A Simple Model of the Commercial Lobbying Industry*

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Abstract

In this paper we present a model of the behavior of commercial lobbying firms (such as the so-called K-Street lobbyists of Washington, D.C.). In contrast to classical special interest groups, commercial lobbying firms represent a variety of clients and are not directly affected by policy outcomes. They are hired by citizens, or groups of citizens, to act as intermediaries on their behalf with policymakers. In our analysis we address two basic questions; what tasks are commercial lobbying firms performing, and what are the implications of their existence for social welfare? We answer the first part of this question by proposing that commercial lobbying firms possess a verification technology that allows them to improve the quality of information concerning the social desirability of policy proposals. This gives policymakers the incentive to allocate their scarce time to commercial lobbying firms. Essentially, it is this access to policymakers that commercial lobbying firms sell to their clients. To address the question of social welfare we construct a simple general equilibrium model that includes commercial lobbying firms, and compare the equilibrium obtained under market provision of lobbying services to the first best optimum. We find that the market level of lobbying services can be socially either too large or too small, and characterize when each will be the case.

Keywords: Lobbying, Influence Activities, Information Acquisition, Financial Contributions, Commercial Lobbying Firms, Political Access

JEL classification: D72, D82.

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1 Introduction

The economic literature on lobbying focuses almost entirely on the activities of special interest groups (hereafter SIGs). These groups attempt to influence the political process because they are directly affected, either ideologically or financially, by policy outcomes.[1] They are typically concerned only with policies relevant to the organizing principle around which they have coalesced.[2] It is surprising then to discover that by some measures only 40% of lobbying in the US is conducted by SIGs, and that they were not responsible for the rapid growth in lobbying expenditures over the 1999-2008 period.[3] The preponderance of lobbying activity in the US, and much lobbying activity in Europe, is performed by for-profit commercial lobbying firms (hereafter CLFs) that are typically neither directly affected by, nor have ideological preferences over, the policies they lobby for.

CLFs sell their services as intermediaries between citizens or SIGs and policymakers. These intermediation services include direct advocacy, legal and political consulting, advice about the political feasibility of clients' objectives, facilitating the formation of coalitions and grass root organizations, legislative drafting, legislative witness hearing preparation, and public relations. To our knowledge the behavior of CLFs and their economic implications have not been analyzed in the theoretical economics literature, and it is our intent that this paper begins to fill this void.[4]

The commercial lobbying industry is large and influential. For example, even excluding campaign contributions, federal lobbying expenditures in the US in 2010 were $3.47 billion. To put this into perspective the US Federal Election Committee reported that for the 2009-10 congressional electoral cycle campaign contributions totaled $1.9 billion. In 2010 there were 12,951 registered lobbyists the majority of whom were commercial lobbyists.[5]

[1] See Persson and Tabellini (2000) and Grossman and Helpman (2001) for a detailed review of SIG activities. Hall and Deardorff (2006) provide a review of various lobbying theories.

[2] See Olson's (1965) seminal work for the formation of SIGs.

[3] Bertrand, Bombardini, and Trebbi (2014) show that in the US between 2000 and 2008 the share of SIG lobbyists amongst all lobbyists fell from 60% to 40%; yet total lobbying expenditures increased by 30% over this period, commercial lobbying expenditures doubled and by 2008 accounted for 60% of all lobbying expenditures.

[4] The only empirical paper in this area is Bertrand, Bombardini, and Trebbi (2014). This was written concurrently with the analysis presented here, and represents an out of sample test which confirms the bulk of our theoretical reasoning.

[5] Numerous CLFs possess their own Political Action Committees, and use them to make campaign contributions to politicians with whom they have political connections. See the website of the Center for

Public concern over the political influence of lobbyists has been increasing in almost all Western democracies. Recent parliamentary discussions and reforms in the United Kingdom and the European Union emphasize this point.[6] Further, pressure to regulate lobbying activities has led to legislation in the United States, Canada, and Australia.[7] The public has also expressed concerns that professional lobbying may crowd citizens out of the political process. However, it remains the case that most Western democracies have very limited regulation of lobbying activities.[8]

The conventional wisdom of lobbying is that SIGs may have information valuable to an imperfectly informed policymaker. Unfortunately, private incentives to misrepresent information may limit what may learned from the signals sent by SIGs; hence the quality of policy decisions and social welfare may suffer. It is clear that politicians are cognizant of these issues; Tony Wright MP, Chairman of the Public Administration Select Committee of the British parliament in 2009, stated:

> *"Lobbying enhances democracy, but it can also subvert it. Government has accepted that it should be more open to outside interests and ideas, and this has brought benefits. But there are risks around influence and public mistrust of government, and these risks have not been managed closely enough."*[9]

We argue that CLFs engage in information verification activities and exist to (at least partially) mitigate this problem. That they have no intrinsic policy bias and respond to standard market incentives may allow them to credibly transmit information that cannot be transmitted by SIGs.

Responsive Politics and Bertrand, Bombardini, and Trebbi (2014) for more details and analysis.

[6] The British Parliament's Public Administration Select Committee (2009a) was initially concerned about lobbyists "for-hire" but acknowledged later their beneficial role of representing smaller organizations and irregular participants in the political process. The European Parliament imposed mandatory registration for lobbyists, while in 2008 the European Commission introduced voluntary registration.

[7] The U.S. Lobbying Disclosure Act of 1995 (LDA) regulates federal lobbying activities. The regulation consists of registration, activity reports, and penalties for potential violations. The LDA is intended *"[...] 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."* In Canada, the Lobbying Act of 2008 extended previous regulation and required activity reports, provided a code of conduct, and limited post-employment opportunities. In 2008, the Australian government introduced a code of conduct and a public register.

[8] See Chari, Hogan, and Murphy (2010) for an extensive overview of lobbying regulations across countries.

[9] Tony Wright's MP statement is taken from a press notice by the Public Administration Select Committee (2009b).

In the sections that follow we develop and analyze a simple stylized model of commercial lobbying. In the model there are three types of agents: Citizens, CLFs, and policymakers. All agents are assumed rational and self-interested. Each citizen is endowed with a policy proposal which if enacted by a policymaker yields them a private benefit and generates a public spillover. Spillovers may be either welfare increasing or decreasing, and are not perfectly observed ex ante. However, CLFs possess a costly verification technology that allows them to observe a signal correlated with the sign of the welfare effect of a policy proposal's spillover. This signal can be shared with a policymaker. Policy proposals may be presented to policymakers either directly by citizens, or indirectly by CLFs acting as intermediaries. The policymakers' time is scarce such that they may only receive and enact a given number of policy proposals. Social welfare in the economy is simply the sum of all private benefits plus net spillovers minus CLFs' costs. In the economy there are two markets; a market for CLFs' intermediation services on which citizens employ CLFs to present their policy proposals to policymakers; and a market for access to policymakers on which the policymaker's time is intermediated via simple agency contracts with CLFs and citizens.

Our analysis contributes to the literature on lobbying in three general ways: The first set of contributions is constructive. In the model we incorporate the main observed characteristics and activities of CLFs. We assume that CLFs possess a costly information verification technology that allows them to construct portfolios of policy proposals of given informational quality that have value to policymakers. We recognize that CLFs are for-profit, and hence their existence requires a market participation constraint be satisfied. This constraint has three immediate but interesting implications: First, it defines the trade-off between information quality and financial contributions faced by policymakers. Information quality is socially beneficial whereas financial contributions are only privately beneficial to the policymaker. This illustrates the tension between information gains from lobbying and the risks of influence. Second, the existence of this trade-off explains why any given CLF both makes financial contributions and supplies information to policymakers simultaneously; a feature not present in the current literature. Third, it explains why in some circumstances there will be political capture by lobbyists in both a market en-

vironment and at a social optimum. Political capture by CLFs is socially desirable as it allows the social planner to realize optimal information gains. In a market environment policymakers facilitate political capture by CLFs so that they may then extract from them a desired mix of information and private rents.

The second set of contributions involve the welfare value of commercial lobbying. In our welfare analysis we respect that the information verification activities of CLFs are costly, hence their existence is only socially desirable if they improve information sufficiently. Should this be the case however, we show that complete political capture, where all policymakers' time is intermediated by CLFs, can be a feature of the social welfare optimum.

