Corporate lobbying: A review of the recent literature

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Abstract

This survey covers the recent literature on lobbying, with a particular focus on corporate lobbying. It conveys a detailed analysis of three main research traditions: contests for policy rent, persuasion games, and multiple-means models. Strategic aspects of lobbying are presented in a single model that encompasses both strategic communication and monetary compensation. The review also investigates three main issues in lobbying literature: (i) Incentive to lobby and the equilibrium amount of lobbying, both in the presence and absence of competitors, (ii) strategic substitution and complementarity of lobbying and contributions, and (iii) the role of intermediation in lobbying. Recent evidence from corporate lobbying based on lobbying outlays and survey data is presented.

Keywords: lobbying, political contributions, menu auction, contest, persuasion

JEL Classification: D72, D82, D83
1 Introduction

Measured by observable spending, lobbying represents the single most important channel of corporate political influence (Ansolabehere et al., 2003; Bennedsen and Feldman, 2002; de Figueiredo and Cameron, 2008). By meeting with policy-makers, hiring lawyers and policy experts, submitting briefs, conveying research results and technical information, and engaging in media advertising and PR campaigns, firms build and maintain influence over policies. Their aim is either to seek rents through favorable regulations, tax treatment, public procurements and state aid, or to shelter themselves from rent-extraction by means of arbitrary tax demands and harmful regulations.

This study reviews the latest developments in lobbying theory and recent evidence gathered specifically for corporate lobbying. In the last decade, the proliferation of literature on contests, disclosure games, strategic communication and evidence production has transformed the landscape of lobbying modeling. Also, choosing from a set of instruments of political influence has only recently been addressed in formal modeling. To our best knowledge, progress in this area achieved since the latest reviews by Grossman and Helpman (2001) and Winden (2003) has not yet been put into a single treatment.

We identify three distinctly different modeling traditions: contests for policy rent, strategic information transmission, and multiple-means models. In the first place, we reflect on the developments of contest literature over the last decade, especially the attempts to build explicit informational foundations for contests for policy rent. Secondly, we show how lobbying is modeled by persuasion games with an informational search. Third, to clarify differences in traditions, we separately investigate each modeling feature and its possibly different effects in the different traditions. Fourth, we build a unified model following Kamenica and Gentzkow (2011) and illustrate how multiple instruments for political influence can be combined within a single robust setting.

Our survey also reflects advances on the empirical front. Lobbying by firms constitutes the major part of observable lobbying outlays and therefore has been relatively extensively studied in the recent past. Corporate lobbying has also attracted attention because corporate benefits can be relatively well identified, industries can be classified, and because public concern about its effect is growing (The Economist, 2011). Finally, data availability has substantially facilitated empirical research. In the last decade, a group of articles utilized survey firm-level data on political influence from the World Bank Enterprise Survey and World Economic Forum. In the USA, the Lobbying Disclosure Act reveals the exact lobbying outlays in the United States and provides relatively clean data on the salaries of lobbyists and their staff, and prices per reports and fees for expert consultants. Altogether, these studies shed new light upon the size of the market, its asymmetries, cost-benefit ratios of lobbying, and the key role of intermediation.

The paper proceeds as follows: Section 2 very briefly presents and classifies the latest
theories of lobbying. Section 3 builds a general model and reviews the key modeling ingredi-
ents in detail and sheds light on the key mechanisms of lobbying models. Section 4 exploits
state-of-the-art knowledge to address the selected questions: When does lobbying pay off?
Are lobbying and direct contributions to policy-makers substitutes or complements? What is
the effect of regulations on competitive lobbying? What explains the presence of lobbying in-
termediaries? For each particular question, both theory and evidence is summarized. Section
5 concludes.

2 Theory

Literature on the means of corporate political influence spans the fields of economic theory,
political economy, and political science. Luckily, in spite of a great variety of contributions,
the driving ideas and mechanisms can still be presented and explained in relatively tractable
static settings accessible even to non-specialists.

To begin, we classify the literature into three main families of models.

2.1 Policy rent

2.1.1 Contests

Influence functions. In early political economy models, the transmission of lobbying ef-
forts into policies is captured by a reduced form function, namely by postulating an influence
function that directly maps effort into influence (e.g., Becker, 1983; for a survey, see van
Winden 2003). Axiomatic restrictions on the properties of the production function for in-
fluence allow us to study the effects of competition and changes in influence technology.
Influence functions bring about several interesting and testable implications, but at the same
time develops from at least two key problems, namely (i) consistently modeling policy-makers’
motivations, and (ii) precisely explaining the channels of influence. Instead of developing and
calibrating the influence functions, subsequent research switched its attention to building ex-
plicit microfoundations of influence, asking why policy-makers respond to evidence, offers and
threats, and illuminating how the information is shared between lobbyists and policy-makers
in the process of exerting influence.

Rent seeking. During the time when influence functions were in retreat, the rent-seeking
tradition associated mainly with Tullock (1980) began flourishing to become a now lively
platform for modeling the political influence of corporations and other interest groups.\(^1\) A
rent-seeking contest effectively constitutes a special form of an influence function; again,
investments in political influence are irreversible, and there is no restriction on how the

\(^1\)For a survey on outcomes and costs of rent-seeking contests, see Del Rosal (2011).
investments should be interpreted and operationalized. The major difference is that a rent-seeking contest is explicit about how influence is bought (cost function) and exactly how influence affects the policy (through the probability of winning a policy rent or gaining a share of the policy rent).

Technically, a rent-seeking contest is a mechanism that distributes a policy prize to the contest winner(s). The prize can be interpreted as the right to set a certain policy. The valuation of the prize may be player-specific. The costs of the effort are captured by a separable cost function, and costs are irreversible up-front payments. The probabilities of winning a prize (or shares of the prize) are given by a predetermined contest-success function (CSF). Two functional forms are studied most frequently, *Tullock’s lottery* and an *all-pay auction*. Both are special cases of a logit function for the elasticity of prize to effort, where Tullock’s lottery represents the case of an imperfectly discriminating contest (which is under a common cost of effort equivalent to a simple raffle), while the all-pay auction represents a perfectly-discriminating contest.

The disadvantage of the contest approach is basically twofold. First, it is empirically difficult to determine the shape of the CSF. Testing the shape is complicated by the necessity to control for other properties; for example, since the level of outlays depends on the degree of the players’ asymmetry, a test for elasticity of effort that uses aggregate spending requires a measure of asymmetry. Even more importantly, the test must control for the possibility of committing to a compromising policy because in the absence of commitment, an increase in discrimination in most cases increases outlays (Epstein and Nitzan, 2004), whereas with commitments, total expenditures fall if discrimination increases (Münster, 2006). Hang (2002) shows that an exclusion restriction may serve as a useful test: For a Tullock lottery, excluded lobbyists must have a lower valuation than included lobbyists. In contrast, for an all-pay auction, excluded lobbyists are those with the higher valuation.

Secondly, and even more importantly, like in any model assuming influence, contests put the source of influence into a black box. This effort can represent a variety of channels: (i) a pure transfer to politicians in the form of campaign contributions or direct compensation, (ii) services provided by an intermediary, for example access facilitation, or (iii) investments into the search for valuable evidence. Also, the rent-seeking tradition considers lobbying to be a single activity of exerting pressure, and this is at odds with a more refined approach that defines lobbying exclusively as the search and communication of evidence.

To answer whether a contest also captures investments into search and communication, which is our preferred definition of lobbying, it is first important to see if a CSF can be explained by means of pure informational transmission. The agreement within the rent-seeking camp is not complete. Epstein and Nitzan (2006b, p. 424) doubt that the contest approach is at all useful for dealing with the role of asymmetric information in politics. In contrast, persuasion contests and innovation races demonstrate that a competition in raising knowledge may exhibit the properties of a CSF.
**Persuasion contests.** A typical representative of a persuasion contest is Lagerlöf (2007) who presumes that a policy-maker wants to award a project to an efficient firm. Each firm knows its efficiency, but nothing else. The lobbying firms search for verifiable evidence that would confirm their efficiency, and search outcomes are stochastic. A search is unobservable, so it cannot serve as a signal, and posteriors are conditional only upon the raised evidence. This persuasion contest model is interesting as it may produce a non-linearity of total outlays in the number of firms. Skaperdas and Vaidya (2012) model competition between lobbyists in gathering either deterministic or stochastic evidence. The imperfect discrimination of the policy-maker is ensured by assumption: The policy-maker is presumed to follow the presented evidence in accordance with a likelihood-ratio function, which generates the necessary stochastic element that ultimately leads to an imperfectly discriminating CSF.

**Innovation races.** In the literature on research and labor tournaments, the problem is not to convince a policy-maker of the value of the proposed policy or project, but to generate the value. Consider contestants who competitively search in order to gain extra competence, knowledge or skills that are valuable to a policy-maker. A simple version is illustrated by Baye and Hoppe (2003): Suppose two players compete to be awarded a project, with a government awarding the project to the better proposal. Each player can search for designs. Then, if the design proposals are drawn from independent identical distributions, the probability that a given player produces the best design equals his share of the total number of designs. Glazer (2008) extends the setup by allowing the government to bargain with those firms that present an equally good design.

In these settings, the government is time-consistent because it selects the best design to maximize value, and it is the randomness of a search that delivers the properties of the contest’s success function, not any property of the policy-maker’s decision-making. Thus, an innovation race provides the microfoundations for some of the policy contests. Yet, innovation races involve at least four fundamental differences if compared to the standard motivation for rent-seeking contests: (i) Investments are productive (used ex post in production), or not productive (used only ex ante). (ii) The outcome of investment is private (excludable) input, or not a public good (such as public evidence). Thus, unlike for a persuasion contest, the use of the investment must be accompanied by a trade between the owner of the competence and the policy-maker. (iii) Payments to the policy-maker are in the bargaining stage, not in the investment stage. Thus, the policy-maker effectively seizes part of the rent by bargaining, not by contest. (iv) The role of the contest is not to distribute the rent between the lobbyists and policy-maker, but to create a rent.

To sum up, only a narrow class of activities that exert political influence can be modeled simultaneously as the transmission of information and the contest.
2.1.2 Auctions and bargaining

Bargaining and auctions. The irreversibility (all-pay) property of payments in contests is motivated by observing that lobbying and campaign expenditures are submitted by competing parties prior to distribution of the prize, mainly in order to secure access to the policy-maker. Still, one cannot neglect a mechanism where competing lobbyists pay only after they are assigned the policy rent. That case is modeled either such that bids are binding for the winners, or investments are reimbursed to the losers. Either way, it is interesting to see that the revenue-oriented policy-maker may prefer to establish a reversibility of payments. Consider two groups with an identical valuation $v$. In Tullock’s contest with irreversible payments, the government collects $\frac{v}{2}$. If there is a non-cooperative bargaining protocol where the government alternates take-or-leave offers between the groups with a discount rate $\delta \in (0,1)$, then a subgame-perfect equilibrium gives the policy-maker $\frac{v}{2-\delta} > \frac{v}{2}$. In a standard first-price auction, equilibrium bids are even as large as $v$, and the expected revenue is $v > \frac{v}{2-\delta}$.

Epstein and Nitzan (2006b) study the optimal design of rent allocation for a mixed-objective policy-maker. The policy-maker may either organize a standard rent-seeking contest or directly assign the policy rent to a highest-value participant. This design issue becomes even more interesting once the policy-maker additionally has agenda-setting power so that he or she can limit the set of policies that can be implemented by the winner of the contest. This agenda constraint imposed by the policy-maker subsequently affects the valuations of the contestants, and represents another way in which the policy-maker addresses the tradeoff between setting a good policy and raising valuable payments.

