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Rent Dissipation and the Social Cost of Price Policy

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ABSTRACT

How much will interest groups spend to secure favorable policies? This paper uses a general equilibrium-based exchange economy model to examine rent seeking for a price policy. Opposing interests spend resources to influence the government's choice of a price vector. This inherently strategic political struggle is modeled as a non-cooperative game. The level of the rent gained by participants is determined endogenously. Numerical simulations explore the degree to which rents are dissipated by wasteful rent seeking in Nash equilibrium. The leading finding is that dissipation, measured as the ratio of rent-seeking costs to rents garnered, can grow without limit, and is greatest when opponents are evenly matched. Dissipation is smallest with widely disparate groups, a result that might help explain the underdissipation that seems to occur in many industries.

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RENT DISSIPATION AND THE SOCIAL COST OF PRICE POLICY

I. Introduction

When government-sponsored regulation of the economy creates rents, one should expect potential beneficiaries to expend resources—which would otherwise be put to productive use—in securing the rents. This "rent-seeking" activity represents a cost to society above and beyond the costs directly attributable to the intervention itself (Tullock 1967). Though there may be agreement that rent seeking adds to the cost of interventionist policies, there is little agreement concerning its importance. How do rent-seeking costs compare in value to the rent they seek to obtain?

The question of interest is whether dissipation is *complete*—by which is meant rent-seeking outlays equal the rent that is sought. Krueger (1974) argued that if the struggle for a rent is perfectly competitive then dissipation should be complete. She used this assumption in estimating the cost of interventionist trade policy in India and Turkey, letting the measured level of the rent represent rent seeking. Complete dissipation, then, is a relevant benchmark in that if it obtains it legitimizes the use of rent (which can be measured) as a proxy for the object of interest, rent-seeking expenditures (which can seldom be measured).

Due at least in part to the difficulty of obtaining reliable data, attention often focuses on the results of theoretical models.[1] Following Tullock (1967) and Posner (1975), for whom the holder of a monopoly license earns extra-normal profits or rents, much of the theoretical literature builds upon monopoly-based models.[2] The monopoly prize might be awarded at random to one rent seeker in a government-sponsored lottery (as in Tullock 1980; and Hillman and Riley 1989) or it might be awarded to the highest bidder in a government-sponsored auction (as in Hillman and Samet

[1] There is a dearth of data on rent-seeking expenditures. Hazlett and Michaels (1992), whose paper does present empirical evidence, compare expenditures aimed at securing cellular telephone franchises in government-sponsored auctions to the franchise values. They find that even in a favorable setting, dissipation is often far from complete.

[2] Models of trade policy are also to be found in the literature on rent seeking—Tullock (1967) considered the waste that can attend trade restrictions. In these models, rather than awarding a prize to one agent, the policy of interest is aimed at moving prices or tariffs incrementally. Examples from this literature include papers by Krueger (1974), Brock and Magee (1978), Bhagwati and Srinivasan (1982), and Young and Magee (1986). For a thorough review of the literature see Magee, Brock, and Young (1989).

1987). The prize itself may be determined endogenously, as in Applebaum and Katz (1986).[3] Recently, Wenders (1987) has argued that dissipation can far exceed the observed rent because the potential victims of a monopoly (the buyers) will seek to prevent the monopoly from arising. Ellingsen (1991), on the other hand, points out that rent seeking by buyers might be mitigated by the deadweight losses avoided if these buyers are successful in preventing a monopoly. He argues that "when expenditures are voluntary, they cannot exceed the size of the prize" (1991, p. 655).

This paper departs from the monopoly-based models, and takes up the problem of lobbying over a price policy. Rather than one winner of a given prize, this model has as it outcome a price vector. Such a policy confers benefits and costs upon participants in a continuous fashion. Instances of price policy include minimum wage laws, much of agricultural policy in the U.S., and protection by tariffs all constitute price-based policy. Important for the present discussion is the fact that in these cases the rent in question is determined endogenously. This, it has been noted, is not new. What may new be is the notion that one cannot be sure even that the lobbying process will create any rents at all.

My purpose is to show that in a rent-seeking battle over a price policy there is no limit to the dissipation that can occur. As it is used here, dissipation refers to the ratio of rent-seeking expenditures *to the rents secured*.[4] The general equilibrium-based model pits opposing agents against each other in a struggle over the level at which a government authority sets relative prices.[5] When agents are symmetrically placed, opponents in the lobbying game may devote resources to a political process that ultimately leaves prices unchanged—creates no aggregate rents. This outcome is akin to the prisoner's dilemma in that the observed Nash equilibrium is Pareto dominated. Either player, by unilaterally "cooperating" and scaling back rent-seeking expenditures, only improves the opponent's payoff to his or her own detriment.[6] The collective outcome might appear to stem from irrational behavior on the part of participants, but it is shown that from their perspectives, each

[3] Monopoly-based models have been extended still further. The effects upon the rent-seeking outcome of a small number of competitors for the rent (Hillman and Samet 1987), of risk averse agents (Long and Vousden 1987), of a dynamic structure (Cairns 1989) are included in the generalizations that appear in this literature. See the survey of earlier work by Tollison (1982).

