Dynamic Commercial Lobbying[*]

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Abstract

This study explains why the preponderance of lobbying occurs between policymakers and commercial lobbyists who act as intermediaries for special interests, rather than directly between policymakers and the special interest groups themselves. Commercial lobbyists are for-profit organizations that have no inherent policy bias and interact repeatedly with policymakers; we argue that these characteristics allow them to be incented by policymakers via repeated agency contracts. Using a dynamic model of commercial lobbying, we show that policymakers select a point on the lobbyist's incentive compatibility constraint which represents a contract involving a mix of financial contributions and information on policy proposals. This contract is shown to solve both an information problem in the presence of unverifiable policy information, and a contracting problem in the absence of legally binding contracts. Both the distribution of the benefits and welfare implications arising from the introduction of repeated agency depend upon the relative weights placed by the policymaker on solving the information and contracting problems. Relative to the full information social welfare optimum the policymaker may place too much or too little weight on socially beneficial policy information relative to privately beneficial financial contributions.

Keywords: Dynamic Lobbying, Influence Activities, Information Acquisition, Financial Contributions, Commercial Lobbying, Political Access, Moral Hazard

JEL classification: D72; D78.

1   Introduction

In recent policy debates on both sides of the Atlantic much concern has been expressed over the influence of lobbyists on the political process.[1] Clearly there are social advantages and disadvantages from lobbying.[2] The transmission of policy relevant information can potentially improve political decision-making whereas the transfer of resources so as to purchase influence seems to be largely distortionary.[3] This may explain why the public continues to tolerate lobbying activities yet increasingly demands that they be regulated.[4]

The preexisting economics literature throws considerable light on the direct activities of special interest groups in the lobbying process. However, the preponderance of lobbying in the U.S. and much lobbying in Europe is not done directly by special interests but rather is performed by professional for-profit intermediaries known as commercial lobbyists.[5] Figure 1 illustrates the importance and growth in commercial lobbying.
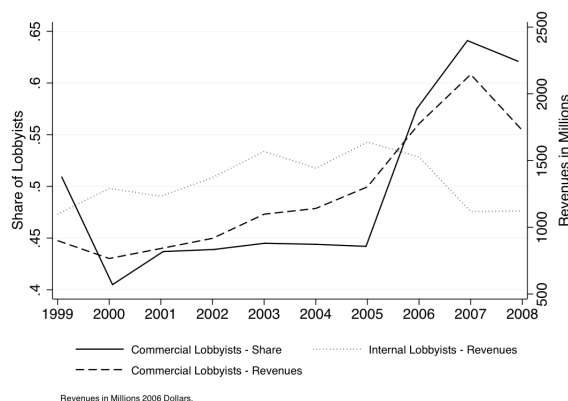

Figure 1: Recent Developments in U.S. Federal Lobbying.

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[1]Lobbying is a phenomenon in all democratic countries. The *New York Times*' online service "Topics" provides a special archive for articles related to lobbying and lobbyists, and the *Washingtonian* publishes a list of the 50 top lobbyists (Eisler, 2007). The extensive Dodd-Frank Wall Street Reform Act and the process of its drafting caused a windfall of lobbying revenues, especially for lobbyists with expertise in financial products and regulation (Becker, 2010). The British House of Commons Public Administration Select Committee (2009) took the observed activities by commercial lobbying as reason to analyze current lobbying activities and regulation in the United Kingdom. The European Parliament and the European Commission responded to public pressure and started lobbyist registrars.

[2]The welfare implications of lobbying activities depend on the provision of policy relevant information relative to the risk of political capture: "[...] for the disclosure of efforts by paid lobbyists to influence the decision-making process and actions of the Federal legislative and executive branch officials while protecting the constitutional right of the people to petition the government for a redress of their grievances." The Lobbying Disclosure Act, 1995 – Purpose and Summary.

[3]Common resource transfers include the supply of research reports, legislative drafts, grass roots organization, staff, campaign contributions, networking events, gifts, and career opportunities (the notorious "revolving door").

[4]See Chari, Hogan, and Murphy (2010) for an institutional comparison across countries.

[5]For an introduction and review see Olson (1965), Tullock (1967), and Krueger (1974) as well as Persson and Tabellini (2000), Grossman and Helpman (2001) and Congleton, Hillman and Konrad (2008). Hall and Deardoff (2006) review various lobbying theories. Groll and Ellis (2013) provide a description of commercial lobbying in a static general equilibrium framework with observable information acquisition.

Figure 1 demonstrate that the share of commercial lobbyists amongst all lobbyists active at the U.S. federal level has been increasing since 2000, and that they are the predominant type.[6] Furthermore, the growth in total lobbying expenditures in the last decade is almost entirely accounted for by the increase in commercial lobbying activities.

The objective of this paper then is to provide an explanation for the existence of commercial lobbying firms and to provide some insight into their likely implications for social welfare. Our strategy will be to construct a simple general equilibrium model in which we nest a detailed analysis of the lobbying industry. To this end we first describe some of the features of the commercial lobbying industry, and the institutional and economic environment in which commercial lobbying firms operate. Table 1 provides some summary statistics for commercial lobbyists operating in the United States.

Table 1: Summary Statistics Lobbying Firms – U.S. Federal Lobbying 2012/13

Variable	Mean	Std. Dev.	Min.	Max.	Median
Number of Employees	6.459	18.278	1	239	2
In DC-Area	5.653	17.648	0	236	1
Outside DC-Area	0.806	2.856	0	56	0
Clients	9.197	17.571	1	225	4
Issue Categories	5.611	7.608	0	58	3
Revenues in Current $1,000	755.226	2063.591	5	29,700	180
Alumni Lobbyists	0.474	1.254	0	16	0
Current Congress Members Served	0.55	1.5	0	18	0
N=1554					

The data in table 1 reveal several interesting features of the lobbying industry.[7] The first observation is its size; this is a billion dollar industry with total revenues that exceed annual campaign contributions. If we consider that this in part describes the revenues spent by the industry's clients on how to spend their other "influence dollars" it may be hard to underestimate its importance. The second observation is that the numbers for Alumni Lobbyists and Current Congress Members Served are much lower than might be anticipated. An Alumini Lobbyist is an employee of a lobbying firm that previously served on the staff of a current Congress member. Current Congress Members Served is the total number of current Congress members for whom the employees of a lobbying firm have been staffers. While far from exhausting all the possible

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[6]Data from Bertrand, Bombardini and Trebbi (2012).

[7]Data are from Lobbyists.info: "Factors of Influence", updated Feb 5 2013, Aug 14 2013. Data are for second semester 2012 and first semester 2013. The Lobbying Disclosure Code specifies 79 issue codes such as, Accounting, Advertising, Health Issues, Housing, Tobacco, or Tourism. In the appendix we provide descriptive statistics for 2010, these closely resemble the 2012/2013 figures.

avenues of contact between lobbying firms and policymakers, these numbers suggest that lobbying firms may do rather more than make introductions between their clients and their policymaker contacts. A final suggestive observation is that a typical lobbying firm only lobbies on 5.611 issues out of the 79 issue codes in a given year and services approximately twice as many clients as issue categories, suggesting that they engage in a degree of specialization.[8] We incorporate these features into our theoretical analysis together with an emphasis on the dynamic nature of repeated interactions between policymakers and lobbyists. This reflects the findings of the recent empirical literature that stresses the importance of ongoing relationships between lobbyists and policymakers.[9]

In what follows we model lobbying as a repeated game between these for-profit commercial lobbyists and policymakers. This game is then nested in a simple general equilibrium framework. Our approach contrasts with much of the work on special interest group lobbying since we argue that commercial lobbyists differ from the "biased experts" and "advocates" found in that literature. A commercial lobbyist is like a biased expert in that they possess a technology that allows them to improve the information available about the quality of policies, however they are not directly affected by implemented policies.[10] Furthermore, a commercial lobbyist is also like an advocate as they represent their clients' interests to a policymaker.[11] A biased expert has a

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[8]Notice that for the largest firms the ratio of clients to issues rises to approximately 4:1 suggesting that the few issues lobbied over by a typical firm may not be simply a matter of small firm size. Bertrand, Bombardini, and Trebbi (2012) analyze whether lobbyists provide issue expertise to policymakers or offer political access to potential clients. They show that value of a lobbyist is mostly from their political access rather than their expertise. Further, they show that commercial lobbyists are *more* specialized with respect to issue expertise than in-house lobbyists.

[9]Recent empirical work by Blanes i Vidal, Draca and Fons-Rosen (2012) and Eggers (2010) focuses on the importance of personal relationships between lobbyists and policymakers by analyzing the "revolving door" phenomenon in which politicians and staff members become lobbyists during their careers. The former emphasize connections through common work experience and the latter connections through common party membership. Bertrand, Bombardini, and Trebbi (2012) show that lobbyists, measured by campaign donations and reported policy issues, follow their political contacts and change their political work issues when those contacts change offices or committee assignments and political issues. Kerr, Lincoln, and Mishra (2013) focus on lobbying activities by corporations and show there is persistence in the set of corporations involved in lobbying on immigration. Empirical work by Krozner and Stratmann (1998) argues that the committee system in Congress provides an environment that facilitates repeated interactions and reputation building between special interest groups and politicians. The committee structure and the repeated interactions enable the construction of informal agreements of legislative support in return for campaign contributions in the absence of legal contracts.

[10]For example, Crawford and Sobel (1982), Gilligan and Krehbiel (1989), Austen-Smith (1994), and Krishna and Morgan (2001) study the behavior of a single or multiple experts with private information who advise an imperfectly informed decision-maker. The latter provide a review and show that a decision-maker may want to consult competing biased experts to gain valuable information.

[11]Dewatriport and Tirole (1999) point out that decision-based rewards are determined by the advocate's achievements for the client, whereas information-based rewards are based on how outcomes were achieved. Their analysis focuses on decision-based rewards and shows that informational benefits for a decision-maker are maximized when there are multiple advocates each incented by their own clients. In contrast, commercial lobbyists represent many clients and compete for scarce political access, which implies that citizens fund lobbying but policymakers incent lobbyists.

direct incentive to misrepresent private information to a policymaker, whereas an advocate may be induced by a client to do this. In our analysis a commercial lobbyist does not have a direct incentive to misrepresent information and is incented by policymakers not their citizen-clients.

Our simple general equilibrium model is populated by three types of infinitely lived agents, citizens (who may also be regarded as special interest groups), commercial lobbyists and policymakers. There is a fixed number of total agents in the economy of which a given number are designated as policymakers by a constitution, the remainder may be either citizens or commercial lobbyists. In every period each citizen is endowed with a policy proposal which if enacted by a policymaker yields a private benefit and generates a social spillover which can be either positive or negative. Each commercial lobbyist is endowed with some expertise that allows them to observe a signal correlated with the sign of the social spillover. Every policymaker has a per period time endowment that allows them to enact a limited number of policy proposals. Output in this economy is simply the sum of realized private benefits plus social spillovers. There are three markets. Firstly, a market for political intermediation on which citizens pay a market clearing fee to commercial lobbyists to present their policy proposals to policymakers. Secondly, a market for political access in which policymakers design access rules which allocate their time to policy proposals. Finally, a labor market on which the division of individuals between the roles of citizen and lobbyist is determined by entry barriers into the lobbying industry. These barriers arise from the policymakers optimal access rules on the political access market.[12] These access rules take the form of repeated agency contracts. This structure is adopted for three reasons, firstly, it incorporates the institutional features found to be important in the empirical literature, and secondly, it fits well the features of the industry as described in table 1 above, and, finally, it corresponds to information obtained in interviews with professional lobbyists.[13]

This framework allows us to make a number of contributions. Firstly, we are able to explain why commercial lobbyists exist and perform a function distinct from those of biased experts and advocates. Secondly, we are able to understand the repeated agency contracts, designed by policymakers in a world of asymmetric information, which incent lobbyists to supply a desired mix of policy relevant information and financial contributions. We refer to these contracts as solving

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[12]We show that policymakers announce political access rules that reward commercial lobbyists' current lobbying effort with future political access. The scarcity of political access and the policymakers' need to incent lobbyists for their unobservable effort create barriers to entry for citizens into the lobbying industry.

[13]In an interview with the authors a professional lobbyist stated that access to policymakers is obtained by working through intermediaries that already enjoy an ongoing relationship, but that continued access required the delivery of useful, quality, information.

the policymaker's *information* and *contracting* problems.[14] We show that these repeated agency contracts, which may appear to involve cronyism, can in fact be socially desirable. Thirdly, by comparing the market outcome to the full information welfare optimum we are able to identify some of the distortions introduced by the existence of commercial lobbying and their welfare implications.

The rest of this paper is organized as follows: Section 2 presents the dynamic model and characterizes a political access rule. Section 3 characterizes the steady state with a simultaneous equilibrium in the lobbying labor market, the market for commercial lobbying services, and the market for political access. Section 4 analyzes the social desirability of the equilibrium. Section 5 concludes and discusses the findings. The details of all derivations and proofs may be found in the Appendix.

2   The Dynamic Model of Commercial Lobbying

The society studied consists of C citizens, L lobbyists, and P policymakers, indexed by c, l and p respectively, and where $T = C + L + P$ is the total population. All agents are self-interested, risk-neutral, and infinitely lived. Each citizen in each period t receives a single policy proposal that if enacted yields a private benefit of $\pi^c > 0$ and creates a symmetric social spillover of s_t^c that can be either positive or negative.[15] A policy proposal with a positive spillover is socially desirable whereas one with a negative spillover is not – i.e., $\pi^c + s_t^c \gtreqless 0$ as $s_t^c \gtreqless 0$. The signs of spillovers are unknown to society in t, but are observed in $t+1$. However, all members of society know the exogenous probabilities of the spillovers which we write as $\rho(s^+) = Pr(s_t^c > 0)$ and $\rho(s^-) = Pr(s_t^c < 0)$. Ex ante the expected social value of any policy proposal is positive – i.e., $\pi_c + s_t^c \left[\rho(s^+) - \rho(s^-) \right] > 0$.