Menu auctions. The idea of reversible investments is typically approximated by a standard auction where the object to be auctioned is the right to set a policy. Alternatively, it is not the right but the policy itself that is subject to auction. Given that an auction must determine a policy from a set of mutually inconsistent policies, it must be organized as a menu auction where bids are set contingent on policies and possibly upon other observables (Grossman and Helpman, 2001). A winning policy is determined by maximal total bids, and only bids related to the winning policy are collected from the bidders. Thus, there is no winner who implements a favorable policy, but a winning policy is supported by multiple contributors. The menu auction currently represents a workhorse model of the allocation of policy rent, even if some properties of menu auctions have been subject to discussions, namely (i) the existence of non-truthful equilibria, (ii) the extremely great power of a policy-maker, implying that the lobby should prefer to focus on other means of influence, including the selection of the policy-maker and incentives to avoid participation; and (iii) the need for the lobby’s commitments when policy-contingent bids are collected.
2.2 Strategic information transmission

Since lobbying is the process of conveying messages from lobby to policy-maker, a natural question is how precisely communicated messages motivates the policy-maker to change the policy. We identify four traditions of modeling of information transmission: (i) costless communication, (ii) communication by means of costly actions, (iii) communication contingent on paid access, and (iv) communication preceded by evidence production. Two particularly decisive aspects are whether the messages are costly or costless, and whether they deliver verifiable or non-verifiable claims or evidence.

2.2.1 Costless communication

When the lobby communicates non-verifiable messages towards a policy-maker at no cost, we speak of cheap talk. The closer aligned are the lobbyist’s and policy-maker’s preferences, the better cheap talk works. Typically, the content of the costless message is the state of the world, where both lobbyist and policy-maker’s optimal policy are correlated with the true state of the world, but the lobbyist’s policy is biased. In equilibrium, a costless message on the state, taken literally, serves as a costless signal if the lobbyist’s bias is expected to be low. Although full revelation is generally not achieved by cheap talk, the information improves. The credibility of cheap talk messages is further improved in the presence of the opposite lobby that applies counteractive lobbying, and for multidimensional messages (Chakraborty and Harbaugh, 2010).

The relevance of cheap talk modeling for explaining corporate lobbying is mainly qualified by the existence of enormous lobbying outlays and the large size of the intermediary market. Nevertheless, it cannot be ruled out that a part of influence is due to simple costless communication. In addition, cheap talk serves as a very instructive starting point for models with the cost of achieving and presenting messages. For a comprehensive review of the main principles, uses and developments of the cheap talk literature, see Grossman and Helpman (2001, Ch.4) and Sobel (2010).

When messages are verifiable but still costless, message space is type-dependent and we speak of disclosure (persuasion) games (Milgrom 1981). Verifiability defines how signals (produced evidence) can be treated by the lobby: The lobby can withhold the evidence, but cannot misinterpret or fabricate it. Verifiability appears to be a particularly useful building block of search models where a signal obtained can be interpreted as a piece of hard evidence.

Verifiability normally enhances the credibility of messages and increases the scope for full revelation. More specifically, under monotonicity assumptions (i.e., Receiver’s best response increasing in type and Sender’s utility preferring higher action than Receiver), any rationalizable equilibrium contains full revelation (Giovannoni and Seidemann, 2007). The well-known intuition behind full revelation is that the equilibrium can accommodate maximal skepticism of the policy maker as well as full revelation of the lobby. In the presence of neologism-
proofness (i.e., out-of-equilibrium messages taken literally), Ryan and Vaithianathan (2011) nevertheless show that verifiability does not necessarily facilitate full revelation in costless communication settings.

2.2.2 Costly signaling

Making a non-verifiable message may deliver extra information to the policy-maker also when it is costly to provide such a message. The exogenously determined or endogenously selected cost then signals the lobby’s private information, irrespective of the literal content of the message. In pure signaling, the literal content of the message is abstracted from. Thus, signaling works with a wide range of costly actions, even with those which lack explicit communication. For example, when a company hires a high-caliber lawyer, some information is transmitted even before the lawyer begins to complete his or her lobbying assignment. This is also why costly signaling\(^2\) is analyzed as pure money burning, where the coordination aspects as present in cheap talk settings are completely missing.

Costly signaling is often bounded by parameters. In an exogenous cost signaling, a message with a too-small cost does not convey information credibly, whereas the large cost deters sending a message at all. Only an intermediate cost separates those lobbyists who point to relevant information from those who exploit the opportunity to mislead the policy-maker (Potters and van Winden, 1992). Signaling models also exhibit problems typical for information economics: (i) The presence of a costly message in the strategy set may decrease the expected lobbyist’s payoff, (ii) multiple equilibria and equilibria switches complicate comparative statics, and (iii) the pooling equilibria with zero extra information always exist and are hard to rule out by a reasonable equilibrium refinement. For endogenous cost signaling and monotonicity in lobbies’ types, it is however fortunately relatively straightforward to obtain the separating equilibrium.

Austen-Smith and Banks (2000, 2002) combine costly actions (money burning) with costless messages (cheap talk) into a single model. The availability of money burning increases the scope for credible cheap talk. With endogenous cost and a single lobby, even full revelation is possible in this combined model. Tovar (2011) recently extended an endogenous cost-setting and obtained full revelation by assuming that the lobby not only signals at a selected level, but also offers a contribution schedule that is conditional upon all payoff-relevant variables, including the state of Nature. More on this approach follows in Section 2.3.1.

\(^2\)Signaling refers to any interaction when a privately informed agent sends signals contingent on his or her type to an uninformed agent. Hence, it contains also cheap talk and disclosure games. In a narrow sense, signaling is used only for setting where utility varies with signals (hence signal costs exist) and where the informed agent’s utility is monotonic in the signals and actions. Both of these assumptions are violated for typical models of costless communication.
2.2.3 Pre-paid communication

When an access cost is imposed by the policy-maker upon any lobby who attempts to send a message, we have sequential learning of the policy maker. In the first step, the policy maker learns from the costly action made by the lobby. The access cost is normally represented by campaign contributions, but we may equally consider payments to gate-keeping intermediaries or any overt or covert compensation. In the second step, the policy maker learns from the (un)verifiable message.

There are three options, depending on whether the lobby has complete, partial or none informational advantage over the policy-maker (see Grossman and Helpman 2001, Ch. 5.3). First, if the lobby is privately informed about all aspects of the state of Nature, the access cost serves as a costly action (i.e., signal), only with the difference of having an extra option of sending an observable message. Second, if the lobby has partial advantage of knowing her bias, a fee is paid either by close groups or extreme groups (Austin-Smith, 1995; Lohmann, 1993). Third, if the policy-maker can discriminate between groups because the lobbies’s biases are known, the lobbying groups may separate such that moderate groups never pay but are always listened to, whereas access fee is applied only to extremists (Lohmann, 1995). Notice that when an access fee is paid well in advance such that a lobby and the policy-maker share common priors, the access fee serves only to redistribute part of the lobby’s surplus from the subsequent communication to the policy maker.

In contrast to cheap talk, pre-paid communication is an appealing mechanism because it explains why lobbies agree to pay substantial amounts for being able to successfully communicate even non-verifiable messages. In contrast to signaling, this version of information transmission is attractive for two additional reasons: (i) The policy-maker prefers to collect access payments instead of letting the signal be produced by wasteful (money-burning) activities, and pre-paid communication thus likely crowds out signaling in the lobbies’ portfolio of instruments. (ii) The access fee serves as a rationing device for a time and attention-constrained politician.

2.2.4 Search

Prior to conveying messages, the lobby needs to obtain evidence or signals that can be communicated. In all heretofore discussed models of strategic information transmission, the state of Nature or any signal was assumed to be the lobby’s inherited private information. Once we abandon the information asymmetry, a firm preferring certain policies needs extra supporting evidence for a policy change and its bias motivates the lobby to seek extra evidence. In the end, an information search complements the strategic communication analyzed above, especially persuasion games given that an overwhelming majority of search models consider verifiable evidence (e.g., Lagerlöf, 2007; Henry, 2009). Yet, a search is not necessarily just an extension of a communication (or specifically persuasion) game by a pre-play. If a search
is unobservable or a no-evidence message can be reported, then persuasion is not a proper subgame, hence we cannot solve the search game by inserting subgame equilibria from the persuasion games.

We can conclude this section of strategic communication with a few comparisons to the contest tradition. The basic pros of strategic information transmission relative to the contest tradition are the explicit motivation of the policy-maker, an explicit description of the influence through the effect upon the policy-maker’s beliefs, a full description of the structure of the information, and the presence of lesser commitments. The drawbacks of strategic communication are the multiplicity of equilibria, difficulty in making robust predictions, and the need to assume extreme sophistication on the part of players to support certain equilibria. Take the basic cheap talk for instance: On one hand, it embeds no commitments at all. On the other hand, a “babbling equilibrium” with no communication exists always. Moreover, once all types of lobbies have monotonic preference over a single-dimensional policy (e.g., a government subsidy to the lobbying group), cheap talk is uninformative. Cheap talk with monotonic lobbies’ preferences becomes influential only under special circumstances in multidimensional models (see Chakraborty and Harbaugh, 2010).

2.3 Multiple-means models

Although strategic information transmission illuminates the communication aspects of lobbying, it is silent on the interaction with other channels of influence. Moreover, some lobbying instruments have different functions depending on the other aspects of interaction with the policy maker. For example, a payment to the policy maker may be either an access fee or a compensation. Finally, for pre-paid communication and search specifically, it is necessary to specify the subsequent interaction. Multiple-means models address these concerns by explicitly modeling the lobby’s use of several instruments for influence. In this relatively heterogeneous group of papers, the mechanisms described above are combined with bargaining and auction schemes, typically in two distinctly different stages.

Timing is one of the key aspects to differentiate between these two-instrument two-stage games. For informational lobbying, evidence is first gathered and presented, and then bribes follow (show and pay). In pay for access, payments are made, and evidence is then presented (pay and show). Apriori, it is not clear which timing is more realistic. The motivation for timing depends, among others, upon priors and the possibility of restricting access. With symmetric priors, the lobby cannot make an influential message without an extra investment, and evidence gathering is the necessary first step. Similarly, lobbying precedes payments unless access can be restricted.

Another key aspect that serves to classify the models is the origin of communication in the model: The family of multiple-means models can be structured into classes depending on whether they basically build upon cheap talk, persuasion, signaling, pre-paid communication,
or search.

2.3.1 Lobby and pay

Informational lobbying (lobby and pay) presumes search and communication in the first stage and payments in the second stage. The second stage is either in the form of extra pressure (Dahm and Porteiro 2008a, 2008b) or in the form of non-cooperative bargaining (Bennedsen and Feldman, 2006). In the former case, the idea is that the policy-maker’s posteriors can be modified by buying extra influence. In the latter case, the idea is that if there is a surplus between the lobby and policy-maker associated with a policy change even after strategic information transmission, this surplus can be cashed in by compensating payments. These two different approaches predict different relations between the instruments. A third possibility is lobbying as signaling in the first stage and payments as menu-contributions in the second stage (Tovar, 2011). Precisely, the menus of contributions are offered first, then signals are produced and finally payments are made. This setup represents a unique combination of endogenous-cost signaling and common agency in a single framework.

For several lobbies, each with a different optimal policy, bargaining between the policy-maker and lobbies needs to be structured. The structure is determined either as a contest (see also Section 2.1.1), auction (with or without policy commitments; see Epstein, Nitzan, 2004), menu-auction (with or without the policy-maker’s private information; see Felgenhauer, 2010), or as multilateral bargaining (e.g., with a sequence of alternate take-or-leave offers; see Glazer, 2008).