[4] This measure also appears in Hazlett and Michaels (1992). An alternative measure would be to compare rent-seeking expenditures to the value of the economy, following Magee, Brock, and Young (1989). Their "black hole" appears when the entire resource base of the economy is wasted on rent seeking.

[5] Monissen (1991) also devises a general equilibrium rent-seeking model, but for him the policy of interest is a monopoly policy.

[6] Similar arguments can also be found in game theoretic models of advertising (see, for example, Friedman 1959).

player does indeed behave optimally.

The model of the paper, which follows Coggins, *et. al.* (1991), is one of exchange between agents with heterogenous endowments. A government is willing to set relative prices in response to political activity. Competition over prices is modeled as a noncooperative game whose Nash equilibrium is examined. Dependent as it is upon the price competition, the rent in question is endogenous to the model. The general equilibrium setting calls for a measure of rent akin to the Tullock costs that accrue to a monopolist. An agent's willingness to pay for the price change that actually obtains (the compensating variation) is taken as that agent's achieved rent. Summed across agents, this rent is compared to rent-seeking expenditures, and their ratio is used as a measure of dissipation.

A technical difficulty arises because agents' incomes and the prices they face are simultaneously determined. The response functions whose joint solution constitutes a Nash equilibrium in the lobbying game have no closed form solution. The paper reports the results of numerical simulations that explore the relationship between dissipation and the underlying parameters of the economy.

For a certain class of economies—those in which agents are symmetric—rent seeking occurs even though the price vector does not move away from the decentralized price. More generally, when lobbyists are fairly well balanced, a small movement in prices may result from large rent-seeking expenditures. This observation appears to have important consequences for empirical work. If one judges the costliness of rent seeking in a given instance by the level of distortionary rent created, the most troublesome cases may be overlooked. Economic policy aimed at setting prices causes the greatest dissipation when only modest levels of distortion are created. This points out the importance for future empirical research of devising improved measures of rent-seeking expenditures.

II. The Model

The theoretical model is of a two-agent exchange economy with two traded goods. These agents might be thought of as groups. I abstract away from the problems of collective action and the costs of organizing a group, problems that are taken up by Nitzan (1991). Each agent selects a commodity bundle x_i from his or her consumption set $X_i = R^2_+$. Preferences may be represented by the well-behaved utility function[7] $U_i : X_i \to R$.

The strategic nature of the competition between opposing interests over a price policy is embodied in the assumption that each agent is endowed with only one good (for convenience, agent i initially owns good i). Let ω_i denote this endowment. (Subscripts will be used to denote agents and superscripts to denote commodities.) I assume that the prices of both goods are strictly positive. Each agent seeks to maximize utility U_i subject to an income constraint. Demands are assumed homogeneous of degree zero, which permits the normalization of prices to the unit simplex $\Delta \subset R^2_{++}$. Let $P = (p, 1-p) \in \Delta$ denote the normalized price vector.

Agents may choose to spend a portion η_i of their income to lobby a government to alter the price vector.[8] The two-agent economy is assumed to be small compared to the rest of the world, with which it may trade in any quantity at the exogenously-determined price p^*. The government has two roles. First, it announces a pricing function $p : R^2 \to (0,1)$ that maps a lobbying pair $\eta = (\eta_1, \eta_2)$ into a relative price. (For a similar tariff-setting function see Findlay and Wellisz 1982.) This price may not clear the domestic markets. The second role for government is to execute trade with the rest of the world. Though strategic interaction between agents will be important, agents are assumed to take the pricing rule $p(\eta)$ as given. In this full-information setting, uncertainty and risk preferences, featured in the papers of Hillman and Katz (1984) and Fabella (1989) do not play a role. I assume that the government has no objective of its own. In its price-setting role, the government is nothing more than a neutral arbiter of the lobbying competition.

Suppose that $p(\eta)$ satisfies the following four assumptions. First, $p(\eta)$ is differentiable. Second, in the absence of lobbying $p(\eta) = p^*$. Agent 1, whose endowment consists entirely of good 1, wishes for the relative price p to increase, while the opposite is true of agent 2. Thus, third, I assume that lobbying is productive, but that its marginal effect is declining: $p(\eta)$ is strictly increasing and concave (resp. strictly decreasing and convex) in η_1 (resp. in η_2). Finally, fourth, lobbying cannot cause income to explode: For each i, for each η_{-i}, there exists an $\hat{\eta}_i(\eta_{-i}) < +\infty$, depending on η_{-i}, sufficiently large so that $P(\hat{\eta}_i(\eta_{-i}), \eta_{-i}) \cdot \omega_i = \hat{\eta}_i(\eta_{-i})$. It can be shown that

[7] By well-behaved I mean specifically that U_i is everywhere twice differentiable, and is strictly quasiconcave and monotonically increasing on the interior of X_i.