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[14]Our study is related to the lobbying literature that focuses on the strategic trade-off between campaign contributions and information acquisition. Like Bennedsen and Feldmann (2006), Dahm and Porteiro (2008) and Cotton (2009) we focus on the interdependency between information acquisition and financial contributions. However, in these papers individual lobbies engage in one activity or the other, in our analysis each individual lobbying firm faces a trade off between these activities and typically engages in both. Groll and Ellis (2013) analyze commercial lobbyists who lobby for multiple clients by providing financial contributions and policy specific information. The current analysis relaxes their restrictive informational assumption of observable verification effort. Earlier models, such as Austen-Smith (1995) and Lohmann (1995), modeled campaign contributions as a means to first receive access that is then used to present information to a policymaker. For lobbying models that examine financial contributions see for example Bernheim and Whinston (1986), Grossman and Helpman (1994), Besley and Coate (2001); for lobbying models that focus on information provision see for example Crawford and Sobel (1982), Gilligan and Krehbiel (1989), Potters and van Winden (1992), Austen-Smith (1994), and Bennedsen and Feldmann (2002).

[15]Policy spillovers can be given several interpretations such as an externality or impure public good. Our treatment of spillovers is simple and symmetric so to focus attention on the role of repeated interactions.

A policy proposal can be presented to a policymaker for enactment either directly by the citizen or indirectly via a lobbyist. Lobbyists possess a verification technology that allows them to receive signals correlated with the signs of the spillovers associated with the policy proposals they receive from citizen-clients. It then follows that lobbyists determine the expected informational quality of proposals presented to a policymaker by choosing the proportions of proposals that are unverified and verified, and the proportions of verified proposals that received positive or negative verification signals. We refer to a combination of proposals of given expected informational quality together with financial contributions as the *portfolio* which is passed from lobbyists to policymakers.

Each policymaker has a per period time constraint and no independent verification technology. The policymakers' time constraints determine the maximum number of enacted policy proposals. The allocation of their time is determined by political access rules, $\tilde{a}^{cp}(.)$ and $\tilde{a}^{lp}(.)$, which specify for individual citizens and lobbyists respectively the portfolios they must deliver to receive a given amount of access. All policy proposals presented to policymakers are enacted and their private benefits and social spillovers are realized.

The political access rules specified by policymakers together with the distribution of the remaining agents between the roles of citizen and lobbyist determine the expected payoffs to these roles.

The timing of the model for each period t is the following: First, all policymakers simultaneously announce individual access rules to citizens and lobbyists. Second, citizens choose, when feasible, whether to become a lobbyist or continue as a citizen with a policy proposal. Third, lobbyists accept a certain number of proposals from clients and may investigate some of them. Finally, lobbyists present to policymakers a portfolio of promised financial contributions and policy proposals, which are immediately enacted.

The information structure is as follows. The actions by lobbyists and the interactions between lobbyists and policymakers are unobservable to citizens. However, citizens can observe the amount of political access, $\tilde{a}_t^{lp}$, and the number of clients, n_t^l, of each lobbyist. Policymakers know the characteristics of the lobbyists' verification technology but cannot observe the lobbyists' verification efforts and received verification signals in t. Furthermore, promised financial contributions are not delivered until after lobbyists have received their access in a period. However, each policymaker observes in $t+1$ whether the financial contributions promised in t were honored, and the previous period's realized spillovers. All individuals know the proportion of citizens, lobbyists

and policymakers in the population in t, where the latter is determined by a commonly known constitutional rule with $P_t = \bar{P}$.

There are three markets in the economy; a market for professional lobbying services in which citizens and lobbyists trade intermediation services, a market for political access in which lobbyists and citizens transact with policymakers over the policymakers' scarce time, and a labor market in which individuals are allocated between the roles of citizen or lobbyist.[16] The market for intermediation services is assumed to be perfectly competitive with a market clearing service fee of k_t. The market for political access is cleared via equilibrium implicit agency contracts between policymakers and lobbyists. These agency contracts take the form of access rules that reward financial contributions and information quality with future political access. The agency rules in the market for political access create barriers to entry that yield lobbyists information rents, this implies that in the labor market citizens would choose to become lobbyists if they could. However, limited access to policymakers prevents them from doing so. We begin by describing the choices and associated payoffs for each of the agent types.

2.1 Citizens

Each citizen first chooses whether to attempt to become a lobbyist. This choice depends on the expected lifetime payoffs from selecting one of the two roles in the current period, which we write as V_t^c and V_t^l. The terms V_t^c and V_t^l involve the per period payoffs in the states citizen and lobbyist and the transition probabilities between these states, all of which we shall make precise shortly.

In periods when an individual chooses to be a citizen they must decide how to use their policy proposal. A proposal if enacted realizes the private benefit of π^c and generates a social spillover. Each citizen, together with all other agents, shares equally in the sum of realized spillovers, $S_t = \sum_{c=1}^{A_t} s_t^c$. Citizens may costlessly present their proposals to a policymaker or hire a commercial lobbyist to present the proposal on their behalf for a fee of k_t.[17] A citizen can hire only one lobbyist in t. If a policy proposal is not enacted it expires at the end of the period and is replaced by a new draw.

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[16]Our market structure is consistent with Bertrand, Bombardini, and Trebbi (2012) who provide empirical support that political access rather than expertise is the scarce resource and hence we allow for free technological access in the market for intermediation services but employ agency contracts in the market for political access.

[17]We observe that lobbyists and clients agree to formal contracts. However, "lobbying success fees" are widely illegal – see the Center for Ethics in Government (2010). We also observe that commercial lobbyists consult both policymakers and clients by informing their clients about the likelihood of success in a current political environment.

The payoff for citizen c in t is then:

$$\Pi_t^c = y\pi^c - zk_t + \frac{S_t}{T}, \tag{2.1}$$

where y and z are indicator variables such that $y, z \in \{0, 1\}$. If a citizen's proposal is enacted, then $y = 1$; and if they hire a lobbyist, then $z = 1$. Citizens treat aggregate spillovers as parametric, hence their choices involve only their private payoffs determined by y and z.

In choosing between making a direct approach to a policymaker, working through a commercial lobbyist as an intermediary, or being inactive a citizen needs to compute the expected payoffs of these alternatives. The citizens' expected payoff from direct political access is given by

$$\frac{\sum_{p=1}^{\bar{P}} \tilde{a}_t^{cp}}{C_t - N_t} \pi^c \geq 0 \text{ for all } t, \tag{2.2}$$

where $\tilde{a}_t^{cp} \in \{0, 1\}$ indicates whether the citizen has direct access to a policymaker or not, N_t is the number of all lobbying industry clients, $C_t - N_t$ is hence the number of citizens competing for direct political access, so $\frac{\sum_{p=1}^{\bar{P}} \tilde{a}_t^{cp}}{C_t - N_t}$ is the probability of successful direct access.

The citizens alternative is to hire a lobbyist to present the policy proposal. They cannot observe the behind-closed-doors interactions between lobbyists and policymakers, but can use information on the lobbyist's political access, $\tilde{a}_t^{lp}$, and the number of clients, n_t^l, to form an expectation that their proposal will be presented by l. The expected payoff from hiring a lobbyist depends on the likelihood the proposal will be presented to a policymaker, the private benefit of the policy proposal, and the lobbying service fee. Hence, then expected payoff from employing a lobbyist is given by

$$\frac{\tilde{a}_t^{lp}}{n_t^l} \pi^c - k_t. \tag{2.3}$$

Finally, a citizen has the alternative of being politically inactive, which yields a certain private benefit of zero.

The citizens' individual demand for commercial lobbying services is now defined by

$$\frac{\tilde{a}_t^{lp}}{n_t^l} \pi^c - k_t \geq \max \left\{ \frac{\sum_{p=1}^{\bar{P}} \tilde{a}_t^{cp}}{C_t - N_t} \pi^c, 0 \right\}, \tag{2.4}$$

where the right-hand side is zero if a citizen expects no direct political access – i.e., $\sum_{p=1}^{\bar{P}} \tilde{a}_t^{cp} = 0$.

2.2 Lobbying Firms

Each citizen that chooses to become a lobbyist constitutes an independent profit-maximizing lobbying firm that provides an intermediation service between citizens and policymakers. A lobbyist accepts proposals from citizen-clients and receives access from policymakers for the presentation of some proposals. They charge their n_t^l clients a service fee of k_t and pay policymakers for access by supplying a portfolio consisting of financial contributions and policy proposals of a specific informational quality. They are able to choose informational quality because they possess a costly verification technology that allows them to investigate the potential spillovers from policy proposals.

We assume that each proposal a lobbyist receives incurs them a processing cost according to the increasing convex cost function $G\left(n_t^l\right)$. The $m_t^l \leq n_t^l$ proposals that are also investigated using the verification technology incur a further cost according to the increasing convex function $H\left(m_t^l\right)$.[18]

The payoff for lobbyist l in t is

$$\Pi_t^l = k_t n_t^l - G\left(n_t^l\right) - H\left(m_t^l\right) - f_t^l + \frac{S_t}{T}, \tag{2.5}$$

where f_t^l is the lobbyist's financial contribution to a policymaker, and $\frac{S_t}{T}$ is their share of aggregate spillovers.[19] Notice that not all proposals have to be verified, nor presented. So the lobbyist's proposal adding-up constraint consists of $n_t^l = m_t^l + u_t^l + d_t^l$, where u_t^l is the number of unverified but presented proposals and d_t^l the number of proposals that are neither verified nor presented.

As stated above a lobbyist receives access from policymakers in return for supplying a portfolio of proposals of a given informational quality and financial contributions. Hence, it is necessary to specify details of the lobbyist's verification technology. This technology returns a private signal $x \in \{x^+, x^-\}$ correlated with the sign of the spillover from a proposal. If the signal is positive, x^+, then the probability of a positive spillover is higher than without investigation, $\rho(s^+|x^+) > \rho(s^+)$. Similarly, $\rho(s^-|x^-) > \rho(s^-)$.

It follows that investigated proposals with a positive signal have a greater expected social value than unverified proposals, and verified proposals with a negative signal have a negative expected

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[18]It is also assumed that $H'(0) = G'(0) = 0$ and $H'''(.) \geq 0$.

[19]For simplicity we assume that only lobbyists can promise financial contributions. If citizens were able to promise contributions it is not obvious how they could make these promises credible. Furthermore, no information would be transmitted. See (Cotton, 2009) for a set up with the pure purchase of access.

social value. This is summarized as follows:

$$\rho(s^+|x^+)\,(\pi^c + s_t^c) + \rho(s^-|x^+)\,(\pi^c - s_t^c) > \rho(s^+)\,(\pi^c + s_t^c) + \rho(s^-)\,(\pi^c - s_t^c)$$

$$> 0 > \rho(s^+|x^-)\,(\pi^c + s_t^c) + \rho(s^-|x^-)\,(\pi^c - s_t^c). \qquad (2.6)$$

The lobbyist's verification signals as well as the number of verified proposals and the amount of financial contributions are private information in t.[20]

2.3   Policymakers

Policymakers accept policy proposals from citizens or lobbyists and enact them such that the private benefits and social spillovers are realized. They do not possess an independent verification technology so act simply as gate-keepers.[21] Unlike citizens and lobbyists the self-interested policymakers do not take the sum of spillovers as given. This motivates them to design implicit repeated agency contracts in the form of access rules.

In each period, a policymaker enjoys a share of spillovers from all enacted policy proposals and may receive a financial contribution, f_t^{lp}, from each of their l_t^p lobbying contacts. These financial contributions are discounted by $\alpha \in [0,1]$.[22,23] This can be given a number of interpretations including the policymaker's degree of dishonesty or the effectiveness of in-kind transfers.

The payoff for policymaker p in t is then

$$\Pi_t^p = \alpha l_t^p f_t^{lp} + \frac{S_t}{T}. \qquad (2.7)$$

The policymaker's problem is to maximize the expected value of (2.7) subject to a time constraint that allows them each to enact a maximum of A_t^p proposals per period. This is a somewhat complex problem. The expected quality of spillovers depends on the mix of proposals accepted from citizens and lobbyists and the verification choices of the latter; which are not observed by policymakers. Also, realized financial contributions depend on lobbyists honoring contribution

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[20] f_t^l may be thought of as a promise that remains to be honored.

[21] The notion of a policymaker as a gate-keeper is similar to Grossman and Helpman (1994). In our analysis a policymaker is not necessarily uninformed as they have a prior belief about the likelihood that a proposal has a positive spillover, what is important, is that a commercial lobbyist can improve available information.

[22] A financial contribution can be interpreted as any resource that yields a private benefit for a policymaker but does not generate policy relevant information or create social benefits – e.g., campaign contributions, network events, paid speeches, charity donations, future employment opportunities, etc.

[23] An earlier version included an ego rent that motivated policymakers to accept political office. Here, for simplicity, we have normalized this to zero. This has no qualitative implications.

promises. So to maximize their expected payoff a policymaker must select from whom to accept policy proposals and design an incentive scheme for lobbyists that solves both an information and a contracting problem.

Given the institutional structure of lobbying, we follow Holmstrom (1981) in arguing that complex contracts are infeasible.[24] Therefore, we adopt a simple approach similar to Esfahani and Salehi-Isfahani (1989) and Black and Garen (1991) in the efficiency wage literature.[25] Each policymaker designs implicit access rules for citizens and lobbyists, $\tilde{a}^{cp}(.)$ and $\tilde{a}^{lp}(.)$, that specify the conditions under which each receives a given amount of access. Because of the information structure, a failure to satisfy these conditions is not detected until the next period when punishment takes place in the form of denying them future access. This implies that they cannot then attract their fee paying citizen-clients.[26] These are precisely the sort of informal "insider rules" understood to mediate these forms of repeated political relationships.