Another key difference is in how a surplus of a policy change is redistributed between the policy-maker and lobby in the contribution subgame. In bilateral bargaining, an explicit non-cooperative bargaining model derives how the lobby compensates the policy-maker for a policy change. Another option is to directly set either the lobby or policy-maker’s willingness to pay (WTP) as a measure of compensation. For example, Bennedsen and Feldman (2006) apply the policy-maker’s WTP for single-group lobbying, and the lobby’s WTP for multiple-group lobbying (by means of a menu auction). Their idea is that a single lobby has strong enough bargaining power to capture the full surplus, whereas competitive lobbying leads to truthful contributions, in which it is the policy-maker who captures the entire surplus. In such a case, however, the comparison of single-group and multiple-group lobbying must thus account for the fact that the bargaining strength of a corporation vis-a-vis politicians is not invariant to the number of players. Moreover, even within menu auctions with multiple groups, truthful contributions are not necessarily the unique outcome; a winning lobby may set a best-response bid that makes the policy-maker exactly indifferent but the loser does not participate (Felgenhauer, 2010). Such a bid makes the winning lobby capture the full surplus from the policy change.
2.3.2 Pay and lobby

Alternatively, contributions in the first stage serve as access tickets for lobbying in the second stage (‘pay-to-play’ politics). This logic intuitively confirms that campaign contributions and some types of lobbying expenditures serve only to buy access to the policy-maker. The timing effectively belongs to the class of screening models reviewed above. Yet, the difference is that verifiable information is presented, communication in the second stage becomes strategically relevant, and the model better falls into the class of two-stage models with payments and subsequent communication.

Thus, while the previous models effectively presented a single message, there are two messages involved here, an indirect screening message and a direct (typically verifiable) message presented in the communication stage.

Two valuable papers on pay-to-play politics with verifiable information exist to date. In Austen-Smith (1998), all lobbies that pay for a ticket are allowed to meet the policy-maker. In Cotton (2009), a single ticket is auctioned in an all-pay auction of two interest groups. Each group possesses a private, jointly independent piece of evidence. Payments in this auction reveal both pieces of evidence, hence ex post verification by the policy-maker serves only to confirm the posteriors.

Why an all-pay auction? An all-pay auction of access appears to be an extremely attractive mechanism for the policy-maker relative to other means, including auctions of policy rent and contests for policy rent. Cotton (2009) shows that selling access by means of an all-pay auction is preferred to selling policy rent by means of an all-pay auction, unless the policy-maker’s valuation of the policy is significantly lower than the lobbies’ valuations. Even more generally, screening combined with the persuasion subgame as constructed in Cotton (2009) is attractive both (i) relative to other means of information transmission (by securing full revelation and raising more funds) and (ii) relative to other means of raising funds (by getting a better policy for the policy-maker).

3 Essentials

To understand more exactly about how lobbying influences policy-makers it is essential to review the ingredients of leading models in the field. Detailed knowledge of the main building blocks gives us a chance to verify the relevance of the models and also its qualitative predictions. We build the comparisons on the grounds of a general setting by Kamenica and Gentzkow (2011) that captures a large class of communication mechanisms.

3.1 States and policies

For states of the world in a finite state space \( \theta \in \Theta \), let \( \Delta(\Theta) \) denote the set of all probability distributions on \( \Theta \). A prior is \( \mu_0 \in \Delta(\Theta) \). The prior is common to the lobby (Sender) and
the policy-maker (Receiver). Policies \(d \in D\) are from a compact policy space \(D\). The lobby has a utility function \(u(d, \theta)\) and the policy-maker has a utility function \(v(d, \theta)\). We denote the policy-maker’s optimal set of policies for his/her belief \(\mu\) as \(d^*(\mu)\).

A frequently presented special case is for two states of the world (low and high), \(\Theta = \{\theta_l, \theta_h\}\). The probability of a high state is \(\mu = \Pr(\theta_h) \in [0, 1]\). The prior probability is \(\mu_0 \in [0, 1]\). Consider three policies, \(D = \{d_l, d_0, d_h\}\). For each player, the expected payoff of any policy \(d \in D\) is a linear combination of the payoffs in each state \(\theta\), hence linear in \(\mu\). For convenience, the lobby’s preferences over policies is assumed to be invariant to states, such that \(0 = u(d_l) \leq u(d_0) < u(d_h) = 1\). For the policy-maker, a policy \(d_l\) is optimal if \(\theta = \theta_l\), and a policy \(d_h\) is optimal if \(\theta = \theta_h\), i.e., \(d^*(0) = d_l\) and \(d^*(1) = d_h\). A default policy \(d_0\) is optimal for priors, \(d^*(\mu_0) = d_0\).

Each communication (persuasion) mechanism induces a Bayes-plausible lottery (distribution) over the policy-maker’s posteriors. Let \(\tau(\mu)\) be any distribution of posteriors on \(\Delta(\Theta)\). Then, for \(\tau(\mu)\) to be induced by a persuasion mechanism in a perfect Bayesian equilibrium, the expected posterior probability of each state equals its prior probability, \(\int \mu \, d\tau(\mu) = \mu_0\) (Bayes plausibility condition). In our special case, if the lobbying mechanism leads to exactly \(m\) posteriors \(\mu_i\), \(i = 1, \ldots, m\), then the distribution is written \(\tau = (p_1, \ldots, p_m)\), and the Bayes-plausibility requires \(E_\tau(\mu) = \sum p_i \mu_i = \mu_0\).

We will specify the persuasion mechanism in the subsequent Section 3.3. Now let us specify the values of the persuasion mechanism for the players; this will be crucial for understanding the incentives for lobbying. First, purely for convenience, suppose that some selection criterion ensures that optimal policy \(d^*(\mu) = \arg \max_D \int v(d, \theta) d\mu(\theta)\) is a singleton for all posteriors induced by the mechanism. The policy-maker’s indirect utility in his/her posterior \(\mu\) is constructed in an upper envelope of the policy-maker’s continuous expected payoffs (given by optimal policies \(d^*(\mu)\)), \(V(\mu) := \int v(d^*(\mu), \theta) d\mu(\theta)\).

The lobby’s value (indirect utility) at a policy-maker’s posterior \(\mu\) is \(U(\mu) := \int u(d^*(\mu), \theta) d\mu(\theta)\).\(^3\) In our special case with a simple state space and the lobby’s state-independent preferences, \(U(\mu) = u(d^*(\mu))\). The expected value of the persuasion mechanism for the lobby is \(E_\tau U(\mu) = \sum p_i U(\mu_i)\). Now, the key thing to see is that inequality \(\sum p_i U(\mu_i) > U(\sum p_i \mu_i) = U(\mu_0)\) requires having \(U(\mu)\) convex at a point \(\mu_0\).\(^5\) In contrast, with concavity, \(U(\mu)\) exhibits risk-
aversion, and the inequality is opposite.

Thus, the shape of $U(\mu)$ determines the value of communication mechanism for the lobby, and the value is important in either of two ways: Firstly, it the lobby can commit to not communicating, the condition $\sum_i p_i U(\mu_i) \geq U(\mu_0)$ is a necessary condition for informative lobbying. Secondly, consider the case when the lobby cannot commit to the absence of communication. (It means, for example, that upon a policy-maker’s request for the lobbyist’s evidence, the lobby discloses evidence that is favorable to its cause.) Then, the inequality compares the lobby’s payoffs in “babbling” vs. informational equilibrium.

The shape of $U(\mu)$ is based on (i) whether the policy-maker’s policy $d^*(\mu)$ is concave or convex in $\mu$, and (ii) whether the lobby’s payoff is concave or convex in $d$. In our special case, it is normally assumed that the lobby’s payoff is convex (or even linear) in $d$, and the single important property is concavity or convexity of function $d^*(\mu)$. What is important is that a finite $D$, $d^*(\mu)$ is a step function at $\mu$ where the policy-maker changes the policy. These discontinuities make concavities and convexities at points parameter-specific (c.f., Dahm and Porteiro, 2008b) and also produces discontinuities in the parameters of the persuasion mechanisms such as in the parameters characterizing signal and message technologies. For instance, Bennedsen and Feldman (2006) separately analyze changes of posteriors that are small enough (weak signals) and large enough (strong signals).

Kamenica and Gentzkow (2011) show that if the lobby can design a communication mechanism arbitrarily, subject only to Bayes-plausibility, then there exists a communication mechanism that improves the lobby’s expected utility, hence is preferred to the absence of communication, whenever (i) the default policy $d_0$ is not the first-best for the lobby and (ii) the neighborhood around prior $\mu_0$, $d^*(\mu)$ is constant. The idea is based on showing that Bayes-plausible persuasion mechanisms implement posteriors in the convex hull of $U(\mu)$, denoted $C(U, \mu)$. The above pair of conditions implies that $U(\mu_0)$ is in the interior of $C(U, \mu)$, hence there is a mechanism that implements a Bayes-plausible convex combination of payoffs in posteriors, $U(\mu)$, such that $E_r U(\mu) > U(\mu_0)$. This process of concavification has been used in a variety of similar communication contexts, e.g., in Brocas and Carillo (2007).

One option to avoid an inconvenient step-wise indirect utility is to add more structure to the problem. Another option is to let the policy-maker’s optimal policy be stochastic in posteriors on fundamentals (Dahm and Porteiro, 2008a). Suppose the states of the world are characterized by two independent dimensions, a fundamental dimension $\theta$ and a policy-maker’s type $r$ (e.g., ideology, risk aversion, or relative weights attached to contributions). The policy-maker type is private information that only influences $v(\cdot)$, but no other payoff, and the policy-maker cannot communicate his/her type. A persuasion mechanism is invariant to the policy-maker’s type, hence implies a distribution of posteriors where the densities are constant in the type-dimension, and we may let $\mu(\theta) := \mu(\theta, r)$. Then, discontinuity in $U(\mu)$ may disappear, since each $d^*(\mu(\theta))$ is constructed as an expected policy from a distribution of policy-maker types, not as a (deterministic) policy of a single policy-maker with a known
As a result, the concavity and convexity of the shape of the distribution of policy-maker types becomes the third parameter that affects whether a lobbying mechanism is desirable. In our special setting, with a parameter \( r \in [0, 1] \), suppose that the policy-maker’s payoffs from ‘fitting’ the right policy are \( v(d_l, \theta_l) = r \) and \( v(d_l, \theta_h) = 1 - r \). The payoffs from a policy mismatch is normalized to zero, \( v(d_l, \theta_h) = v(d_h, \theta_l) = 0 \), and the default policy \( d_0 \) also imparts only zero. Thus, \( d^*(\mu, r) = d_l \) if \( \mu \leq r \) and \( d^*(\mu, r) = d_h \) if \( \mu \geq r \). Then, with any distribution of the policy-makers types \( F(r) \), the lobby’s expected payoff is \( U(\mu) = \Pr(d_h) = \Pr(r \leq \mu) = F(\mu) \). As a result, the value of the persuasion mechanism depends only on concavities and convexities in the distribution \( F(r) \). By this reasoning, it is immediately clear that Dahm and Porteiro’s (2008a) results crucially hinge on the risk-neutrality that is imposed by the assumption of a uniform distribution of the policy-maker’s types, \( F(r) = r \).^6

### 3.2 Players’ instruments and commitments

To start with, Table 1 shows a generalized timeline that serves as a useful organizing principle.

| \( t = 0 \) | Policy maker | Contest or auction rules |
| \( t = 1 \) | Lobby | Platform announcement |
| | | Signal/search and/or message technologies |
| \( t = 2 \) | Nature | State of the world \( \theta \) |
| \( t = 3 \) | Lobby | Costly action or access fee |
| | | Decision to search |
| \( t = 4 \) | Nature | Signals/evidence produced |
| \( t = 5 \) | Lobby | Communication |
| | | Costly action, contribution |
| \( t = 6 \) | Policy maker | Policy \( d \) |

In any lobbying game, stages \( t = 2, 5, 6 \) are always present. Beliefs updates are straightforward. Only in \( t = 3 \), we classify into cases with privately fully informed, partially informed, and non-informed lobby.

