# Exaggerated Interests:
# Truthfulness in the Lobbying of Administrative Agencies by Competing Interest Groups

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**Abstract**

Under intense competitive pressures to secure scarce public resources for their members, lobbyists for organized interests groups may feel compelled to exaggerate the benefits the government would see in tax returns and increased social welfare if administrative agency officials allocated such resources to the lobbyist's members. This incentive to mis-represent grows if we, like most scholars, assume that information asymmetry exists between lobbyists and government agency officials favoring the former. Yet we argue that agency officials can design optimal administrative rules taking into account lobbyists' strategic behaviors and exploiting the information structure. Our original model reveals important policy implications analyzing how the extent that a lobbyist mis-represents his or her members' interests changes with the alignment of these interests with the agency's needs, the similar/ dissimilar interests between competing interest groups, the credibility costs to the lobbyist if caught, and the tax rate, and how the benefits accruing to an agency and society also change in relation.

Key words: interest group, lobbyist, resource allocation process, mis-representation, exaggeration

If lobbying groups and industries have significant advantages over government decision makers because they have more information regarding the consequences of policy decisions, are public officials always at their mercy? And if one interest group is competing for public benefits against other groups, will it therefore be able to exaggerate the benefits of serving its members in order to convince government officials to favor them with a larger share of limited public resources? Will that interest group perhaps even mimic another whose interests are a better fit with government needs to cut in on its competitor's benefits? Or can public officials, such as those running administrative agencies, structure their interactions with lobbyists for competing interests so that they lobby truthfully? These questions are important as more and more groups come to populate the political landscape and find that it is to their competitive advantage to lobby for a diminishing supply of public resources (Lux et al. 2011).

In this paper we explore these questions with a signaling model of lobbying by benefit-seeking groups with competing interests and response from implementing agency officials who must decide how to allocate resources from fixed budgets for the greatest return. Lobbyists, we assume, seek to convince agency officials to provide resources to their members, and in return these members will use these resources to produce benefits that increase public revenues through taxes and, consequently, increase social welfare. Government policy-makers seek to promote this benefit and will attempt to do so by aiding only those interest groups they believe are best able to increase tax revenue. Groups less able to fulfill this goal may choose to exaggerate the benefits of serving their members when they lobby because of information asymmetries advantaging them visa vie agency officials. Officials must then make their allocation decisions regarding how much, if anything, to give to each group based on these lobbying signals.

We derive an equilibrium in our model where agency officials under this condition of

information asymmetry can discourage lobbyists from exaggerating the public-benefit of serving their members' interests and still maximize social welfare. As we show, the asymmetry that gives lobbyists their advantage actually pushes policy-makers to design rulemaking mechanisms to acquire information about those groups, utilizing lobbyists' incentives to exaggerate to help agency officials make better informed decisions. Weighing the expected benefits and costs of mis-representation, we find that lobbyists are pushed to reveal the true public benefits of serving their members' interests, even if it means allowing competitor groups to claim larger shares.

## Lobbying and the Mis-Representation of Interests

While the popular view of interest group and industry lobbying tends to emphasize corruption and deceit (e.g., Birnbaum 1992; McKean 2004), scholars have been more reserved in their evaluations. They argue that the incentive to lie, or even exaggerate, is actually quite weak. Lobbyists, of course, are employed to articulate the demands of particular economic and social groups using the tools of influence at their disposal. For their part government policy-makers often want to satisfy these demands in return for electoral support, to keep political superiors happy, and even to improve overall social welfare (Hansen 1991; Ainsworth and Sened 1993; Lohmann 1998). But officials are bombarded with so many demands from so many sources that it is often difficult for them to determine what the real impacts of their policy decisions will be on key constituencies, or what the economic and social returns will be for providing organized interests with benefits (Wright 1996). Thus they must rely on lobbyists to provide honest assessments of what their members' interests are and what will be gained by serving those interests with policy (Austen-Smith 1993).

Such reliance would appear to provide lobbyists an opportunity and incentive to take advantage of government officials. Lobbyists, after all, are only successful when they can

procure the policy benefits their members desire (Browne 1990; Gray and Lowery 1997). And the sheer number of groups in democratic nations such as the United States (Baumgartner and Leech 2001) and in the European Union (Greenwood 1997; Cohen and Richardson 2009) competing for the attention of a relatively small set of political officials arguably places great pressure on lobbyists to win benefits for their constituents any way they can, even if it means exaggerating the benefits the government will realize if their members' demands are served.

Yet it is these officials who actually decide how to distribute resources, and what they lack in information they can make up in control of the decision making process. Ainsworth (1993) argues that legislators can (and do) structure their interactions with lobbyists in order to control the relationship, playing competing lobbyists off against each other and cutting out those who they find are dishonest and uncooperative. Group competition, Austen-Smith and Wright (1992; 1994) argue, further weakens lobbyists because policy-makers are often alerted to mis-representation when lobbyists present conflicting claims regarding the impact of policy on, or the benefits of providing resources to, particular constituencies and industries. Lobbyists know this will happen, so their equilibrium strategy is to tell the truth. This may jeopardize their short-term ability to deliver benefits, but it preserves their long-term credibility and influence (Wright 1996).

This research has been developed in the context of lobbyist–legislator relationships, but it is agency officials who have the final responsibility for designing the implementation of laws and distributing public resources. Yet while they frequently hear from lobbyists through advisory committees (Priest et al. 1984; Petracca 1986) and public comments on rules (Yackee 2006), their information needs are often different from elected officials (Balla and Wright 2001). They desire to maintain their independence from legislators (Balla 1998; Shipan 2004), increase their budgets (Downs 1967), and even pursue policies that benefit society (Brehm and Gates 1997).

Their ability to verify lobbyist information is also different. Legislators are generally closer to the constituencies they wish to serve so it is easier for them to verify advocacy messages and catch lobbyists in a lie. Lacking this connection, it is less clear if and how agency officials can catch mis-representation and interest exaggeration by lobbyists. One possible solution, the one we explore below, is that officials design implementation rules allocating benefits that require lobbyists to present arguments as to how their members, should they be served, will produce a return to the government in terms of tax revenue and, consequently, improved social welfare (we provide an example at the end of the paper). Officials can then verify that what groups actually produced ex-post lines up with what they claimed ex-ante.