Our third set of contributions involve identifying and analyzing the welfare implications of the distortions that arise in the full information market equilibrium. In this equilibrium policymakers supply CLFs with political access that they then sell to their citizen-clients. Policymakers' time, or, alternatively expressed, potential political access, is the critical scarce resource in the model. Control of this resource endows policymakers with a form of market power which is the fundamental distortion. This market power allows policymakers to demand from CLFs a "price" for access that involves their employing their verification technology to raise the expected value of spillovers to a required level and combine this information improvement with direct financial contributions. Informational improvements are socially beneficial, whereas financial contributions benefit only the policymaker recipient. Policymakers are selfish rational maximizers who value the informational component of this payment only in as much as it benefits themselves. They recognize that CLFs' market participation constraints face them with a trade-off between information transfers and financial contributions. The policymaker's optimization problem involves picking a point on this trade-off frontier. In making this choice, policymakers fail to fully internalize both CLFs' costs and the social value of spillovers. Since these distortions tend to move the policymaker's choice around the trade-off frontier away from the socially optimal choice in different directions, there is the possibility that the market equilibrium will involve either inefficiently low or high levels of information improvements. Our contribution here is to identify the circumstances under which each distortion is dominant, and to analyze the ef-

fects of policy in each of these cases. If policy involves selecting a policymaker with a level of honesty, as defined by the weight they place on financial contributions, then we show that in a market environment employing fully honest policymakers may be socially undesirable. Similarly, if the size of government is a policy choice variable, then we show that it can be welfare improving to increase the number of policymakers above their first-best level.[10]

The rest is organized as follows. Section 2 presents the model of commercial lobbying. Section 3 characterizes the socially optimal allocation of political access and lobbying activities. Section 4 derives the full information market outcome and characterizes how policymakers allocate access so as to shape lobbying behavior. Section 5 compares the market outcome with the social optimum and discusses some reforms. Section 6 concludes.[11]

2 The Basic Model

The economy has a total population of size T and three types of agents: Citizens indexed $c = 1, ..., C$, policymakers indexed $p = 1, ..., P$, and lobbyists of consisting of $l = 1, ..., L$ who actively engaged in the lobbying industry, and a remaining $j = 1, ...J$ who are inactive.[12] The number of agents who are policymakers is determined by a constitution and the number of citizens is given. The division of lobbyists between those that are active and inactive is determined endogenously below.

Each citizen is endowed with a policy proposal which if enacted by a policymaker will yield a private benefit of $\pi > 0$ and a spillover to the rest of society of magnitude s. Spillovers may be either positive with $\pi + s > 0$ or negative and absolutely large enough

[10] In a companion paper, Groll and Ellis (2013b), we focus on personal repeated relationships between CLFs and policymakers in the presence of unobservable lobbying activities by CLFs. Though the focus is different, a couple of the current results are confirmed there. Policymakers announce political access rules to CLFs that specify the terms of exchange of political access for lobbying resources. These exchanges also depend on the policymakers' preferences for information quality and financial contributions, externalities from spillover shares and CLFs' costs and technologies. Policymakers have an incentive to deny access to citizens in order to increase CLFs' resources that they can extract. The welfare implications hinge on whether policymakers solve a contracting problem for financial contributions or an information problem of unobservable information improvement.

[11] All appropriate proofs and derivations may be found in the appendices at the end of the paper.

[12] This division of lobbyists into active and inactive is a device to simplify the model. In a previous version, we allowed individuals to choose between the roles of citizen and lobbyist and modeled this choice. This simplification does not significantly affect our results.

such that $\pi - s < 0$. Hence, proposals with positive spillovers are socially desirable, while those with negative spillovers are not. There are a number of possible interpretations for these spillovers; they may be externalities or associated with impure public goods in a traditional sense, or they may represent the public provision of capital, education, or laws.

The ex ante exogenous probability of a positive spillover is $\rho(s^+)$, so the probability of a negative spillover is $\rho(s^-) = 1 - \rho(s^+)$. Overall, the expected social value of a randomly drawn proposal is assumed positive.

Policy proposals may be either presented directly by citizens to policymakers, or indirectly via CLFs. We assume that all policy proposals that are presented to policymakers, and are not known to be socially undesirable, are enacted and thus yield their private benefits and spillovers. In this sense, policymakers act only as "gatekeepers" whose role is to decide how to allocate their scarce time by choosing which agents' proposals to listen to. The solution to the policymaker's problem then specifies political access rules.

2.1 Citizens

Citizens are rational self-interested agents. They have three options for their proposal: Attempt to gain direct access to a policymaker so as to realize its payoffs, attempt to gain access for their proposal indirectly by employing a CLF as an intermediary, or do not attempt to gain access for their proposal.[13] Direct access is costless. Employing a CLF as an intermediary requires they pay a fee of k.[14] We assume that a citizen can hire only one lobbyist. The citizen's payoffs are

$$\Pi^c(\pi, k, S) = y\pi - zk + \frac{S}{T}, \tag{2.1}$$

[13] There is a large literature on lobbying as a form of rent-seeking going back to Tullock (1967), Krueger (1974), and Buchanan (1980). See Congleton, Hillman, and Konrad (2008) for an extensive survey. In our approach lobbying is not pure rent-seeking.

[14] We assume that lobbyists are compensated for the services they provide to clients and not for success. The use of "lobbying success fees" is sensitive, since such fees are often illegal or restricted. Lobbying success fees are illegal in connection to U.S. federal government contracts – see 10 U.S.C. 2306(b) – but exceptions apply for lobbying Congress members – see the Lobbying Disclosure Act Guidance (2011) for further details. Also, 43 U.S. states prohibit the use of lobbying success fees and 3 states restrict them – see the Center for Ethics in Government's (2010) "50 State Chart: Contingency Fees" for an overview.

where $S = \sum_{c=1}^{A} s^c$ is the sum of all spillovers, if A proposals are heard and enacted, and 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 $z = 1$. Notice that we assume each member of the economy shares in the sum of total spillovers, S.

2.2 Lobbying Firms

There are L active commercial lobbyists each of whom constitutes a CLF. Each firm accepts proposals from n^l clients and charges a lobbying service fee of k per proposal. Each lobbying firm l receives political access of a^{lp} from policymaker p. Overall, lobbying firm l receives political access of $a^l = \sum_{p=1}^{P} a^{lp}$, where $a^{lp} > 0$ if the policymaker is one of their political contacts, and is zero otherwise. It is this access which they sell to their citizen-clients.

In return for access the lobbying firms supply policymakers with the proposals of their clients, and potentially also financial contributions of f^{lp}.[15,16] We assume that CLFs have expertise which allows them to investigate the potential spillovers of a policy proposal.[17] This expertise takes the form of a verification technology which returns a signal x, $x \in \{x^+, x^-\}$, which is positively correlated with the sign of the spillover. Formally, we have $\rho(s^+|x^+) > \rho(s^+)$ and $\rho(s^-|x^-) > \rho(s^-)$. Hereafter, to save on notation, we define the expected information gain from receiving the signal x^+ as $\Delta(\rho|x^+) \equiv \rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)$. Investigated proposals with a positive signal have greater expected social value than unverified proposals; verified proposals with a negative signal have negative expected social value. In summary, we have

$$\begin{aligned} \rho(s^+|x^+)(\pi + s) + \rho(s^-|x^+)(\pi - s) &> \rho(s^+)(\pi + s) + \rho(s^-)(\pi - s) \\ &> 0 > \rho(s^+|x^-)(\pi + s) + \rho(s^-|x^-)(\pi - s). \end{aligned} \tag{2.2}$$

[15] Financial contributions are not linked to policy outcomes here; for the implications of policy contingent financial contributions see Bernheim and Whinston (1986), Grossman and Helpman (1994), and Besley and Coate (2001).

[16] The assumption that only commercial lobbyists make financial contributions is a simplification. However, Bertrand, Bombardini, and Trebbi (2014) provide evidence that commercial lobbyists make larger campaign contributions than either in-house lobbyists or their clients.

[17] This assumption was confirmed in an interview with a professional lobbyist, and is also supported by the conclusions of Bertrand, Bombardini, and Trebbi (2014) who construct a measure of lobbyists' concentration in specific issues. They distinguish between "specialists" who focus on a few issues and "generalists" who are involved with a larger range of issues. They find that out-of-house lobbyists are more likely to be specialized than in-house lobbyists.

Verification is costly and is represented by the increasing convex cost function $H(m^l)$, where m^l is the number of proposals verified. In addition each proposal, whether verified or not, incurs the CLF a processing cost, represented by the increasing convex cost function $G(n^l)$, where n^l is the number of proposals processed. We assume $H'(0) = G'(0) = 0$.

Active lobbyists also enjoy a share of aggregate spillovers, hence their payoffs are

$$\Pi^l(n^l, m^l, f^l, S) = kn^l - G(n^l) - H(m^l) - f^l + \frac{S}{T}, \tag{2.3}$$

where $f^l = \sum_{p=1}^{P} f^{lp}$ is the sum of financial contributions paid by CLF l to policymakers $p = 1, .., P$, and where $f^{lp} = 0$ if the policymaker is not a "contact" of firm l.