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^6 The assumption of the uniform distribution of the policy-maker’s types is also present in the literature on the communication design. Rayo and Segal (2010) manage to characterize several properties of the optimal communication mechanisms under special assumptions that the policy-maker’s action space is binary (\( \{d_l, d_h\} \)) and that the policy-maker’s action is affected by noise to the policy-maker’s values, and the noise has a uniform distribution.
3.2.1 Lobby’s instruments

In this review, we restrict our attention only to instruments that target a single policy-maker and policies that differ only in substantive content, not in other aspects such as durability (c.f. Harstad and Svensson, 2011). The literature predominantly identifies five instruments of the lobby’s political influence:

- **Commitment to a platform.** If the right to set a policy is sold or auctioned to a single winner, then the competing lobbies may commit to a platform that will be implemented, conditional on winning the right. Of course, this strategic instrument never stands alone, and exists only along with the instrument that is used to win the right (typically a rent-seeking investment or payment to the policy-maker).

- **Mechanism selection.** Kamenica and Gentzkow (2011) and in a more narrow setup also Rayo and Segal (2010) study the lobby’s choice from a class of communication mechanisms only subject to Bayes-plausibility. In other words, this involves that the lobby is selecting a signal technology and, at the same time, is making a commitment to a message technology that maps signals into messages.\(^7\) These are two choices at the same time. Therefore, it is also possible to study in isolation a pure effect of signal technology selection and a pure effect of commitment to a message technology. For instance, the lobby’s partial commitment to a message technology but not signal technology implies that pooled signals cannot be unbundled, hence there exists an upper (but not lower) bound on the lobby’s discretion over the level of informativeness (in the sense of garbling order) of the messages.

- **Costless communication.** As we have discussed, communication (or persuasion) is presenting the admissible messages. In cheap-talk games, messages are unverifiable, hence any message is admissible. In persuasion games, messages are verifiable, but presented evidence may be affected by strategically communicating incomplete evidence. Normally, the concealed evidence is not used any further. An exception is Stone (2011) who argues that concealed evidence may be put into the public domain. Therein, the evidence is only randomly observed by the policy-maker, but the policy-maker is not able to recognize the source of the evidence.

- **Costly action.** The cost of the action serves as a signal. In pure signaling settings (money-burning), the action has a pure signaling function. In pre-paid communication, the costly action (payment) has an additional function of securing access. Thus,

\(^7\)In a follow-up article, Gentzkow and Kamenica (2011) extend the mechanism selection problem by considering multiple senders. An individual lobby is allowed to select from any signal technology such that its signals will be arbitrarily correlated with signals of the other lobbies. This assumption however rules out idiosyncratic noise: to determine arbitrary levels of correlations, there must be a common underlying noisy variable from which messages are mapped.
communication is complementary to the costly action. Such communication is normally not verifiable. Verifiable messages are present only in two-level ‘pay-and-lobby’ games by Austen-Smith (1998) and Cotton (2009). An interesting observation is that verifiability does not improve information transmission. First, we know that under well-behaving monotonic preferences, endogenously determined costly signals lead to separation and truthful revelation even in the absence of subsequent messages. Also in Cotton (2009), the lobbies’ endogenously determined payments for access fully reveal their evidence even before they are allowed to present the evidence to the policy-maker. The policy-maker thus infers the correct posteriors of the winner’s type from the level of contributions, and verification serves only as a confirmatory check.

- **Evidence production (search).** For a search, its observability is crucial. With an observable search, a no-search subgame is isolated from the subgame containing signals produced by the search. In contrast, unobservability brings in at least three effects: (i) First, the set of multiple equilibria tends to enlarge. (ii) Second, the policy-maker knows that an extra search is opportunistic (to get better evidence and hide bad evidence), hence anticipates a moral hazard. The equilibrium amount of the search tends to increase. (iii) Third, the lobby may be subject to a pessimistic policy-maker’s expectations, called the ‘curse of lobbying’ or ‘trap of information acquisition’, which depresses the lobby’s value of the persuasion mechanism even below zero (Lagerlöf, 1997). The search is unobservable in the presence of monitoring barriers on the policy-maker’s side and the lack of credible reporting on the lobby’s side. Of course, search is never present alone, and must be complemented by communication of search outcomes by means of messages or direct observability of the signals.

- **Contributions.** One of the main properties of contributions is whether the payments are contingent upon a policy, rent, or any other observable variable. (Equivalently, the property states whether an upfront-paid contribution is reversible or irreversible.) We can identify four forms of payments, each corresponding to a different mechanism: (i) Policy-contingent compensation in the bargaining stage or in menu auctions. Notice that the shape of the marginal cost of compensation affects concavity vs. linearity in $U(\mu)$ in search games with ex post contributions. For example, Dahm and Porteiro (2008b) have an increasing marginal cost thus additional local concavity, whereas Bennedsen and Feldman (2006) assume a constant marginal cost. (ii) Bids in standard auctions that are paid only by winners. (iii) Investments in a contest for a policy rent or policy-maker’s attention. These payments are irreversible hence not contingent. (iv) Tickets for access which are by definition irreversible payments. Access tickets serve also an informational

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*For the sake of interpretation, it is worth mentioning that with a single-type lobby, unobservability only matters in the construction of the equilibrium, since any lobby’s action is correctly inferred and expected in the equilibrium.*
role of an indirect message in the context of two-level pay-and-lobby games. It is thus a transfer of both money and information from the lobby to the policy-maker.

### 3.2.2 Lobby’s commitments

Commonly, the lobby has significantly less commitment devices at his/her disposal than the policy-maker. Still, three types of the lobby’s commitments can be found in lobbying models. The first is a commitment to a *policy-contingent payment* that appears in a menu auction (Bennedsen and Feldman, 2006). In Tovar (2011), the payment is also contingent upon the state of the world, and a *state-and-policy-contingent payment* represents the strongest type of the lobby’s commitment to an ex post payment. Notice that in an unregulated environment, the lack of the lobby’s commitment to pay ex post could theoretically be replaced by a commitment by the policy-maker to return up-front payments to losers.

In contests, a winner normally realizes his or her first-best policy. Thus, the second type of the lobby’s commitment is when contestants commit to realizing a certain compromising outcome (*policy/platform commitment/announcement*). This commitment strategically decreases the opponents’ valuations. Epstein and Nitzan (2004) show in a spatial setting that if valuations are endogenous due to the option of policy commitments, the moderation of the aggressiveness of the opponent is a first-order effect to the loss of value from deviating from its own first-best policy. Münster (2006) generalizes by showing that moderation is incomplete for imperfect discrimination and complete for perfect discrimination.

Finally, we have discussed the lobby’s choice from a class of communication mechanisms (Kamenica and Gentzkow, 2011; Rayo and Segal, 2010). In such a case, the lobby is selecting a *signal technology* and, at the same time, is making a commitment to a *message technology*. Whether this type of the commitment is present in lobbying is open to discussion. Ray and Segal (2010) motivate the commitment by viewing the sender (i.e., the interest group that lobbies) as a long-run player facing a sequence of short-run receivers (i.e., the policy makers). In such a repeated game, learning arguments support the idea that a patient long-run player is able to develop the Stackelberg leadership. Hence, the commitment seems reasonable to capture long-term interaction of well-organized and stable interests (e.g., unions and corporations) and more volatile decision-makers (e.g., individual legislators with weaker party affiliations).

The commitment makes a major difference to standard communication (cheap talk, persuasion) where message technology is set to be *ex-post optimal*, not *ex-ante optimal*. The difference naturally leads to a contrasting comparative statics. For instance, in cheap talk, there is more communication if preferences of the lobby and the policy-maker are aligned. This is generally not the case when the communication mechanism is set ex ante. Nevertheless, an ex ante optimal mechanism frequently comprises ex post optimal messages. Gentzkow and Kamenica (2011) show that a fully-revealing message technology is credible if messages are verifiable in the sense of disclosure/persuasion games (Milgrom 1981). In other words, un-
der verifiability assumption, the presence or absence of the lobby’s commitment to a message technology plays no role.

### 3.2.3 The policy-maker’s objectives

The first generation of rent-seeking contests limited the policy-maker’s role to only the distribution of the prize in accordance with the rules of the CSF. However, an idea implicit in rent-seeking is that the policy-maker intentionally generates contest prizes because he or she values the benefits associated with the rent-seeking investments. The early contest literature thus focused on contest design, but only for a purely revenue-oriented policy-maker.

To make the policy-maker’s decision-making more realistic, one may postulate a policy-maker with a mixed objective who shapes the parameters of the contest. An additional choice of such a policy-maker is to determine whether to use the contest at all or whether to hand out the prize to the highest-valuation group (Epstein and Nitzan, 2006). For a mixed-objective policy-maker, another relevant strategic instrument is the presence of policy restrictions that bind the contest winner, change contestants’ valuations, and also their efforts. To sum up, before initiating a contest a mixed objective policy-maker solves a number of tradeoffs that are otherwise absent for a purely revenue-oriented policy-maker.

A mixed objective is not only present in contests, but also in menu-auction, pay-for-access models, and naturally takes place in bargaining between the lobby and policy-maker. For strategic information transmission per se, contributions are not present, and the tradeoff between policy and revenue does not exist. However, in multiple-means models that apply information transmission at an early stage, the exact shape of the policy-maker’s motivation plays a significant role for the design of contributions schemes. The key issue is how to structure the interaction to both extract information and collect payments for a mixed-objective policy-maker. This topic is now at the frontier of research interest. For example, Cotton (2011) identified the optimal contest for the policy-maker’s attention for lexicographic preferences that value revelation first and payments second.

### 3.2.4 The policy-maker’s commitments

The literature frequently constrains the policy-maker in interactions with lobbies, hence either explicitly or implicitly assumes commitment devices. The most complex is commitment to the rules of a contest, including the promise of using the specific CSF, the promise to distribute the prize (e.g., not to sell only an agenda or access instead of policy), the promise not to initiate separate bilateral bargaining with additional side-payments, and the promise to enforce set policy restrictions prior to the contest. The incentive of the policy-maker to break a promise then varies in parameters. Consider three examples:

1. Cotton (2009) lets the policy-maker choose ex ante from two different classes of all-pay auctions. In one, the right to set policy is sold, and in the other, it is access that is
sold. Both are organized exactly in the same way and differ only in the last moment, after payments are collected. Therein, the policy-maker has an incentive to switch from policy-sale rules to access-sale rules because it implies a policy improvement without extra cost.

2. The promise to sell policy may be ex post suboptimal if payments reveal additional information. Consider a symmetric setting with two lobbies and multiple policy choices in the spirit of Bennedsen and Feldman (2006). If two oppositely extreme groups offer similar amounts, then the policy-maker updates priors very little and prefers the neutral default policy over the lottery of extreme policies. The rules of the policy sale, however, dictate making one of the groups the buyer of the policy who realizes his or her preferred policy. (See also Section 3.3.5 on the role of default policy.)

3. Time-inconsistency may also be present when the policy-maker sets an agenda in Stage 1 (Epstein and Nitzan, 2006b). The policy-maker thereby restricts the policy set of the winner of the contest and thereby changes valuations and efforts. Once the winner is determined, the policy-maker may have an incentive to lift the restriction and extend the reduced agenda set so that the contest winner can set a better policy both for him/herself and the policy-maker.