If banking lobbyists claim that their member banks will translate government loan securities into more student and home mortgage loans, then agency officials have a baseline against which the industry's claims can later be evaluated. If mining corporations claim they will create new jobs and grow the public treasury through greater tax revenue in return for access to public lands and subsidies, then these are benchmarks against which they can be evaluated. If environmental lobbyists claim they can restore natural habitats and monitor the pollution activities of corporations in return for public grants, then they should be able to hand regulators a record demonstrating this success. If not, they would be denied access to future benefits.

Yet nothing spurs imitation like success, or at least the likelihood of success. Many political battles pit two sides against each other where a gain for one is a zero-sum loss for the other. An example of this is the effort by the U.S. auto industry and interests representing South Korean farmers to stall the Korea – U.S. Free Trade Agreement (KORUS FTA), while the U.S. Chamber of Commerce and Federation of Korean Industries estimated that its collapse could cost the U.S. roughly $34 billion in exports and 345,000 jobs (Bloomberg, Nov. 19, 2009). While

many industry groups in both countries saw their interests as aligned with government, others felt threatened, desiring the protectionist regulation from international trade competition they had historically enjoyed (Stigler 1971; Peltzman 1976; Grossman and Helpman 1994).

But in many cases differences between competing interests are not so clear cut (Holyoke 2009). For example, the U.S. Congress has sought to contract out an alternate engine for the Joint Strike Fighter (JSF), resulting in fierce competitive lobbying between Pratt & Whitney, the original makers of the JSF engine, and GE – Rolls Royce, makers of an alternative engine. Not only did both have interests fairly aligned with the goals of the U.S. Department of Defense, they were similar to each other for both could simultaneously benefit from receiving lucrative defense contracts.[1] Yet they are also competitors because both want as much of the government money available for building JSF engines as possible. This similarity makes it difficult for agency officials to determine which firm it would be most beneficial to serve. If one is only marginally different in interests and capabilities from another, the other being marginally more compatible with the agency's goals, it may be tempting for the disadvantaged firm's lobbyist to exaggerate the firm's capabilities to also get a contract. Indeed, Heaney (2004) found that lobbyists often strategically re-frame their members' interests to "mimic" other groups as the situation warrants.

In sum, we argue that the literature would be well served by developing a model of agency lobbying that not only begins with the common assumption of information asymmetry favoring lobbyists, but also explores how agency officials can design rules to pressure lobbyists into predicting (or revealing) returns to government that can subsequently be verified by agency officials. Such mechanisms could pressure lobbyists to report truthful information because they know that exaggerating the alignment of their members' interests with the agency's, what their members can actually do if served with policy, could be found out and they would suffer a severe

cost in credibility depriving them of future careers in advocacy politics. Even if the exaggeration is not always uncovered, a well-designed procedure would make the benefits of exaggeration too small to compensate for the risk of being caught. Thus competition may actually help agency officials evaluate competing lobbyists' claims, and can even result in a general increase in the returns the government realizes from serving interest groups and improve social welfare.

## Model Assumptions, Stages, and Notation

Again, our most fundamental assumption is that information asymmetry exists between lobbyists and government officials regarding what different groups and industries can do if served with policy benefits. This asymmetry favors the lobbyists and makes agency officials dependent on them for information, often leading to a highly inefficient distribution of public resources favoring some economic or social interests at the expense of others or the public interest (Coates and Morris 1995; Acemoglu and Robinson 2001, but see Denzau and Munger 1986). Dixit, Grossman, and Helpman (1997), however, argue that lobbying for public resources can actually help government officials realize distributional efficiencies though they do not model actual lobbying strategy. We do present such a model in a signaling game between lobbyists and agency officials where the latter have only imperfect information regarding the interests and capabilities of the groups soliciting them.

Our model comprises four stages. **Stage 1:** Here we assume that agency officials want to maximize the return from all public resource investments. We assume that there are two sources of investment return – tax revenue generated by interests served with public resources and alternative sources from risk-free asset investments when no groups are served. Officials seek to maximize the sum of all investment returns from these sources. The overall benefit (utility) to the government we refer to as *social welfare* and it is proportional to the sum of the public

revenue accruing to government agencies and/or other benefits gained from serving the public interest (our results remain robust with this assumption, see Groves and Ledyard 1977; Laffont and Maskin 1980; and Ball 1995). We also assume that the resources an agency has, which they may transfer to an interest group, are fixed and finite (though this assumption can be relaxed with only minimal changes to our model's results). Agency officials must decide to which group, if any, they will allocate some or all of these resources so that the transfer will maximize social welfare. For simplicity we assume that there are only two groups, $i = 1,2$, who both desire to obtain as much of this limited supply as possible. Each group's use of these resources will contribute to at least a marginal increase in social welfare by $v_i$.

**Stage 2:** In the second stage lobbyists observe their interest group's type (interest compatibility with the agency's needs), $s_i$. Lobbyists know whether or not their members' interests (what their members are actually capable of doing if allocated public resources) are highly compatible with the agency's needs, $s = H$, or whether compatibility is low, $s = L$. Agency officials do *not* have this information, the asymmetry meaning that our model is a subset of Bayesian games where some players (agency officials in this case) do not know for certain what the payoffs will be before allocating resources.[2]

In Figure 1 we lay out the structure of our lobbying game model. Parameter $p$ denotes the extent to which the interests and capabilities of group $s_i$ correlates with return $v_i$ to the public treasury it claims it can produce if allocated resources. If the interests of the organization and the needs of the agency are highly compatibility ($s_i = H$), then the group's members are more likely to produce the services agency officials require ($v_i = H$) than a group whose member interests have only a low compatibility ($s_i = L$). In other words, an interest group whose members are able to carry out the tasks the agency requires, meaning a higher value of $p$, will, as a consequence,

produce a greater return to the agency and therefore a greater increase in social welfare, thus increasing the utility to agency officials because $\Pr(s_i = v_i) = p \geq 1/2 \geq \Pr(s_i \neq v_i) = 1 - p$. Higher values of $p$ mean a greater compatibility of public and private interests and, consequently, a higher return to the public for serving the needs of the group's members.

