{\partial x_i^2} < 0$ [5] (the latter inequality ensures that the second order conditions are satisfied). Since $\Pr_i(x_i, x_j) + \Pr_j(x_j, x_i) = 1$ it holds that

$$\frac{\partial^2 \Pr_i(x_i, x_j)}{\partial x_i \partial x_j} = -\frac{\partial^2 \Pr_j(x_j, x_i)}{\partial x_i \partial x_j}. \tag{4}$$

In our two-stage game with full information a sub-game perfect equilibrium can be calculated by using the following backward induction procedure. The equilibrium effort levels determined at the second stage are interior (x_c and x_d are positive). Such equilibria need not be unique[6]. An interior equilibrium is characterized by the following conditions ($\frac{\partial E(u_i)}{\partial x_i} = 0 \quad \forall\ i = c, d$): [7]

$$\Delta_i = \frac{\partial \Pr_i}{\partial x_i} N_i - 1 = 0 \qquad \forall\ i = c, d \tag{5}$$

Thus the first order conditions require[8] that:

$$\frac{\partial \Pr_i}{\partial x_i} = \frac{1}{N_i} \qquad \forall\ i = c, d \tag{6}$$

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[5] The function $\Pr_i(x_i, x_j)$ is usually referred to as a contest success function (CSF). The functional forms of the CSF's commonly assumed in the literature, see Nitzan (1994) and Skaperdas (1996) satisfy these assumptions.

[6] A sufficient condition for the uniqueness of equilibrium is (see Skaperds, 1992): $\Pr_i(x_i, x_j)(1 - \Pr_i(x_i, x_j))\frac{\partial^2 \Pr_i(x_i, x_j)}{\partial x_i \partial x_j} + (2\Pr_i(x_i, x_j) - 1)\frac{\partial \Pr_i(x_i, x_j)}{\partial x_i}\frac{\partial \Pr_i(x_i, x_j)}{\partial x_j} = 0$

For this condition to be satisfied we have to make an additional plausible assumption, namely, that $\frac{\partial^2 \Pr_i(x_i, x_j)}{\partial x_i \partial x_j} \begin{matrix} > \\ = \\ < \end{matrix} 0 \ \ iff \ \ \Pr_i(x_i, x_j) \begin{matrix} > \\ = \\ < \end{matrix} 0.5$. This assumption means that player i has an advantage in terms of ability if a change in j's effort positively affects his marginal winning probability. In other words, a positive (negative) sign of the cross second-order partial derivative of $\Pr_i(x_i, x_j)$, $\frac{\partial^2 \Pr_i}{\partial x_j \partial x_i}$, implies that i has an advantage (disadvantage) when j's effort changes.

[7] The sufficient second order conditions of such equilibria are assumed to be satisfied.

[8] It can easily be verified that the second order condition holds.

By total differentiation of the first order conditions we get that the Nash equilibrium rent-seeking rent-avoidance activities satisfy the following conditions:[9]

$$\frac{\partial x_i}{\partial I_j} = \frac{\frac{\partial \Delta_i}{\partial x_j}\frac{\partial \Delta_j}{\partial I_j} - \frac{\partial \Delta_j}{\partial x_j}\frac{\partial \Delta_i}{\partial I_j}}{\frac{\partial \Delta_i}{\partial x_i}\frac{\partial \Delta_j}{\partial x_j} - \frac{\partial \Delta_j}{\partial x_i}\frac{\partial \Delta_i}{\partial x_j}} \quad \forall i \neq j \text{ and } i, j = c, d \tag{7}$$

We thus obtain that:

$$\frac{\partial x^*_d}{\partial I_c} = \frac{N_d \frac{\partial^2 \Pr_c}{\partial x_d \partial x_c}\frac{\partial \Pr_c}{\partial x_c}\frac{\partial N_c}{\partial I_c} - N_c \frac{\partial^2 \Pr_c}{\partial x_c^{\,2}}\frac{\partial \Pr_d}{\partial x_d}\frac{\partial N_d}{\partial I_c}}{N_d N_c\left(\frac{\partial^2 \Pr_c}{\partial x_c^{\,2}}\frac{\partial^2 \Pr_d}{\partial x_d^{\,2}} - \frac{\partial^2 \Pr_d}{\partial x_d \partial x_c}\frac{\partial^2 \Pr_c}{\partial x_d \partial x_c}\right)} \tag{8}$$

and

$$\frac{\partial x^*_c}{\partial I_d} = \frac{N_c \frac{\partial^2 \Pr_d}{\partial x_d \partial x_c}\frac{\partial \Pr_d}{\partial x_d}\frac{\partial N_d}{\partial I_d} - N_d \frac{\partial^2 \Pr_d}{\partial x_d^{\,2}}\frac{\partial \Pr_c}{\partial x_c}\frac{\partial N_c}{\partial I_d}}{N_d N_c\left(\frac{\partial^2 \Pr_c}{\partial x_c^{\,2}}\frac{\partial^2 \Pr_d}{\partial x_d^{\,2}} - \frac{\partial^2 \Pr_d}{\partial x_d \partial x_c}\frac{\partial^2 \Pr_c}{\partial x_d \partial x_c}\right)} \tag{9}$$