In communication literature, the commitment power of the policy maker to follow a certain action after a certain message is given is normally missing. The idea is that executive policy discretion is very hard to be restrained, and it is also difficult for the policy-maker to restrain himself or herself from the acquisition of ex post valuable information. The presence of such a commitment would substantially alter the game; normally, the policy-maker could commit to skeptical behavior that would force the lobby to exert additional effort. Nevertheless, there are settings where the commitment actually makes no difference. In a simple setup with partial verification, Glazer and Rubinstein (2004) identify the policy-maker’s optimal communication mechanism. The optimal mechanism is set such that it minimizes the policy-maker’s probability of mistake subject to three elements: (i) the set of admissible messages of the lobby, (ii) which messages will be verified, and (iii) the policy-maker’s action based on the messages and verification results. In the end, the optimal mechanism is credible, hence the lobby’s optimum is to induce such policy-maker’s beliefs that make it optimal for the policy-maker to follow exactly the prescribed mechanism.

This shows that communication literature consider at least the policy-maker’s commitment to verification, including random auditing (Cotton, 2011). Consider pay-for-access models, where lobbies truthfully reveal evidence by contributions because their equilibrium expectations involve that verification will be undertaken with certainty (Cotton, 2009). If verification is costless for the policy-maker, then a commitment to verification is not necessary. But, costless verification is at odds with the assumption that access is rationed due to limited (costly)
attention. In contrast, if verification is costly, then ex post verification is time-inconsistent and an announcement to verify must be binding the policy-maker.

If policies are generally considered discretionary, where is the source of commitments? The existence of the policy-maker’s commitment may be partly explained by strategic delegation to intermediaries such as aides and lobbyists. Specifically for contests with imperfect discrimination, there have been several attempts to build microfoundations for an imperfectly discriminating CSF. Konrad (2009) recognizes three derivations of microfoundations for CSFs: (i) axiomatic, (ii) stochastic, and (iii) innovation-race based. The stochastic derivation is mostly a product of the imperfect monitoring of contributions (Jia, 2008). In an innovation race, the CSF emerges because a valuable skill that is rewarded by the policy-maker is acquired randomly. Apparently, there is no fundamental difference between the two explanations: In either case, the players’ efforts are subject to a shock, either to the perception of the efforts (imperfect monitoring) or to the production of the efforts (innovation race).

### 3.2.5 The policy-maker’s environment

The policy-maker may be restricted not only by its commitments but also by regulations dictated by the exogenous environment. For example, the policy-maker may be subject to the mandatory disclosure of private information which affects equilibrium bids of lobbies in menu auctions. Felgenhauer (2010) examines information asymmetry where it is the government or bureaucracy that disposes of private information, and competing lobbies engage in menu auction contributions. From the policy-maker’s perspective, the regime of secrecy (no mandatory disclosure of the policy-maker’s information) is preferred to transparency as it raises the expected equilibrium bids; hence transparency must be imposed by regulation. From the social point of view, however, transparency is preferred only if lobbies are sufficiently similar, hence their equilibrium bids do not change the policy-maker’s default policy, which by assumption is the socially first-best policy. If lobbies are sufficiently asymmetric, transparency cannot protect the default policy. In contrast, secrecy provides partial protection to the default policy, since it involves mixed strategies where a default policy is realized with a positive probability.

### 3.3 Production and communication of evidence

Communication starts with common priors $\mu_0$ and $\theta \in \Theta$ selected by Nature. Then, we have to distinguish between models with pure communication and models of search and communication. For pure communication, the lobby exogenously acquires the private signal and a persuasion mechanism directly applies. In search and persuasion models, the lobby makes a decision of whether to acquire a signal or not, and then communicates. Notice that with common priors, the observable lobby’s decision to acquire or not to acquire a signal cannot affect the policy-maker’s beliefs. Only with asymmetry, search has a signaling effect upon
the policy-maker’s posteriors. This asymmetry is not present if only a single search is made, but with a sequence of searches, the signaling effect of search per se is in place. To our best knowledge, models with a signaling role of search decisions are yet to be built.

### 3.3.1 Communication mechanism

A persuasion mechanism is a combination of *signal* and *message technologies*. The *signal technology* is a family of distributions \( \{ \pi(s|\theta) \}_{\theta \in \Theta} \) over \( S \), where a signal realized is \( s \in S \). A *message technology* is the other component of the persuasion mechanism. For messages \( m \in M \), it involves a family of cost functions \( c(\cdot|s) \), where the cost of message \( m \) after observing \( s \) is \( c(m|s) \in R^+ \cup \infty \). Often, \( M = P(\Theta) \), where \( P(\Theta) \) is the set of all subsets of \( \Theta \).

Notice how restrictions on message costs serve to define verifiability. In cheap-talk games, the cost is zero (or constant), hence signal-independent. For persuasion with verifiable evidence (Milgrom, 1981), the signal is perfectly informative, the message space is \( M = P(\Theta) \), the message cost is constant if the lobby does not explicitly lie (\( s \in m \)) and infinity for an explicit lie (\( s \in \neg m \)). In an honest mechanism, the lobby must tell the ‘whole’ truth, and nothing but the truth, hence the cost is constant only if the whole truth is revealed (\( s = m \)), and is infinity otherwise (\( s \neq m \)). This can be also interpreted such that the signal is directly observable by the policy-maker without need for additional messaging.

How to interpret messages? Traditionally, messages are assumed to have a literal meaning. In cheap-talk, signal technology is perfectly informative for the lobby but it is also assumed that a signal does not involve observable evidence (e.g., logical arguments or documents that cannot be fabricated). Hence, the set of admissible messages is unrestricted. In disclosure/persuasion games, a signal involves observable evidence. The existence of the observable evidence makes the messages verifiable, and the set of admissible messages (i.e., those message that pass the burden of proof) becomes signal-dependent. In such games, notice that a standard message set also includes an ‘empty message’ defined as the message that implements priors.

Ascribing literal meaning of messages has tremendous consequences with respect to how out-of-equilibrium messages are interpreted by the policy-maker. Consider a case when a privately informed lobby sends an unused out-of-equilibrium message with the following meaning: “The world is of type \( \theta \in K \).” Now, if the message is taken literally by the policy-maker, then he or she would implement policy \( d(\mu(K)) \). If the lobby’s payoff would increase with the policy \( d(\mu(K)) \) and this increase would be only for \( \theta \in K \), then an equilibrium would not be *neologism-proof* (Farell 1993) and the refinement of neologism-proofness would dictate to eliminate this equilibrium. Nevertheless, the disadvantage of neologism-proofness is that it refines away all equilibria in many settings, including cheap talk, and lacks general existence properties (Sobel 2010).

We have also argued that payments in signaling and screening models (costly actions) serve as messages, albeit indirect ones. There are however differences. These actions typically do
not involve conveying messages with a literal meaning, except for some campaign statements. Thus, verifiability issue cannot arise, and the cost of sending the message cannot be interpreted as a lying cost, but only as an opportunity cost of productive factors (time, money and effort) put into signaling or screening.

### 3.3.2 Search (evidence production) technology

In classic information transmission setups, involving cheap talk and persuasion games, the lobby exogenously receives a perfectly informative private signal, and the setting can be studied as a case of pure asymmetric information. A different case is when the lobby has no information and must invest in a signal. In particular, two major signaling technologies (a.k.a. search/evidence-production/investigation functions) appear in the literature:

- **Hard evidence.** Signal space includes only two outcomes, truth and no-evidence. For $s = \emptyset$, the only admissible message (not infinite cost) is $m = \emptyset$. For $s = \theta$, the set of admissible messages is $\{\theta, \emptyset\}$. Thus, hard evidence cannot be fabricated, but unfavorable evidence can be presented as a lack of evidence. This setting is also used in search models that use contest with evidence (Lagerlöf, 2007). Signal distributions normally feature a common precision level, $\pi(\theta|\theta) = \omega \in [0, 1], \theta \in \Theta$. Thus, in our special case, ex ante probabilities of the realizations of signals $(\theta_l, \emptyset, \theta_h)$ are $(\omega(1 - \mu_0), 1 - \omega, \omega \mu_0)$.

- **Noisy signals.** Signal space does not include no-evidence, but rather noise over all states of the world, $S = \Theta$. In our special case, let a common precision again be $\pi(\theta|\theta) = \omega \in [0, 1]$. The ex ante probabilities of $(\theta_l, \emptyset, \theta_h)$ are now $(\omega(1 - \mu_0) + (1 - \omega)\mu_0, \omega \mu_0 + (1 - \omega)(1 - \mu_0))$. (See also Brocas and Carrillo, 2007.)

Hard evidence is not necessarily the preferred evidentiary structure for the lobby. Consider our setup where the policy-maker has symmetric preferences and symmetric priors $\mu_0 = \frac{1}{2}$, hence selects $d^*(\mu) = d_l$ if $\mu < \frac{1}{2}$ and $d^*(\mu) = d_h$ if $\mu > \frac{1}{2}$. Recall that the lobby’s expected payoff is defined by the probability of getting a favorable policy $d_h$, $\Pr(d_h)$. For both evidentiary structures, the probability of getting a favorable policy is equal to the probability of delivering favorable evidence, $\Pr(d = d_h) = \Pr(s = \theta_h)$, and the probability of getting an unfavorable policy is equal to the complementary probability, $\Pr(d = d_l) = \Pr(s \in \{\theta_l, \emptyset\}) = 1 - \Pr(s = \theta_h)$. This is because the relevant posterior associated with the favorable evidence satisfies $\mu_h \geq \frac{1}{2}$ (i.e., $d_h$ is implemented), and the relevant posterior associated with unfavorable evidence satisfies $\mu_l \leq \frac{1}{2}$ (i.e., $d_l$ is implemented). Thus we may compare the structures by studying only the probability of delivering favorable evidence.

For a search with hard evidence, there are three outcomes $(\theta_l, \emptyset, \theta_h)$ with probabilities $(\frac{\omega}{2}, 1 - \omega, \frac{\omega}{2})$. The unfavorable evidence $\theta_l$ is concealed, and the reported outputs are $(\emptyset, \theta_h)$, …
with probabilities \((1 - \frac{\omega}{2}, \frac{\omega}{2})\). For a noisy signal, there are two outcomes \((\theta_l, \theta_h)\) with probabilities \((\frac{1}{2}, \frac{1}{2})\), and both are disclosed. As a result, the lobby’s expected payoffs in the two structures are \(\frac{\omega}{2} \leq \frac{1}{2}\), and the noisy technology is relatively superior to the hard-evidence technology.

### 3.3.3 Quality of search

Often, the lobbyists select from the family of evidence-production functions with different precisions \(\omega\), where a cost function \(C(\omega)\) is convex. The selected precision level may be the lobby’s private information. Interestingly, in contests, the quality of the signal is not only subject to the lobby’s choice, but may also be \textit{strategically distorted} by the policy-maker. The distortion can be introduced through the delegation of judgment over the lobbying effort to a staff member who commits systematic errors. This echoes the discussion on the stochastic foundations for CSFs, where the low elasticity of the prize to relative effort may be due to noise about lobbyists’ efforts. In the case of persuasion contests, the effort is represented by the quality of lobbied evidence, and it is the policy-maker’s processing of the evidence which decreases the precision of the evidence.

Another issue is whether quality can be interpreted interchangeably as quantity. Lagerlöf (2007), Dahm and Porteiro (2008a) and Henry (2009) interpret the level of precision as \textit{the amount} of lobbying, hence their setups make no distinction between the two aspects. The difference might actually be suppressed for private tests (or an unobservable search), where the outcomes of a search can be jammed into a single message. However, with public tests or observable (repeated) searches, quantity and quality are different features. For example, Brocas and Carrillo (2007) characterize the optimal stopping rule in the flow of public signals (i.e., the optimal quantity) as a function of the quality of a single signal.