Note that the CLFs' payoffs imply their only direct interest in the information they pass along to policymakers operates through their contributions to total spillovers, S, so contrary to the conventional literature they have no incentive to misrepresent information.[18]

2.2.1 Inactive Lobbyists

There are J inactive lobbyists who may be thought of as citizens who did not receive a policy proposal. However, they can enter the lobbying industry and become CLFs.[19] Inactive lobbyists, those who do not enter the lobbying industry, only enjoy a share of aggregate spillovers. Hence, their payoffs are

$$\Pi^j(S) = \frac{S}{T}. \tag{2.4}$$

2.3 Policymakers

Each of the P policymakers has a given endowment of time that allows them to approve a maximum of A^p proposals. Hence, policymakers in aggregate can approve a total of $A \leq PA^p$ proposals. Each policymaker has to decide how to allocate political access across citizens and CLFs. Policymakers do not have an independent verification technology.

[18] See Crawford and Sobel (1982), Potters and van Winden (1992), Austen-Smith (1994), Dewatripont and Tirole (1999), Krishna and Morgan (2001), and Gromb and Martimort (2007) for some exemplary studies in this literature.

[19] This is a simplification of the working paper version, Groll and Ellis (2013a), which includes an endogenous allocation of citizens and lobbyists. The assumption here replaces the lobbying labor market there, and it eases the analysis at no significant cost in terms of results.

Nevertheless, each policymaker can design rules that determine the conditions of access for citizens and CLFs.[20] These access rules can include financial contributions by CLFs.[21]

Policymakers' payoffs include any financial contributions, f^{lp}, received from their l^p lobbying contacts, and a share of aggregate spillovers.[22] Their valuation of financial contributions is parameterized by $\alpha \in (0, 1]$; this may be interpreted in several ways, if financial contributions are illegal or considered unethical, then α may be interpreted as the exogenous degree of dishonesty or corruption, alternatively if the transfers are in-kind, then α represents the efficiency of transfers.[23] The payoff for policymaker p is then

$$\Pi^p(f^p, S) = \alpha f^p + \frac{S}{T}, \tag{2.5}$$

where $f^p = \sum_{l=1}^{L} f^{lp}$ is the sum of financial contributions received by policymaker p from CLFs $l = 1, .., L$, where $f^{lp} = 0$ if the CLF is not a "contact" of policymaker p.

The objective function gives a hint as to the nature of the policymaker's problem in designing access rules; if there is a trade-off between financial contributions and spillovers, as indeed we shall argue, then this will be reflected in the optimal access rules.

3 Social Welfare

We first characterize the social welfare optimum, which acts as the benchmark for our analysis. We employ a social planner who is a utilitarian social welfare maximizer and

[20] The relationship between a policymaker and a CLF is characterized by an exchange rather than a "legislative subsidy" as in Hall and Deardorff (2006).

[21] There is a well developed literature on the purchase of access via financial contributions, see for example Austen-Smith (1995) and Lohmann (1995), with the aim of transmitting information so as to influence the policymaker. Here, access is purchased by commercial lobbyists so as to sell this access to their clients. Other models focus on the strategic interaction of observable information acquisition and campaign contributions. Bennedsen and Feldmann (2006) discuss an information externality that arises when several interest groups compete over one policy via information acquisition and financial contributions. Because of this externality interest groups with better information technologies specialize in information provision. Dahm and Porteiro (2008) consider the possibility that the acquisition of informations can benefit or harm an interest group. The uncertainty of information makes financial contributions more likely or serve as "damage control". Cotton (2009) discusses how policymakers sell favors to SIGs for less important issues but sell access for transmitting information on more important ones.

[22] In the working paper version, we introduce an ego rent to motivate agents to accept the role of a policymaker. Here, this is suppressed for brevity and does not affect any of our results.

[23] We discuss the case with a perfectly honest policymaker, $\alpha = 0$, in the working paper.

attaches equal weights to the payoffs of all members of society. Social welfare is thus

$$\Pi^w = \sum_{c=1}^{C} \Pi^c + \sum_{l=1}^{L} \Pi^l + \sum_{j=1}^{J} \Pi^j + \sum_{p=1}^{P} \Pi^p. \tag{3.1}$$

In expected terms and employing symmetry, (3.1) can be written as[24]

$$E[\Pi^w(L, P, n^l, m^l, f^l, S)] = PA^p\pi - L[H(m^l) - G(n^l) + (\alpha - 1)f^l] + E[S]. \tag{3.2}$$

Obviously, a social planner would not enact policy proposals with negative verification signals. The details of expected spillovers are then given by

$$E[S] = (A^c + Lu^l)s\left[\rho(s^+) - \rho(s^-)\right] + \rho(x^+)Lm^l s\left[\rho(s^+|x^+) - \rho(s^-|x^+)\right], \tag{3.3}$$

where A^c is the number of proposals directly presented by citizens and u^l is the number of proposals presented by CLF l that have not been verified. We shall maintain the assumption that the social welfare optimum involves the existence of CLFs.[25] In the following we describe the socially optimal lobbying activities by both CLFs and citizens. We then discuss some comparative statics.

3.1 Socially Optimal Lobbying Activities

The planner's problem involves choosing how many proposals will be presented via lobbing firms and how many by citizens, A^c. It also involves specifying the number of proposals to be verified, m^l, the number of unverified proposals to be passed along from a CLF to a policymaker, u^l, the number of proposals accepted from citizens by CLFs but not submitted to policymakers, r^l, and the financial contributions to be made by CLFs to each policymaker, f^l. The number of proposals within any CLF must satisfy the proposal

[24] Here and throughout the paper we exploit symmetry and use notationally simpler forms such as $LE[\Pi^l(n^l, m^l, f^l, S)]$ rather than a cumbersome summation notation. In the working paper version we offer a more detailed exposition.

[25] In the working paper version with a socially optimal division of the population between citizens, lobbyists, and policymakers we show that commercial lobbying tends to be socially desirable if (i) the verification technology significantly improves information, (ii) private benefits from proposals are smaller, or (iii) the lobbyists' costs of processing and verifying proposals are smaller.

constraint $n^l = m^l + u^l + r^l$. The planner's problem can then be written as

$$\begin{aligned}\max_{\substack{n^l,m^l,u^l,\\ r^l,f^l,A^c}} E\left[\Pi^w\right] &= PA^p\pi - L[H(m^l) - G(n^l) + (\alpha-1)f^l] \\ &\quad + \left(A^c + Lu^l\right) s\left[\rho(e^+) - \rho(e^-)\right] + \rho(x^+)Lm^l s\left[\rho(e^+|x^+) - \rho(e^-|x^+)\right] \\ \text{s.t.} \qquad & n^l = m^l + u^l + r^l \text{ and } PA^p = A^c + L(u^l + \rho(x^+)m^l). \end{aligned} \tag{3.4}$$

Perhaps obviously, at the social welfare optimum we have $u^l = r^l = 0$ and therefore $n^l = m^l$, because processing proposals by CLFs is costly. Given the described optimization problem, we can state the following for socially optimal lobbying activities.

Proposition 1. *The solution to (3.4) may take one of the two following forms:*

(a) A corner solution where all proposals are verified by lobbyists and all access is granted to CLFs, who present only those proposals with positive verification signals. Each CLF presents $m^{co*} = \frac{PA^p}{\rho(x^+)L}$ *proposals.*

(b) An interior solution where CLFs verify m^* *proposals and present only those with positive verification signals, where these are implicitly defined by*

$$\frac{\partial F(m^l)}{\partial m^l} + \frac{\partial G(m^l)}{\partial m^l}\bigg|_{m^l=m^*} = \rho(x^+)s\Delta(\rho|x^+). \tag{3.5}$$

The remaining government resources are employed to approve unverified proposals presented by citizens – i.e., $A^{c*} = PA^p - \rho(x^+)Lm^*$.

Financial contributions do not affect the allocation of political access or verification effort and are either zero or pure transfers – i.e., $f^* \geq 0$.

Whether or not the solution for m^* is interior has interesting implications. At the corner solution all proposals presented are verified, that is all policymakers' time is allocated to CLFs with no access for citizens. There is in this sense complete, but socially desirable, political capture by lobbyists. However, at the interior solution some unverified proposals are presented to policymakers, it follows that as any proposal that passes through a lobbing firm incurs a processing cost, it is therefore socially desirable that all unverified proposals

come from citizens. It follows that it is never socially desirable for lobbyists to act as pure intermediaries for any proposals; this would amount to pure distortionary rent-seeking.[26] Also note that if policymakers discount financial contributions, then at neither an interior nor a corner solution are these payments pure transfers; they are therefore always socially wasteful and set to zero at the optimum.[27] However, if financial contributions are pure transfers, then they do not affect the social optimum.