At this juncture a simple observation allows us to stream-line the analysis. Each policymaker may allocate political access to citizens or lobbyists: Citizens provide policy proposals but lobbyists provide multiple policy proposals, verification effort, and financial contributions. Clearly, if possible, a policymaker will choose to allocate all access to lobbyists. We maintain this as an assumption hereafter, but later discuss alternative equilibrium outcomes.

2.4 A Political Access Rule for Lobbyists

The political access rule announced by a policymaker to a lobbyist consists of a quadruple $\left\{\bar{q}_t^{lp}, \bar{f}_t^{lp}, \tilde{a}_t^{lp}, \tilde{a}_{t+1}^{lp}\right\}$, which specifies that if a lobbyist delivers $\tilde{a}_t^{lp}$ proposals today that realize the minimum informational quality level of $\bar{q}_t^{lp}$ combined in a portfolio with a minimum financial contribution of $\bar{f}_t^{lp}$, then they will be rewarded with $\tilde{a}_{t+1}^{lp} > 0$ in the following period. A failure to deliver either $\bar{q}_t^{lp}$, $\bar{f}_t^{lp}$, or $\tilde{a}_t^{lp}$ will result in $\tilde{a}_{t+1}^{lp} = 0$.

We shall derive the political access rule from the policymaker's optimization problem. This

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[24]Holmstrom (1981) points out that simple fixed-wage contracts may not be generally optimal but might perform better in circumstances when the optimal contract itself would be complex and too expensive to enforce.

[25]The two key differences are that; lobbyists' efforts are indirectly compensated with political access that is valued in the market for lobbying services, and that lobbyists undertake efforts with different monitoring characteristics. Verification efforts are unobservable at t and imperfectly observable at $t + 1$, financial contributions are unobservable at t and perfectly observable at $t + 1$. Earlier efficiency wage models by Shapiro and Stiglitz (1984) and Sparks (1986) do not exhibit equilibrium dismissal of unlucky agents.

[26]Notice that this constitutes an equilibrium in a simple game between individual policymakers and lobbyists. If lobbyists believe they will be denied access in a period because they failed to meet the conditions specified in the previous period, they have no incentive to try to meet them in the current period. While policymakers correctly believing that lobbyists will not attempt to meet the conditions specified for the current period given that they failed them in the previous period have no incentive other than to terminate the relationship.

requires that we construct the mapping between the policymakers' choice variables and their expected payoff function. We do this in stages. First, we explain the elements of an abstract political access rule, $\tilde{a}^{lp}(.)$, which, given that the spillovers are stochastic and efforts are unobservable, generates probabilistic outcomes for the lobbyists associated with any verification level choices. Second, given the probability distribution that describes the mapping from lobbyists' choices to outcomes we derive the lobbyists' best-responses to any given rule. Finally, we use the lobbyists' best-responses as a constraint on the problem that policymakers solve to find the optimal values for this access rule.

Clearly, the access rule must induce a lobbyist to undertake the actions desired by a policymaker. Why the access rule includes requirements for a number of proposals, and for specified financial contributions, is transparent. Ideally, the policymaker would also like to specify a required level of verification activity. However this is unobservable, so the access rule must condition on an observable measure correlated with verification activity. We assume that the policymaker conditions access on informational quality defined as the proportion of proposals that realize positive spillovers.[27] In expected terms information quality can be expressed as

$$E_t\left[q_t^{lp}\right] \quad = \quad \frac{\rho(x^+)\rho(s^+|x^+)m_t^{lp} + \rho(s^+)u_t^{lp}}{\tilde{a}_t^{lp}}. \tag{2.8}$$

Employing $\tilde{a}_t^{lp} = \rho(x^+)m_t^{lp} + u_t^{lp}$, we obtain the number of verified proposals that are required to realize the specified expected information quality, which is

$$m_t^{lp} = \frac{E_t\left[q_t^{lp}\right] - \rho(s^+)}{\rho(x^+)\left[\rho(s^+|x^+) - \rho(s^+)\right]}\tilde{a}_t^{lp}. \tag{2.9}$$

However, the policymaker's problem in implementing an access rule requires they make inferences about m_t^{lp} given observed quality. Taking expectations of (2.9) appropriately, they form a conditional expectation of the verification effort the lobbyist expended in t, that is

$$E_{t+1}\left[m_t^{lp}\right] = \frac{q_t^{lp} - \rho(s^+)}{\rho(x^+)\left[\rho(s^+|x^+) - \rho(s^+)\right]}\tilde{a}_t^{lp}, \tag{2.10}$$

where $\tilde{a}_t^{lp}$ and q_t^{lp} and are known to the policymaker in $t+1$.

Each policymaker can announce a quality threshold for policy proposals, $\bar{q}_t^{lp}$. If a policymaker

---

[27]We do not provide an algebraic representation of this to save on notation.

observes $q_t^{lp} \geq \bar{q}_t^{lp}$ in $t+1$, then the relationship continues and the lobbyist receives political access in $t + 1$; otherwise it is terminated. The lobbyist chooses m_t^{lp} and not q_t^{lp}, which is stochastic. Therefore for any given choice there is an associated probability that $q_t^{lp} \geq \bar{q}_t^{lp}$. To compute this the lobbyists and policymakers need to construct a distribution over the likelihood that a mix of verified and unverified policy proposals will yield the desired informational quality. Formally, this distribution is hypergeometric; which leads to tractability problems. Fortunately, the hypergeometric distribution can be approximated by the continuous normal distribution, which is the approach that we adopt in what follows.[28]

Using (2.8), the observed quality of enacted policy proposals can be approximated by

$$q_t^{lp} = \frac{\phi m_t^{lp}}{\tilde{a}_t^{lp}} + \epsilon_t^{lp}, \tag{2.11}$$

where $\phi = \rho(x^+)\left[\rho(s^+|x^+) - \rho(s^+)\right]$: The ϵ_t^{lp}'s are identically independently normally distributed random variables with mean $\rho(s^+)$ and variance σ^2. We write the marginal density as $w(\epsilon)$. Now we can state the probability distribution that maps verficiation efforts and the minimum informational quality into the likelihood of a terminated relationship. The likelihood a lobbyist is terminated because they supplied information of insufficient quality can be written

$$Pr\left(q_t^{lp} \leq \bar{q}_t^{lp}\right) \equiv D = \int_{-\infty}^{\epsilon^*} w(\epsilon)d\epsilon, \tag{2.12}$$

where $\epsilon^* = \bar{q}_t^{lp} - \frac{\phi m_t^{lp}}{\tilde{a}_t^{lp}}$ with $D_{\bar{q}} = w(\epsilon^*) > 0$, $D_m = -\phi/\tilde{a}_t^{lp} w(\epsilon^*) < 0$, and $D_{\tilde{a}} = \phi m_t^{lp} \tilde{a}^{-2} w(\epsilon^*) > 0$. Therefore a lobbyist has an incentive to expend verification effort to reduce the likelihood of termination.[29] Note that a greater minimum informational quality increases the likelihood of

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[28]In Esfahani and Salehi-Isfahani (1989), the principal observes a signal that is equal to the agent's effort plus an unobservable error term, which is characterized with a continuous bell-shaped density function. Since a bell-shaped density function does not guarantee a unique solution to the agent's optimization problem and a continuous best-response function in a principal-agent framework, they make additional assumptions about the agent's cost of efforts to ensure a solution. Similarly, in Black and Garen (1991) the principal observes a similar performance signal but the error term is normally distributed. Our current problem has a different information structure. Each policy proposal has either a positive or negative spillover. Further, the lobbyist's verification technology returns either a positive or a negative signal. Given the binary outcomes and exogenous probabilities, the probability of achieving a specific quality threshold follows a hypergeometric probability distribution. The hypergeometric probability distribution is discrete but can be, for specific parameter values, approximated to either a Poisson or a normal probability distribution – see Fahrmeir et al. (1997). Following Jewitt (1988), the Poisson probability distribution fulfills the desired characteristics for the first-order approach of solving principal-agent problems. Unfortunately, the approximation of the hypergeometric probability distribution to a Poisson probability distribution requires that the number of presented proposals with a positive verification signal is relatively small in comparison to the lobbyist's portfolio. So the statistically appropriate approximation would be the normal distribution.

[29]It is possible for the policymaker to increase the number of observations by to incorporating a lobbyist's performance history. The analysis abstracts from the optimal political access rules and focuses on how repeated personal

termination. Recall that given a policymaker perfectly observes the financial contribution in $t+1$, and that the access rule specifies the lobbyist will be terminated with probability one if they fail to deliver less than the specified contribution.

At this point we are ready to derive the lobbyist's best-responses of $m_t^* = M\left(\bar{q}_t^{lp}, \bar{f}_t^{lp}, \tilde{a}_t^{lp}, \tilde{a}_{t+1}^{lp}\right)$ and $f_t^* = F\left(\bar{q}_t^{lp}, \bar{f}_t^{lp}, \tilde{a}_t^{lp}, \tilde{a}_{t+1}^{lp}\right)$ to the access rule $\left\{\bar{q}_t^{lp}, \bar{f}_t^{lp}, \tilde{a}_t^{lp}, \tilde{a}_{t+1}^{lp}\right\}$. Given these best-responses the policymaker will choose the optimal values for the desired informational quality and financial contributions.

2.5 The Lobbyist's Optimization Problem

Each lobbyist takes the lobbying service fee, k_t, the citizen's current payoff, Π_t^c, and the political access rules of policymakers, $\tilde{a}^{lp}(.)$, with $\tilde{a}_t^{lp}$, $\bar{q}_t^{lp}$, $\bar{f}_t^{lp}$, and $\tilde{a}_{t+1}^{lp}$ as given. In each period they choose their number of clients, n_t^l, the number of proposals to verify, m_t^{lp}, and the financial contribution to make, f_t^{lp}, taking into account the impact of these choices on the likelihood of maintaining their relationship with a policymaker.[30] The lobbyist's optimal portfolio of policy proposals includes only proposals with positive verification signals and unverified proposals – i.e., $\tilde{a}_t^{lp} = \rho(x^+)m_t^{lp} + u_t^{lp}$.[31] Recall the expected lifetime payoff at the beginning of $t+1$ of a lobbyist and a citizen are V^l and V^c. The lobbyist's optimization problem, writing $r \in [0,1]$ as the discount rate and treating V^l and V^c as parameters, can be expressed as

$$\max_{n_t^l, m_t^{lp}, f_t^{lp}} \Pi^l = k_t n_t^l - G\left(n_t^l\right) - H\left(m_t^{lp}\right) - f_t^{lp} + \frac{D}{1+r}V^c + \frac{(1-D)}{1+r}V^l \qquad (2.13)$$

s.t. a current political access constraint of

$$\tilde{a}_t^{lp} = \rho(x^+)m_t^{lp} + u_t^{lp} \text{ for all } t \qquad (2.14)$$

with associated multiplier λ_t^{lp}, and the lobbyist's adding-up constraint

$$n_t^l = m_t^{lp} + u_t^{lp} + d_t^l \text{ for all } t \qquad (2.15)$$

---

[30]The number of presented but unverified proposals, u_t^{lp}, follows from (2.14) and m_t^{lp}; the number of disappearing policy proposals, d_t^l, follows from (2.15), (2.14), and m_t^{lp}.

[31]There is a very small probability that a lobbyist will have insufficient verified proposals with positive signals so as to simultaneously meet both the access and quality requirements. This can be modeled at significant cost in terms of algebra and complexity but in terms of economics only adds a small deadweight loss arising from verification and processing costs incurred by the lobbying firms that subsequently relinquish access in the current period. We suppress this but can provide details on request.

interactions can solve a policymaker's information and contracting problem.

with associated multiplier μ_t^{lp}.[32]

We first derive the first-order conditions with respect to the lobbyists choices over their number of clients and level of verification.[33] For the number of clients we obtain

$$\frac{\partial \Pi^l}{\partial n_t^l} = k_t - G'\left(n_t^l\right) + \mu_t^{lp} \leq 0 \tag{2.16}$$

and for verification effort

$$\frac{\partial \Pi^l}{\partial m_t^{lp}} = -H'\left(m_t^{lp}\right) - D_m \frac{\left(V^l - V^c\right)}{1+r} - \rho(x^+)\lambda_t^{lp} - \mu_t^{lp} \leq 0. \tag{2.17}$$

Equation (2.17) is essentially the lobbyist's incentive compatibility constraint.[34] It provides their behavioral response in terms of their verification effort for a given probability of termination as specified by the policymaker's access rule. The immediate implication of (2.17) is:

Proposition 1. *Lobbyists provide positive levels of unobservable verification efforts in t whenever policymakers can promise sufficient future benefits and lobbyists' verification efforts decrease the likelihood of being terminated by a policymaker. That is in t, $m_t^{lp} > 0$, if $V^l > V^c$ and $D_m < 0$.*

Hence, as long as there are promised future benefits to being a lobbyist, $V^l - V^c > 0$, and the lobbyist's verification effort decreases the likelihood of being terminated in the future, $D_m < 0$, then they undertake a positive level of unobservable verification effort so as to maintain the relationship with the policymaker.[35] Shortly, we shall show how this is crucial to the result that a policymaker may design a political access rule that allows them to escape a lobbying equilibrium without information transmisson.

At this point we are not quite ready to employ the participation and incentive compatibility constraints to solve the policymaker's optimization problem. It is well-known that the first-order approach to these sorts of agency problems may involve a nonconcave optimization problem.[36] This would imply that the lobbyist's best-response, m_t^*, is not a continuous function. Hence, we require

---

[32]It is not optimal for a lobbyist with political access to become a citizen in t if $k_t n_t^l - G\left(n_t^l\right) \geq \Pi_t^c$, otherwise no society member would want to be a lobbyist.

[33]The second-order conditions are $\frac{\partial^2 \Pi^l}{\partial n_t^{l2}} = -G''\left(n_t^l\right) < 0$ and $\frac{\partial^2 \Pi^l}{\partial m_t^{lp2}} = -H''\left(m_t^{lp}\right) - D_{mm}\frac{\left(V^l - V^c\right)}{1+r} \gtrless 0$.