### 3.3.4 Private or public search

The literature differentiates between a \textit{private} test/search and \textit{public} test: For a private search, it is possible to withhold evidence and report an empty message. The observability of a search then makes a difference. With an \textit{observable search}, the policy-maker interprets an empty message as both an unsuccessful search (no evidence) and concealed evidence. With an \textit{unobservable search}, an empty message covers not only two but three events at the same time: no search, search without evidence, and search with unfavorable evidence.

When the test is public, evidence cannot be withheld. Imposing a public test (or mandatory disclosure rule) makes not only the search outcome, but also the search itself observable. Thus, analyzing the effect of the public test relative to the private test crucially depends on whether we start with an observable or unobservable search. With an \textit{observable search}, introducing the public test only separates unfavorable evidence from no-evidence. With an \textit{unobservable search}, the public test separates no-search, no-evidence, and unfavorable evi-
dence, and the effects of mandatory disclosure are therefore more complex.

3.3.5 The role of empty messages

The literal meaning of an empty message, \( m = \emptyset \), is to say nothing but confirm priors. In the absence of a search, an empty message is just one of all messages. With a search and private test, four options arise for the interpretation of the empty message:

1. The absence of a no-evidence search outcome \( (\emptyset \in \neg S) \) – observable search: This is a standard persuasion game preceded by a search in an early stage, where \( M = P(\Theta) \). Under verifiability, an empty message has a zero strategic effect, since full disclosure appears (Milgrom, 1981; Henry, 2009). The idea is that unless private evidence is the worst possible, it is ex post better to separate oneself from all types with worse evidence and pool with all types of better evidence. This ‘sharpening’ of the messages ultimately leads to the full revelation of the truth.

2. The absence of a no-evidence outcome – unobservable search: An empty message is now used to conceal unfavorable evidence behind a no-search. For example, in Henry (2009), all positive signals are reported, all negative signals are withheld, and the Receiver (policy-maker) understands that the hidden signals are negative. The revelation is incomplete, because the number of positive signals only probabilistically indicates the number of negative signals.

3. The no-evidence outcome \( (\emptyset \in S) \) – observable search: In addition to unfavorable evidence, an empty message now also captures the existence of a no-evidence outcome. Again, the empty message is ex post always used strategically to conceal bad evidence, namely to conceal bad evidence behind no evidence.

4. No evidence – unobservable search: In this most complex case, an empty message jams together no-search, unfavorable evidence, and no-evidence.

We have seen that the empty message especially interacts with the no-evidence search outcome. One effect of having an admissible empty message in the presence of the no-evidence outcome is to bring asymmetry into an otherwise symmetric model. Let us return to a comparison of hard-evidence vs. noisy signal technologies. Consider our special case with a symmetric prior \( \mu_0 = \frac{1}{2} \). Start with an observable search for hard evidence with a no-evidence outcome, where the precision level is \( \omega \in [0, 1] \). The search delivers one of three outcomes, \( s \in \{ \theta_l, \emptyset, \theta_h \} \). The lobby discloses only two outcomes, \( m \in \{ \emptyset, \theta_h \} \): unfavorable evidence is hidden by showing no evidence, \( m(\theta_l) = \emptyset \). The unconditional probability of obtaining no evidence is \( \Pr(\emptyset) = 1 - \omega \).

By Bayes rule, the relevant posteriors are written \( \mu_\emptyset := \Pr(\theta_h|\emptyset) = \frac{1-\omega}{2-\omega} \in (0, \frac{1}{2}) \) and \( \mu_h := \Pr(\theta_h|\theta_h) = 1 \). This creates asymmetry in posteriors \( (\mu_\emptyset, \mu_h) \) around the prior \( \mu_0 = \frac{1}{2} \).
The asymmetry is important if there is a default policy $d_0$ that serves as the policy-maker’s insurance against extremes, for instance by providing a state-invariant payoff. In our setting specifically, it is important whether the posterior $\mu_0$ implements a default policy, $d^*(\mu_0) = d_0$, or not. If so, then the default policy fully absorbs (neutralizes) the indirect cost of a search associated with posteriors at an empty message, which makes the value of a search positive for the lobby.

In contrast, for a noisy search without a no-evidence outcome, a search leads to two outcomes. The relevant posteriors are $(\mu_l, \mu_h) = (\text{Pr}(\theta_h|\theta_l), \text{Pr}(\theta_h|\theta_h)) = (1 - \omega, \omega)$. With symmetric neutralization around $\mu_0 = \frac{1}{2}$, either both posteriors are neutralized, $d^*(\mu_l) = d^*(\mu_h)$, or none of the posteriors are neutralized, $d^*(\mu_l) \neq d^*(\mu_0) \neq d^*(\mu_h)$. Unlike for a hard evidence search, a noisy search (where errors are symmetric) is either uninformative or the indirect search cost cannot be absorbed. In contrast to the comparison in Section 3.3.1, this particular aspect makes noisy technology relatively inferior to the hard-evidence technology.

4 Selected topics

4.1 To lobby or not to lobby

4.1.1 Single lobby

In the context of a single lobby that conducts an observable search, so far we have stressed that the key determinant is the shape of the lobby’s expected indirect utility in posteriors, $U(\mu)$. The shape is derived differently with and without subsequent contribution subgames. In the absence of contribution subgames, this indirect utility is derived from the policy-maker’s policy decision based on his or her upper envelope of the expected utilities of all policies, evaluated at the respective posterior. The existence of policy-switches in $\mu$ makes the shape of the lobby’s expected indirect utility generally ambiguous. Specifically, conflicting preferences between the policy-maker and lobby imply that the lobby’s utility is step-wise at the critical posteriors (i.e., at levels that make the policy-maker change his or her optimal policy), which implies that the utility is neither convex nor concave. With a larger number of policies, the number of policy-switches increases and complexity grows. For instance, some differences between Dahm and Porteiro (2008b) and Bennedsen and Feldman (2006) stem only from the fact that the former have two policies and a single policy-switch, while the latter allows for three policies and two policy-switches.

With steps in $U(\mu)$, an important variable for the decision to lobby is the relative position of the priors to the critical level of posteriors. In our symmetric setting with two policies $\{d_l, d_h\}$, the policy-maker selects $d^*(\mu) = d_l$ if $\mu < \frac{1}{2}$ and $d^*(\mu) = d_h$ if $\mu \geq \frac{1}{2}$; the critical posterior that defines a policy-switch is $\bar{\mu} := \frac{1}{2}$. The incentive to lobby can be found either directly (by calculating expected payoffs) or indirectly (by checking concavity or convexity at the prior level). First, if $\mu_0 > \bar{\mu}$, the lobby never has a strict incentive to lobby since the
default policy \( d_h \) is his/her first-best policy. Alternatively, we may say that a search brings a negative expected payoff because of concavity at point \( \mu_0 \) over alternatives \((\mu_\varnothing, \mu_h)\), where \( \mu_\varnothing \) is the policy-maker’s posterior for an empty message \( m = \emptyset \), and \( \mu_h \) is the policy-maker’s posterior for the message \( m = \theta_h \). On the contrary, if \( \mu_0 < \overline{\mu} \), then the lobby’s search for hard evidence with success rate \( \omega \) implies \( \mu_h = 1 \), policy \( d^*(\mu_h) = d_h \), and gain 1, all with probability \( \omega\mu_0 \). With probability \( 1 - \omega\mu_0 \), an empty message is presented, and the posterior is \( \mu_\varnothing = \frac{(1-\omega)\mu_0}{1-\omega\mu_0} < \mu_0 < \frac{1}{2} \). This implies policy \( d^*(\mu_\varnothing) = d_l \), and zero gain. As a result, the lobby’s expected payoff is \( \omega\mu_0 \geq 0 \), and the lobby always lobbies. Notice also that the positive expected payoff of a search is equivalent to convexity at point \( \mu_0 \) over \((\mu_\varnothing, \mu_h)\).

With subsequent contribution subgames, the policy-maker’s policy choice in each posterior is affected by contributions offered by the lobby, and the structure of the interaction can be modeled as non-cooperative bargaining. Therein, the additionally important aspects are the existence of surplus, bargaining powers, and transaction costs. Consider our special case and let the policy-maker have value \( \alpha r > 0 \) from correctly fitting a \( d_l \) policy with state \( \theta_l \), and \( \alpha(1 - r) > 0 \) from correctly fitting a \( d_h \) policy with \( \theta_h \), where \( \alpha r > 1 \). Payoffs from misfits are normalized to zero. Without contributions, the critical level for a policy-switch is \( \overline{\mu} := r \).

We observe that \( d^*(\mu) = d_l \) if \( \mu < \overline{\mu} \) and \( d^*(\mu) = d_h \) if \( \mu \geq \overline{\mu} \). To change a policy from \( d_l \) to \( d_h \), the policy-maker has to be compensated by at least \( \max\{0, \alpha(r - \mu)\} \), hence the total surplus from the policy change is \( S(\mu) := 1 - \alpha(r - \mu) \). If \( S(\mu) \leq 0 \), there is no compensation.

The critical level for compensation to be feasible for the lobby is at \( \mu := \frac{\omega\mu_0}{\alpha} \). Thus, with contribution subgames, we have (i) no compensation for \( \mu \in \left[0, \mu_\varnothing\right) \), (ii) positive compensation for \( \mu \in \left[\mu_\varnothing, \overline{\mu}\right) \), and (iii) no compensation for \( \mu \in \left[\overline{\mu}, 1\right] \).

Let \( \hat{U}(\mu) \) be the lobby’s equilibrium payoff in the contribution subgame. First, see that \( \hat{U}(\mu) \geq U(\mu) \) since a non-contribution subgame that does not affect the policy-maker’s posteriors can always be chosen by the lobby. Second, we have (i) \( \hat{U}(\mu) = U(\mu) = 0 \) for \( \mu \in \left[0, \mu_\varnothing\right) \), (ii) \( \hat{U}(\mu) \in [0, 1] \) for \( \mu \in \left[\mu_\varnothing, \overline{\mu}\right) \), and (iii) \( \hat{U}(\mu) = U(\mu) = 1 \) for \( \mu \in \left[\overline{\mu}, 1\right] \).

Now, examine the shape of \( \hat{U}(\mu) \) in detail. Unless the policy-maker extracts a full surplus, we have \( \hat{U}(\mu) > 0 \) for intermediate beliefs \( \mu \in \left[\mu_\varnothing, \overline{\mu}\right) \). Since zero surplus exists at low beliefs, we have, around \( \mu = \mu_\varnothing \), and there are points at which \( \hat{U}(\mu) \) is convex. If the lobby can extract either some but not all surplus, then \( \hat{U}(\mu) < 1 \) for all intermediate beliefs. Thus, at \( \mu = \overline{\mu} \), there is a step in \( \hat{U}(\mu) \). Therefore, in the neighborhood of \( \overline{\mu} \), there are points where \( \hat{U}(\mu) \) is concave. In other words, unless the lobby extracts full surplus, the step in the lobby’s indirect utility exists both with and without contributions. Bennedsen and Feldman (2006) serve as a good example of how these problems are suppressed: The extra risk-proclivity associated with zero surplus around \( \mu \) is entirely avoided by assuming a positive surplus for all posteriors. Secondly, the convexity around \( \overline{\mu} \) is eliminated by vesting the lobby with full bargaining power.