---- Insert Figure 1 about here ----

The other crucial parameter in our model is the potential similarity of member interests of the two groups lobbying the agency for resources. We capture this potential similarity of interests as $q$ such that $(\Pr(s_1 = s_2) = q \in [0,1])$. If $q > ½$, the interests of two groups are increasingly similar (if $q = 1$ both would represent exactly the same interest). So if $q > ½$, and the interests of one group are also highly compatible with the agency's needs (high values of $p$), then the second group's interests are also highly compatible with the agency and both can generate high returns. But if $q < ½$, the interests of the two organizations are dissimilar and more likely to be competitive so that gains to one represent harm to the other. Further, if one can generate a high return to the agency, then the other is unlikely to be able to do so.[3]

**Stage 3:** In stage three both groups lobby the agency, each sending signal $s_i^l$ regarding the compatibility of their members' interests ($s_i$) with the return they can provide the agency ($v_i$) if served with resources, $b_i(\bullet)$ being the allocation group $i$ actually receives as a result of their lobbying. The payoff for group $i$ is $u_i(y_i,c) \equiv y_i - Ic$ where $y_i$ is the group's share of all benefits and after-tax revenue when its agenda is served, i.e. $y_i = b_i(\bullet)v_i$, and $c$ the loss in the lobbyist's credibility *if* he or she is found by agency officials to have mis-represented the compatibility of interests with the value of $v_i$. $I$ is an indicator function such that $I = 0$ if $s_i^l = v_i$ and $I = 1 > 0$ if $s_i^l \neq v_i$. It denotes the difference between what a lobbyist claims his or her group members could do and what they actually are able to produce in return to the agency in exchange for resources.

After receiving the two group's agenda signals $s_1^l$ and $s_2^l$, agency officials respond with an allocation of resources between the two, $b_i(s_1^l, s_2^l)$, in a way they believe will maximize their revenue return. The total resources the agency was appropriated for distribution is $2B$ and officials may choose to provide all of it to both groups subject to the constraint that $\sum_{i=1,2} b_i(\bullet) \leq 2B$, give it all to one, allocate only part of it to one or both, or give nothing to either. We assume that any resources not distributed are invested by the agency for a risk-free return of $R_f$ (often referred to as the "outside option").

Remember that prior to any lobbying the agency officials have no information about the compatibilities of group interests with their own needs. From their perspective either group is highly or minimally compatible with equal chances ($\Pr(s_i = H) = \Pr(s_i = L) = ½$). The value of $p$, however, is common knowledge to all players in the game. Thus, if lobbying is truthful ($s_i^l = s_i$), officials will allocate resources to a highly compatible group and increase their utility because $s_i = H$ means $v_i = H$ as well with probability $p > ½$.

It is important to be clear that agency officials do not necessarily require lobbyists to specifically predict a priori the amount of revenue they can generate. Instead, they require lobbyists to reveal how they can meet the agency's requirements. The lobbyists can provide any information on interest compatibility they choose, including exaggerated ability to do what the agency needs. They may even make mistakes, random and unanticipated events always interfere with the best efforts to make economic forecasts. The effect of any random errors is captured in the parameter $p$, the serial correlation between signal and output.

**Stage 4:** In the final stage, group members use the resources they are allocated (if any) to generate a return to the government, although depending on their true interest compatibility ($s_i$),

and the accuracy of the compatibility in estimating the future return ($p$), these returns may not be all that agency officials had expected. For simplicity, we conceive of returns as increased tax revenue with a flat rate $\tau$ where $0 \leq \tau \leq 1$, meaning the rate is not a function of taxable income. We also assume that $\tau H/2 < R_f$, meaning the agency cannot implement its own agenda without interest group aid, and $p\tau H > R_f$ so that it is better for agency officials to invest in groups with highly compatible interests ($s_i = H$) than to simply hold on to resources at the risk-free rate. This is *why* the agency is willing to work with interest groups in the first place.

To summarize, agency officials determine the functional form of $b_i(\bullet)$ in order to maximize the revenue from resource investment conditional on the outside option, its total resource ($2B$), information structure (seen in Figure 1), and the signals they receive from the lobbyists on whether their groups' interests are highly or minimally compatible with their own. The lobbyist for group $i$ determines his or her group's signal $s_i^l$ in order to maximize $u_i$ given the rule that agency officials design.[4]

## The Benchmark Model

To demonstrate the importance of information asymmetry in our lobbying model, we first present a version *without* it. Here agency officials know exactly whether the interests of any lobbying organization are compatible with their needs so that no information through lobbying $s_i^l$ is needed. We make this even simpler by assuming that $L = 0$, that the agency receives no benefit at all from allocating resources to a low-compatibility group. We also assume that agency officials are risk neutral with respect to how they allocate their budgeted resources, which we can do without any loss of generality because we can change the values of the high-compatibility group to transform a risk-averse world into a risk-neutral one (see Hull (2008)

about risk-neutral valuation). The agency's optimization problem can be expressed as

$$\max_{b_i(\bullet)} \mathrm{E}\left[\tau\left(\sum_{i=1,2} b_i(s_i, s_{-i})v_i\right) + R_f\left(2B - \sum_{i=1,2} b_i(s_i, s_{-i})\right)\right] \qquad (1)$$

subject to budget constraints $b_i(\bullet) \geq 0$ and $\sum_{i=1,2} b_i(\bullet) \leq 2B$.

This shows that agency officials seek to maximize their revenue returns from tax on the product of interest group member efforts and other savings. Revenue is tax rate $\tau$ multiplied by the returns from each group's efforts ($b_i(s_i, s_{-i})v_i$) summed over the two, $\sum_{i=1,2} \tau b_i(s_i, s_{-i})v_i$. The payoff from saving, that part of the agency's budget not allocated to interest groups, is the product of the risk free rate $R_f$ and amount saved, $2B - \sum_{i=1,2} b_i(s_i, s_{-i})$. The agency needs to solve a constraint maximization problem because it cannot allocate a negative amount to the groups, $b_i(\bullet) \geq 0$, and can only use the resources within its budget, $\sum_{i=1,2} b_i(\bullet) \leq 2B$. Recalling that $H$ means a group's interests are highly correlated with the agency's needs, the agency's solution in the benchmark model is (with group subscripts dropped due to symmetry and all proofs in Appendix 1):

Theorem 1: *The optimal allocation of agency resources when there is no information asymmetry is* $b(HH)=B$, $b(HL)=2B$, $b(LH)=b(LL)=0$. *Then the optimized revenue of the agency is* $B(q(R_f - p\tau H) + 2p\tau H)$.

When both interest groups are of high-compatibility types, meaning both of their members' collective interests are aligned with the agency's needs, all of resources $2B$ are allocated to them. How this is divided between the two does not change the result, so we can examine just $b(HH) = B$ without any loss of generality. When both groups have interests

incompatible with agency needs, neither receives anything so $b(LL) = 0$. When one group has highly compatible interests but the other's compatibility is low, the agency allocates all of its resources to the highly compatible group, $b(HL) = 2B$, and none to the other, $b(LH) = 0$.