The Interest Groups' Optimal Policies

The question we now wish to consider is what are the proposed policies that the interest groups prefer. The interior equilibrium policy proposals of the two interest groups are characterized by

$$\frac{\partial E(u_c)}{\partial I_c} = 0 \quad \text{and} \quad \frac{\partial E(u_d)}{\partial I_d} = 0 \tag{10}$$

Notice that since I_a maximizes U_c , it also maximizes $N_c(I_c,I_d)$, for any given I_d that differs from I_a. Similarly, I_s maximizes $N_d(I_c,I_d)$, for any given I_c that differs from I_s. By assumption then, $\frac{\partial N_c(I_c, I_d)}{\partial I_c} = 0$, if $I_c = I_a$ and $\frac{\partial N_d(I_c, I_d)}{\partial I_d} = 0$, if $I_d = I_s$, even if $I_c = I_s$.

[9] The comparative statics analysis is consistent with the sufficient conditions for the uniqueness of equilibrium, see footnote 6.

The policy I_i $(i = c, d)$ that maximizes interest group *i*'s expected payoff $E(u_i)$ is characterized by the following first order condition: $\forall\ i \neq j\ and\ \ i, j = c, d$,

$$(11) \qquad \frac{\partial E(u_i)}{\partial I_i} = \frac{\partial \Pr_i}{\partial x_i}\frac{\partial x_i}{\partial I_i} N_i + \frac{\partial \Pr_i}{\partial x_j}\frac{\partial x_j}{\partial I_i} N_i + \Pr_i \frac{\partial N_i}{\partial I_i} - \frac{\partial x_i}{\partial I_i} = 0$$

Given (6), we rewrite (11),

$$(12) \qquad \frac{\partial E(u_i)}{\partial I_i} = \frac{\partial \Pr_i}{\partial x_j}\frac{\partial x_j}{\partial I_i} N_i + \Pr_i \frac{\partial N_i}{\partial I_i} = 0$$

It is assumed that the utility functions U_c and U_d are differentiable at the optimal policies I_s . This implies that the first order effect of moving away from the ideal policies has a second-order effect. By definition, $\left.\frac{\partial N_c(I_c, I_d)}{\partial I_c}\right|_{I_c = I_a} = 0$, $\left.\frac{\partial N_d(I_c, I_d)}{\partial I_d}\right|_{I_d = I_s} = 0$, $\left.\frac{\partial N_c(I_c, I_d)}{\partial I_d}\right|_{I_d = I_s} < 0$ and $\left.\frac{\partial N_d(I_c, I_d)}{\partial I_c}\right|_{I_c = I_a} > 0$. Hence, by (8) and (9), $\left.\frac{\partial x_c}{\partial I_d}\right|_{I_d = I_s} < 0$ and $\left.\frac{\partial x_d}{\partial I_c}\right|_{I_c = I_a} > 0$. Since, by assumption, $\frac{\partial \Pr_i}{\partial x_j} < 0$ **,** we obtain that $\left.\frac{\partial E(u_c)}{\partial I_c}\right|_{I_c = I_a} < 0$ and $\left.\frac{\partial E(u_d)}{\partial I_d}\right|_{I_d = I_s} > 0$**.** This means that around the ideal policy of each of the players, the equilibrium contest effort does not increase as a result of reduced polarization.

The latter two inequalities directly imply that, as long as the two interest groups engage in a viable contest in the second stage of the game, in equilibrium the two interest groups are induced to voluntarily moderate their proposals relative to their best policies when there is no opposition.[10] Specifically, the equilibrium policies I^*_c and I^*_d satisfy: $I^*_c < I_a$ and $I^*_d > I_s$. That is

[10] We disregard corner solutions.

Proposition 1*: Competition over endogenously determined policy proposals reduces polarization.*

The intuition for this result is as follows: If there is no opposition the challenger chooses the policy I_a. In the presence of an opposition, the challenger realizes that lowering his proposal below I_a leads to a decrease of his payoff from winning the contest. But the more restrained proposal yields an increase in the payoff of the opponent and, in turn, a reduction in his stake that induces him to become less aggressive. The resulting decline in the defender's probability of winning the contest clearly benefits the challenger. Since the latter favourable effect dominates the former unfavourable effect, the challenger prefers to restrain his lobbying target, i.e., propose a policy below I_a. A similar intuition explains the readiness of the defender of the status-quo to moderate his position by proposing a policy that exceeds I_s.[11]

What is needed for this result is that the rent-seeker's marginal cost from a moderation of his position is zero, because he starts his moderation from an ideal point at which the first-order condition holds. Hence, a marginal moderation reduces his gain from winning only by a second order effect. However, this moderation has a first-order effect on the opponent's incentive to engage in rent-seeking efforts and, consequently, on the winning probability. Accordingly, the marginal benefit exceeds the marginal cost.