In summary, the analysis tells us that at the social welfare optimum CLFs should exist only to fulfill the socially desirable role of information improvement through expertise, they should not act as pure intermediaries between citizens and policymakers. Furthermore financial contributions from CLF's to policymakers are at best welfare neutral.

3.2 Selected Comparative Statics

If there is an interior solution to the welfare optimization problem, then the optimal number of verified proposals, m^*, is a function of the magnitude of spillovers, the quality of the verification technology, as given by the improvement in information about spillovers, and the costs of commercial lobbying as below

$$m^* = m\left(\underbrace{s}_{(+)}, \overbrace{\underbrace{\rho(x^+)}_{(+)}, \underbrace{\rho(e^+|x^+)}_{(+)}, \underbrace{\rho(e^-|x^+)}_{(-)}, \underbrace{\rho(e^+)}_{(-)}, \underbrace{\rho(e^-)}_{(+)}}^{\text{verification technology } (+)}, \overbrace{\underbrace{G'(m^*)}_{(-)} + \underbrace{H'(m^*)}_{(-)}}^{\text{lobbying costs } (-)}\right). \tag{3.6}$$

The signs under the variables indicate the direction of the comparative statics effects. If the magnitude of spillovers, s, increases, then it is more valuable to distinguish between proposals with positive and negative spillovers, and it is hence optimal to invest more resources in verification. The same holds for the verification technology. If the technology is more effective at the margin at distinguishing between proposals, then it is more valuable to invest resources in verification. Finally, if the marginal costs of processing and verifying proposals are, all else equal, higher, then CLFs verify less. Notice that at an interior solution the optimal investigation efforts, m^*, are invariant with respect to the number of

[26] For all unverified proposals it is true that $\frac{\partial E[\Pi^s]}{\partial u^l} < \frac{\partial E[\Pi^s]}{\partial A^c}$.

[27] The financial contributions are discounted by the degree of dishonesty. A policymaker with a lower degree of dishonesty, low α, discounts financial contributions more than a more dishonest policymaker.

CLFs, L, and policymakers, P.

The results differ at a corner solution, where the number of policymakers and CLFs determine the amount of verification. The amount of verification at a corner solution depends positively on the number of policymakers, P, and individual political resources A^p, and is decreasing in the number of lobbying firms, L, and the likelihood of a positive verification signal $\rho(x^+)$.[28] We now consider the market allocation.

4 The Market Outcome

Here we characterize the market equilibrium and then ask if it is socially efficient. There are two markets in the economy: A perfectly competitive intermediation services market on which citizens and lobbyists trade at the equilibrium price k, and a political access market on which lobbyists and citizens trade access with policymakers. The former market is characterized by free entry and exit by lobbyists between being active (being CLFs) or inactive; the latter market is characterized by access rules designed by policymakers (simple agency contracts).[29] To complete the market environment, we need to specify an information structure.

4.1 Information Structure

The information structure adopted is deliberately simple and somewhat artificial; but is designed to focus attention on the questions we wish to address. We want to explore how market incentives in the presence of commercial lobbying distort social welfare from the first-best optimum. That is, we are interested in how the constraints implied by the market provision of these intermediation services affect welfare. We assume that ex ante no agent observes the spillovers of proposals directly. However, all individuals know the exogenous

[28] For a discussion of the optimal allocation of the population between the roles of citizens, lobbyists, and policymakers see the working paper version of this model.

[29] The structure of the market environment with free entry into the lobbying industry but agency characteristics with access rules follows Bertrand, Bombardini, and Trebbi (2014) as well as Blanes i Vidal, Draca, and Fons-Rosen (2012). The structure illustrates that access rather than expertise is the scarce resource in lobbying activities. Further evidence that the lobbying industry is competitive follows from noting that total U.S. lobbying expenditures in 2010 were $3.47 billion at the federal level and that there were 12,951 registered lobbyists, yet the top 10 U.S. CLFs only reported revenues from lobbying services of around $252 million. Suggesting that the industry is not very concentrated.

probabilities $\rho(s^+)$, $\rho(s^-)$, $\rho(s^+|x^+)$, $\rho(s^-|x^+)$, $\rho(s^+|x^-)$, and $\rho(s^-|x^-)$. Further, citizens do not observe lobbyists' actions or the interactions between lobbyists and policymakers. However, they can observe realized political access, a^l, the number of clients of each CLF, n^l, and the number of CLFs. Policymakers can observe both the verification efforts of CLFs and the signals generated.[30] That the number of policymakers is determined by a constitution is common knowledge as is the number of citizens.

4.2 Citizens

Citizens are assumed to know the structure of the economy and take the distribution of political access as given. A citizen can approach a policymaker directly at no cost. If access is granted, their proposal is approved. However, some approaches may not be granted access, hence the citizens must calculate the probability of gaining access in computing their expected payoffs. This probability is simply $A^c/(C-N)$, where $C-N$ is the number of citizens competing for this access.

Alternatively, citizens may hire CLFs to present their policy proposals. These citizens cannot observe the CLFs' activities and have to form expectations about the likelihood that their proposals will be presented. Citizens observe the amount of political access a lobbying firm enjoys, a^l, and their number of clients, n^l, hence they correctly compute the probability that their proposal will be presented to be a^l/n^l.

A citizen can decide to be politically inactive, in which case their payoff comprises only of a share of spillovers. If all government resources are employed to approve policy proposals and if citizens must make their choices of whether to present their proposals prior to CLFs engaging in any verification activity, then citizens enjoy the same share of expected spillovers independent of their individual choices. The citizen's decision reduces

[30] This may be given the interpretation that policymakers are competent and ask lobbyists for "hard facts," which consist of research reports, from which they may deduce lobbyists' verification activities. Bennedsen and Feldmann (2006) adopt a set up in which a policymaker asks interest groups to provide independent information from a reputable third-party. Other models with verifiable information include Milgrom and Roberts (1986), Laffont and Tirole (1990), Bennedsen and Feldmann (2002a, b), and Cotton (2009, 2012). In a companion piece, Groll and Ellis (2013b), we allow the verification efforts of lobbyists to be private information and explore repeated agency relationships between policymakers and lobbyists.

to maximizing the incremental payoff from this decision, $\Delta E[\Pi^c]$, where

$$\Delta E[\Pi^c] = \begin{cases} \frac{A^c}{C-N}\pi & \text{if } c \text{ chooses the direct approach,} \\ \frac{a^l}{n^l}\pi - k & \text{if } c \text{ passes the proposal to lobbyist } l, \\ 0 & \text{if } c \text{ does not participate.} \end{cases} \tag{4.1}$$

If citizens expect political capture by CLFs, that is if all political access goes to the lobbying firms, then the choice alternatives reduce to hiring a CLF or being politically inactive. The demand for lobbying services then satisfies

$$\frac{a^l}{n^l}\pi - k \geq 0 \; \forall \; l. \tag{4.2}$$

4.3 Lobbyists

Lobbying firms are profit-maximizers. They also receive a share of total spillovers, but we assume the contributions of their own activities to aggregate spillovers are sufficiently small such that they are neglected in their choice problems. Each faces access rules devised by policymakers that specify a portfolio of verified and unverified proposals together with financial contributions that must be presented by any given CLF to any given policymaker. We assume that any CLF that fails to deliver on the requirements of the access rule is immediately denied all access to the policymaker in question.[31] Firm $l's$ optimization problem is characterized by

$$\max_{n^l} E[\Pi^l] = kn^l - G(n^l) - H(m^l) - f^l. \tag{4.3}$$

Each firm l must provide verification effort of $m^l = \sum_{p=1}^{p^l} m^{lp}$ and financial contributions of $f^l = \sum_{p=1}^{p^l} f^{lp}$ to its p^l political contacts according to the terms of the access rules. Each firm then chooses the number of clients to take on so as to maximize profits. The

[31] This is consistent with our informational assumptions, and can be supported in a more complex informational environment via a repeated agency relationship between policymakers and CLFs (see Groll and Ellis, 2013b).

first-order conditions with respect to the number of clients are then

$$k = \frac{\partial G(n^l)}{\partial n^l} \; \forall \; l \tag{4.4}$$

with $n^l > 0$ because of $G'(0) = 0$. The distribution of policy proposals in the CLF is illustrated by the *proposal condition* with $n^l = m^l + u^l + r^l$.