[34]Note that (2.16) and (2.17) depend on whether $n_t^l \geq m_t^{lp}$ and $\tilde{a}_t^{lp} \geq \rho(x^+)m_t^{lp}$ – i.e., $u_t^{lp} \geq 0$. If $u_t^{lp} > 0$, then $\lambda_t^{lp} = 0$ and $\mu_t^{lp} = 0$. Otherwise there would be a corner solution with $\tilde{a}_t^{lp} = \rho(x^+)m_t^{lp}$ and $n_t^l = m_t^{lp} + d_t^l$ with $d_t^l \geq 0$.

[35]This follows at an interior solution from $H'(0) = 0$ and that $H(.)$ is increasing convex.

[36]See Rogerson (1985) for a general discussion of the multiplicity problem in principal-agent frameworks.

Assumption 1.

$$\frac{H''\left(m_t^{lp}\right)}{H'\left(m_t^{lp}\right)} > \frac{D_{mm}}{D_m} = \frac{w'(\epsilon^*)\phi}{w(\epsilon^*)\tilde{a}_t^{lp}}, \tag{2.18}$$

which ensures a continuous best-response function with unique optimal verification effort if $n_t^l > m_t^{lp}$.[37] This assumption is maintained for the remaining analysis.[38]

Note however that this does not imply that the best-response is monotonic. At low and high levels of the information quality threshold the marginal value of verification to the lobbyist is low. This follows because for low levels of the threshold the lobbyist will almost certainly achieve the information quality requirement whereas at high levels they will almost certainly fail it.[39]

The best-response function for the lobbyist's verification effort can be now summarized by the following:

$$m_t^* = M\left(\bar{q}_t^{lp}, \bar{f}_t^{lp}, \tilde{a}_t^{lp}, \tilde{a}_{t+1}^{lp}\right). \tag{2.19}$$

With respect to financial contributions; a lobbyist has no incentive to make a contribution in excess of the minimum, $f_t^{lp} > \bar{f}^{lp}$. Furthermore, if any of their choices will lead to the relationship being terminated, then they will select $f_t^{lp} = 0$ as their best-response. This can be summarized as the following:

$$f_t^* = F\left(\bar{q}_t^{lp}, \bar{f}_t^{lp}\right) = \begin{cases} \bar{f}_t^{lp} & \text{if } V^l \geq V^c \text{ for a given } \left\{\bar{q}_t^{lp}, \bar{f}_t^{lp}\right\} \text{ or} \\ 0 & \text{if } V^l < V^c \text{ for a given } \left\{\bar{q}_t^{lp}, \bar{f}_t^{lp}\right\}. \end{cases} \tag{2.20}$$

---

[37] As noted earlier, the normal probability distribution does not fulfill Jewitt's (1988) general sufficiency conditions for the first-order approach. This would require we adopt a Poisson approximation. Unfortunately this makes the analysis intractable. So we employ a normal approximation and maintain assumption 1 so as to ensure that the second derivative, $\frac{\partial^2 \Pi^l}{\partial m_t^{lp\,2}}$, is negative. Notice that because $\frac{\partial^2 \Pi^l}{\partial n_t^l \partial m_t^{lp}} = \frac{\partial^2 \Pi^l}{\partial n_t^l \partial m_t^{lp}} = 0$, this is sufficient for uniqueness. If $n_t^l = m_t^{lp}$, then the assumption would have to be $\frac{H''\left(m_t^{lp}\right)+G''\left(m_t^{lp}\right)}{H'\left(m_t^{lp}\right)+G'\left(m_t^{lp}\right)-k_t} > \frac{D_{mm}(\bar{q}_t,m_t)}{D_m(\bar{q}_t,m_t)}$.

[38] We will use from now on the statistical approximation such that (2.17) is written as $-H'\left(m_t^{lp}\right) + w(\epsilon^*)\frac{\phi}{\tilde{a}^{lp}}\frac{(V^l-V^c)}{1+r} - \rho(x^+)\lambda_t^{lp} - \mu_t^{lp} \leq 0$.

[39] In a steady state the lobbyists best response in terms of verification effort to a change in the information requirement may be written

$$\frac{\partial m^*}{\partial \bar{q}} = \frac{\overbrace{w'(\epsilon^*)\frac{\phi}{\tilde{a}}\left(V^l - V^c\right)}^{(?)} + \overbrace{w(\epsilon^*)\partial V^l/\partial\bar{q}^{lp}}^{(-)}}{\underbrace{H''(.) + w'(\epsilon^*)\frac{\phi^2}{\tilde{a}^2}\left(V^l - V^c\right)}_{(+)}} \gtreqless 0,$$

since $w'(\epsilon^*) \gtreqless 0$ as $\epsilon^* \lesseqgtr \rho(s^+)$ we cannot ensure monotonicity.

Where (2.20) can be interpreted as a version of the lobbyist's participation constraint.

2.6 The Policymaker's Optimization Problem

Each policymaker knows the lobbyists' best-responses to $\tilde{a}^{lp}(.)$ and takes the outcomes of the lobbying service market, k_t and n_t^*, as well as the citizens' payoffs, Π_t^c and V^c, as given. They also take the actions of other policymakers, A_t^{-p}, as given, that is the policymakers play a Nash game.

Each policymaker selects a quadruple, $\left\{ \bar{q}_t^{lp}, \bar{f}_t^{lp}, \tilde{a}_t^{lp}, \tilde{a}_{t+1}^{lp} \right\}$, so as to maximize their expected lifetime payoff subject to lobbyists' participation and incentive compatibility constraints as well as their own time constraint, $A_t^p \geq l_t^p \tilde{a}_t^{lp}$. In a steady state, the policymaker's optimization problem can be written as maximizing their per-period payoff

$$
\max_{\bar{q}^{lp}, \bar{f}^{lp}, \tilde{a}^{lp}, l^p} \Pi^p = \alpha l^p f^{lp} + \frac{1}{T} E \left[\sum_{c \in A^{-p}} s^c \right] + \frac{s}{T} \rho(x^+) l^p m^{lp} \left[\rho(s^+|x^+) - \rho(s^-|x^+) \right]
$$
$$
+ \frac{s}{T} l^p u^{lp} \left[\rho(s^+) - \rho(s^+) \right] \tag{2.21}
$$

s.t. the lobbyist's political access constraint (2.14), the policymaker's time constraint of $A^p = l^p \tilde{a}^{lp}$ and the lobbyist's participation constraint, which may be written[40]

$$
(1+r) \left[kn^l - G(n^l) - H\left(m^{lp} \right) - f^{lp} \right] \geq rV^c \text{ for all } l^p. \tag{2.22}
$$

We see immediately that the policymaker's time constraint determines l^p, leaving $\bar{q}^{lp}, \bar{f}^{lp}, \tilde{a}^{lp}$ as the remaining choice variables. When the lobbyist's participation constraint is non-binding, $V^l > V^c$, and applying the conditions above, we can express the first-order conditions with $m^* = M\left(\bar{q}^{lp}, \bar{f}^{lp}, \tilde{a}^{lp} \right)$ and $f^* = F\left(\bar{q}^{lp}, \bar{f}^{lp} \right)$ as:[41]

$$
\frac{\partial \Pi^p}{\partial \bar{q}^{lp}} = \alpha \frac{A^p}{\tilde{a}^{lp}} \frac{\partial f^*}{\partial \bar{q}^{lp}} + \frac{s}{T} \frac{A^p}{\tilde{a}^{lp}} \psi \frac{\partial m^*}{\partial \bar{q}^{lp}} \leq 0, \tag{2.23}
$$

---

[40]The lobbyist's stationary participation constraint, $V^l \geq V^c$, follows from (2.13) with $\Pi^l = V^l$ as well as the expected lifetime payoff for a citizen such that:

$$
\Pi^l = kn^l - G\left(n^l \right) - H\left(m^{lp} \right) - f^{lp} + \frac{D}{1+r} V^c + \frac{(1-D)}{1+r} V^l \geq V^c
$$
$$
V^l = \frac{(1+r)\left(kn^l - G\left(n^l \right) - H\left(m^{lp} \right) - f^{lp} \right)}{r+D} + \frac{D}{r+D} V^c \geq V^c,
$$

which reduces to (2.22).

[41]As it is standard in principal-agent frameworks with asymmetric information the agent must enjoy information rents; this relaxes the participation constraint.

$$\frac{\partial \Pi^p}{\partial \bar{f}^{lp}} = \alpha \frac{A^p}{\tilde{a}^{lp}} \frac{\partial f^*}{\partial \bar{f}^{lp}} + \frac{s}{T} \frac{A^p}{\tilde{a}^{lp}} \psi \frac{\partial m^*}{\partial \bar{f}^{lp}} \leq 0, \tag{2.24}$$

and

$$\frac{\partial \Pi^p}{\partial \tilde{a}^{lp}} = -\alpha \frac{A^p}{\tilde{a}^2} f^{lp} - \frac{s}{T} \frac{A^p}{\tilde{a}^2} \psi m^{lp} + \frac{s}{T} \frac{A^p}{\tilde{a}^{lp}} \psi \frac{\partial m^*}{\partial \tilde{a}^{lp}} \leq 0, \tag{2.25}$$

where $\psi = \rho(x^+)\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right]$. Expressions (2.23), (2.24), and (2.25) together with (2.17) and (2.20) describe all the possible solutions to the policymaker's optimization problem. In each case the policymaker chooses a point along the lobbyist's incentive compatibility constraint (2.17), which defines the trade-off they face between information quality and financial contributions. There is an interior solution and three corner solutions for the optimal values of m_t^{lp}, u_t^{lp}, and f_t^{lp}. This may appear complex but each of the cases is entirely intuitive; some are novel and some have the appealing feature of corresponding to cases discussed in the previous literature. Since the corner solution in u_t^{lp} offers little extra to our analysis, we focus on financial contributions and verification effort and present the interior solution and the corner solutions for these variables. We begin with the interior solution.

2.6.1 The Interior Solution: Verification Effort and Financial Contributions

The implicit interior solutions for the optimal quality threshold, $\bar{q}^*$, and the minimum financial contribution, $\bar{f}^*$, are then defined by the lobbyists's best-responses described by (2.19) and (2.20) and the policymaker's first-order conditions (2.23) and (2.24) equated to zero. The convexity of $F(.)$ ensures that this solution is unique.[42] Given the solutions for the policymaker's optimal access rule, the induced verification effort, m^* and submitted payment, f^*, follow immediately from the lobbyists best responses.

Note that the relationship between $\bar{q}^{lp}$ and m^* is not monotonic, because the lobbyist's best-response is not monotonic. At both high and low levels of $\bar{q}^{lp}$ the lobbyist has little incentive to engage in verification. Given n and k, the optimal minimum financial contribution of $\bar{f}^{lp}$ follows from the lobbyist's incentive compatibility condition, described in (2.17), and the pair $\{\bar{q}^{lp}, m^*\}$. However, the relationship between $\bar{q}^{lp}$ and $\bar{f}^{lp}$ is monotonic and decreasing. We derive the amount of political access and the number of lobbying contacts when we solve for the equilibrium.

In the interior solution, the policymakers demand of every lobbyist information improvement and positive financial contributions – i.e., $\bar{q}^{lp} > 0$ as well as $\bar{f}^{lp} > 0$. It follows from (2.23) and

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[42]The detailed solution with variance σ^2 is derived in Appendix A.2.2 and describes the global maximum.

(2.24) equal to zero and $M_{\tilde{f}^{lp}}(.) < 0$ and $F_{\tilde{f}^{lp}}(.) = 1$ that

$$\underbrace{H'\left(m^{lp}\right) - H''(m^{lp})\frac{r+D}{w\left(\epsilon^*\right)}}_{(a)} = \frac{1}{\alpha}\underbrace{\frac{s}{T}\rho(x^+)\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right]}_{(b)}\underbrace{\frac{\phi}{\tilde{a}^{lp}}}_{(c)}, \quad (2.26)$$

which describes a policymaker's trade-off between a greater quality threshold, to incent lobbyists' verification efforts, and larger minimum financial contribution. The immediate implication of this trade-off is

Proposition 2. *The desired unobservable verification effort depends on the trade-off faced by the policymaker between expected improved spillover shares and financial contributions and their relative weights in the objective function. Further, the desired level of verification effort per firm is less than would be found under full information.*

Proposition 2 may be understood by considering the policymaker's incentives. The right-hand side of (2.26) is the marginal benefit to a policymaker of inducing a marginal increase in verification by adjusting the required quality threshold. It is the expected increment to their share of spillovers, term (b), weighted by their relative importance in the policymaker's objective function, $\frac{1}{\alpha}$. The left-hand side is the marginal cost. This has two components: a direct and indirect marginal cost of verification. The direct cost is that the lobbyist incurs greater verification costs and therefore makes a smaller financial contribution to the policymaker. The indirect cost involves the need for the policymaker to provide sufficient incentive for the lobbyist to honor the promised portfolio of information improvement and financial contributions. An increment to m^{lp} reduces the incentive for the lobbyist to honor this promise and so they must be offered the extra marginal compensation represented by the information rent terms (a) and (c).

Expression (2.26) is the same as the solution equation for the level of verification that arises in the full-information problem except for the additional terms (a) and (c), which is the distortion introduced by the need for the policymaker to incent the lobbyist by allowing them information rents.[43] The distortion is larger; (i) the less precisely the policymaker can infer the lobbyist's effort from observations on the realized information quality – i.e., the smaller are $w\left(\epsilon^*\right)$ and $\phi/\tilde{a}^{lp}$; (ii) the more convex are the lobbyist's costs – i.e., the greater is $H''(.)$; and (iii) the less the lobbyist values an ongoing relationship – i.e., the greater is $r + D$.

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[43]See Proposition 4 of Groll and Ellis (2013).