Alternatively, Dahm and Porteiro (2008a,b) construct the contribution subgame as a unilateral purchase of extra pressure. They start with the policy-maker who is expected to
set policy $d_h$ with probability $\mu$. (This is the outcome of having a stochastic policy-maker and a uniform distribution of the policy-maker’s types, $F(r) = r$.) Hence, in the absence of contributions, $U(\mu) = \mu$, and the lobby is risk-neutral. Their novelty is that extra pressure $\pi \in \mathbb{R}^+$ can be purchased at a constant cost $c > 0$. The pressure modifies the posteriors over the states. Specifically, the total ‘evidence’ in favor of $\theta_h$ is $\mu + \pi$, and total ‘evidence’ in favor of $\theta_l$ is $1 - \mu$. As a result, $\hat{U}(\mu) = \Pr(d_h) = \frac{\mu + \pi}{1 + \pi}$.

Solving for equilibrium pressure, $\pi^\star(\mu)$, we find that pressure decreases and is concave in the posterior $\mu$, and the expected lobby’s utility is surprisingly convex in the posterior. A lobby becomes risk-loving, independently of the level of posteriors. This modeling of the contribution/pressure subgame nevertheless has a few drawbacks, including a lack of foundations for the selected functional form and extreme sensitivity to the distribution of policy-maker types (as discussed in Section 3.1). Moreover, consider the presence of counteractive lobbying: If two competing groups have identical pressure technologies and valuations, then their equilibrium marginal returns from pressure investments ($\pi_1^*, \pi_2^*$) must be identical, hence the levels of presented evidence must equal, $\mu + \pi_1^* = 1 - \mu + \pi_2^*$, and the posterior equilibrium is $\frac{1}{2}$. Each group’s share of the prize is one half, and the expected payoff of a search for each lobby is linear in the posteriors. As a result, each lobby remains risk-neutral.

To sum up, lobbying by means of search and subsequent persuasion tends to occur with (i) a low search cost, (ii) large bargaining power of the lobby in the contribution subgame, (iii) an unfavorable status quo that increases gains in the case of success and lowers the indirect cost of a search, and (iv) large stakes. In general, however, the decision to lobby depends on whether convexities appear in $\hat{U}(\mu)$ in relevant posteriors.

4.1.2 Multiple lobbies

With a competition of heterogeneous lobbies, the participation decision of individual lobbies and the aggregate level of lobbying are potentially separate issues. A parametrical change that motivates one player to increase lobbying may decrease the overall lobbying activity, and vice versa. To start with, focus on the results achieved for a contest over policy rent. This literature has produced a bulk of comparative statics observations on how aggregate and individual lobbying changes with (i) the level of discrimination, (ii) contribution caps, (iii) player exclusion, and (iv) the number of prizes.

A first general result is that, ceteris paribus, perfect discrimination induces more effort for symmetry and imperfect discrimination works better for large asymmetry (Hang, 2002; Epstein and Nitzan, 2006b; Wang, 2010). The explanation goes through the participation-decision of less interested players. The non-participation of an individual contestant has a first-order effect on relaxing the overall contest activity, hence the values of the discrimination parameter that encourages non-participation are excessively high. This issue can be best addressed if both the level of discrimination and relative productivity of efforts can be simultaneously optimized. Then, an all-pay auction with its conditionally optimal relative
productivity raises more than any logit CSF with its conditionally optimal relative productivity, including Tullock’s lottery (Epstein, Mealem and Nitzan, 2011).

The participation of low-valuation lobbying groups may also be encouraged by setting a ceiling to high-level payments. A standard effect of such a cap is to decrease both the highest payments and the total expenditures, hence it represents, from the perspective of the policymaker, a costly prize redistribution. This property nevertheless varies in the contest success function. While for Tullock’s lottery, the aggregate expenditures do fall (Hang, 2002), Che and Gale (1998) show that in an all-pay auction, a rigid contribution cap makes the low-valuation lobbyist more proactive, and total expenditures may even rise. Kaplan and Wettstein (2006) argue that a non-rigid contribution cap (i.e., a discontinuous but not infinite marginal cost) re-establishes the result that aggregate contributions decrease in an all-pay auction with a cap. Che and Gale (2006) show that even with a non-rigid cap, the non-intuitive effect of the cap is restored as long as the relative effect of the ‘leveling of the playing field’ is strong enough. This only confirms the intuition that a too-large asymmetry in contests is, from a revenue-maximization perspective, not desirable. For recent contributions, see also Pastine and Pastine (2010) and Grossman and Dietl (2012).

In addition to contribution caps, the structure of prizes matters in a contest. Prize redistribution may induce wider participation and stimulate total effort. In a review of multiple-prize contests, Sisak (2009) demonstrates that adding an additional prize to encourage additional participation has ambiguous properties on the individual efforts of contestants. Epstein and Nitzan (2006a) show that sufficiently asymmetrically reducing the prize (valuations) for all players may paradoxically boost total expenditures. For all-pay auctions, Siegel (2009) derives the number of participating players as a linear function of the number of prizes. In a fairly general setting, he shows that increasing the number of prizes and thereby attracting additional players makes existing players weakly worse off.

For the policy-maker, it pays off to stimulate participation even if influence is only through strategic communication. There are two ways how multiplicity of lobbies enhance informativeness of cheap-talk reporting to the policy-maker. First, the policy-maker uses multiple reports as checks and may respond to differences by punishments. Second, the lobby may provide information along a dimension of common interest, and the policy-maker thereby combines the information from multiple lobbies (Sobel 2010). Fully-revealing equilibria exist under relatively weak conditions.

With informational lobbying, the majority of models suggest that the policy-maker can stimulate more intense lobbying competition with a larger number of competitors. In Bennedsen and Feldman (2006), competition increases the incentive for a search because an unsuccessful search is interpreted against the lobbying group only if the other group is also unsuccessful. If contributions are allowed, then this effect represents an information rent to the group with less informative technology in the case both groups are unsuccessful. This serves as extra-special motivation for the participation of a weaker player.
An interesting corollary of lobbies’ competition arises in settings where lobbies can commit to communication mechanisms (Kamenica and Gentzkow, 2011; Rayo and Segal, 2010). The role of competition can be incorporated into the design problem by entering the policy-maker’s surplus into the lobbies’ choice, as a competing lobby tries to outperform its rival by offering a better mechanism to the policy maker. The more competitive is the market, the larger is the weight attached to the surplus. In the limit of perfect competition, the Pareto-optimal communication mechanism is found to be fully revealing (Rayo and Segal, 2010, Sect. 8A).

When informational lobbying yields a collective benefit but a side-payment gives a private benefit, then non-participation is differently motivated for each of the instruments. Non-participation in lobbying activities is primarily motivated by free-riding, and the total amount of lobbying depends on whether the demand for lobbying benefits exhibits the neutrality or non-neutrality we see in public good games. In contrast, non-participation in contributions is motivated by the absence of a bargaining surplus. An example of the interaction between these two instruments is built in Polk and Schmutzler (2005). They examine a tradeoff of firms that select from collective-good lobbying (industry-specific benefits) and private-good lobbying (firm-specific benefits), and show that the option of the private-good lobbying crowds out the use of the collective-good lobbying.

4.1.3 Evidence

Corporate political influence has traditionally been measured by campaign contributions and their exact influence has been ascribed to buying a favorable roll call vote. The results of roll call voting studies utilizing US evidence since the 1970s are nevertheless inconclusive, and the structure of campaign contributions also reveals that the campaign contributions are in fact more individual and not through Political Action Committees (PAC) within firms (Ansolabehere et al., 2003).

Lobbying expenses represent a promising alternative measure of political influence. Data on lobbying outlays are nonetheless notoriously hard to collect, and except for survey data, for a long time the only extra evidence of lobbying has been participation in interest group associations. The virtual lack of evidence is related to weak or non-existent lobbying regulations, even in developed countries such as the EU countries (Chari, Hogan and Murphy 2010.) The major significant exception is the United States, where the Lobbying Disclosure Act 1995 has revealed relatively clean data on the salaries of lobbyists and their staff, prices per reports, and fees for expert consultants.

The US data clearly show that the magnitude of reported lobbying expenses turns out to be of a higher order than direct payments. Ansolabehere et al. (2003) find for firms with both PACs and a Washington lobby, that the ratio of lobbying expenditures to PAC contributions is 10 to 1. Bennedsen and Feldman (2002) show that the top 100 contributing interest groups gave a total of $144 million to federal candidates during the 1998 election cycle, and spent over $1 billion on lobbying activities during that period. Lobbying also brings large returns, but
on a much lower (and more realistic) scale than previously estimated returns to campaign
contributions. Richter et al. (2009) measure quid-pro-quo in terms of tax benefits (i.e.,
tax breaks including R-D credits and tax depreciation schedules) and observe that for each
additional $1 spent on lobbying, a mean firm receives $6-$20 in tax benefits. A downside of
these particular estimates is that they do not treat the potential endogeneity of the lobbying
firms, hence the true effect is likely overestimated.

In addition to measuring the size of the market and relative profitability, the empirical
literature investigates the determinants of lobbying. De Figueiredo and Cameron (2009)
explore institutional and political variation across states in the US to deliver three sets of
results. Their first result is that the ideological distance between the lobbying group and the
legislature increases outlays; this complies with a standard signaling model with non-verifiable
information and endogenous cost where a stronger signal is needed to persuade the legislature
if the lobby’s bias is larger (Austen-Smith, 1995). For corporations specifically, the distance
is coded zero for Republican legislature and one for Democratic legislature. Their second
result shows the strong positive effect of the budgeting cycle upon the total lobbying outlays
(a 23% increase during a budget year), independent of the electoral cycle. Also, the length
of the legislative session matters; each extra 10 days results in a 6% increase in the lobbying
rates. Hence, corporate influence is much less related to electoral campaigns than previously
thought. Thirdly, the size of the legislature does not matter. The authors’ interpretation is
that lobbying brings a non-rival benefit to legislators.

Are there significant determinants of lobbying at the industry and firm levels? In a sample
of lobbying expenditures aiming at tax benefits, Richter et al. (2009) show that lobbying ex-
penditures follow a skewed, power-law distribution, and only a small fraction of firms actually
lobby. This confirms that participation is a key issue to be addressed. Kerr et al. (2011) find
significant evidence that up-front costs associated with entering the political process explain
why so few firms lobby, and why lobby status is persistent over time. Bombardini and Trebbi
(2009) examine incentives to lobbying collectively. Sectors characterized by a higher degree
of competition (more substitutable products and a lower concentration of production) tend
to lobby together more through a sector-wide trade association, while sectors with a higher
concentration and are more differentiated. Their idea is that individual lobbying pays off only
in oligopolies where product-specific protection may increase both prices and profits (recall
tax-overshifting); in competitive markets, these measures increase prices but decrease profits.

4.2 Strategic substitution and complementarity

4.2.1 Theory

Does the possibility of providing direct contributions affect the usefulness of lobbying? And
vice versa, does lobbying change the effect of direct contributions? In the theoretical litera-
ture, the instruments are typically pure or impure substitutes. Consider an increase in the
bargaining power of a single lobby. In Section 4.1, we have seen that it makes a lobby more likely to search. At the same time, the increase in bargaining power implies less payments in each relevant contribution subgame. Overall, we observe less payments and more lobbying, i.e., a substitution effect.

A different story emerges when we study the effects of the deregulation of one instrument upon the equilibrium level of the other instrument. For this purpose, Bennedsen and Feldman (2006) have built up a setting which allows for 16 configurations of multi-player lobbying: un/observable search, strong/weak signals, with/without contributions, and with/without lobbying. The effects of introducing contributions upon lobbying are conditional upon participation, which depends upon the asymmetry of valuations. For symmetry, contributions intensify the competition in terms of the informational search (complementarity). For sufficiently asymmetric lobbies, the introduction of contributions implies that the group with the less effective search technology decides not to participate in info-collection and the decision-maker receives less information (substitution).