[8] This quantity represents waste in the model. The government, having no objective function, has no desire for commodities. See Congleton (1988) for a defense of the notion that lobbying expenditures do indeed represent pure welfare losses. (See also Tullock 1990; and Posner 1975, p. 812,) If lobbying occurs in the model considered here, when there are no direct gains from lobbying in that the "recipient" of the lobbying revenues does not consume them, then the argument that wasteful lobbying can occur is strengthened.

$\hat{\eta}_i(\eta_{-i}) = \{x \in R_+ \mid P(x, \eta_{-i}) \cdot \omega_i = x\}$ is a continuous function. Let the symbol $\mathcal{E}$ denote a *lobbying economy*, which consists of the pricing function $p(\eta)$ and, for each agent, a pair $(U_i(x_i), \omega_i)$.

With lobbying, each agent's optimization program consists in maximizing utility given the government's pricing function and *given the other agent's lobbying level* η_{-i}. The dependence of each agent's optimal decision upon the other agent's behavior constitutes the essential strategic element of the model. The choice set for this problem, given by $\psi_i(\eta_{-i}) = \{(x_i, \eta_i) \in R^3_+ \mid P(\eta) \cdot x_i \leq P(\eta) \cdot \omega_i - \eta_i\}$, specifies all triples that agent i can afford. Given η_{-i}, agent i solves the problem

$$(1) \qquad \max_{(x_i, \eta_i) \in \psi_i(\eta_{-i})} U_i(x_i).$$

Let $\tilde{\omega}_1 = \omega_1 - (\eta_1 / p(\eta))$ denote 1's endowment after lobbying, and let $\tilde{\omega}_2$ be similarly defined. This quantity defines a new budget set $\tilde{\beta}_i(P, P \cdot \tilde{\omega}_i)$, denoting all consumption pairs that are affordable after i has spent η_i on lobbying. Once both η_1 and η_2 have been chosen, each agent's budget set is well-defined. Let $x_i(\eta) = x_i(p(\eta), P(\eta) \cdot \tilde{\omega}_i)$ denote i's after-lobbying demand, and let $z_i(p(\eta)) = x_i(\eta) - \tilde{\omega}_i$ denote i's excess demand.

If the lobbying price does not equal P^*, losses may be incurred when trade with the rest of the world takes place. These losses, amounting to $(P^* - P(\eta)) \cdot z(p(\eta))$, are funded out of the government's revenue $\eta_1 + \eta_2$. Candidate equilibria will be ruled out if the trade-induced losses exceed revenue. Formally, for a lobbying economy $\mathcal{E}$, the 6-tuple $(x_i, \eta_i)_{i=1,2}$ is *government feasible* if $\pi(\eta) = (\eta_1 + \eta_2) - (P^* - P(\eta)) \cdot z(p(\eta)) \geq 0$. Clearly, by assumption if both $\eta_i = 0$, then the price is unchanged: $\pi(0,0) \equiv 0$. An equilibrium for the lobbying economy is defined according to

DEFINITION 1. *Given a lobbying economy* $\mathcal{E}$, *a* **lobbying equilibrium** *is a vector* $(x_1^*, \eta_1^*; x_2^*, \eta_2^*)$ *satisfying:*

i) for each i, (x_i^*, η_i^*) *solves program (1); and*

ii) $(x_i^*, \eta_i^*)_{i=1,2}$ *is government feasible.*

In Coggins, *et. al.* (1991), conditions guaranteeing the existence of a lobbying equilibrium for this model are presented. The two key conditions place a steepness restriction on the pricing function $p(\eta)$ and require that agent i always wishes to consume more of good i than of the other good.

All that now remains is to devise a measure of policy-created rent, and to compare this measure to rent-seeking expenditures. The compensating variation (CV) measures the amount of money that would, at the new prices, restore an agent to his or her pre-change level of utility. Ignoring for the moment the effect of lobbying expenditures upon i's utility, one can ask how much i must be paid to accept an *exogenous* movement in the price vector from p^* to $p(\eta)$.[9]

Let $\mu_i(p(\eta); p^*, y_i)$ denotes i's *expenditure function*, where y_i is pre-lobbying income. This function yields the income level that i would need at prices $p(\eta)$ to be as well off as at p^* with income y_i. Compensating variation, which shall be used to measure the rent accruing to i as a result of the price change, is given by

$$C_i(\eta) = p(\eta)\omega_i - \mu_i(p(\eta); p^*, y_i).$$

Dissipation may be defined for an individual agent or for the economy. Some of the dissipation that occurs can be attributed directly to agent i; one might also aggregate up rents and rent-seeking costs to derive an aggregate dissipation measure. Let $D_i(\eta) = \eta_i / C_i(\eta)$ denote i's individual rent dissipation. This ratio compares the amount actually paid in lobbying expenditures to the amount that i would be willing to pay for the price change were it exogenous. If the ratio is greater than one (or if it is negative), then rent seeking is harmful to i. Economy-wide dissipation is defined as follows.