Inactive lobbyists with zero private payoffs enter the lobbying industry and contest lobbyists' payoffs whenever $E[\Pi^l] > 0$ and political access is available.

4.4 Policymakers

Each policymaker takes the lobbying service fee, k, the size of each firm, n^l, and the number of CLFs, L, as given and determines the allocation of their political resources, A^p, and the access rule for lobbying firms. The access rule consists of a required level of verification effort, m^{lp}, the number of policy proposals to be presented, a^{lp}, and a given financial contribution, f^{lp}, for each CLF. Each maximizes their expected payoff taking as given the access rules of the other, A^{-p}, policymakers. These access rules cannot make infeasible demands of CLFs, and must therefore respect the CLFs' participation constraints. For simplicity, we assume that CLFs have sufficient clients such that $n^l > m^l$.

A couple of observations allow us to simplify the policymaker's optimization problem: First, a policymaker knows that a citizen provides only a single unverified proposal, but a CLF can provide verification efforts and financial contributions. Therefore, a policymaker allocates all access to CLFs as long as they satisfy the access rules. Second, all proposals with negative verification signals will be ignored – i.e., the lobbyist's *presentation condition* is $a^{lp} = \rho(x^+)m^{lp} + u^{lp}$. Finally, given that all the policy proposals that will be presented have a positive expected spillovers, then each policymaker always exhausts political access – i.e., $A^p = \sum_{l=1}^{l^p} a^{lp}$.

The policymaker's expected payoff maximization problem is then

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

$$+\frac{1}{T}\left(\sum_{l=1}^{l^p} u^{lp}\right) s\left[\rho(s^+) - \rho(s^-)\right] \tag{4.5}$$

s.t. to the CLF's participation constraint

$$n^l k - f^{lp} - \sum_{h\neq p} f^{lh} - H(m^{lp} + \sum_{h\neq p} m^{lh}) - G(n^l) \geq 0 \ \forall \ l^p. \tag{4.6}$$

with Lagrange multiplier λ^{lp}. The first-order conditions of interest are

$$\frac{\partial E[\Pi^p]}{\partial m^{lp}} = \rho(x^+)\frac{s}{T}\Delta(\rho|x^+) - \lambda^{lp}\frac{\partial H(.)}{\partial m^{lp}} \leq 0 \ \forall \ l^p \tag{4.7}$$

$$\text{and } \frac{\partial E[\Pi^p]}{\partial f^{lp}} = \alpha - \lambda^{lp} \leq 0 \ \forall \ l^p, \tag{4.8}$$

where the standard complementary slackness conditions hold. The amount of access per firm, a^{lp}, the number of presented but unverified proposals, u^{lp}, and the number of lobbying contacts, l^p, will follow later from the equilibrium conditions. The second first-order condition (4.8) implies the following.

Lemma 1. *Each policymaker with $\alpha \neq 0$ extracts all potential resources up to the point that each CLF with whom he has contact is indifferent between staying in and leaving the industry, that is $\lambda^{lp} > 0$ for every l^p.*

This result is standard in the classical principal-agent literature, and tells us that the agents' participation constraints always bind, the only twist being that here the policymakers do not compensate their agents directly but rather transfer to them an asset, access, which they sell to their citizen-clients.[32]

Proposition 2. *The solution to (4.5) may take one of the following forms:*

(a) If the solution is interior, $f^{lp} > 0$ and $m^{lp} > 0$, the amount of verification follows from

$$\begin{aligned} &(i) \quad \tfrac{\partial H(.)}{\partial m^{lp}} = \rho(x^+)\tfrac{s}{\alpha T}\Delta(\rho|x^+) \quad \text{for } u^{lp} \geq 0 \\ &\text{or } (ii) \quad m^{lp} = \tfrac{A^p}{\rho(x^+)l^p} \quad \text{for } u^{lp} = 0 \end{aligned} \tag{4.9}$$

[32] For reviews of the principal-agent literature see Laffont and Martimort (2002) and Bolton and Dewatripont (2005).

(b) If $\lambda^{lp} > \alpha$, then there is a corner solution with respect to contributions, $f^{lp} = 0$ and $m^{lp} > 0$. The amount of verification follows from $H\left(m^{co} + \sum_{h \neq p} m^{lh}\right) = n^l k - \sum_{h \neq p} f^{lh} - G\left(n^l\right)$.

(c) If $\alpha > \rho(x^+)\frac{s}{\alpha T}\Delta(\rho|x^+)$, then there is a corner solution with respect to verification, $f^{lp} > 0$ and $m^{lp} = 0$.

The outcome that arrises depends on the slopes of the policymaker's indifference curve, and the CLF's participation constraint. For the interior solution, part (a(i)) of the proposition, we can see immediately from (4.9) that the portfolio will involve more verification and a smaller financial contribution as $\rho(s^+)$, s, or $\Delta(\rho|x^+)$ increase, or as α or T decrease. This is intuitive, a higher $\rho(s^+)$ or $\Delta(\rho|x^+)$ imply that the expected marginal value of verification is higher either because a positive signal is more likely or the informational gain from a positive signal is more valuable. A higher s implies that enacted policies have a greater impact and hence increases the marginal value of verification. A lower α implies that the policymaker values financial contributions less at the margin, while a smaller T implies that the relative value of each policymaker's contribution to aggregate spillovers is greater at the margin. Part (a(ii)) of the proposition holds if the policymaker's time constraint binds before the lobbyists run out of resources. Then all proposals are verified and remaining resources are extracted via financial contributions.

For sufficiently high values of $\rho(s^+)$, $\Delta(\rho|x^+)$ or s, or sufficiently low values of α or T the solution is driven to a corner where financial contributions fall to zero, as in part (b) of the proposition. Conversely for sufficiently low values of $\rho(s^+)$, $\Delta(\rho|x^+)$ or s, or sufficiently high values of α or T the solution is driven to another corner where verification effort falls to zero, as in part (c) of the proposition.

In summary, the solution to the policymaker's problem tends to involve greater levels of socially beneficial information improvement if; their own spillover shares from policy proposals are larger, verification technology is more effective or inexpensive, or financial contributions are valued less. However, they demand less verification and greater financial contributions if the opposite conditions hold.

4.5 Market Equilibrium

We now derive the overall market equilibrium. This is characterized by an equilibrium for policymakers selecting agency contracts to offer CLFs, as well as supply equals demand in the lobbying service market. We attain this equilibrium under the assumption of a given constitution that specifies the number of policymakers, P, and for a given number of citizens, C.

4.5.1 The Market for Political Access

On the market for political access policymakers make take-it-or-leave-it offers to lobbying firms. They require a given number or proposals be submitted, a certain share of which must have been verified and have received positive signals, any remainder being unverified. They also demand financial contributions (hereafter we consider only interior political access rules where $m^{lp} > 0$, $u^{lp} \geq 0$, and $f^{lp} > 0$). We know that provided they can supply sufficient proposals policymakers allocate all political access to CLFs, so given that the number of policymakers is constitutionally determined, it follows that in the symmetric case the supply of access (or demand for proposals) is simply

$$a^l = \frac{PA^p}{L} \; \forall \; l. \tag{4.10}$$

Now applying the fact that policymakers extract all residual rents from lobbying firms via financial contributions, we have that in a symmetric political access market equilibrium the sum of financial contributions paid to policymakers by firm l is given by

$$f^l = n^l k^l - H(m^l) - G(n^l) \geq 0 \; \forall \; l. \tag{4.11}$$

This allows us to specify the per policymaker per CLF contract that clears the market for political access, which consists of the triple $\left\{m^l, \rho(x^+)m^l + u^l, \frac{f^l}{p^l}\right\}$. The demand of m^l ensures that given the demands of other policymakers each CLF verifies m^{**}, u^{**} is such that each policymaker has no unused time, and $f^{**} = \frac{f^l}{p^l}$ such that all residual rents are extracted.

4.5.2 The Market for Commercial Lobbying Services

On the commercial lobbying market citizens demand commercial lobbying services up to the point where their expected benefit equals the price, while lobbying services are supplied up to the point where the marginal processing cost of another proposal just equals that same price, k. Assuming symmetric CLFs and applying (4.10), the market clearing lobbying service fee satisfies

$$\frac{PA^p}{Ln^l}\pi = k = \frac{\partial G(n^l)}{\partial n^l} \ \forall \ l. \tag{4.12}$$

This together with the equilibrium conditions from the political access market implies

Lemma 2. *In an equilibrium with a perfectly competitive lobbying market and agency contracts for access, all citizens are clients of CLFs – i.e., $C = n^l L$.*

This is an immediate implication of the assumption that the market for lobbying services is perfectly competitive and the result that policymakers extract all rents from CLFs. If a citizen exists who is not a client of a CLF, then he realizes no expected private benefits. Given that the costs of lobbying activities are increasing and convex an inactive lobbyist can always enter the lobbying industry at a lower cost per client than pre-existing firms and can offer greater opportunities for rent extraction to policymakers. Hence, all citizens must either be clients of existing or entering CLFs.