Baik (1999), Ellingsen (1991) and Schmidt (1992) study the welfare effect of consumer opposition to the existence of monopoly rents sharing the assumption that the contested alternatives are the standard textbook profit-maximizing price and the competitive consumer-surplus-maximizing price. Proposition 1 implies that, as long as the alternative prices are endogenously selected by the monopoly firm and by its customer coalition, the firm would voluntarily support some price regulation and the consumers would not lobby for a tight price cap.[12] Our result has a broad applicability

[11] Epstein and Nitzan (2002b) study a considerably less general contest between a consumer and a potential monopoly, using a specific contest success function (Tullock's special case) and allowing only the potential monopoly to propose its desirable target/policy. Their analysis of the social cost of monopoly is based on a result which is implied by Proposition 1.

[12] For related results in the special context of monopoly regulation, see Cairns and Long (1991) and Glazer and McMillan (1992). Using the different setting of Becker's (1983) pressure model, these authors show that the monopolist is induced to price below the unregulated profit-maximizing price. The former authors argue that the monopolist takes into account the effect of his price on the probability that regulation is imposed by the legislator. Self regulation is his way to permit government regulation. The latter authors argue that lack of knowledge by the monopolist of just how much can be

as the framework we are suggesting naturally fits numerous contexts where economic policy is the outcome of interest group pressures that may take the form of lobbying, rent-seeking, bribes or campaign contributions.

Although polarization is reduced, it is not eliminated. That is, an equilibrium with completely converging proposed policies is impossible. To prove this claim, suppose, to the contrary, that (I^*, I^*) is such an equilibrium. Then, by the definition of Nash equilibrium, for every I_c, $U_c(I^*)$ exceeds $E(U_c(I_c, I^*))$. Recall that $E(U_c(I_c, I^*)) = U_c(I^*) + (Pr_c(I_c, I^*) N_c(I_c, I^*) - x^*(I_c, I^*)) = U_c(I^*) + A(I_c, I^*)$. Since $A(I_c, I^*)$ is positive when I_c is associated with a positive stake and I^* differs from such I_c, $E(U_c(I_c, I^*))$ exceeds $U_c(I^*)$. The obtained contradiction implies that (I^*, I^*) cannot be an equilibrium, which proves our claim. Namely,

Proposition 2*: The equilibrium policy proposals of the interest groups cannot coincide.*

The intuition behind this result is as follows: for both interest groups, a deviation from any agreed upon compromise results in a first order increase in the expected payoff, $Pr_i(I_i, I^*) N_i(I_i, I_j)$, and a second order reduction in the expected payoff, $-x_i$. Consequently, both interest groups are induced to deviate from any agreed upon proposal and conflict is a necessary outcome of the interaction in our game.[13] Since there always remain effective incentives for the interest groups to engage in a viable contest, wasteful resources are expended in the second stage of the game. Note that the interest groups could, of course, increase their expected payoffs by agreeing to cut down their lobbying efforts by the same proportion. This implies that the equilibrium of the policy – determination game is inefficient.[14]

III. Concluding Remarks

Competition over endogenously determined policy proposals reduces the polarization between the positions of interest groups. In particular, each group restrains its proposal relative to its optimal proposal under certainty. Although the interest groups

extracted from consumers before they will be induced to mount an effective political opposition induces him to accept a lower price.

[13] A different result can be obtained if the interest groups are allowed to be risk averse or in a different one-time interaction setting, see Skaperdas (1992).

[14] Note that full dissipation of the rent may occur in this contest.

voluntarily restrain their proposals, they are nevertheless induced to engage in a wasteful contest as complete agreement is not an equilibrium outcome.

Our result has broad applications. It rationalizes the self-restraint of interest groups such as firms investing in pollution control or voluntarily adopting cleaner production processes or such as environmentalists who do not maintain a zero pollution target. It explains why monopolists are induced to self regulate their price and why their customer coalitions do not insist on a tight price cap. It also implies that an interest group's support of a welfare program or of any policy that has redistribution effects need not reflect its altruistic preferences, but rather its egoistic strategic restraint. This result is somewhat related to the voting literature where two parties choosing platforms may have an incentive to moderate their positions and often to converge to the same platform (the median voter's ideal position).

The robustness of our result needs to be examined with respect to an increase in the number of interest groups that propose policy proposals. Another possible worthwhile extension is the endogenization of the contest success function by adding the government (the elected politicians, the bureaucrats or both) as an active player in the policy-determination game.

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