DEFINITION 2. *Given a lobbying economy $\mathcal{E}$,* **aggregate rent dissipation** *is given by*

$$D(\eta) = \frac{\sum_i \eta_i}{\sum_i C_i(\eta)},$$

the ratio of total lobbying expenditures to the sum of rents created by the price policy.

In the following section the numerical model is developed, along with the set of interrelated first order necessary conditions (or reaction functions) that define an equilibrium in the lobbying economy.

III. The Numerical Model

The decision faced by agent i requires the simultaneous selection of three variables: x_i^1, x_i^2, and η_i. We have seen that this problem depends upon the lobbying decision of the other agent.

[9]The monopoly diagrams of Tullock (1967) and of Posner (1975) use the area behind a demand curve and between a competitive and a monopoly price to represent rent. That idea is approximated most closely in this case, it seems, by the CV, which also measures the area behind a set of demand curves (in this case individual demands) between two relevant prices: p^* and $p(\eta)$.

The problem can be recast so as to depend only upon the choice of η_i given η_{-i}. To see this, note that for a given pair (η_1, η_2), agent i's decision problem involves only the choice of x_i from a budget triangle. The solution to this problem has been defined as $x(\eta)$. Assuming that agents always choose consumption bundles optimally once the lobbying decisions have been made, consumption choices are pushed into the background and the problem is simply to maximize the indirect utility function $V_i(\eta) = U_i(x(\eta_1, \eta_2))$.

Suppose that agent 1's preferences may be represented by a homogeneous of degree one Cobb-Douglas utility function $U_1(x_1) = (x_1^1)^\alpha (x_1^2)^{1-\alpha}$, where $\alpha \in (0,1)$. Straightforward manipulation of the attendant first order necessary conditions for an interior maximum yields the demand functions[10]

$$x_1^1(\eta) = \alpha \cdot \tilde{\omega}^1$$
$$x_1^2(\eta) = (1-\alpha) \cdot \left(\frac{p(\eta)}{1-p(\eta)}\right) \cdot \tilde{\omega}^1.$$

Inserting these expressions, which depend only upon η, into U_i, the indirect utility function for agent 1 is obtained. Differentiating this function partially with respect to η_1 and setting the derivative equal to zero yields the following implicit best response function in η_1 and η_2.

$$\eta_1 = \frac{p(\eta)}{\alpha} \cdot \left(\frac{1}{\partial p(\eta)/\partial \eta_1} - \frac{(1-\alpha)(\omega^1 - \eta_1)}{(1-p(\eta))}\right). \tag{2}$$

For a given η_2, the value for η_1 that solves this expression is agent 1's *best response* lobbying contribution. A similar treatment for agent 2, whose utility function takes the form $U_2(x_2) = (x_2^1)^\beta (x_2^2)^{1-\beta}$, with $\beta \in (0,1)$, yields

$$\eta_2 = \frac{1-p(\eta)}{\beta - 1} \cdot \left(\frac{1}{\partial p(\eta)/\partial \eta_2} + \frac{\beta(\omega^2 - \eta_2)}{p(\eta)}\right). \tag{3}$$

The simultaneous solution to equations (2) and (3), denoted $\eta^* = (\eta_1^*, \eta_2^*)$, constitutes a lobbying equilibrium. It is an equilibrium in the spirit of Nash because each agent, in playing η_i^*, supposes that his or her opponent will not respond to that choice.[11]

For agent 1, compensating variation for a price change from p^* to $p(\eta)$ is given by

$$C_1(\eta^*) = p(\eta^*)\omega_1 - \left(\frac{p(\eta^*)}{p^*}\right)^\alpha \left(\frac{1-p(\eta^*)}{1-p^*}\right)^{1-\alpha} p^*\omega_1,$$

[10]The non-negativity constraint on η_i is also dropped. Here, η_i can take any value in the real line.

[11]This equilibrium is evidently unique on R_+^2. See Young (1982) for a tariff-based lobbying model with a numerical version that possesses multiple equilibria.

and $C_2(\eta^*)$ is similarly defined. The dissipation ratio may be constructed in straightforward fashion from this result.