Because everyone in the benchmark model knows whether the groups are aligned with agency needs, neither lobbyist has any incentive to exaggerate compatibility by claiming that his or her group's interests align when they do not. They would simply incur credibility cost $c$ with nothing gained, which makes truthful lobbying a weakly dominant equilibrium strategy. Agency officials also have a clear choice: they will allocate resources to a group if there is one whose interests match their own, and hold onto their resources otherwise. Either way their choice is efficient given the circumstances. Lemma 2, however, does reveal an interesting result:

Lemma 2*: Under the no information asymmetry condition, the greater the similarity of the two groups' interests, higher values of q, the lower the revenue level returned to the agency.*

Without information asymmetry Lemma 2 implies that agency officials prefer a game in which groups with very different interests are competing for public resources.

## Main Model

Now we alter the benchmark model by introducing information asymmetry between lobbyists and agency officials. The official's optimization problem is still the same and subject to budget constraints $b_i(\bullet) \geq 0$ and $\sum_{i=1,2} b_i(\bullet) \leq 2B$, but now we need to take into account the fact that information asymmetry allows lobbyists to consider more strategic choices, that they can exaggerate the capabilities of their group and the fit of member interests with agency goals.

### Strategies of Agency Officials and Lobbyists

We first explore the choice each group's lobbyist faces. His or her optimization problem

is to maximize the expected utility of the interest group represented with respect to their lobbying signal to agency officials $s_i^l$. Expected utility $\mathrm{E}[u_i(s_i^l = s_i, s_{-i})|s_i]$ results when he or she presents officials with a truthful agenda (an argument for public benefits) that does not exaggerate member capabilities, or $\mathrm{E}[u_i(s_i^l \neq s_i, s_{-i})|s_i]$ when he or she does exaggerate to mislead the agency. A lobbyist is thus honest only if $\mathrm{E}[u_i(s_i^l = s_i, s_{-i})|s_i] \geq \mathrm{E}[u_i(s_i^l \neq s_i, s_{-i})|s_i]$. With this notation we can now state the agency's optimization problem as

$$\max_{b_i(\bullet)} \mathrm{E}\left[ \tau\left( \sum_{i=1,2} b_i(s_i, s_{-i}) v_i \right) + R_f\left( 2B - \sum_{i=1,2} b_i(s_i, s_{-i}) \right) \right] \qquad (2)$$

subject to the lobbyist's optimization problem ( $\max \mathrm{E}[u_i(s_i^l, s_{-i})|s_i]$ with respect to $s_i^l$ ), the agency's budget constraint $b_i(\bullet) \geq 0$ and $\sum_{i=1,2} b_i(\bullet) \leq 2B$, and the lobbyist's optimization problem $\max \mathrm{E}[u_i(s_i^l, s_{-i})|s_i]$ with respect to $s_i^l$.

Utilizing the Myerson's (1981) Revelation Principle allows us to claim that agency officials can design an administrative rule for allocating resources that imposes a restriction on lobbyists that gives them an incentive to lobby truthfully as an equilibrium strategy. This means we can replace the constraint regarding group *i*'s optimization problem ( $\max \mathrm{E}[u_i(s_i^l, s_{-i})|s_i]$ with respect to $s_i^l$ ) with the honest lobbying condition $\mathrm{E}[u_i(s_i^l = s_i, s_{-i})|s_i] \geq \mathrm{E}[u_i(s_i^l \neq s_i, s_{-i})|s_i]$ (which we can do without any loss of generality under the Revelation Principle). Lobbyists have many ways to exaggerate the signal they send to the agency regarding their members' interests, but the Revelation Principle allows us to impose truthful-lobbying conditions in Bayesian Nash equilibrium.

Specifically, Myerson's (1981) Revelation Principle states that the equilibrium can be

characterized with incentive-compatible direct-revelation mechanisms without loss of generality. A "direct-revelation mechanism" consists of requirements that government officials specify when designing an administrative rule in order to shape the kind of information they receive from other players, in our case lobbyists regarding the compatibility of group interests with agency needs. While officials can use a variety of methods as they write the rule, a direct-revelation mechanism is "incentive-compatible" if no lobbyist can be made better off by lying given the information available to them and the understanding and expectation that other lobbyists will be honest (see Appendix 2 for more details).Applying the revelation principle does not require an assumption that lobbyists use a particular strategy, or that agency officials design any specific type of rule. Whatever equilibrium is observed in a Bayesian game, it is always possible to map actual practice in agency rule design, such as rules requiring lobbyists to make claims about the compatibility of their members' interests with agency needs, into the incentive-compatible direct-revelation mechanism.

Now we lay out the conditions under which lobbyists will, in equilibrium, lobby honestly and when they might not utilizing the revelation principle. Given the symmetry between the two groups in our model, we can drop subscript *i*. We denote $w_L \equiv b(HL) - b(LL)$, $w_H \equiv b(HH) - b(LH)$, $c_0 \equiv c(2p-1)/(H(1\text{-}\tau)) > 0$ and define *TRUTH*(*L*) and *TRUTH*(*H*) as the conditions under which a lobbyist for a group whose interests are highly or minimally compatible with the agency's needs, which is private information known only to the lobbyist, will lobby truthfully or exaggerate interest compatibility (which is to say, lie to agency officials). The truthful lobbying conditions given ether of these types of interest compatibility are:

Honest lobbying when compatibility is low, or *TRUTH*(*L*): $qw_L+(1-q)w_H \leq c_0/(1-p)$

Honest lobbying when competitive is high, or *TRUTH*(*H*): $qw_H+(1-q)w_L \geq -c_0/p$

($w_L \equiv b(HL) - b(LL), w_H \equiv b(HH) - b(LH)$, $c_0 \equiv c(2p - 1) / (H(1 - \tau))$)

*TRUTH*(*L*) and *TRUTH*(*H*) have important implications for the allocation of resources by agency officials as $w_L$ and $w_H$ show us the extent to which an official's allocation is sensitive to his or her valuation of a group's agenda when the interest compatibility of the other group is low and highly compatible respectively. Intuitively, officials want to maximize $w_L$ and $w_H$ in order to discriminate between low and high group compatibilities so they can allocate as much as possible to highly compatible groups. However, since lobbyists can exaggerate the interest compatibility signals, officials cannot increase $w_L$ and $w_H$ much and should limit them as per *TRUTH*(*L*) and *TRUTH*(*H*). For instance, if $w_L$ is large, a low-compatibility group lobbyist has an incentive to exaggerate interest compatibility in order to receive more resources.