4.5.3 Full Equilibrium

The full market equilibrium is characterized by the market equilibrium conditions discussed above and the population constraint $T = C + L + P$, where P is the constitutionally determined number of policymakers.[33] Employing the population constraint, expression (4.12) and Lemma 2 (twice) provides us with a three equations in three unknowns which may be rearranged to give the implicit solutions

$$\frac{\partial G(n^{**})}{\partial n^{**}} = \frac{PA^p\pi}{C}, \ L^{**} = \frac{C}{n^{**}}, \text{ and } J^{**} = T - L^{**} - P - C. \tag{4.13}$$

[33] We have used * to indicate socially optimal values, and we now use ** to indicate market values.

The equilibrium is unique because of the convexity of $G(.)$. Exploiting these results and using (4.12) and (4.10), we obtain the equilibrium lobbying service fee and the equilibrium level of political access per CLF such that

$$k^{**} = \left.\frac{\partial G(n^l)}{\partial n^l}\right|_{n^l=n^{**}} \text{ and } a^{**} = \frac{PA^p}{L^{**}}. \tag{4.14}$$

Political access is granted by policymakers in exchange for the presentation of portfolios of proposals with requisite expected social value and financial contributions. For the interior solution, the presented proposals consist of verified proposals with a positive verification signal, $\rho(x^+)m^{**}$, where m^{**} solves (4.9). The equilibrium number of unverified but presented proposals, number of unverified and unpresented proposals, and financial contributions are

$$\begin{aligned} u^{**} &= a^{**} - \rho(x^+)m^{**} \geq 0, \\ r^{**} &= n^{**} - m^{**} - u^{**} \geq 0, \text{ and} \\ f^{**} &= n^{**}k^{**} - H(m^{**}) - G(n^{**}) \geq 0. \end{aligned} \tag{4.15}$$

Notice that here each CLF may both supply information and make financial contributions despite being engaged in competition for political access. This contrasts with Bennedsen and Feldmann (2006) where some SIGs make financial contributions and others supply information. In their paper which SIG completes each task depends on which has the superior information gathering technology. It also contrasts with Dahm and Porteiro (2008) where a single SIG supplies information and financial contributions to a single policymaker.

An interesting characteristic of the market equilibrium is the following.

Lemma 3. *In the market equilibrium policymakers extract all expected private rents from citizens and CLFs.*

Intuitively, we can see why this must be true. Essentially, citizens bid for the political access of policymakers by offering the demand price $k = \frac{a^l}{n^l}\pi$, which implies they receive no private rents in equilibrium. Free entry by inactive lobbyists into the lobbying industry results in zero payoffs for CLFs as well. It follows that all private rents are captured by

policymakers who control the key scarce resource, political access.[34]

4.6 Selected Comparative Statics

In table 1 we present some of the more interesting comparative static properties of the market equilibrium when the solution to the policymaker's problem is interior.[35]

	dm^{**}	df^{**}	du^{**}	dn^{**}	dL^{**}	
$d\alpha$	$-$	$+$	$+$	0	0	
ds	$+$	$-$	$-$	0	0	Substitution Effects
$d\Delta(\rho\|x^+)$	$+$	$-$	$-$	0	0	
$d\pi$	0	$+$	$+$	$+$	$-$	Resource Effects
dP	0	$+$	$+$	$+$	$-$	

Table 1: Comparative Statics of the Market Equilibrium.

We divide these into what are termed substitution and resource effects. The substitution effects arise from either changes in policymakers' preferences or the trade-offs they face in their optimization problems. The resource effects arise from changes in aggregate resources in the economy.

Notice first that an increase in the weight placed by policymakers on financial contributions, α, changes only the form in which policymakers extract rents from CLFs; they require them to present fewer verified proposals, m^{**}, and more unverified proposals, u^{**}, then extract the savings in terms of verification costs in the form or greater financial contributions, f^{**}. Given that n^{**} and L^{**} are invariant with respect to α, it immediately follows that the total number of proposals presented and hence private benefits remain constant while the expected value of spillovers must decline. An increase in the magnitude of spillovers, s, raises the expected return to verification and has the opposite effect to an increase in α as rent extraction via improved information quality is more attractive to policymakers. If the efficiency of the verification technology improves, $d\Delta(\rho|x^+) > 0$, then the marginal value to the policymaker of rent extraction via verification increases, raising the verification

[34] In the working paper version we show that both Lemma 2 and 3 hold similarly with a perfectly arbitraged labor market on which citizens can become lobbyists. In a companion paper, Groll and Ellis (2013b), we examine a problem where policymakers cannot observe verification efforts and must incentivize lobbyists to engage in verification using simple repeated agency contracts. In this problem lobbyists do retain some private rents.

[35] The comparative statics values that are not zero can be found in the Supplemental Appendix B or online.

demanded but lowering their demands for financial contributions and unverified proposals. To summarize, the effects of the first three rows can be explained by a policymaker's choice to substitute one method of rent extraction for another in their optimization problem, but without any effects on the equilibrium in the market for commercial lobbying services.

Slightly surprisingly, an increase in private benefits, π, has no effect on verification per firm. This follows from the fact that it does not affect either the marginal costs or benefits of verification at the firm level. However, it does imply that, all else equal, the value of an enacted policy proposal is higher. Citizens thus bid up the price of intermediation services, k, incentivizing each lobbying firm to accept more clients. The extra resources within each lobbying firm are then extracted by policymakers in the form of increased financial contributions, f^{**}. An increase in the number of policymakers, P, has a very similar effect to an increment to π, as both raise expected private benefits. An increase in the number of policymakers implies a greater likelihood that a policy proposal is enacted and thus increases the citizen-clients' willingness to pay for lobbying services. The greater willingness to pay and the consequent greater service fees imply greater marginal processing costs, more clients, and more rents per lobbyist, which – together with the population constraint – explain the negative effect of a change in the number of policymakers on the number of lobbyists.

5 Comparison of the Market and Socially Optimal Outcomes

Using the results from Section 3.1 and Section 4, we examine the differences between the full information social welfare optimum and market solutions. Then we investigate some policy options.

5.1 The Socially Optimal and Market Contract Levels of Verification and Financial Contributions

Here we make a per CLF comparison between the requests for verification and financial contributions made by a policymaker in a market environment and their socially optimal levels. This allows us to identify the distortions present in an economy in which there

is commercial lobbying. Alternatively, this section may be thought of as addressing the question of what determines how well commercial lobbying firms perform their role as creators of information.

We know that a social planner takes all costs and benefits of commercial lobbying into account, but each policymaker in a market environment neglects the value of spillovers to others and all costs that do not impose direct constraints on their choices. Further, a policymaker has an incentive to substitute financial contributions for information quality. It is trivially obvious that for any $\alpha \in (0, 1]$ financial contributions are welfare decreasing, hence we focus here on verification efforts.

Using (3.5) and (4.9), the verification effort levels determined by the social planner and the verification efforts requested by policymakers, we can establish the following.

Proposition 3. *Comparing the verification effort levels at the full information social welfare optimum and the full information market outcome, we have*

$$\alpha T - \left[\left. \frac{\partial G(n^l)}{\partial n^l} \right|_{n^l=m^*} \Big/ \left. \frac{\partial H(m^l)}{\partial m^l} \right|_{m^l=m^{**}} \right] \gtreqless 1 \Rightarrow m^* \gtreqless m^{**}.$$

Proposition 3 tells us that verification per CLF tends to be less than the socially optimal level, $m^* > m^{**}$, if; α or T are large, or if the ratio $\left. \frac{\partial G(n^l)}{\partial n^l} \right|_{n^l=m^*} \Big/ \left. \frac{\partial H(m^l)}{\partial m^l} \right|_{m^l=m^{**}}$ is small. These three effects correspond to the distortions in the market equilibrium. Referring back to Proposition 2, we see that at an interior solution a higher value of α or T causes the policymaker to substitute f^{lp} for m^{lp} along the CLFs' participation constraints in the optimal portfolios. Intuitively, a larger T implies that the policymaker internalizes a smaller proportion of spillovers, while a larger α implies that even though transfers are more efficient this only induces the policymaker to substitute away from verification towards transfers. The term $\left. \frac{\partial G(n^l)}{\partial n^l} \right|_{n^l=m^*} \Big/ \left. \frac{\partial H(m^l)}{\partial m^l} \right|_{m^l=m^{**}}$ reflects the incentive for policymakers to allow lobbyists to accept policy proposals that will be both unverified and unpresented but yield rents that they may then extract via financial contributions. The possibility of per-firm over-verification is also a reflection of this last argument. Given that in the market equilibrium CLFs accept proposals from citizens that will not be verified, whereas all proposals are verified at the welfare optimum, it follows that the policymakers can choose

to extract these rents either as financial contributions or increased verification. This can lead to per-firm oververification in the market equilibrium relative to the full information welfare optimum. Carrying the welfare implications of Proposition 2 and Proposition 3 further, we can state the following.