All that now remains is to introduce a pricing function that meets the requirements placed upon it by the four assumptions appearing above. A candidate function is $p(\eta) = p^* \cdot (1 - e^{-\delta_1 \eta_1} + e^{-\delta_2 \eta_2})$, where the $\delta_i > 0$ capture the political influence of each agent. If δ_i is large, then the effectiveness of a small increase in lobbying contributions near the origin is high. If δ_i is small, then contributions have relatively little effect.

This pricing function does, indeed, satisfy the slope and curvature restrictions, but it needs to be scaled so that its value lies in the interval $(0, 1)$. The required function, which is used throughout the calculations, is

$$p(\eta) = \begin{cases} p^* \cdot (1 - e^{-\delta_1 \eta_1} + e^{-\delta_2 \eta_2}), & \text{if } p^* \leq 1/2; \\ p^* \cdot \left(1 - \frac{1-p^*}{p^*}(e^{-\delta_1 \eta_1} - e^{-\delta_2 \eta_2})\right), & \text{otherwise.} \end{cases} \tag{4}$$

Equations (2), (3), and (4) make up the system whose numerical solution is a lobbying equilibrium. These three equations, inserted into a computational algorithm, may be solved for various combinations of the parameter vector $\lambda = (\omega^1, \omega^2, \alpha, \beta, \delta_1, \delta_2, p^*)$. Two essential characteristics of an agent are embodied in this vector: *wealth* (captured by the endowment ω_i), and *political influence* (captured by δ_i). As δ_i increases, agent i becomes more powerful: the pricing function grows steeper at the origin, which reflects the fact that a small lobbying contribution has a greater marginal effect on the price level. As ω_i increases, agent i becomes more wealthy, which has a natural interpretation in an exchange economy setting.

IV. Numerical Results

Suppose that the model could be so designed that the two agents are identical in their level of lobbying capability. If their wealth and their power are perfectly symmetric, and if the world prices favor neither, then they might perfectly balance one another in the lobbying struggle. Such an economy is called *symmetric* (specifically, by this is meant $\omega^1 = \omega^2$, $\delta_1 = \delta_2$, $\alpha + \beta = 1$, and $p^* = 1/2$). A symmetric economy yields a symmetric lobbying equilibrium. That is, utility levels, lobbying levels, and the rent and dissipation measures are identical across agents. In this case, opponents are perfectly matched, equally powerful. More to the point, because the price does not move as a result of lobbying ($p^* = p(\eta)$) there is no rent created by the lobbying program. For each player, compensating variation must equal zero, for there is no price change. Because agents pay a positive amount for something upon which they place zero value, our dissipation measure approaches infinity.

Table 1 presents equilibrium lobbying and policy results for a series of symmetric economies. In each, $\omega^i = 6$, $\alpha = 0.75 = 1 - \beta$, and $p^* = 1/2$. The influence parameter δ_i, identical for each agent, steps from one to eight. In this range the steepness of $p(\eta)$ at the origin (in both the η_1 and η_2 directions) grows along with δ_i. Increasing influence leads first to an increase in equilibrium lobbying η_i^* (as δ_i grows from one to two), and then to a decrease as influence continues to grow. In all of the examples in this table, we have $C_i = 0$ for each agent. Behaving optimally, each agent chooses to lobby and, at equilibrium, There is no change in the price. Thus, the ratio of lobbying activity to the rent that lobbying secures for our agents approaches infinity; dissipation is unbounded.

Table 1 about here.

Is it rational for agents to behave in this manner in equilibrium? The answer to this question is yes, and Figure 1 helps to illustrate why. The figure depicts best response curves for the two agents in the symmetric economies with $\delta_i = 2$, and with $\delta_i = 5$. As η_1 ranges from zero to 1.6, the curve $\eta_2(\eta_1)$ traces out 2's optimal lobbying choice. Interest centers on the intersection each pair of curves, where one finds the Nash equilibrium for the lobbying game. Clearly, with $\eta_i^* = 0.647$, lobbying behavior is costly in this case (siphoning off 21.6% of each agent's income). Interestingly, with $\delta_i = 5$ lobbying activity is reduced. As $p(\eta)$ gets steeper near the origin, this result suggests, the first increment of lobbying activity has a greater effect but additional lobbying becomes disadvantageous more quickly.

Figure 1 about here.

Do the players in this lobbying game take the view that their political activity has not helped them? No, they do not, and moreover they do not wish to withdraw from the lobbying game, *given that* η_{-i}^* *will be played*. This point bears some further elaboration.