Our assumptions ensure the existence of an interior solution for some parameter values, where the financial contribution component of the access rule follows jointly from (2.17) and (2.26). Surprisingly, the characteristics of this interior solution are novel. We show that contrary to the results found in the existing lobbying literature individual lobbyists do not specialize in either transmitting information or making financial contributions but rather provide an optimal mix of both.[44] This corresponds to what is observed in the lobbying industry.[45]

Furthermore, there has been considerable comment both in the popular press and in the empirical literature on the importance of repeated relationships between policymakers and lobbyists. Here, our Propositions 1 and 2 jointly explain why these repeated relationships arise as they allow policymakers to design implicit access rules that solve a contracting problem over financial contributions and an information problem over the quality of policy proposals.

2.6.2 Corner Solutions

The first-order conditions (2.23) and (2.24) admit two corner solutions where policymakers demand only information improvement or only financial contributions. These two outcomes correspond to when the policymaker faces either a pure information problem or a pure contracting problem. There will be only be an information problem if α gets sufficiently small, spillover shares sufficiently large and important, or the lobbyist's verification technology is very effective.[46] Conversely, there will be only a contracting problem when the opposite conditions hold.[47]

A simple but important point here is that whether we get a corner solution depends upon the lobbyist's incentive compatibility constraint and their verification technology as well as the policymaker's preferences. There is a policy debate in which it is presumed that financial contributions are significant and distortionary. The two corner solutions illustrate when the presumed financial

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[44]For example, Bennedsen and Feldmann (2006) investigate information externalities when multiple interest groups attempt to influence a single policy. The information externality reduces an interest group's incentive to provide information and results in the interest group's specialization in either means. Dahm and Porteiro (2008) show that the provision of information may harm a single interest group and that financial contributions can either complement or substitute for information transfers. Cotton (2009) analyzes a policymaker's trade-off between selling policy favors without information provision and selling access in exchange for contributions and observable information. The current analysis provides a prediction that is similar to Cotton (2009). As a policymaker receives a smaller share in social spillovers, s/T, policymakers are more likely to demand contributions, selling favors, rather than information, providing access.

[45]This observation has been shared in interviews with the authors by professional lobbyists, and is also analyzed in Bertrand, Bombardini, and Trebbi (2012).

[46]This is similar to efficiency wage mechanism in Esfahani and Salehi-Isfahani (1989) and Black and Garen (1991).

[47]The case where there are only financial contributions seems to formalize Krozner and Stratmann's (1998) empirical argument that the committee system of U.S. Congress allows for repeated interactions that solve the contracting problem of legislative favors for campaign contributions.

contributions are not present and when they may be a major concern.

When it is deemed necessary to eliminate financial contributions, then our analysis points out that this can be achieved via policies that impact the policymaker's optimization problem at different points. For example, zero financial contributions may arise if a policymaker whose preferences involve $\alpha \approx 0$ can be selected, this might be interpreted as choosing an honest policymaker. Alternatively, a restriction of payments to in-kind contributions or by making contributions illegal so that they must be hidden at some cost, may again yield $\alpha \approx 0$. Second, policymakers may be induced to choose zero financial contributions by policies that make them value spillover shares more.[48]

We turn now our attention to embedding the political access rules in a simple general-equilibrium framework and will work primarily with the interior solution.

3   Equilibrium

The equilibrium is characterized by a steady state in the markets for political access, lobbying labor, and commercial lobbying services. The political access market is in equilibrium if given the policymakers' access rules and the number of lobbyists, the policymakers' total time endowment is precisely exhausted. The labor market is in equilibrium if the inflow of citizens into the lobbying industry is equal to the outflow of lobbyists who have lost political access to policymakers and return to being citizens. Finally, the market for commercial lobbying services is in equilibrium if demand equals the supply for intermediation services. In the following, we characterize the symmetric steady state equilibrium by employing the interior solution to the policymaker's problem.

3.1   Market for Political Access

As shown in the policymaker's problem, policymakers want to employ all political resources and have no incentive to allocate political access to citizens – i.e., $A_t = \bar{P}A^p$ and $\tilde{a}_t^c = 0$. The symmetric equilibrium requires that the allocation of access per lobbyist, as defined by the optimal access rule, multiplied by the equilibrium number of lobbyists just exhausts the sum of the policymakers'

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[48]This apparently trivial point is subtler than it first may appear. For example, residency requirements for policymakers may induce to care more about spillover shares that arise in their jurisdiction.

time endowment, viz

$$\tilde{a}_t^{lp} L_t = \bar{P} A^p. \tag{3.1}$$

Notice that (3.1) does not imply that the identity of the lobbyists L_t is the same across periods. While all lobbyists are incented to both supply the requisite verification effort and financial contributions by the access rules, this does not mean that some of them will not be unlucky with respect to actual realized information quality. The unlucky lobbyists will be replaced by new lobbyists drawn from the pool of citizens.[49] The likelihood that an lobbyist will be unlucky is given by D_t.

3.2 Lobbying Labor Market

The flow of lobbyists who lose access in t and therefore become citizens is $D_t L_t$. Therefore, for there to be an equilibrium this must equal the number of citizens flowing in the other direction. It follows that if we write the probability a given agent will enter the market for political access and become a lobbyist as e_t, then the equilibrium condition is

$$e_t \left(C_t + D_t L_t \right) = D_t L_t. \tag{3.2}$$

Note however, that for (3.2) to hold it must be the case that citizens and "unlucky" lobbyists wish to enter the lobbying industry – i.e., $V^l \geq V^c$ in the steady state. We shall provide further details shortly.[50]

3.3 Market for Lobbying Services

The equilibrium in the market for lobbying services involves the citizens' willingness to pay equals to the lobbyists' willingness to accept, which determines k_t. Employing (2.16) and (2.4) with political capture, we obtain the equilibrium condition

$$G' \left(n_t^l \right) = k_t = \frac{\tilde{a}_t^{lp}}{n_t^l} \pi^c \text{ for every } l \text{ and } t, \tag{3.3}$$

We now proceed to solving for and characterizing the equilibrium.

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[49]Policymakers find this optimal despite being aware that the lobbyist was just unlucky because they must discourage future shirking.

[50]We assume that unlucky lobbyists are not stigmatized, given that in equilibrium it will be the case that all lobbyists that lose political access are indeed merely unlucky this seems to make sense.

3.4 Solution

The full symmetric steady state equilibrium is characterized by the previously described equilibrium conditions (3.1), (3.2), (3.3) as well as the population constraint, adding-up conditions, access rules, and a formal description of the asset value equations incorporating the lobbyists' choices.

To obtain the equilibrium values for the variables in the model we are able to exploit the problem's recursive structure. We first solve for n^*. Then using n^* we obtain k^*, L^*, and C^* from the lobbying services market. Next we use these values to describe the equilibrium in the political access market and finally in the lobbying labor market.

From the population constraint and because of $C_t = L_t n_t^l$ we may write

$$L_t = \frac{T - \bar{P}}{1 + n_t^l}. \tag{3.4}$$

From the equilibrium condition in the political access market, (3.1), and the equilibrium in the lobbying service market, (3.3), we have

$$\frac{\bar{P} A^p}{L_t n_t^l} \pi^c = G'\left(n_t^l\right) \text{ for every } l \text{ and } t. \tag{3.5}$$

Using (3.4) and (3.5), the implicit solution for the equilibrium number of clients per firm follows from

$$\frac{n^*}{1 + n^*} G'\left(n_t^l\right)\Big|_{n^l = n^*} = \frac{\bar{P} A^p \pi^c}{T - \bar{P}}, \tag{3.6}$$

where the equilibrium number of clients is positive and unique.[51] The equilibrium numbers of lobbyists and citizens are then

$$L^* = \frac{T - \bar{P}}{1 + n^*} \text{ and } C^* = L^* n^* \tag{3.7}$$

and the equilibrium lobbying service fee is

$$k^* = G'\left(n_t^l\right)\Big|_{n^l = n^*}. \tag{3.8}$$

The market clearing lobbying service fee thus depends on the number of clients, lobbyists' political

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[51] See Groll and Ellis (2013).

access, the private benefit of an enacted policy proposal, and the cost of processing proposals. The values of k^*, n^*, L^*, and C^* describe the equilibrium in the lobbying service market.

Continuing with the market on which lobbyists and policymakers trade for political access and applying (3.1), each lobbying firm receives political access of

$$\tilde{a}^* = \frac{\bar{P} A^p}{L^*} \tag{3.9}$$

in exchange for their lobbying efforts. The lobbyists' efforts are their best-responses to the policymakers' political access rules of $\{\tilde{a}^*, \bar{q}^*, \bar{f}^*\}$. The equilibrium minimum quality threshold, $\bar{q}^*$, and the lobbyist's equilibrium verification effort, m^*, follow from the policymaker's first-order condition and the lobbyist's best-response. Following (A.9) and (2.26), the optimal values for $\{\bar{q}^*, m^*\}$ can be solved for by using

$$\tilde{a}^* \frac{w(\epsilon^*)}{r + D}\bigg|_{\bar{q}^{lp}=\bar{q}^*, m^{lp}=m^*} = -\frac{\phi(\epsilon)}{\sigma^2} \tag{3.10}$$

and

$$\left(H'(.) + H''(.)\frac{r+D}{w(\epsilon^*)}\right)\bigg|_{\bar{q}^{lp}=\bar{q}^*, m^{lp}=m^*} = \frac{s}{\alpha T}\psi\frac{\phi}{\tilde{a}^*}, \tag{3.11}$$

where ϵ^* depends on $\{\bar{q}^*, m^*, \tilde{a}^*\}$. The equilibrium number of unverified presented proposals per firm follows from (2.14) with the equilibrium values from (3.9) and (3.10) with (3.11) such that

$$u^* = \tilde{a}^* - \rho(x^+)m^*. \tag{3.12}$$

The equilibrium number of proposals that disappear (are not verified or presented to a policymaker) in each lobbying firm follows from (2.15) with (3.6), (3.10) with (3.11), and (3.12) such that

$$d^* = n^* - m^* - u^*. \tag{3.13}$$

These equilibrium values with $\bar{f}^* = f^*$, which we derive shortly, describe the equilibrium in the political access market. To derive the amount of equilibrium financial contribution, we first have to derive citizens' transition probability and the stationary payoffs for citizens and lobbyists. This will describe the equilibrium in the lobbying labor market.

To solve for the equilibrium values in the lobbying labor market, we first solve for the equilib-

rium inflow of citizens into the lobbying industry, which follows from (3.2), (3.7), and (3.10) such that

$$e^* = \frac{D^*}{n^* + D^*}.$$ (3.14)

Second, we may now employ the transition probability to write the value asset equation for a citizen such that

$$\Pi^c = e_t \Pi^l + (1 - e_t) \left(\Pi_t^c + \frac{V^c}{1+r} \right) = e_t \Pi^l + (1 - e_t) \Pi_t^c + \frac{(1 - e_t)V^c}{1+r}$$ (3.15)

with

$$V^c = \frac{(1+r)\left(e_t \Pi^l + (1 - e_t)\Pi_t^c\right)}{r + e_t}.$$ (3.16)

The lobbyist's expected lifetime payoff in the steady state is

$$V^l = \frac{(1+r)\left(kn^l - G(n^l) - H\left(m^{lp}\right) - f^{lp}\right)}{r + D} + \frac{DV^c}{r + D}.$$ (3.17)

Hence, the value asset equation for a lobbyist follows from the lobbyist's expected lifetime payoff in the steady state as described in (3.17). Given the opportunity for access, the citizen's entry decision depends on whether $V^l \geq V^c$ and implied available access.

Third, the equilibrium value for the citizen's expected lifetime payoff essentially involves two components as they expect that in the future they will enjoy periods of being a citizen and being a lobbyist. When they are citizens their expected current private rents are dissipated – i.e., $k^* = \frac{\tilde{a}^*}{n^*}\pi^c$ from (3.5) and therefore $\Pi_t^c = 0$. When they are lobbyists they enjoy positive information rents. It follows from (3.16) that

$$V^c = \frac{(1+r)e^* \Pi^l}{r + e^*} > 0.$$ (3.18)

We may now obtain the steady state values for Π^l, V^l, V^c, $\bar{f}^{lp}$, and f^{lp}. Using $\Pi^l = V^l$, (3.17), and (3.18), we have

$$V^l = \frac{(1+r)\left(kn^l - G\left(n^l\right) - H\left(m^{lp}\right) - f^{lp}\right)(r + e^*)}{r\left(r + e^* + D^*(1 - e^*)\right)}.$$ (3.19)

From (A.18) and (3.18), it follows that

$$f^{lp} = kn^l - G(n^l) - H\left(m^{lp}\right) - H'\left(m^{lp}\right)\frac{r+D}{\phi w(\epsilon^*)/\tilde{a}^{lp}} - \frac{re^*}{r+e^*}V^l. \tag{3.20}$$

The equilibrium minimum financial contribution can be derived from (3.19) and (3.20) such that

$$\bar{f}^* = k^*n^* - G\left(n^*\right) - H\left(m^*\right) - \left(\frac{H'\left(m^*\right)}{\phi w(\epsilon^*)/\tilde{a}^*}\right)\left(\frac{r+e^*+D^*(1-e^*)}{1-e^*}\right) \tag{3.21}$$

with the lobbyist's equilibrium best-response of $f^* = \bar{f}^*$. The expected lifetime payoff for a lobbyist in the steady state is then

$$V^{l*} = \left(\frac{1+r}{r}\right)\left(\frac{r+e^*}{1-e^*}\right)\frac{H'(m^*)}{\phi/\tilde{a}^*}, \tag{3.22}$$

which is the discounted benefit of information rents. Finally, the expected lifetime payoff for a citizen in the steady state is

$$V^{c*} = \frac{(1+r)e^*}{r+e^*}V^{l*}. \tag{3.23}$$

3.5 Selected Comparative Statics

In the following we present the comparative statics effects of changes in some of the model's key parameters on the steady state equilibrium when there is an interior solution to the policymaker's information and contracting problems. These effects fall into three basic categories: changes in preferences, changes in the trade-offs faced by decision makers, and changes in resources. Those that are easily signed are reported in Table 2.

	dm^*	$d\bar{q}^*$	df^*	du^*	dn^*	de^*	dL^*	dV^{l*}
$d\alpha$	−	−	+	+	0	0	0	−
ds	+	+	−	−	0	0	0	+
$d\psi$	+	+	−	−	0	0	0	+

Table 2: Selected Comparative Statics of the Market Equilibrium.