Both of these conditions, *TRUTH*(*L*) and *TRUTH*(*H*), have intuitive interpretations. In *TRUTH*(*L*), ($w_L$, $w_H$) denotes how much more resources a low-compatibility group lobbyist can expect to receive by exaggerating his or her group's compatibility given the fact that a competing group is of either high or low compatibility respectively. Recall that the two groups' interests are the same with probability $q$ and different with probability $1 - q$, so $qw_L+(1 - q)w_H$ is the expected value of how much the agency allocates if a low-compatibility group's lobbyist exaggerates. Similarly, $(qw_L+(1 - q)w_H)H(1-p)$ is the expected change of return from the exaggeration because a low-compatibility group can generate a high return ($H$) with probability $(1 - p)$ and a low return ($L = 0$) with probability $p$. Since the group's members pay fraction $\tau$ to the government in tax, the final incremental return from a low-compatibility group becomes $(qw_L + (1 - q)w_H)H(1-p)(1-\tau)$ when it exaggerates. On the other hand, exaggeration also generates lobbyist credibility costs. If a lobbyist for a low-compatibility group exaggerates, his or her expected credibility cost is $cp$ because low returns occur with probability $p$. If he or she is

truthful, the cost is $c(1–p)$ because high returns occur with probability $1–p$. Thus, exaggeration generates expected credibility cost, $c(2p – 1)$. A low-compatibility group lobbyist decides whether or not to exaggerate by comparing this incremental cost with the incremental return of exaggeration. He or she lobbies truthfully if $(qw_L + (1 – q)w_H)H(1–p)(1–\tau) \leq c(2p – 1)$.

Similarly, in *TRUTH*(*H*), $(–w_L, –w_H)$ denotes how much a high-compatibility group will receive in government resources by understating its interest compatibility given that the competitor group is low and high compatibility respectively. The expected change in resource allocation when a lobbyist for a highly compatible group understates this compatibility is $–(qw_H + (1 – q)\ w_L)$. Since it generates a high return ($H$) with probability $p$, the change in after-tax return for this understatement is $–(qw_H + (1 – q)\ w_L)pH(1–\tau)$. Understated lobbying will also incur credibility cost by $c(2p – 1)$, so a high-compatibility group lobbyist is truthful if $–(qw_H + (1 – q)\ w_L)pH(1–\tau) \leq c(2p – 1)$, which is equivalent to *TRUTH*(*H*). These truthful lobbying conditions for low or highly compatible groups (*TRUTH*(*L*) and *TRUTH*(*H*)) implies Theorem 3, which shows how agency officials change the allocations as the parameters in our model vary.

Theorem 3: *The optimal combination of $w_L$ and $w_H$, given q, is a non-decreasing function of the credibility cost of exaggeration c, tax rate τ and correlation between compatibility and return p, but a non-increasing function of the upside potential of an agenda H.*

The intuition of Theorem 3 is closely related to the incentive lobbyists have to mis-represent their group's compatibility with agency needs. Terms $w_L$ and $w_H$ measure the degree to which the agency's allocation is sensitive to its valuation of the group's capabilities as presented by the lobbyist. In the benchmark case of no information asymmetry $w_L = 2B$ and $w_H = B$, but in the asymmetry case strategic exaggeration by lobbyists limits $w_L$ and $w_H$. The greater the difference in the amount allocated between high- and low-compatibility groups ($w_L$ and $w_H$), the

greater the incentive to exaggerate. The incentive to mis-represent decreases with the cost of credibility $c$, tax rate $\tau$, or the correlation $p$ between group and agency compatibility and return to the public treasury, but increases when agency officials perceive a greater potential in serving a highly compatible group $H$.

Intuitively, if a lobbyist's credibility cost $c$ is low, then he or she faces a smaller cost even if the mis-representation is caught. If tax rate $\tau$ is low, or the potential of serving the group's members is high, a lobbyist can expect higher returns from exaggeration. If the correlation $p$ between group and agency compatibility and return to the agency is low, it is more likely to generate a high return accidently and the lobbyist can actually avoid being caught and losing credibility. Lemma 4 summarizes this intuition.

Lemma 4: *A low-compatibility* (*high-compatibility*) *interest group has larger incentive to overstate* (*understate*) *its signal with the decrease of the credibility cost of exaggeration* ($c$), *tax rate* ($\tau$) *or correlation between compatibility and return* ($p$), *but with the increase of the upside potential of an agenda* ($H$).

Imposing restrictions $w_L \geq 0$ and $w_H \geq 0$ are also realistic because it is unlikely that agency officials would announce ex-ante that an interest group will receive a larger share of resources if its lobbyist argues that the group's interests are minimally compatible with the agency's. This allows condition $TRUTH(H) > 0$ to always hold true, and at least $TRUTH(L) \geq 0$ to hold true as well. Thus a lobbyist for an interest group that can generally produce a high return for its efforts ($s_i = H$) is rewarded for lobbying honestly because the equilibrium payoff for truth in this scenario of information asymmetry is greater than if he or she had misrepresented interest compatibility, the payoff increase being $(qw_H + (1 - q)w_L)pH(1-\tau)+c(2p - 1)$. By contrast, in equilibrium a lobbyist representing a group with minimally compatible interests may

be indifferent between honest or exaggerated lobbying strategies.

**Government Revenue and Social Welfare**

We can now show how agency revenue varies as the similarity of the interests of both groups varies:

Theorem 5: *Let us denote* $q_1 \equiv (c(pH - R_f/\tau) / ((1-p)B))^{1/2} H^{-1}$ *and* $q_2 \equiv c_0/(B(1-p))$. *The revenue return to government official is the function of q as displayed in* Table 1.

---- Insert Table 1 about here ----

Information asymmetry between agency officials and interest group lobbyists changes the way the similarity (or lack thereof) of the interests of the two lobbying groups affects the choices of agency officials and, ultimately, revenue returned to the agency. When there is no asymmetry, agency revenue is a decreasing function of how similar the interest of one group is to the other, measured by $q$. In contrast, Theorem 5 shows that the agency's revenue is not a monotonic function of this interest similarity, but, as we lay out in Table 1, closer to a U-shaped function ($q_2 < q_1 < 1$) or increasing function ($q_1 \leq q_2$) or even unrelated ($q \leq q_2$).