To return to our setting with a single lobby, Bennedsen and Feldman (2006) derive that for observable searches and contributions, lobbying is fully crowded out (pure substitution). Unfortunately, this striking result crucially hinges upon two assumptions: (i) Surplus from attaining the lobby’s first-best policy is positive, \( S(\mu) > 0 \) for \( \mu \in [0,1] \); (ii) The policy-maker has zero bargaining power, hence his/her utility is constant with introduction of contributions.

To see crowding-out, denote the equilibrium lobby’s compensations in Stage 2 as \( C(\mu) \). We know that the policy-maker’s indirect utility \( W(\mu) \) is derived as an upper envelope of the expected utilities over policies, \( W(\mu) := v(d^*(\mu), \mu) \). Since \( v(d, \mu) \) is linear in \( \mu \) for each \( d \in D \), the upper envelope from the linear functions is convex. Now, by the two assumptions stated above, \( C(\mu) = W(\mu) - W(d_h; \mu) \), and this is the difference between a convex and linear function. As a result, \( C(\mu) \) is convex. The lobby’s expected utility is \( \hat{U}(\mu) = 1 - C(\mu) \). As the difference between a linear and convex function, it is a concave function. With a concave \( \hat{U}(\mu) \), the lobby is risk-averse over posteriors and does not lobby. Bennedsen and Feldman (2006) conclude that lobbying is crowded-out by the introduction of contributions. But notice that if any of the two assumptions is lifted, the chain of reasoning is broken and pure substitution (full crowding out) is no longer present.

To receive complementarity for a single lobby requires a special framework. Dahm and Porteiro (2008a,b) derive complementarity in the case of a single lobby for the high costs of pressure in the contribution subgame. However, this result is derived in the setup with the contribution subgame defined as a pressure subgame, where the shape of \( U(\mu) \) depends on the distribution of the policy-maker’s types. Hence, it is not robust to other methods of modeling contribution subgames and to other distributions of the policy-maker’s types, as discussed in Section 4.1.1.

If lobbying and payments are assumed to achieve two different things, not just a policy change, then they can be complements by pure assumption. For example, in pay-to-play
politics, only those who pay the access fee (or pay the highest fee) are allowed to present
their evidence (Austen-Smith, 1995; Lohmann 1995; Cotton, 2009). Or, lobbying facilitates
payments to the policy-maker: Damania, Fredriksson and Mani (2004) suppose that lobbying
may be directed at undermining law enforcement so as to make corruption easier.

4.2.2 Evidence

The theoretical part of the review has separately looked at direct payments and information
provision. But these two are idealized activities that cannot be perfectly disentangled in the
empirics and each captures both legal and illegal activities. An alternative is to examine
bribes as a measure of contributions and political influence as a measure of lobbying.

Three studies have recently examined the strategic substitution between corruption and
political influence (Campos and Giovannoni, 2007; Bennedsen et al., 2011; Kaufmann and Vi-
et al. (2011) confirm that the stage of development and maturity of a firm is conducive to lob-
bying. Firms’ characteristics affect corruption and political influence in opposite directions.
Large, old, government-owned, and export-oriented firms use more influence than bribes;
smaller firms or firms in a fragmented industry choose corruption. When using instruments,
the influential firms appear to use less corruption, but corrupt firms are no less influential.
To reconcile the two results, they propose the idea of asymmetric substitutes: Strong firms
have access to both political influence and bribes, whereas weak firms can only resort to cor-
rupption. The asymmetric substitution is a challenge to competitive informational lobbying,
the main prediction of which is that the competitors with high stakes bribe under almost
any condition. Also Chong and Gradstein (2010) confirm that political influence is associated
with large firms, especially in countries with a low level of institutional quality. Yet weaker
evidence is found for the political influence of state-owned enterprises, exporting firms and
firms in competitive industries.

Kaufmann and Vicente (2011) use country-level evidence from the Executive Opinion
Their definition of legal corruption involves variables that proxy lobbying, such as the In-
fluence of Well-Connected in Procurement, Influence of Legal Contributions to Political Par-
ties, Independence of the Judiciary from Influence, and Influence on Laws and Regulations-
Respondent’s Industry. For illegal corruption, the variables proxy rather direct payments to
policy-makers, such as Illegal Donations to Political Parties, Frequency of Bribes in Influ-
encing Laws and Policies, and Frequency of Bribes in Procurement. Their evidence shows
that more illegal corruption occurs at low-income levels, low political accountability and high
inequality levels. An increase in income inequality, business cycle slumps, structural changes
and pro-competitive practices make firms more likely to bribe than lobby.

As already stated, a disadvantage of this approach is that corruption is comprised of activ-
ities targeting the rule enforcers (with only a small portion of political corruption), whereas
lobbying is directed towards rule makers (Campos and Giovannoni, 2007; Harstad and Svensson, 2011). This is not perfectly aligned with our theoretical interest in the production of pure political influence. Once we mix the activities that lead to qualitatively different outcomes, the key differences between the instruments will not only be on the cost side and externalities it produces, but also in the qualities of the product, namely the durability of and appropriability of benefits. For example, the fact that lobbying is preferred to corruption by large firms in developed countries may be explained by the barriers to entry and appropriability of lobbying benefits.

4.3 Intermediaries

4.3.1 Theory

Why does lobbying go through intermediaries? There are effectively two issues: The firm’s choice of working alone or hiring an intermediary, and the policy-maker’s choice of a mediator.

**Corporate choice.** Johnson (1996) models the firm’s choice from two basic options, namely working alone through establishing a corporate PR office and hiring a lobbyist. Otherwise, three groups of tentative hypotheses are discussed in the empirical literature. The standard arguments for the existence of the intermediation industry, such as specialization, networks, and economies of scale do likely apply. Secondly, the lack of transparency may explain intermediation. An intermediary is the agent for the ‘dirty’ job assigned by the principal, namely serving as a skillful bribe negotiator who charges a high premium for the silence and stability of covert deals and internalizes risks associated with crime detection. The benefits to the firm are then twofold: (i) The cost of detection decreases. (ii) Regulations are circumvented, since the rules covering third party lobbyists’ conduct are often less restrictive than those covering their employers. For example, in the US municipal finance industry, underwriters cannot make campaign contributions to those from whom they solicit business. But an underwriter is free to hire a lobbyist who faces no such restrictions (Retnasaba, 2006).

Alternatively, lobbyists may be predominantly efficient communicators who handle an excess of information under time and attention constraints. They may not have a strong advantage in technical expertise, but they may still possess politician-specific expertise such as the knowledge of the politician’s constituency. As intermediaries, lobbyists may charge a reputational premium especially if investigation and verification require credible and trustworthy agents. Lobbyists may also charge a premium stemming purely from social relations, generated by the fact that barriers to social networks are large relative to barriers to entry into issue expertise, where academia and industry experts are available.

**Gatekeepers.** Why do policy-makers offer the right to auction access to delegates who serve as gatekeepers? And why don’t they better exploit competition between lobbyists
and other producers of relevant expertise? First, we have seen that the policy-maker prefers imperfectly discriminative contests under asymmetry (recall the evidence of large asymmetries in corporate interests), which can be achieved by delegating policy advice even to imperfect agents.

Second, strategic mediation takes place in cheap talk. Ivanov (2010) demonstrates how selecting a mediator whose preferences are determined by the policy-maker (strategic delegation) can be used in a mediation mechanism that maximizes the policy-maker’s expected payoff. Goltsman et al. (2009) compare mediation to negotiation, and show that mediation works better for small or large lobbies’ biases.

4.3.2 Evidence

Lobbyists are important for who they know and have access to, and this makes them earn a large premium. To date, Blanes-i-Vidal et al. (2010) offer one of the empirically cleanest identification strategies to measure the value of a political connection. For revolving-door lobbyists who were previously congressional staffers, they measure how the exit of a former employer affects their payoff. The premium for connections is above 20%, and lasts for over three years. Estimating the value of a lobbyist’s political connections from stock markets is another strategy. Gely and Zardkoohi (2001) study firms that retain law firms as lobbyists. The firms show abnormal gains when one of the partners at that firm obtains a federal cabinet position. This effect disappears when anti-lobbying laws are enacted.

Bertrand et al. (2011) compare the connection premium with the expertise premium using price tags per report. The connection is proxied by individual campaign contributions of the lobbyist to the policy-maker. Expertise is measured by the concentration of the lobbyist’s assignments across 76 issues; another proxy is whether a lobbyist spends at least 25% of his assignments in each active year on the same issue. From price tags per report, the report-level analysis reveals that (i) the premium of having a relevant specialist in the report is 3-5% and (ii) the premium of having a relevant connected lobbyist is 8–10%. Extra evidence on the time profile of the lobbyists’ assignment shows that lobbyists change topics as their connections switch committee assignments. There are also revenue cycles independent of the time profile of issues.

These report-level findings can be combined with more aggregate findings. For example, in de Figueiredo and Cameron (2008), the size of the legislature does not matter for the overall level of lobbying outlays. However, in Bertrand et al. (2011), lobbying works better if delivered through a lobbyist with multiple connections and well-posited legislators. Thus, the number of connected legislators makes a difference. An explanation of both facts may rest in the organization of parties that distinguishes between marginal and inframarginal legislators. Extra legislators that change the size of the legislature are marginal backbenchers, and they may be irrelevant for lobbyists. Consequently, aggregate size does not matter, whereas lobbying directed at individual inframarginal legislators matters.
5 Conclusions

This review covers three modeling traditions of lobbying as they have been established in the recent past: the contest for policy rent, strategic communication, and multiple-means models. In the first part, it focuses on these developments in the last decade, and specifically on the emergence of multiple-means models that involve search, persuasion, and contributions in a single game. Next, the survey presents different approaches to various modeling aspects such as state spaces, preferences, lobbies’ instruments, policy-makers’ and lobbies’ commitments, bargaining, evidence verifiability, message costs, the observability of a search, and the presence of empty messages. In the second part, we look into the recent theory and evidence on three selected issues: incentive to lobby and the magnitude of lobbying for a single lobby and multiple lobbies, the relationship between lobbying, contributions and bribes, and the role of lobbying intermediation.

To summarize, the recent literature models policy-makers as strategic players who benefit both from extra information and extra contributions provided by corporate interests. Moreover, strategic policy-makers who design access fees may improve their information and collect campaign funds at the same time. By pitting one group against each other they extract a huge surplus, and if they encourage wide participation, they obtain large rents and more precise information.

On the other hand, we show that a competitive lobbying contest is often detrimental to business interests. Lobbyists often gain low or even negative payoffs when lobbying instruments are available and therefore may benefit from a regulation of the instruments. First and foremost, competition in a lobbying contest dissipates much of the prize. Contribution caps normally reduce the competition, and represent distribution from the policy-maker to the lobbies. Secondly, the possibility of concealing evidence generates pessimistic policy-makers’ expectations that force lobbyists to make excessive efforts. A mandatory disclosure of searches avoids this information trap and may serve to the benefit of lobbies.

The review also covers recent evidence on corporate lobbying, generated predominantly from cross-country surveys and lobbying data disclosed in the US since 1995. We observe a large benefit-cost ratio for those firms that lobby, even if it is not that striking for campaign contributions. Firms resort to relatively few intermediaries who dominate the market with lobbying influence. Only large and connected firms tend to lobby; small firms would rather bribe. The distribution of intermediaries’ returns is highly skewed. In terms of instruments for influence, with minor exceptions, lobbying and corruption are substitutes rather than complements.
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