An increase in the weight placed by policymakers on financial contributions, α, changes the form in which policymakers prefer to extract rents from lobbyists. Policymakers reduce the quality

threshold for presented proposals and induce lobbyists to present fewer verified proposals, m^*, and more unverified proposals, u^*. They also increase required financial contributions, f^*. Given that policymakers put now more weight on financial contributions and induce less verification effort, lobbyists earn lower information rents and their expected lifetime payoffs, V^{l*}, decline. Further, given that n^* and L^* are invariant with respect to α, it immediately implies that the total number of presented proposals and the amount of private benefits is constant while the expected value of total spillovers must decline.

An increase in the magnitude of spillovers, s, or an improvement in the efficiency of the verification technology, ψ, work through the lobbying firm's participation constraints to affect the trade-off between information quality and financial contributions faced by policymakers. They both raise the expected returns to verification, and have the opposite effect of policymakers putting more weight on financial contributions. Policymakers increase their quality thresholds inducing more verified proposals and fewer unverified proposals to be presented, and decrease their required financial contributions. Overall these changes must increase expected information rents. These gains are then shared between the policymakers and lobbying firms with **both** enjoying higher expected lifetime payoffs.[52] Another way to view these results is that a change in s or ψ influences the policymaker's preferred method of rent extraction in the political access market. Notice that these effects do not impact the equilibrium in the market for commercial lobbying services. The number of lobbyists remains the same as does the total number of their citizen-clients.

We now turn to the comparative static effects that arise from a change in resources. These include changes in the private benefit from an enacted proposal, $d\pi$, and the number of policy-makers, $d\bar{P}$. The effects of changes in these parameters are quite complicated and cannot be easily signed.[53] However, we can gain some insights into their likely effects. Consider first the effects of an increase in the private benefit from a presented proposal. All else equal this must raise the demand price for lobbying services and hence the number of proposals accepted by lobbying firms. Given the population adding up constraint this implies there must be fewer larger lobbying firms each of whom enjoys greater access to policymakers. It seems probable that this leads to greater totals rents in the lobbying industry which are in turn extracted by policymakers via a combination of an increase in minimum information quality and financial contribution requirements. Now consider an exogenous increase in the number of policymakers, or in the time endowment

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[52]Indeed citizens benefit too in as much as they are potential future lobbyists.

[53]Formal derivations run to several pages and are available from the authors on request.

of a given number of policymakers. Clearly lobbyists in total will receive more access, ceteris paribus this means that the probability of any given proposal being presented increases raising its expected value. The line of reasoning is then the same as when the expected value of a policy proposal rises because of an increase in the private benefit.

We are now able to consider some normative implications of our equilibrium results.

4   The Social Value of Cronyism

The repeated relationships between policymakers and lobbyists are frequently referred to using the pejorative term cronyism.[54] This usually refers to the capture of a policymaker's time by a lobbyist, which is regarded negatively both in a social welfare sense and in distributional terms. The analysis developed above tells us that this popular and apparently economically intuitive conclusion may be far from correct. The populist view is that repeated relationships between policymakers and lobbyists crowd out others from the political process to the detriment of social welfare and with negative distributional consequences. However, this overlooks the fact that these relationships solve both an information and contracting problem. Furthermore, casual economic intuition suggests that the welfare outcomes with repeated relationships in a world of asymmetric information must be inferior to the outcomes in a world of full information. But, this neglects the fact that the full information world may involve other distortions such that cronyism may involve a second-best welfare improvement.

Consider the distributional consequences of repeated agency under asymmetric information. It has been shown that policymakers must allow lobbyists information rents to incent them to engage in unobservable verification efforts. Furthermore, because of turnover in the political access market and entry in the lobbying service market citizens enjoy a share of these expected rents. But recall that it is still necessary for policymakers to create entry barriers into the political access market. If they do not protect lobbyists from entry, they will not be able to credibly promise them the future rents which make it in their best interests to fulfill the terms of the implicit contracts. In other words, satisfy the incentive compatibility condition – i.e., from Proposition 1 and (3.23) it follows that $V^{l*} > V^{c*} > 0$. In contrast, in a world of full information there is a complete dissipation of

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[54]For example, the conviction of lobbyist Jack Abramoff and multiple Congress members for tax evasion, fraud, and bribery confirmed the public's critical view of close lobbyist-policymaker relationships (Schmidt and Grimaldi, 2006) and also resulted in regulatory reforms.

private rents for citizens and lobbyists – i.e., all private rents are captured by policymakers.[55] In summary we stress

Proposition 3. *Repeated personal interactions between lobbyists and policymakers in the presence of asymmetric information as well as the resulting barriers to political entry create private benefits for both citizens and lobbyists, and do not result in the full private rent dissipation observed in the full information equilibrium.*

The public's skeptical view of the close personal relationships between lobbyists and policymakers is hence only partially correct. Lobbyists do capture more rents than citizens. However, in absolute terms citizens are actually better off with this cronyism.

It is unsurprising that in a world of asymmetric information repeated relationships have the advantage of allowing the players to escape equilibria with unrealized opportunities to gain welfare enhancing information. What perhaps is surprising is the possibility that the quality of political decisions and the level of social welfare may be higher than found in the full information model. Policymakers are self-interested and do not fully internalize all the benefits and costs of commercial lobbying activities.[56] This is the standard result that introducing an extra distortion into a second-best world can be welfare improving. Here, it may be that the distortion introduced by the need to allow lobbyists information rents in an asymmetric information world offsets other distortions that induce oververification in a full information world.

We are able to establish that the number of lobbying firms is the same in both the full and asymmetric information worlds.[57] Whereas the level of verification per firm induced by policymakers in the asymmetric information world is lower (proposition 2). Hence, if there is oververification at the firm-level, then a policymaker's imperfect monitoring may improve social welfare outcomes. The welfare outcomes can be summarized as

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[55] The private rent dissipation focuses on citizens' and lobbyists' private payoffs excluding spillover shares. The incomplete social rent dissipation arises because citizens and lobbyists do not internalize their spillover shares in their lobbying decisions. This result follows Groll and Ellis (2013) and Groll (2013) and is restated in the appendix. This is different to Cotton (2012) in which a policymaker extracts all rents from a wealthier interest group in a contributions-for-access environment whereas a less-wealthy interest group receives no access but enjoys private rents. The result shows that heterogeneous agents are not necessary for incomplete rent dissipation.

[56] Groll and Ellis (2013) identify several distortions in the full information market outcome: (i) each policymaker receives only a share of aggregate spillovers and does not internalize all benefits from improved policy information; (ii) each policymaker acts as a gate-keeper and can induce lobbying activities according to their preferences and payoffs, which follow form their trade-off between spillover improvements and financial contributions; and (iii) each policymaker does not bear any direct cost of lobbying activities. Following their Proposition 5 an underverification at the firm-level is more likely (i') the smaller the policymaker's share of expected aggregate spillovers (through a larger population T), (ii') the greater the policymakers' weight on financial contributions, whereas an oververification is more likely (iii') the greater the marginal processing costs.

[57] See equations (3.6) and (3.7) as well as the corresponding equations in Groll and Ellis (2013).

Proposition 4. *The social welfare effects of commercial lobbying with asymmetric information are ambiguous. Asymmetric information may actually improve welfare outcomes in comparison to full information.*

More generally, the welfare consequences of repeated personal interactions in a world of asymmetric information depend crucially on the attitude of the policymaker to solving the information and contracting problems and the precision in which the policymaker makes inferences concerning lobbyists' unobservable verification effort. Alternatively, expressed they depend upon the trade-off between socially beneficial verification efforts and privately beneficial financial contributions.

5   Discussion and Conclusions

This study provides an explanation for the observed repeated personal interactions between lobbyists and policymakers. In the presence of asymmetric information about lobbyists' information acquisition or the absence of binding contracts, policymakers have an incentive to initiate repeated personal interactions with lobbyists to solve their information and contracting problems. Lobbyists undertake current verification efforts and make promised financial contributions if repeated personal relationships promise them sufficient future profits. Policymakers generate the rents necessary to incent lobbyists by creating barriers to entry that restrict access to the political establishment. If commercial lobbying is socially desirable, then repeated personal interactions between lobbyists and policymakers improve social welfare outcomes. We show that the welfare implications depend on the policymakers' preferences and the efficacy of monitoring and of verification effort. Further, verification effort under asymmetric information is less than under full information. However, welfare may be higher under imperfect information if under complete information policymakers would induce lobbying firms to engage in oververification relative to the first-best.

Our analysis speaks to some of the questions currently being explored in the academic literature and debated on policy forums. The crux of our argument is that policymaker time is the key scarce resource in this economy, and it is the control of this resource that allows policymakers to adopt the role of principals to their lobbyist agents. This is exploited by policymakers by threatening to withhold future political access unless lobbyists perform today.

This is consistent with empirical work on the revolving door phenomenon such as reported

in Blanes i Vidal, Draca, and Fons-Rosen (2012) who show that lobbyists experience significant revenue losses when their previous work contact drops out of political office.[58] While in our current analysis there is no mechanism for policymakers to lose office, it is clear that what is lost is the value of a repeated relationship as we emphasize.[59] This point is also made by Krozner and Stratmann (1998) who provide evidence that repeated interactions allow policymakers and lobbyists to solve a contracting problem of promised campaign contributions for legislative favors. In our analysis we address this contracting problem, but recognize that lobbyists appear to be more than just "money-delivering" agents, and introduce the policymaker's information problem.[60] Bertrand, Bombardini and Trebbi (2012) address the empirical question whether lobbyists provide political access to their clients and employers or expertise to policymakers. They find stronger evidence for the former but cannot reject the latter. Our theoretical analysis is consistent with their empirical findings. Political access is the key scarce resource in our analysis and is used to incent lobbyists both to provide information and make financial contributions. We are mute on the question of why prior contacts determine initial political access as in the revolving door argument, but a simple additional transactions cost argument might explain this. It is cheaper in some sense to meet with someone whose attributes you already know.

In some ways our analysis is relevant to the debate over transparency in the political process. Generally attention has focused on policymakers finances and the perceived need for campaign contribution limits. The obvious fear is that the transfer of resources purchases influence and causes distortions. The debate seems to largely neglect the transmission of information, which is actually desirable and justifies lobbying activities. Our analysis highlights that one may want to ask whether politicians meet with lobbyists to solve primarily a contracting or an information problem. For example, a disclosure of calendars and communication between lobbyists and policymakers might be informative in this context.

There are many directions in which we might extend this analysis. Clearly we have neglected electoral competition and the possibility of rent seeking by organized political groupings. Both of these seem potentially tractable extensions that we hope to visit soon.

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[58]The current regulation of federal lobbying activities (*Lobbying Disclosure Act* 1995 and amendments in 2006) does not allow direct identification of lobbyist-policymaker interactions as only client and lobbyist names are reported but not policymakers' names. Hence, recent empirical studies try to identify such networks by using common work history, party affiliation, or campaign contributions to link lobbyists and policymakers.

[59]See also Eggers (2010) who uses party affiliation to identify lobbyist-policymaker networks.

[60]One may argue that lobbyists are "money-delivering" guys but that their formal expertise keeps up appearances of information transmission. We leave this comparative advantage of expert lobbyists for future research.

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A Appendix

A.1 Descriptive Statistics

Table 3: Summary Statistics Lobbying Firms – U.S. Federal Lobbying 2010

Variable	Mean	Std. Dev.	Min.	Max.	Median
Employees	6.324	18.125	1	244	2
In DC-Area	5.523	17.53	0	241	1
Outside DC-Area	0.802	2.861	0	56	0
Clients	9.259	18.132	1	252	4
Issue Categories	5.45	7.414	0	56	3
Revenues in Current $1,000	670.288	1825.562	5	27,060	154.5
Alumni Lobbyists	0.482	1.304	0	16	0
Current Congress Members Served	0.553	1.544	0	19	0
N=1613					

Data are from Lobbyists.info: "Factors of Influence", updated Feb 5 2013, Aug 14 2013. Sample of entries with revenue entries and positive employees. The Lobbying Disclosure Code specifies 79 issue codes such as, for example, Accounting, Advertising, Health Issues, Housing, Tobacco, or Tourism. Alumni Lobbyist is the number of lobbyists in a firm who have worked for any current Congress members; Current Congress Members served describes the unique of number of Congress members for whom a firm's overall alumni lobbyists have worked for during their career.

A.2 Proofs and Derivations

A.2.1 Proof of Proposition 1

The statement follows from (2.17) and is independent of λ_t^{lp} and μ_t^{lp} if $n_t^l > 0$ and $\tilde{a}_t^{lp} > 0$, which implies $m_t^{lp} > 0$ if $D_m < 0$ and $V^l > V^c$ because of $H'(0) = 0$.