These patterns arise because of the similarity of group interests. The less the similarity, lower values of $q$, the greater the difference between the likely capabilities of the two groups. When this occurs the agency can expect to see greater revenue generated by allocating more resources to the group whose interests are most similar to its own (and less to the other). In other words, serving the group that can actually do what the agency needs generates greater tax revenue and, as we shall see, social welfare. When both groups have little interest similarity with the agency, allocating resources to them does not generate any benefit. Only when at least one group has interests similar to the goals of the agency will officials focus their resources towards an interest group rather than hold on to them in a risk free investment. When one group's

interests are not similar to the other, then there is high chance that at least one of the two has interests compatible with the agency's. The more dissimilar are the interests of the two groups from each other, the more efficient is the allocative function of the agency because it will still invest resources in a group with highly compatible interests.

In contrast, if the groups have similar interests, agency officials can collect information from one group's lobbyist and apply it to their assessment of the value of the other group. They can do this by designing an administrative rule that collects information on the interest group, cross-checks it with the information received from the competing group, and use these informational signals to update their estimation of the compatibilities of both (for more on such efficient rulemaking see Cremer and McLean 1985, 1988; McAfee et al. 1989; and McAfee and Reny 1992). Thus, the greater the similarity of the interests of the two groups to each other, the better agency officials can estimate the true compatibilities of the groups.

In sum, when the correlation is low, the agency's allocation can generate a large payoff, but misallocation is likely. When the correlation is high, how well officials allocate resources may not be so important in generating high returns, but misallocation and information collection in rulemaking becomes more efficient. Lemma 6 and Lemma 7 summarizes this intuition.

Lemma 6: (*1*) *Agency revenue is more likely to be a U-shaped function of the similarity of interests than an inverted U-shape.* (*2*) *The more extreme* (*i.e. very high or very low*) *the similarity of the interests of the two groups becomes, the higher the returns from allocations to these groups.* (*3*) *The lower* (*larger*) $q_1$ *is, the larger* (*lower*) *the benefit created by the interest groups if their interests are very similar* ($q_1 \equiv (c(pH - R_f / \tau) / ((1-p)B))^{1/2} H^{-1}$).

Lemma 7: *We define social welfare as the sum of agency revenue and the payoffs interest groups receive from lobbying. Both the payoffs to interest groups for sending information signals*

*and social welfare therefore exhibit the same pattern as increases or decreases in government revenues due to the variation in the similarity in the two groups' interests.*

Surprisingly, one might suspect that the countervailing effect of interest similarity (allocative efficiency vs. informational efficiency) would lead to an optimal level of similarity at an intermediate point, but we find the opposite pattern. At moderate levels of $q$ neither agency officials nor the interest groups enjoy the benefits of an efficient allocative function in doling out resources to the compatible group, or any efficient informational function in estimating the compatibilities of groups to reduce misallocation. The agency's revenue, groups' lobbying payoffs, and social welfare are thus not an inverted-U-shape function of interest similarity. Instead, they are a U-shape or monotonic function of it. Optimality arises at the extreme values of $q$ and the more extreme the values of interest similarity or dissimilarity, the greater is the return to the agency. The same is true of groups' lobbying payoffs as well as social welfare. Furthermore, government revenue is at a minimum at $q_1 \equiv (c(pH - R_f / \tau) / ((1 - p)B))^{1/2}H^{-1}$. Thus the smaller (larger) is $q_1$, the more (less) attractive similar interests become to both officials and lobbyists. This arises because small (large) $q_1$ implies larger (smaller) area in which the welfares increase with $q$.

**Competitive Lobbying**

Finally, given this optimal scheme of agency allocation in response to lobbying, we can explore how the similarity of the two groups' interests to each other, $q$, influences their lobbying strategies visa vie each other. We know the payoffs from over- and under-statement by incompatible and compatible interest groups are $(qw_L+(1-q)w_H)H(1-p)(1-\tau)$ and $-(qw_H+(1-q)w_L)pH(1-\tau)$ respectively. Plugging in the optimal agency allocations specified in Theorem 5,

we have following Lemma:

Lemma 8: *If* $q < c_0/(B(1-p))$*, then the greater the dissimilarity of the two groups' interests, the greater the incentive for the lobbyists to exaggerate interest compatibility with the agency's needs regardless of true compatibility. The similarity otherwise is irrelevant to the incentives for lobbyists to mis-represent their members' interests and capabilities.*

To rephrase, when the competing groups are very different ($q<c_0/(B(1-p))$), as $q$ decreases the lobbyists are more likely to mis-represent their group's interests to agency officials. On the other hand, when the competing groups are very similar ($q\geq c_0/(B(1-p))$), it does not influence their lobbying strategies at all. This result is corollary to Theorem 5. We have also analyzed the case when groups can collude or mimic each other, or when agency officials have politically-driven policy preferences, and will provide those results on request.

## Government Allocation and the Revelation Principle in Practice

Readers may feel that while our model is logically consistent, it may not be tied to reality. Do government agency officials really use administrative rulemaking procedures to press lobbyists into making claims about the benefit of serving their member industries that can be subsequently evaluated? Consider how this very standardized resource allocation process works in Korea.[5]

First, agency officials send out a request-for-proposals (RFP) to four or five firms about a public project. Second, these firms' representatives send their proposals back to the agency (often via email). Third, officials assign grades or scores to these firms based on the proposals. This is called first-stage assessment. Fourth, officials convene a committee composed of internally recruited agency staff and external experts recruited from academia, research institutes,

and law firms. The size of each committee varies from 10 to 20 with the ratio of external experts to staff at about 50%. Fifth, the committee invites the lobbyists or other representatives from the firms to come in and give forty minutes presentations and answer questions for about 30 minutes presentations, all of which occur the same day. Sixth, the committee does a second-stage assessment. There are five criteria: business, people, process, performance and service. All of these criteria, especially performance and service, are used to assess present capabilities of the firm as well as their past performance in related projects. Finally, the committee members combine the first- and second-stage assessments to rank the firms. Depending on the gaps between their scores, they select one to three firms for a project.