Corollary 1. *If $\alpha < 1$, then policymakers may request financial contributions that are socially inefficient. However, their welfare effects in a market equilibrium are ambiguous.*

Corollary 1 might be trivial, since if a transfer from one agent to another is valued more by the giver than the recipient there must be a welfare loss relative to the first-best outcome. However, in a second-best sense inefficient transfers may be socially desirable. We know that policymakers in this structure do not fully take into account lobbyists' costs or fully internalize spillovers. They may request under- or oververification of proposals as described by Proposition 3 above. The value placed by policymakers on financial contributions determines, in part, the trade-off that they face and hence may offset their incentive to engage in inefficient levels of verification.

In summary, in the market environment there are externality effects with respect to the burden of costs and the benefits from spillovers as well as market power effects in the market for political access with respect to the policymakers' ability to substitute private rents for information gains. However, the distortions interact and can offset each other.

5.1.1 Selected Comparative Statics

In Table 2 we present some of the comparative static effects of parameter changes on the differences between the socially optimal and market equilibrium outcomes when the solutions to both the social planner's and policymaker's problems are interior.[36] We continue to identify the comparative statics with the substitution and resource effects discussed earlier. The substitution effects originate from the policymaker's and social planner's problem and work through the political access market; the resource effects arise in the market for political representation.

[36]Detailed expressions for Table 2 can be found in the supplemental appendix. There the interested reader can also find additional comparative static results for direct access by citizens, A^c, and the number of lobbyists, L.

	$d(m^* - m^{**})$	$d(f^* - f^{**})$	$d(u^* - u^{**})$	$d(n^* - n^{**})$	
$d\alpha$	$+/-^{1}$	$+$	$+$	0	Substitution Effects
ds	$+/-^{1,2}$	$-$	$-$	$+/-^{3}$	Both
$d\Delta(\rho\|x^+)$	$+/-^{1,2}$	$-$	$-$	$+/-^{3}$	
$d\pi$	0	$+$	$+$	$-/+^{3}$	Resource Effects
dP	0	$+$	$+$	$-/+^{3}$	

1: As $m^* \gtrless m^{**}$;
2: As $\alpha T H''(m^{**}) \gtrless G''(m^*) + H''(m^*)$;
3: As $n^* \gtrless n^{**}$.

Table 2: Comp. Statics of the Distortions between Socially Optimal and Market Values.

A change in the weight placed by policymakers on financial contributions again causes a substitution effect. An increase in the weight on financial contributions, α, decreases the verification efforts demanded by self-interested policymakers, but does not affect the socially optimal level of verification. If policymakers demand too much verification in the market equilibrium, then an increase in the weight placed on financial contributions decreases distortions. There is then a second-best welfare improvement. Conversely, if too little verification is demanded, then an increase in the weight placed on financial contributions exacerbates the distortion.

An increase in the magnitude of spillovers or an improvement in the verification technology result in both a substitution and a resource effect. Both of these changes cause the marginal value of verification effort to increases in both the social planner's and policymaker's problems leading to an increase in verification. Whether the verification distortion increases or decreases depends on their absolute and relative magnitudes – i.e., $m^* \gtrless m^{**}$ and the respective adjustments by policymakers and the social planner described by $\alpha T H''(m^{**}) \gtrless G''(m^*) + H''(m^*)$. For example, if there is an underverification at the firm level in the policymaker's problem, $m^* > m^{**}$, and the social planner increases verification demands relatively more, $\alpha T H''(m^{**}) > G''(m^*) + H''(m^*)$, then the distortion increases. However, if policymakers would demand relatively more verification effort than the social planner, then, ceteris paribus, the gap closes and the distortion decreases. The same intuition holds with reverse effects if there is an oververification caused by self-interested policymakers, $m^* < m^{**}$. The implication is that self-interested policymakers respond by increasing information quality, but this may exaggerate an oververification

distortion. Hence, these exogenous changes may not improve the market outcome in a second-best welfare sense. Increases in the magnitude of spillovers or an improvement in the verification technology cause the distortions in financial contributions and unverified proposals presented by CLFs to policymakers to decrease because of the substitution effect, which imply second-best welfare improvements. Finally, an increase in the magnitude of spillovers or an improvement in the verification technology affects the social planner's problem with respect to the optimal number of verified proposals – and therefore, because of $n^* = m^*$, the size of the firm. This describes a resource effect on the social planner's problem that is not present in the market outcome.

An increase in private benefits or in the number of policymakers affects neither the social planner's nor policymakers' demands for verification effort and thus has no substitution effect. However, they do have resource effects as policymakers demand more financial contributions and accept more unverified proposals from CLFs increasing potential distortions. Whether an increase in private benefits or government resources increases or decreases the distortion in the size of CLFs depends on the initial values of n^* and n^{**}. Note that those distortions operate in opposite directions from those arising from changes in spillovers and the effectiveness of the verification technology.

5.2 Social Welfare at the Market Equilibrium

In this section we address a simple issue, how expensive in terms of welfare losses are the distortions present in the market equilibrium. Employing Lemma 3, expected social welfare evaluated at the market equilibrium may be written as

$$E[\Pi^{w**}] = P\left(\alpha f^{**} L^{**}\right) + PE[s|\alpha], \tag{5.1}$$

where expected spillovers depend on the weight the policymaker places on financial contributions via the effect of α on m^{**} – see (4.5).

Optimal social welfare when commercial lobbying is socially desirable, is

$$E[\Pi^{w*}] = P\left(A^p \pi\right) - L^*\left(H(m^*) + G(m^*)\right) + PE[s|x^+]. \tag{5.2}$$

The excess of social welfare at the full information social welfare optimum over social welfare at the market equilibrium, $E[\Pi^{w*}] - E[\Pi^{w**}] \geq 0$, is summarized by

$$\underbrace{PA^p\pi - L^*\left(H(m^*) + G(m^*)\right)}_{(?)} - \underbrace{\alpha P f^{**} L^{**}}_{(+)} + \underbrace{P\left(E[s|x^+] - E[s|\alpha]\right)}_{(\geq 0)} \geq 0, \tag{5.3}$$

which can be broken down into the three terms indicated. The first term is the potential pure private gains for citizens and lobbyists in the social welfare optimum with commercial lobbying. The second term gives the private benefits of policymakers from financial contributions in a market environment. The difference between the first and second terms has an intuitive interpretation. In the market equilibrium policymakers capture all private rents. It follows that the difference between the first and second terms in expression (5.3) is the difference between private rents in the first best optimum and market outcomes, and thus measures the effects of distortions on private rents. Notice that it need not be the case that private rents are greater in the first best, as the socially planner trades off private rents against the benefits from spillovers via the selection of the level of verification m^*. The third term in (5.3) identifies the change in aggregate spillovers due to the distortions that arises because policymakers may substitute unverified proposals for verified proposals to realize higher financial contributions. This substitution cannot increase the expected quality of information and hence the level of expected spillovers.

5.3 Welfare Improvements in the Political Structure at the Market Equilibrium

Suppose that government resources and policymakers' tastes for financial contributions could vary. We might then ask, given resource allocations are market determined, how should the number of policymakers be adjusted from their first-best level and what taste for financial contributions would we like these policymakers to have?[37]

[37] The more ambitious question asking how the market allocation compares to the second best social welfare optimum is difficult to analyze at this level of abstraction.