Agent i, who takes η_{-i} as given, can calculate a willingness-to-pay measure that holds his or her opponent's lobbying fixed. Let $C_i^\circ(\eta^*) = p(\eta^*)\omega_i - \mu_i(p(0,\eta_{-i}^*); p(0,\eta_{-i}^*), y_i^\circ)$, where $y_i^\circ = \omega_i \cdot p(0, \eta_{-i}^*)$ is i's income when i chooses not to lobby while his or her opponent spends η_{-i}^*. This expression denotes the compensating variation to i of a change in the price from $p(0, \eta^*_{-i})$ to $p(\eta^*)$. It is this amount that agent i would be willing to pay for the price change that will result from lobbying η_i^*. Does i get a good deal when η_i^* is contributed?

The answer to this question is yes, so long as $D_i^\circ(\eta^*) = \eta_i^*/C_i^\circ(\eta^*)$, the "perceived dissipation," is less than one: i's contribution in this case is smaller than the gain that it purchases. The right-most columns in Table 1 present $C_i^\circ(\eta^*)$ and $D_i^\circ(\eta^*)$, respectively, for the symmetric economies. In every case we see that $D_i^\circ < 1$. When the δ_i increase the level of perceived dissipation becomes smaller, as lobbying is reduced while the value of a small unit of lobbying grows. Given the setting in which they find themselves, where they know η^*_{-i} but do not expect that it will change in response to their own behavior, lobbying at the equilibrium level is perfectly logical for both agents. If only both could pull back from the temptation to lobby, they would be helped, but they have no mechanism for achieving the coordination that would be required.

What are some instances in which an outcome approximating this might obtain? It is conceivable in a trade setting, for example, that domestic producers and the importers of foreign-made autos each struggle to obtain a favorable movement in a relevant import quota. The outcome of this struggle might be very little change or no change at all. The lobbying expenditures by both sides, having no effect on the policy, represent social costs.

Perhaps no real lobbying situations are truly symmetric. How do lobbying behavior and the degree of dissipation respond to departures from symmetry? Table 2 presents at least a partial answer to this question. In panel (a), we begin with a symmetric case, and then step δ_1 up from 2 to 12 as δ_2 remains fixed at 2. As this change occurs, dissipation $D(\eta^*)$ declines. Other effects are present as well, but this one is primary: as the gap between political influence or power wielded by the two groups increases, dissipation decreases. In certain respects, this result reinforces Rogerson's (1982) conclusion that as the interest groups engaged in strategic rent seeking become more dissimilar, the losses due to rent seeking decrease.

Table 2 about here.

Note that the *cause* of one group's political advantage (in the form of $\delta_1 > \delta_2$) over its opponent is not explored here. No appeal has been made, for example, to the collective action problem that can drive results of this sort. Agent 2 might represent a small, diffuse group (say, taxpayers), while agent 1 represents a relatively small group of beneficiaries of a program (say, domestic wheat producers). If $\delta_1 \geq 6$, then dissipation for agent 1 is less than one, which is to say our influential agent is better off after the lobbying program than before.[12] This could correspond to a real-world setting in which δ_1 is big because of the inherent organizational qualities of a particular group. (See Olson 1965 for the classic discussion of organizational difficulties and collective action.) All that is being said here is that if the disparity in influence increases, then actual rent dissipation will decrease.

In panel (b) of Table 2, agent 1 is both rich and powerful. That is, $\omega^1 > \omega^2$, and δ_1 again steps from 2 to 12. Here we find that aggregate rents are larger than rent-seeking expenditures. In other words, $0 < D(\eta) < 1$ in the last two rows. It may be that most price-related policy settings correspond most closely to this set of results, with considerable divergence in both the wealth and the power between opposing groups. If so, it would explain the many instances in which dissipation appears to fall far short of the rents that a policy offers a group.

By increasing ω_1 sufficiently, the dissipation ratio $D(\eta)$ can be made to approach zero. Tullock (1990) notes that rent-seeking expenditures often appear to fall far short of the rents created. He argues that this apparent anomaly might be explained by the fact that distortionary policies often entail the use of inefficient production technologies, which soak up some fraction of the available rent. The result is achieved here without productive inefficiency, thus highlighting once more the importance of the explicit strategic interaction between opposing groups.

Finally, in Table 3 the effects of variations in the world price are presented. As one might expect, in the otherwise symmetric setting, agent 1 is helped when p^* is greater than one half. This does not mean that the lobbying program is beneficial to 1. Even with $p^* = .70$, agent 1 prefers the lobby-free outcome at p^* to the after-lobbying outcome. Put another way, $D_1(\eta^*) > 1$. But these results are useful in emphasizing that aggregate dissipation falls as the gap between the two groups widens. If ω_1 is greater than ω_2 for p^* above one half, for example, one can find cases with $D(\eta) < 1$. In the absence of production, no light is shed upon the effects of lobbying on factor prices and so on (these questions are treated by, among others, Hillman 1989 and Magee, *et. al.* 1989). But the absence of production at the same time appears to sharpen the conclusions

[12]In each case appearing in Tables 2 and 3, perceived dissipation, the measure that holds η^*_{-i} fixed, is smaller than one. That is, each agent is better off for having lobbied, given his or her opponent's behavior.

regarding dissipation: rent seeking can be extremely wasteful even in a simple setting.