There are multiple similarities between this procedure and the process we modeled. First, the firms know the rules of the game. Agency officials describe through the RFP how selections will be made (and most firms have been through it before). Second, firms are clearly competing to obtain governmental resources, i.e. the project. Third, firm lobbyists can exaggerate project outputs when they write their proposal and at the presentation. Fourth, the types of firms are similar in that they all have some capacity to complete the project, which means they are competing. But they offer different services, so what they offer in the proposals and presentations varies from firm to firm and project to project. Fifth, firm representatives cannot observe their competitors because the proposals and presentation are strictly confidential (and information sharing is prohibited). Sixth, what matters in the end is relative quality, i.e. ranks of firms. Agency officials allocate resources with expectations of the benefits they will receive from a completed project that can be evaluated. Finally, firms failing to complete the projects satisfactorily and not provide the benefits they promised will, at the very least, be disadvantaged next time a project is offered because past performance becomes part of the selection criteria.

The connection between our theoretical model, along with its incentive-compatible direct-revelation mechanism, and project allocations in Korea should hopefully be clear. Since the firms must explain how efficiently they can complete a project that can be evaluated later, the direct-revelation mechanism used here to reveal information about each firm's type, agency officials and other committee members are able to estimate the firm's true type by comparing their signals. Thus, they identify the amount of exaggeration, which is simply the difference between what the firm claims it can do and what it actually can do. Learning the extent of this exaggeration allows agency officials to construct a one-to-one mapping between signaling and true type. Comparing proposals from competing firms help agency officials to identify the true types of firms. As this procedure is common knowledge to all players, the signaling strategy of firms, or any other interest group, can be transformed into an incentive-compatible mechanism.

## Remarks and Extension Possibilities

Recent work by Lux et al. (2011) finds not only that the sheer number of corporate interests in the United States lobbying for public benefits is increasing, but so too is the marginal payoff they receive for doing so. Lobbying for public benefits produces enough of a return that it gives a private interest a decisive edge over non-lobbying competitors. This means first that the kind of agency lobbying we are describing in this paper is no mere abstraction, it is very real and becoming increasingly prevalent. Second, and perhaps more importantly, the competitive pressure on interests to lobby and receive financial and other benefits from government is becoming enormous, lest a company lose a competitive advantage, and therefore the pressure on lobbyists to exaggerate interests, mis-representing what a company or sector of companies can do with public resources has become similarly enormous.

Our results, however, show that these pressures to exaggerate can be optimally controlled and that it is in an agency's interests to do so. In our signaling game, agency officials use administrative rulemaking to try to extract as much information about the true interests and capabilities of the groups lobbying them as possible in order to learn who is best to serve to maximize revenue. Lobbyists may try to exaggerate the real compatibility of their organization's interests with that of government in order to maximize their payoffs, but an agency outmaneuvers the strategies of lobbyists and implements optimal mechanism taking into account the inclination to exaggerate. Of course a poorly designed rule inefficiently let a lobbyist deceive the agency as they are less likely to be afflicted from the manipulation, and legislators who want an interest group served may even pressure agency officials into writing a rule that favors one group even though serving it will not produce an optimal return and increase social welfare. This would be rich grounds for future research.

Finally, while all players compete against each other, they may also have a surprising incentive to cooperate. They all have a common interest in that an efficient allocation mechanism would enhance future budget surpluses so that everyone can receive a larger future payoff. In other words, while all players compete in order to take bigger slices of the public pie (i.e., the surplus government resource allocation creates), they have the common incentive to also increase the size of that pie. We did not explore the interesting intersection of these individual competing interests and this common interest, but the interesting possibilities of "co-opetition," as Brandenburger and Nalebuff (1997) call it, would also be a field for future research.

## Appendix 1: Proofs

*Proof of Theorem 1*: The government agency knows the compatibilities of interest groups and designs an administrative rule to deal with each group's compatibility. Step 1: When both interest groups are of high compatibility (*HH*), government conducts constraint maximization $[b_1(HH) + b_2(HH)p\tau H + R_f(2B\text{-}(b_1(HH) + b_2(HH)))]$. Taking the derivative with respect to $b_i(HH)$, we have $p\tau H - R_f > 0$ for both $i = 1,2$. Thus any allocation is optimal and the same if $b_1(HH) + b_2(HH) = 2B$. Since we are interested in symmetric allocations, we have $b_1(HH) = b_2(HH) = B$. Step 2: When both interest groups are of a low compatibility (*LL*), the government conducts constraint maximization $b_1(LL) + b_2(LL)\ (1-p)\tau H + R_f(2B - (b_1(HH) + b_2(HH)))$. Taking the derivative with respect to $b_i(LL)$, we have $(1 - p)\tau H - R_f < \tau H/2 - R_f < 0$ for both $i = 1,2$. Thus the government minimizes $b(LL)$ for both interest groups. Since $b$ must be non-negative, $b_1(LL) = b_2(LL) = 0$. Step 3: When only one interest group is a high compatibility (*HL*), the government conducts constraint maximization $b_1(HL)p\tau H + b_2(LH)(1 - p)\tau H + R_f(2B - (b_1(HL) + b_2(LH)))$. Taking the derivative with respect to $b(HL)$ and $b(LH)$, we have $p\tau H - R_f > 0$ and $(1 - p)\tau H - R_f < 0$ respectively. Thus the government maximizes $b(HL)$ and minimizes $b(LH)$. Given the resources constraint, we have $b(HL) = 2B$ and $b(LH) = 0$. Also, (*HH*) and (*LH*) occur with probability $q/2$ respectively, and (*HL*) and (*LH*) occur with probability $(1 - q)/2$ respectively. To sum up the payoff to government with probability weights, the optimized revenue to government is $B(q(R_f - p\tau H) + 2p\tau H)$. Q.E.D.

*Proof of Lemma 2*: Theorem 1 shows that the revenue for government is $B(q(R_f - p\tau H) + 2p\tau H)$, which is a decreasing function of $q$ given the assumption that $R_f < p\tau H$. Q.E.D.

*Proof of Theorem 3*: Straightforward from *TRUTH*(*L*) and *TRUTH*(*H*). Theorem 5

provides exact solution of the allocations. Q.E.D.

*Proof of Lemma 4*: ($w_L$, $w_H$) denotes how much more resources a low-compatibility interest group expects to receive from the government official by exaggerating its signal given the other interest group is low compatibility and high compatibility respectively. ($-w_L$, $-w_H$) denotes how much a high-compatibility interest group receive more resources from the government official by understating its signal given the other interest group is low compatibility and high compatibility respectively. Then, low-compatibility group's incentive to exaggerate is $(qw_L + (1 - q)w_H)H(1-p)(1-\tau)\text{-}c(2p - 1)$. High-compatibility group's incentive to understate is $q(\text{-}w_H)+ (1 - q)(\text{-}w_L)pH(1-\tau)\text{-}c(2p - 1)$. They increase with the decrease of the credibility cost of exaggeration ($c$), tax rate ($\tau$) or correlation between compatibility and return ($p$), but with the increase of the upside potential of an agenda ($H$). Q.E.D.