A.2.2 Interior Solution: Verification Effort and Financial Contributions

The policymaker's optimization problem can be described as

$$
\begin{aligned}
\max_{\bar{q}^{lp}, \bar{f}^{lp}, \tilde{a}^{lp}} \Pi^p &= \alpha \frac{A^p}{\tilde{a}^{lp}} f^{lp} + \frac{1}{T} E\left[\sum_{c \in A^{-p}} s^c\right] + \frac{s}{T}\left(\rho(x^+)\frac{A^p}{\tilde{a}^{lp}} m^{lp}\left[\rho(s^+|x^+) - \rho(s^-|x^+)\right]\right) \\
&\quad + \frac{s}{T}\left(\frac{A^p}{\tilde{a}^{lp}}\left(\tilde{a}^{lp} - \rho(x^+)m^{lp}\right)\left[\rho(s^+) - \rho(s^+)\right]\right) \\
&= \alpha \frac{A^p}{\tilde{a}^{lp}} f^{lp} + \frac{1}{T} E\left[\sum_{c \in A^{-p}} s^c\right] + \frac{s}{T} A^p \left[\rho(s^+) - \rho(s^+)\right] \\
&\quad + \frac{s}{T}\frac{A^p}{\tilde{a}^{lp}} m^{lp}\rho(x^+)\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right] \\
&= \alpha \frac{A^p}{\tilde{a}^{lp}} f^{lp} + \frac{1}{T} E\left[\sum_{c \in A^{-p}} s^c\right] + \frac{s}{T} A^p \left[\rho(s^+) - \rho(s^+)\right] + \frac{s}{T}\frac{A^p}{\tilde{a}^{lp}} m^{lp}\psi \quad \text{(A.1)}
\end{aligned}
$$

s.t.
$$(1+r)\left[kn^l - G(n^l) - H\left(m^{lp}\right) - f^{lp}\right] \geq rV^c \text{ for all } l^p. \tag{A.2}$$

The best-responses are $m^* = M(\bar{q}^{lp}, \bar{f}^{lp}, \tilde{a}^{lp})$ and $f^* = F(\bar{q}^{lp}, \bar{f}^{lp})$. Hence, we have

$$\frac{\partial \Pi^p}{\partial \bar{q}^{lp}} = \alpha \frac{A^p}{\tilde{a}^{lp}} \frac{\partial f^*}{\partial \bar{q}^{lp}} + \frac{s}{T} \frac{A^p}{\tilde{a}^{lp}} \psi \frac{\partial m^*}{\partial \bar{q}^{lp}} \leq 0. \tag{A.3}$$

For the interior solution with $m^* > 0$ and $f^* > 0$ we need that $V^l > V^c$, which follows from (2.17) and $f^* = F(.)$. If $V^l > V^c$, then $\frac{\partial f^*}{\partial \bar{q}^{lp}} = 0$ as the lobbyist pays $f^* = \bar{f}^{lp}$. This implies that $\frac{\partial m^*}{\partial \bar{q}^{lp}} = 0$. Following (2.19) this implies that $w'(\epsilon^*) > 0$. Hence, we are on the left-hand side of the normal density function. Further, we have

$$\frac{\partial \Pi^p}{\partial \bar{f}^{lp}} = \alpha \frac{A^p}{\tilde{a}^{lp}} \frac{\partial f^*}{\partial \bar{f}^{lp}} + \frac{s}{T} \frac{A^p}{\tilde{a}^{lp}} \psi \frac{\partial m^*}{\partial \bar{f}^{lp}} \leq 0, \tag{A.4}$$

If $V^l > V^c$, then $\frac{\partial f^*}{\partial \bar{f}^{lp}} = 1$ as the lobbyist pays the increase. This implies that $\frac{\partial m^*}{\partial \bar{f}^{lp}} < 0$. Finally, we have

$$\frac{\partial \Pi^p}{\partial \tilde{a}^{lp}} = -\alpha \frac{A^p}{\tilde{a}^2} f^{lp} - \frac{s}{T} \frac{A^p}{\tilde{a}^2} \psi m^{lp} + \frac{s}{T} \frac{A^p}{\tilde{a}^{lp}} \psi \frac{\partial m^*}{\partial \tilde{a}^{lp}} \leq 0, \tag{A.5}$$

which also follows from $\frac{\partial f^*}{\partial \tilde{a}^{lp}} = 0$. The first two terms are negative and therefore for $\tilde{a} > 0$ we have

$$\frac{\partial m^*}{\partial \tilde{a}^{lp}} = \frac{w'(\epsilon^*)\frac{\phi^2 m}{\tilde{a}^2} - w(\epsilon^*)\frac{\phi}{\tilde{a}^2} - w(\epsilon^*)^2 \frac{\phi^2}{\tilde{a}^3}(r+d)^{-1}}{H''(.) + w'(\epsilon^*)\frac{\phi^2}{\tilde{a}^2}} > 0, \tag{A.6}$$

which again implies that $w'(\epsilon^*) > 0$.

Quality Threshold Setting $\partial \Pi^p / \partial \bar{q}^{lp} = 0$ with $\frac{\partial m^*}{\partial \bar{q}^{lp}} = 0$ and employing (2.19), we have

$$w(\epsilon^*)\frac{\phi}{\tilde{a}^{lp}}(V^l - V^c) + w'(\epsilon^*)\partial V^l/\partial \bar{q}^{lp} = 0 \tag{A.7}$$

and therefore with $\partial V^l/\partial \bar{q}^{lp} = -w(\epsilon^*)(r+D)^{-1}(V^l - V^c)$ we get

$$w(\epsilon^*)\frac{\phi}{\tilde{a}^{lp}}(V^l - V^c) + w'(\epsilon^*)\left(-w(\epsilon^*)(r+D)^{-1}(V^l - V^c)\right) = 0, \tag{A.8}$$

which reduces, because of $w'(\epsilon^*) = w(\epsilon^*)(-\epsilon)/\sigma^2$ with σ^2 as the distribution's variance, to

$$\frac{-\epsilon}{\sigma^2}\frac{\phi}{\tilde{a}^{lp}} = \frac{w(\epsilon^*)}{r+D}. \tag{A.9}$$

This describes the global maximum of $\frac{\frac{\phi}{\alpha}w(\epsilon^*)}{r+D}$ and we denote this as h^*. Further, we define θ by $h^* = h(\theta)$. In equilibrium the optimal quality threshold is $\theta = \bar{q} - \phi m/\tilde{a}^{lp}$. We will employ this in the next step.

Verification Effort and Financial Contributions This step will describe the policymaker's trade-off between setting a quality threshold, which shall induce verification effort, and a financial

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contribution minimum, which shall induce contributions. Employing

$$\frac{\partial m^*}{\partial \bar{f}^{lp}} = \frac{\partial \Pi_m^l / \partial \bar{f}^{lp}}{-\partial \Pi_m^l / \partial m^{lp}} = \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(1+r)^{-1}\frac{\partial V^l}{\partial \bar{f}^{lp}}}{H''(.) + \frac{\phi^2}{\bar{a}^2}w'(\epsilon^*)\frac{V^l - V^c}{1+r}} \tag{A.10}$$

with

$$\frac{\partial V^l}{\partial \bar{f}^{lp}} = -\frac{1+r}{r+D}, \tag{A.11}$$

we get

$$\frac{\partial m^*}{\partial \bar{f}^{lp}} = -\frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{\phi^2}{\bar{a}^2}w'(\epsilon^*)\frac{V^l - V^c}{1+r}} < 0. \tag{A.12}$$

Setting $\partial \Pi^p / \partial \bar{f}^{lp} = 0$ and using the intermediate results above, we have

$$\alpha = \frac{s}{T}\psi \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{\phi^2}{\bar{a}^2}w'(\epsilon^*)\frac{V^l - V^c}{1+r}}. \tag{A.13}$$

Using the first-order condition from (2.17) for an interior solution, $u^{lp} > 0$, we can write

$$\alpha = \frac{s}{T}\psi \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{\phi^2}{\bar{a}^2}w'(\epsilon^*)\left(H'(.)\frac{\bar{a}^{lp}}{\phi w(\epsilon^*)}\right)} = \frac{s}{T}\psi \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{\phi}{\bar{a}^{lp}}w'(\epsilon^*)\frac{H'(.)}{w(\epsilon^*)}}. \tag{A.14}$$

Taking advantage of $w'(\epsilon^*) = w(\epsilon^*)(-\epsilon)/\sigma^2$, we get

$$\alpha = \frac{s}{T}\psi \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{\phi}{\bar{a}^{lp}}\left(w(\epsilon^*)\frac{-\epsilon}{\sigma^2}\right)\frac{H'(.)}{w(\epsilon^*)}} = \frac{s}{T}\psi \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{\phi}{\bar{a}^{lp}}\left(\frac{-\epsilon}{\sigma^2}\right)H'(.)}. \tag{A.15}$$

From above we now that $(-\epsilon\phi)/(\sigma^2\tilde{a}^{lp}) = w(\epsilon^*)(r+D)^{-1}$ and therefore

$$\alpha = \frac{s}{T}\psi \frac{w(\epsilon^*)\frac{\phi}{\bar{a}^{lp}}(r+D)^{-1}}{H''(.) + \frac{w(\epsilon^*)}{r+D}H'(.)}, \tag{A.16}$$

which can be rearranged to

$$H'(.) + H''(.)\frac{r+D}{w(\epsilon^*)} = \frac{s}{\alpha T}\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right]\frac{\phi}{\tilde{a}^{lp}}, \tag{A.17}$$

where $0 < \phi/\tilde{a}^{lp} < 1$. The convexity of $H(.)$ ensures a unique solution to m^{lp} together with the optimal $\bar{q}^{lp}$ from (A.9) and for a given $\tilde{a}^{lp}$, which we derive when we solve for the equilibrium.

The lobbyist's stationary first-order condition for verification effort can be derived from $\partial \Pi^l / \partial m^{lp}$, which is described in (2.17), and $\Pi^l = V^l$ such that

$$H'(.)\frac{r+D}{\frac{\phi}{\tilde{a}^{lp}}w(\epsilon^*)} = kn^l - G(n^l) - H(m^{lp}) - f^{lp} + \frac{r}{1+r}V^c. \tag{A.18}$$

Tis can be rearranged for $\bar{f}^{lp} = f^*$, and using h^* for the global maximum, to

$$f^* = kn^l - G(n^l) - \frac{r}{1+r}V^c - H(m^{lp}) - \frac{H'(m^{lp})}{h^*}. \tag{A.19}$$

A.2.3 Proof of Proposition 2

The first part of Proposition 2 follows from (2.26), which has been derived in Appendix A.2.2 and is essentially (A.17).

The second part of the proposition follows from the comparison with Groll and Ellis (2013). In their analysis the lobbyist's observable lobbying effort for the interior solution with positive levels of verification and positive amounts of financial contributions is described by

$$\frac{\partial H(m^l)}{\partial m^{lp}} = \rho(x^+)\frac{s}{\alpha T}\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right].$$

B Supplemental Appendix – Online

B.1 Corner Solutions

B.1.1 Corner Solution: Verification Effort

In a corner solution with only verification effort, each policymaker sets $\bar{f}_m^{lp} = 0$ to extract lobbyists' available resources via verification efforts by adjusting the information quality threshold. Note that a lobbyist who would make a positive financial contribution would be dropped as a contribution would reduce resources for verification. So a lobbyist's best-response is $f_m^* = 0$. The first-order condition for the quality threshold is

$$\frac{\partial \Pi^p}{\partial \bar{q}^{lp}} = \frac{\rho(x^+)s}{\alpha T} \left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-) \right] \frac{\partial m^*}{\bar{q}^{lp}}, \tag{B.1}$$

which again implies $\frac{\partial m^*}{\bar{q}^{lp}} =$ for $\bar{q}^{lp} > 0$. This implies that

$$\frac{-\epsilon}{\sigma^2} \frac{\phi}{\tilde{a}} = \frac{w(\epsilon^*)}{r + D}. \tag{B.2}$$

It follows that a policymaker chooses $\bar{q}^{lp}$ to solve (B.2). Again, at low levels of $\bar{q}^{lp}$ an increase in this minimum quality requirement increases verification, whereas for $\bar{q}^{lp}$ sufficiently high an increase in this minimum quality requirement decreases verification. It follows that (B.2) displays a global maximum. Using (B.2) and the lobbyist's stationary first-order condition from (A.18), the corresponding m_m^* solves

$$H\left(m^l\right) + H'\left(m^l\right) \frac{r + D}{\frac{\phi}{\tilde{a}} w(\epsilon^*)} = kn^l - G\left(n^l\right) - \frac{rV^c}{1 + r} \tag{B.3}$$

and is unique because of the convexity of $H(.)$.

Equilibrium The equilibrium conditions for the lobbying labor market and the market for commercial lobbying services are not affected by a corner solution for the policymaker's problem with respect to verification efforts. It still holds that

$$\frac{n^*}{1 + n^*} \left. G'(n^l) \right|_{n^l = n^*} = \frac{\bar{P} A^p \pi^c}{T - \bar{P}} \tag{B.4}$$

and the equilibrium values of k^*, L^*, C^*, and $\tilde{a}^*$ are identical. However, each policymaker sets $\bar{f}_m^{lp} = 0$ and maximizes the resources available for verification efforts. Lobbyists make no financial contributions, $f_m^* = \bar{f}_m^* = 0$, because it would signal a waste of resources. The steady state entry into the lobbying industry follows from $e_m^* = \frac{D_m^*}{n^* + D_m^*}$.