Table 3 about here.

V. Conclusions

If it is true, as Ellingsen (1991) argues, that rational rent seekers will never choose to spend more in total than the value of the *monopoly* prize they seek, this paper has shown that the same cannot be said of rent seeking for a *price* policy. How is one to interpret the price-setting function of the government in this study? Imagine a unitary policy authority, despotic or otherwise, charged with arbitrating a struggle over relative prices like the one envisioned here. That authority might, especially if it were intent on maximizing its lobbying revenues, whisper in each lobbyist's ear the honest pledge that for a few dollars more, *ceteris paribus*, a favorable policy change can be had. Each hears this pledge, each solves the *cet. par.* problem, and each chooses to lobby. This means of setting policy, perhaps not so fanciful, can create waste.

What's more, this waste can be very large in comparison to the prize that it secures. In the extreme, lobbying expenditures (which are often said to represent pure waste) by evenly-matched opponents might be infinitely greater than the rent. More generally, as long as the wealth and influence of opposing interests are not too different, total rent-seeking costs are likely to exceed total rents. It is when opponents are very different that dissipation may be incomplete—rent-seeking costs fall short of the rents. Many of the programs that provide generous returns to groups (for example, commodity programs in agriculture and certain trade barriers) are not rigorously contested. Dissipation over these programs appears to be low, an observation that agrees with the results of this paper. For whatever reason political influence varies across groups (and the most compelling reason is probably related to collective action problems as laid out by Olson 1965), disparity between groups might by its very nature keep dissipation low.

Twenty-five years ago Tullock (1967) first pointed out that losses due to interventionist policies are not limited to deadweight costs. The rent, he said, should be counted as a cost as well. This idea lent credence to the popular view, which at the time found surprisingly little support, that policies which move the economy away from a competitive equilibrium are bad. The question of just how much of the rent represents loss has still not been answered empirically to a satisfactory degree.

But in many instances this may not be the relevant question. For an important class of policies—those in which a price is the target of lobbying—the observed level of rent may bear little resemblance to lobbying expenditures. Lobbying and its attendant waste may indeed be important, but we can know this only by observing and measuring actual lobbying expenditures. To discover exactly whether, and when, rent seeking represents a significant social cost, we need more and better data.

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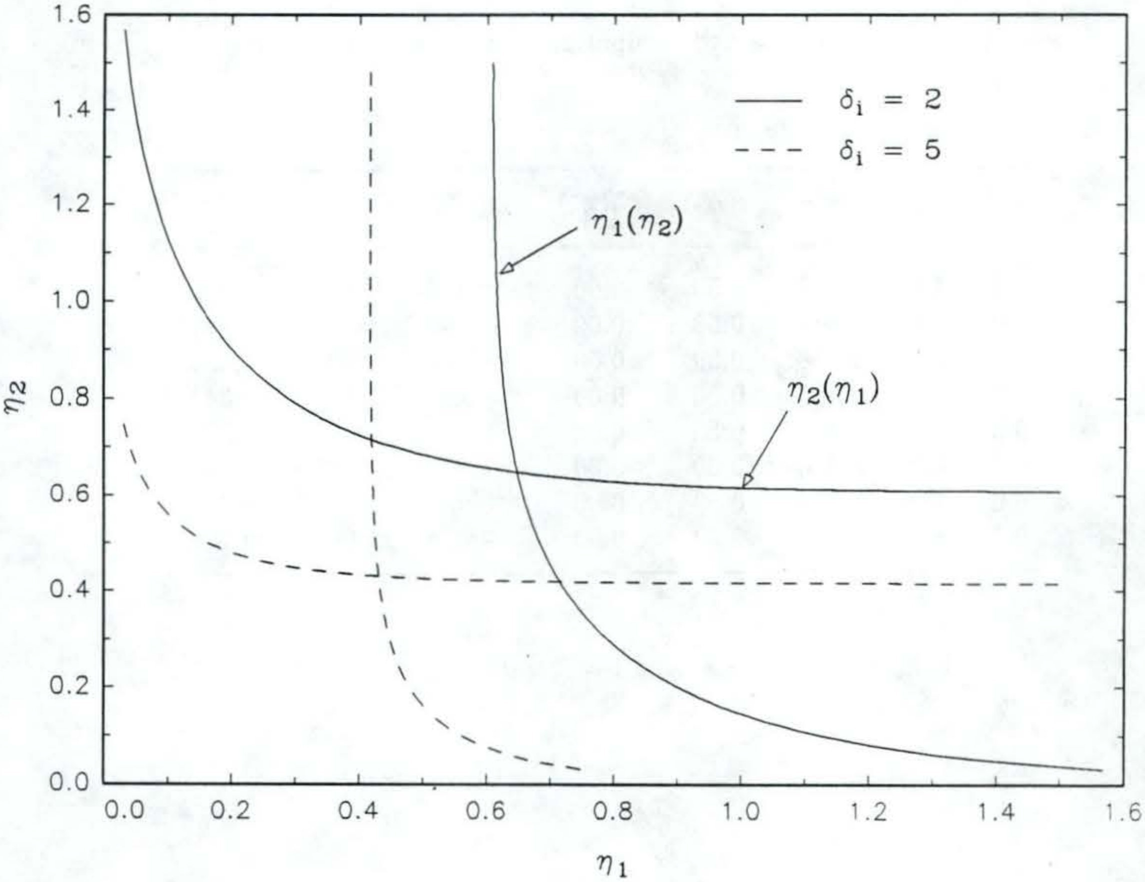