*Proof of Theorem 5*: To differentiate objective function of the government official with $q$, we have: $(b(LH) - b(LL))\ (R_f/\tau - (1 - p)\ H) + (b(HH) - b(HL))\ (pH - R_f/\tau)$. Thus, exploiting symmetry and restrictions, we have: $b(LL) = 0$, $b(HH) = B$, $b(LH) = B$. To solve $b(HL)$, we plug $TRUE(L)$ into objective function. Then, given the resource constraint, we have: $b(HL) = \min (B, c_0/(q(1 - p)))$, where $c_0 \equiv c(2p - 1)/(H(1-\tau))$. Let $q_1 \equiv (c(pH - R_f/\tau) / ((1- p)B))^{1/2} H^{-1}$ and $q_2 \equiv c_0/(B(1- p))$. Then, the objective function has three properties. (1) It is positive when $q = 0$. (2) It is convex function of $q$ up to $q < q_2$. (3) It has minimum at $q = q_1$. Therefore, we have: If $q < q_2$, $q$ is irrelevant. Else if $q_1 \geq 1$, the welfare is decreasing function of $q$. Else if $q_2 < q_1 < 1$, U-shape function such that welfare is minimum at $q = q_1$. Else if $q_1 \leq q_2$, it is increasing function of $q$. This proves theorem. Q.E.D.

*Proof of Lemma 6*: Straightforward from Theorem 5. Q.E.D.

*Proof of Lemma 7*: Tax is a profit-sharing linear contract between an interest group and

the agency, so the lobbying payoff must follow the same pattern as revenue to the agency. In addition, since social welfare is the sum of government revenue and interest group lobbying payoffs, social welfare must also display this same pattern because of variation in groups' interest similarity $q$. Q.E.D.

*Proof of Lemma 8*: The gross payoffs from over- and under-statement by incompatible and compatible interest groups are $(qw_L+(1-q)w_H)H(1-p)(1-\tau)$ and $-(qw_H+(1-q)w_L)pH(1-\tau)$ respectively. We can plug optimal values of $(w_L, w_H)$ computed at Theorem 5 to prove the result. Q.E.D.

## Appendix 2: Expansion on the Revalation Principle

More specifically, we argue that the agency can identify a lobbyist's mis-representation because it knows the lobbyist's optimal strategy given a mechanism design. The Revelation Principle is general in that it applies to all lobbying strategies. Suppose $v$ is true information and $f(v)$ is a lobbyist's mis-representation where $f(\cdot)$ is an optimal mis-representation function that maps true type ($v$) to signal $s=f(v)$. Then, since officials know the lobbyist's optimal strategy (i.e. $f$), officials can know $v$ upon receiving $f(v)$ and taking inverse function, $f^{-1}(f(v))$. The Revelation Principle states that the design mechanism for $s=f(v)$ is identical to the design mechanism simply about the true value $v$ because we can take inverse function $f^{-1}$ on the signal from the lobbyist.

[1] The information in this section comes from the personal experiences of one of the authors of this paper, who has had recurring opportunities to sit on, and participate in, the committee process described here.

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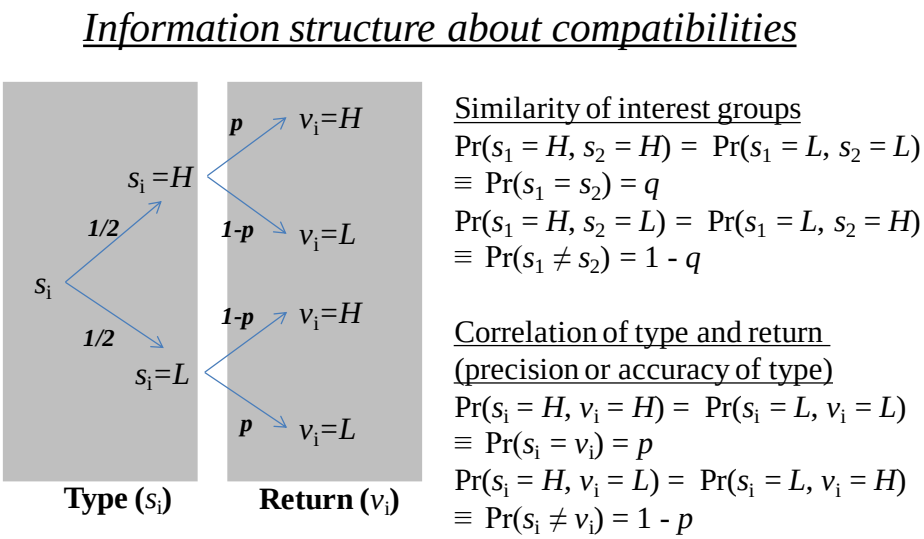
**Table 1: Social welfare implication of correlated interest**

| Cases | Pattern |
|---|---|
| $q_1 \geq 1$ | Government revenue decreases with $q$ if $q_2 < q < 1$ |
| $q_2 < q_1 < 1$ | Government revenue decreases with $q$ if $q_2 < q < q_1$ |
| | Government revenue increases with $q$ if $q_1 \leq q < 1$ |
| $q_1 \leq q_2$ | Government revenue increases with $q$ if $q > q_2$ |

Government revenue is a constant function of $q$ if $q \leq q_2$. '$q$' denotes correlation between the interests of interest groups. $q_1 \equiv (c(pH - R_f/\tau) / ((1- p) B))^{1/2} H^{-1}$, $q_2 \equiv c_0/(B(1- p))$ and $c_0 \equiv c(2p - 1)/(H(1-\tau))$.

**Figure 1: Informational Structure of the Lobbying Game**

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[1] See http://www.jsf.mil for more information, last accessed on December 2, 2010.

[2] Harsanyi (1967) assumes an initial move by nature that determines actors' private information, or their *type*. Type in general is any private information relevant to an actor's decision making.

[3] If $q = ½$ the interests are independent so that the group's potentials to generate public benefits are unrelated.

[4] It is also worth pointing out that our results remain the same whether the agency levies a tax on an group's total payoff (including resources gained) or net payoff (excluding such resources.)

[5] The information in this section comes from the personal experiences of one of the authors of this paper, who has had recurring opportunities to sit on, and participate in, the committee process described here.