The equilibrium quality threshold and verification effort follow (B.2) and (B.3) for a given V^c. The value asset equation for a citizen follows from (3.16) and it still holds that there is a private rent dissipation for citizens in the current period as characterized in (B.4) – i.e., $\Pi_t^c = 0$. Hence, we have

$$V^c = \frac{(1 + r)e_m^*}{r + e_m^*} V^l. \tag{B.5}$$

Finally, the value asset equation for a lobbyist without financial contributions can be written as

$$V^l = \frac{(1+r)\left(kn - G(n) - H\left(m^{lp}\right)\right)}{r+D} + \frac{D}{r+D}V^c. \tag{B.6}$$

Using (B.5) and (B.6), we get

$$V^l = \frac{(1+r)\left(kn^l - G\left(n^l\right) - H\left(m^{lp}\right)\right)(r+e^*)}{r\left(r+e^* + D^*(1-e^*)\right)}. \tag{B.7}$$

Using (B.3) and (B.5), we have

$$H\left(m^l\right) + H'\left(m^l\right)\frac{r+D}{\frac{\phi}{\tilde{a}}w(\epsilon^*)} = kn^l - G\left(n^l\right) - \frac{re}{r+e}V^l \tag{B.8}$$

Using $e_m^* = \frac{D_m^*}{n^*+D_m^*}$, (B.7), and (B.8), we can write

$$H'\left(m^{lp}\right)\frac{1}{\frac{\phi}{\tilde{a}}w(\epsilon^*)} = \left(kn^* - G\left(n^*\right) - H\left(m^{lp}\right)\right)\frac{n^*}{r(n^*+D) + D(1+n^*)} \tag{B.9}$$

which solves with (B.2) and $\tilde{a}^*$ for $\{\bar{q}_m^*, m_m^*\}$ that is unique as shown. The pair $\{\bar{q}_m^*, m_m^*\}$ solve for D_m^*, which solves for e_m^*. The expected lifetime payoff for a lobbyist in steady state is then

$$V_m^{l*} = \frac{(1+r)(r+e_m^*)}{r(1-e_m^*)}\frac{H'\left(m_m^*\right)}{\frac{\phi}{\tilde{a}^*}w(\epsilon^*)} \tag{B.10}$$

and for a citizen

$$V_m^{c*} = \frac{(1+r)e_m^*}{r+e_m^*}V_m^{l*} > 0. \tag{B.11}$$

Finally, $u_m^* = \tilde{a}^* - \rho(x^+)m_m^*$ and $d_m^* = n^* - m_m^* - u_m^*$.

B.1.2 Corner Solution: Financial Contributions

Finally, suppose policymakers do not value verification efforts sufficiently and desire only financial contributions. A policymaker avoids providing any incentives for costly verification effort as it reduces a lobbyist's resources and hence chooses a quality threshold of $\bar{q}_f^* = 0$. Since a policymaker can monitor perfectly a lobbyist's current financial contribution in $t+1$, the policymaker takes only the participation constraint into account and tries to extract all available rents. It follows that the participation constraint is binding. The optimal financial contribution minimum follows from (2.22) with

$$\frac{V^l - V^c}{1+r} = f_t^{lp}. \tag{B.12}$$

Using the stationary expected payoff described in (3.17) with $V^l - V^c$, it follows that

$$V^l - V^c = \frac{(1+r)\left(kn^l - G(n^l) - f^{lp}\right)}{r} - V^c \tag{B.13}$$

so (B.12) and (B.13) jointly imply

$$kn^l - G(n^l) - \frac{rV^c}{1+r} = (1+r)\bar{f}_f^* = (1+r)\bar{f}_f^*. \tag{B.14}$$

Equilibrium The equilibrium conditions for the market for commercial lobbying services are not affected by a corner solution for the policymaker's problem with respect to financial contributions. It still holds that

$$\frac{n^*}{1+n^*} G'(n^l)\Big|_{n^l=n^*} = \frac{\bar{P}A^p\pi^c}{T-\bar{P}} \tag{B.15}$$

and the equilibrium values for k^*, L^*, C^*, and $\tilde{a}^*$ are identical. However, each policymaker sets $\bar{q}_f^{lp} = 0$ and maximizes rents through financial contributions. Lobbyists undertake no verification efforts, $m_f^* = 0$, and make the required financial contributions since policymakers can identify perfectly whether or not a lobbyist made the required financial contribution – i.e., $f_f^* = \bar{f}_f^*$. The lobbyist's equilibrium portfolios are characterized by $u_f^* = \tilde{a}^*$ and $r_f^* = n^* - u_f^*$.

In steady state, there is a no exit out of and entry into the lobbying industry and political access market. It follows that $D_f^* = 0$ and $e_f^* = 0$. The lifetime expected payoff for a citizen follows from (3.16) with $\Pi_t^c = 0$, because of the expected private rent dissipation for citizens, such that

$$V^{c*} = \frac{(1+r)\Pi_t^c}{r} = 0. \tag{B.16}$$

Using (B.14), the steady minimum financial contribution is

$$\bar{f}_f^* = \frac{k^*n^* - G(n^l)}{1+r}\Big|_{n^l=n^*} \tag{B.17}$$

with $f_f^* = \bar{f}_f^*$. Finally, the expected lifetime payoff for a lobbyist follows from (B.14) and is

$$V_f^{l*} = (1+r)\bar{f}_f^* \tag{B.18}$$

with $V_f^{l*} > V_f^{c*} = 0$. Policymakers can extract larger rents from lobbyists because of the better monitoring of financial contributions but they still have to share rents with lobbyists to induce promised and legally nonenforceable financial contributions.

B.2 Calculations for Selected Comparative Statics

To save on notation, we keep $\psi = \rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)$ for the following equations. The equilibrium equations from Section 3.4 and the nonzero results describe Table 2.

B.2.1 Equilibrium Equations for Interior Solution

Clients per firm: $\frac{n^l}{1+n^l}\frac{\partial G(.)}{\partial n^l} - \frac{PA\pi}{T-P} = 0$.
Lobbying service fee: $\frac{\partial G(.)}{\partial n^l} - k = 0$.
Lobbyists: $L - \frac{T-P}{1+n^l} = 0$.
Citizens: $C - n^l L = 0$.
Political access per firm: $a^l - \frac{PA}{L} = 0$.

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Verification and quality threshold per firm (1): $H'(.) + H''(.)\frac{r+D}{w(\epsilon^*)} - \frac{s}{\alpha T}\psi\frac{\phi}{\tilde{a}^*} = 0$.

Verification and quality threshold per firm (2): $\tilde{a}^{lp}\frac{w(\epsilon^*)}{r+D} + \frac{\phi\epsilon}{\sigma^2} = 0$.

Unverified presented proposals per firm: $u^l - a^l + \rho(x^+)m^l = 0$.

Disappearing proposals per firm: $r^l - n^l + m^l + u^l = 0$.

Entry likelihood: $e - \frac{D}{n+D} = 0$.

Financial contribution per firm: $f^l - n^l k + H(m^l) + G(n^l) + \left(\frac{H'(m^l)}{\phi w(\epsilon^*)/\tilde{a}^{lp}}\right)\left(\frac{r+e+D(1-e)}{1-e}\right) = 0$.

Lobbyist's expected lifetime payoff: $V^l - \left(\frac{1+r}{r}\right)\left(\frac{r+e}{1-e}\right)\frac{H'(m^l)}{\phi/\tilde{a}^{lp}} = 0$.

Citizen's expected lifetime payoff: $V^c - \frac{(1+r)e}{r+e}\left(\frac{1+r}{r}\right)\left(\frac{r+e}{1-e}\right)\frac{H'(m^l)}{\phi/\tilde{a}^{lp}} = 0$.

B.2.2 Selected Nonzero Results

1. Dishonesty/Effectiveness of Financial Contributions on

   (a) Verification per Firm: $\frac{\partial m^l}{\partial\alpha} = -\frac{\rho\phi\psi sw'(\epsilon^*)}{\alpha^2\tilde{a}^{lp}T[w'(\epsilon^*)H''(.)+(r+w(\epsilon)H'''(.)]} < 0$.

   (b) Quality Threshold for Portfolio: $\frac{\partial\bar{q}^{lp}}{\partial\alpha} = -\frac{\rho\phi^2\psi sw'(\epsilon^*)}{\alpha^2\tilde{a}^{lp2}T[w'(\epsilon^*)H''(.)+(r+w(\epsilon)H'''(.)]} < 0$..

   (c) Financial Contributions per Firm: $\frac{\partial f^l}{\partial\alpha} = \frac{s\rho\psi\left[(1-e)\phi H'(.)w'(\epsilon^a st)+a^{lp}(e+r+(1-e)D)H''(.)\right]}{a^{lp}(1-e)T\alpha^2[w'(\epsilon)H''(.)+(r+D)H'''(.)]} > 0$.

   (d) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial\alpha} = \frac{s\rho^2\phi\psi w'(\epsilon^*)}{\alpha^2\tilde{a}^{lp}T[w'(\epsilon^*)H''(.)+(r+D)H'''(.)]} > 0$.

   (e) Lobbyist's Expected Lifetime Payoff: $\frac{\partial V^l}{\partial\alpha} = -\frac{(1+r)(e+r)s\rho\psi H''(.)}{(1-e)rT\alpha^2[w'(\epsilon^*)H''(.)+(r+D)H'''(.)]} < 0$.

2. Magnitude of Spillovers on

   (a) Verification per Firm: $\frac{\partial m^l}{\partial s} = \frac{\rho\phi\psi w'(\epsilon^*)}{\alpha\tilde{a}^{lp}T[w'(\epsilon^*)H''(.)+(r+w(\epsilon)H'''(.)]} > 0$.

   (b) Quality threshold for portfolio: $\frac{\partial\bar{q}^{lp}}{\partial s} = \frac{\rho\phi^2\psi w'(\epsilon^*)}{\alpha\tilde{a}^{lp2}T[w'(\epsilon^*)H''(.)+(r+w(\epsilon)H'''(.)]} > 0$.

   (c) Financial Contributions per Firm: $\frac{\partial f^l}{\partial s} = -\frac{\rho\psi\left[(1-e)\phi H'(.)w'(\epsilon^a st)+a^{lp}(e+r+(1-e)D)H''(.)\right]}{a^{lp}(1-e)T\alpha[w'(\epsilon)H''(.)+(r+D)H'''(.)]} < 0$.

   (d) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial s} = -\frac{\rho^2\phi\psi w'(\epsilon^*)}{\alpha\tilde{a}^{lp}T[w'(\epsilon^*)H''(.)+(r+D)H'''(.)]} < 0$.

   (e) Lobbyist's Expected Lifetime Payoff: $\frac{\partial V^l}{\partial s} = \frac{(1+r)(e+r)\rho\psi H''(.)}{(1-e)rT\alpha[w'(\epsilon^*)H''(.)+(r+D)H'''(.)]} > 0$.

3. Information Gains from Verification on

   (a) Verification per Firm: $\frac{\partial m^l}{\partial\psi} = \frac{\rho\phi sw'(\epsilon^*)}{\alpha\tilde{a}^{lp}T[w'(\epsilon^*)H''(.)+(r+w(\epsilon)H'''(.)]} > 0$.

   (b) Quality threshold for portfolio: $\frac{\partial\bar{q}^{lp}}{\partial\psi} = \frac{\rho\phi^2 sw'(\epsilon^*)}{\alpha\tilde{a}^{lp2}T[w'(\epsilon^*)H''(.)+(r+w(\epsilon)H'''(.)]} > 0$.

   (c) Financial Contributions per Firm: $\frac{\partial f^l}{\partial\psi} = -\frac{s\rho\left[(1-e)\phi H'(.)w'(\epsilon^a st)+a^{lp}(e+r+(1-e)D)H''(.)\right]}{a^{lp}(1-e)T\alpha[w'(\epsilon)H''(.)+(r+D)H'''(.)]} < 0$.

   (d) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial\psi} = -\frac{s\rho^2\phi w'(\epsilon^*)}{\alpha\tilde{a}^{lp}T[w'(\epsilon^*)H''(.)+(r+D)H'''(.)]} < 0$.

   (e) Lobbyist's Expected Lifetime Payoff: $\frac{\partial V^l}{\partial\psi} = \frac{(1+r)(e+r)s\rho H''(.)}{(1-e)rT\alpha[w'(\epsilon^*)H''(.)+(r+D)H'''(.)]} > 0$.

B.3 Unpublished Results

Here, we state briefly some unpublished results from Groll and Ellis (2013).

B.3.1   Policymaker's Lobbying Effort Requests

Proposition (Groll and Ellis, 2013). *The solution to the policymaker's problem with observable verification efforts and financial contributions may take one of four possible forms dependent on parameter values:*

1. *If the solution is at a corner with respect to verified proposals, then all approved policy proposals received positive verification signals. All remaining rents are extracted by policymakers via financial contributions.*

2. *If the solution is at a corner with respect to verified and unverified proposals, then then the solution to the policymaker's problem involves lobbyists verifying m^{co} proposals, which exhaust a lobbyist's financial resources, and presenting those proposals which received a positive verification signal together with sufficient unverified proposals to exhaust access. No rents are extracted via financial contributions because of a sufficiently small α. The amount of verification at the firm-level is determined by*

$$H\left(m^{co} + \sum_{h \neq p} m^{lh}\right) = n^l k - \sum_{h \neq p} f^{lh} - G\left(n^l\right) - E[\Pi^c | private\ ben.].$$

3. *If the solution is interior with respect to verification and financial contributions, then the policymaker's problem involves lobbyists verifying $m^{\#}$ proposals, and presenting those proposals which received a positive verification signal together with sufficient unverified proposals to exhaust access. All remaining rents are extracted by policymakers via financial contributions. The amount of verification at the firm-level is determined by*

$$\frac{\partial H(m^l)}{\partial m^{lp}} = \rho(x^+)\frac{s}{\alpha T}\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right].$$

4. *If the solution is at a corner with respect to financial contributions and the following holds*

$$\alpha > \rho(x^+)\frac{s}{T}\left(\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right),$$

then all approved proposals are unverified. All rents are extracted by policymakers via financial contributions.

B.3.2   Social Welfare of Full Information Equilibrium

Proposition (Groll and Ellis, 2013). *Comparing the verification effort levels for the full information social welfare optimum and the requests by policymakers under the full information market outcome, we have*

$$H'(m^l)\Big|_{m^l=m^*} \gtreqless \frac{1}{\alpha T - 1}\, G'(n^l)\Big|_{n^l=m^*} \Rightarrow m^{\#} \lesseqgtr m^*.$$

Proposition 5 is intuitive once we recognize that there are several distortions in operation. First, each policymaker receives only a share of aggregate spillovers and therefore does not fully

internalize all benefits from improved political decisions. Second, a policymaker does not internalize the costs of verifying proposals, and an socially undesirable oververification at the firm-level is more likely. Finally, a policymaker faces a trade-off between privately beneficial financial contributions and socially desirable spillover improvements, which may cause either an underverification (high α) or underverification (low α).