Figure 1. Response functions for symmetric economies.

Table 1. Lobbying and dissipation in a symmetric economy.

ω_i	δ_i	η_i^*	$p(\eta^*)$	$C_i(\eta^*)$	$D(\eta^*)$	$C_i^\circ(\eta^*)$	D_i°
6.0	1.0	0.583	0.50	0.00	$+\infty$	0.634	0.920
6.0	2.0	0.647	0.50	0.00	$+\infty$	1.106	0.585
6.0	3.0	0.558	0.50	0.00	$+\infty$	1.299	0.430
6.0	4.0	0.485	0.50	0.00	$+\infty$	1.418	0.342
6.0	5.0	0.430	0.50	0.00	$+\infty$	1.503	0.286
6.0	6.0	0.386	0.50	0.00	$+\infty$	1.569	0.246
6.0	7.0	0.352	0.50	0.00	$+\infty$	1.622	0.217
6.0	8.0	0.323	0.50	0.00	$+\infty$	1.666	0.194

Notes: In each case, $\alpha = 1 - \beta = 0.75$, and $p^* = 1/2$.

Table 2. Lobbying and dissipation when agent 1 is rich and powerful.

(a)

ω_1	δ_1	η_1^*	η_2^*	$p(\eta^*)$	$C_1(\eta^*)$	$C_2(\eta^*)$	$D(\eta^*)$
6.0	2.0	0.647	0.647	0.500	0.000	0.000	$+\infty$
6.0	4.0	0.517	0.614	0.583	0.282	−0.219	17.990
6.0	6.0	0.417	0.609	0.607	0.374	−0.270	9.876
6.0	8.0	0.350	0.608	0.618	0.419	−0.293	7.559
6.0	10.0	0.303	0.608	0.624	0.446	−0.305	6.455
6.0	12.0	0.268	0.608	0.628	0.464	−0.313	5.804

(b)

ω_1	δ_1	η_1^*	η_2^*	$p(\eta^*)$	$C_1(\eta^*)$	$C_2(\eta^*)$	$D(\eta^*)$
16.0	2.0	1.188	0.610	0.601	0.937	−0.258	2.650
16.0	4.0	0.775	0.608	0.626	1.207	−0.308	1.538
16.0	6.0	0.586	0.608	0.633	1.295	−0.322	1.227
16.0	8.0	0.476	0.608	0.637	1.339	−0.329	1.073
16.0	10.0	0.403	0.608	0.639	1.365	−0.333	0.980
16.0	12.0	0.351	0.608	0.641	1.382	−0.337	0.917

Notes: In each case, $\omega_2 = 6$, $\delta_2 = 2$, $\alpha = 1 - \beta = 0.75$, and $p^* = 1/2$.

Table 3. Lobbying and dissipation as the world price changes.

p^*	η_1^*	η_2^*	$p(\eta^*)$	$C_1(\eta^*)$	$C_2(\eta^*)$	$D(\eta^*)$
0.30	0.262	0.765	0.187	−0.189	0.701	2.005
0.35	0.360	0.689	0.268	−0.163	0.405	4.338
0.40	0.455	0.651	0.348	−0.119	0.212	11.992
0.45	0.551	0.638	0.426	−0.063	0.083	60.066
0.50	0.647	0.647	0.500	0.000	0.000	$+\infty$
0.55	0.638	0.551	0.574	0.083	−0.063	60.066
0.60	0.651	0.455	0.652	0.212	−0.119	11.992
0.65	0.689	0.360	0.732	0.405	−0.163	4.338
0.70	0.765	0.262	0.813	0.701	−0.189	2.005

Notes: In each case, $\omega_i = 6$, $\delta_i = 2$, and $\alpha = 1 - \beta = 0.75$.