5.3.1 Government Resources

First, we ask how varying government resources such as the number of policymakers (or equivalently, their time endowments) affects welfare outcomes. Social welfare evaluated at the market equilibrium with P policymakers is described in (5.1) and may be rewritten as

$$E[\Pi^{w**}] = P\left(A^p s\left(\rho(s^+) - \rho(s^-)\right)\right) + \alpha L^{**} f^{**} + \rho(x^+) L^{**} m^{**} s \Delta(\rho|x^+). \tag{5.4}$$

Given that verification efforts at the firm level are independent of the number of policymakers, the effect on welfare of a marginal increase in the number of policymakers is

$$\frac{\partial E[\Pi^{w**}]}{\partial P} = \underbrace{A^p s\left(\rho(s^+) - \rho(s^-)\right)}_{(+)} + \underbrace{\alpha L^{**} \frac{\partial f^{**}}{\partial P}}_{(+)} + \underbrace{\frac{\partial L^{**}}{\partial P}}_{(-)} \underbrace{\left(\alpha f^{**} + \rho(x^+) m^{**} s \Delta(\rho|x^+)\right)}_{(+)}. \tag{5.5}$$

Expression (5.5) can be understood by considering the following: Suppose that there is an increment to the number of policymakers, ceteris paribus, each CLF will be granted more access. More access for a given number of proposals in each CLF raises the probability that each will be presented, hence the price each citizen is willing to pay to the CLF, k, rises. Each CLF then demands more clients/proposals, in equilibrium this leads to larger, but fewer, CLFs.[38] From this little story we can then back out the various welfare effects. The first term on the right hand side of (5.5) represents the direct effects of more policymakers, more unverified proposals can be enacted unambiguously raising social welfare. The second term is the effect of more policymakers and therefore more access on the per-firm rents that can be realized by lobbyists and extracted by policymakers, since the firms receive a higher fee per proposal from citizens and then re-optimize by demanding more clients it follows that this term is positive. The third term on the right hand side of (5.5) indicates that having fewer lobbyists affects both the quality of information and the amount of financial contributions. Informational quality declines because while more total access is supplied by policymakers, there are fewer firms each of whom verifies the same number of proposals as before. It follows that the proportion of unverified-to-verified proposals passed

[38] It might seem that there could also be entry by inactive lobbyists, however this does not occur because the policymakers continue to extract all rents.

to policymakers by CLFs must increase, with a consequent fall in the quality of information and social welfare. The overall effect of fewer lobbyists on total financial contributions is ambiguous. Per-lobbyist contributions increase but the number of CLFs goes down. We may conclude that it is welfare improving to increase the number of policymakers above the first best if the increment to concentration of the lobbying industry is small, if the gain in information from verification is small or if the increase in per-firm rents from an increment to access is large.

5.3.2 Dishonesty and Effectiveness of Financial Contributions

Finally, we ask how a change of the policymakers' taste for financial contributions, α, would affect social welfare at the market equilibrium. We have given a number of interpretations for α; for example if it represents dishonesty then a change in α may be interpreted as a change in motoring activity or in social norms. Alternatively, it maybe be that if there is heterogeneity in the population in terms of α such that a change in this variable may reflect choosing different individuals to be policymakers.

Differentiating (5.4) with respect to α, and rewriting the resultant expression using the equilibrium conditions gives

$$\frac{\partial E[\Pi^{w**}]}{\partial \alpha} = L^{**}\left(f^{**} + \left(\frac{\left(\rho(x^{+})s\Delta(\rho|x^{+})\right)^{2}}{\alpha^{2}T\frac{\partial^{2}H(m^{**})}{\partial m^{**2}}}\right)\left(\frac{1}{T}-1\right)\right) \gtreqless 0. \tag{5.6}$$

We might anticipate that an increase in α would be unambiguously welfare improving as it brings closer the values a recipient and donor attach to any dollar transferred. However as α increases policymakers demand greater financial contributions and require lower levels of verification from lobbyists. We know that policymakers fail to fully internalize spillovers and do not fully take into account CLFs' processing costs such that verification at the market outcome can be too low or high relative to the first best, in this context it is less surprising that the welfare effects of changes in α are ambiguous. We can however note that the general implications of (5.6) are quite intuitive, an increase in α tends to raise social welfare when; $\rho(x^{+})s\Delta(\rho|x^{+})$ is small, that is the expected cost of reducing verification is small; when T is small, that is when policymakers tend to take spillovers more in to

account simply because of self-interest; and, when $\frac{\partial^2 H(m^{**})}{\partial m^{lp^2}}$ is large, that is the costs of verification are rapidly increasing such that there is little change in verification associated with a change in α.

Notice that if we interpret α as representing the policymaker's honesty or integrity, then perfectly honest policymakers may not be socially desirable.

6 Conclusion

This paper provides an analysis of the hither-to-fore neglected commercial lobbying industry. It provides a description of the industry and its activities, and it supplies an analysis of some of its potential implications for social welfare.

The introduction of commercial lobbyists as intermediaries between citizens and policymakers provides several new insights into lobbying and political influence. We demonstrate how commercial lobbying arises endogenously in a simple market model, and identify potential sources of inefficiencies. We find that, relative to the first-best optimum when commercial lobbying is socially desirable, the market equilibrium may involve inefficient levels of verification activity by CLFs. We are able to provide intuitive explanations of each of these potential distortions.

Throughout most of our analysis we take the number of policymakers as fixed at the first best optimal level and the preferences of these policymakers as exogenously given. In our final section, we explore the possibility that a deviation from first best institutions can be welfare improving when allocations are market determined. The conclusion is affirmative but the directions of the implied institutional changes are ambiguous. This is a desirable feature of the model, as this allows us to suggest why we might anticipate seeing variations in the number of policymakers and their characteristics in different countries and to anticipate the welfare consequences of such.

Since this is, to our knowledge, the first formal economic model of the commercial lobbying industry our approach has been quite straightforward and there are many interesting aspects of the industry not explored here that remain for future research. The informational assumptions made are deliberately simple. It would be interesting to examine the

same set of problems in an information structure where lobbyists' actions are not directly observable. Further there is no political competition in our analysis since all policymakers, lobbyists and citizens are homogeneous (except for their given roles). It would seem that the analysis can be extended in this direction by allowing heterogeneity amongst policymakers or citizens. Political competition based on either distributional conflict of efficiency concerns then seems possible within the structure developed above.

7 References

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A Appendix

A.1 Proof of Proposition 1

After substituting the proposal and political access constraints into the objective function of (3.4) and taking the first derivatives, we obtain the following first-order conditions and results:

$$\frac{\partial E\left[\Pi^s\right]}{\partial m^l} = -\frac{\partial F(m^l)}{\partial m^l} - \frac{\partial G(m^l + u^l + r^l)}{\partial n^l} + \rho(x^+)s\Delta(\rho|x^+) \;\forall\; l \tag{A.1}$$

with $m^l > 0$ because of $F'(0) = G'(0) = 0$ and $\Delta(\rho|x^+) > 0$;

$$\frac{\partial E\left[\Pi^s\right]}{\partial u^l} = -\frac{\partial G(m^l + u^l + r^l)}{\partial n^l} + s\left[\rho(e^+) - \rho(e^-)\right] \leq 0 \;\forall\; l, \tag{A.2}$$

with $u^l = 0$ because of $\frac{\partial E[\Pi^s]}{\partial u^l} < \frac{\partial E[\Pi^s]}{\partial A^c}$;

$$\frac{\partial E\left[\Pi^s\right]}{\partial r^l} = -\frac{\partial G(m^l + u^l + r^l)}{\partial n^l} \leq 0 \;\forall\; l \tag{A.3}$$

with $r^l = 0$ because of $m^l > 0$ and $G'(.) > 0$;

$$\frac{\partial E\left[\Pi^s\right]}{\partial A^c} = s\left[\rho(e^+) - \rho(e^-)\right] > 0 \;\forall\; c \tag{A.4}$$

with $A^c \geq 0$ depending on $PA^p \geq \rho(x^+)Lm^l$.

$$\frac{\partial E\left[\Pi^s\right]}{\partial f^l} = \alpha - 1 \leq 0 \;\forall\; l \tag{A.5}$$

with $f^l = 0$ if $\alpha < 1$ and $f^l \geq 0$ for $\alpha = 1$ but with no effect on (A.1-A.4). It is straightforward to show that the second-order conditions with respect to verification are satisfied because $F(.)$ and $G(.)$ are increasing and convex.

A.2 Proof of Lemma 1

If $\alpha \in (0, 1]$, then the first term in (4.8) is positive. Suppose $\lambda^{lp} = 0$, then (4.8) is positive and each policymaker can increase their payoff by increasing f^{lp} because of the availability of lobbyist's financial resources. This contradicts $\lambda^{lp} = 0$. Therefore, the

lobbyists' participation constraint has to bind for $\alpha \neq 0$.

A.3 Proof of Proposition 2

For the interior solution described by (i): Suppose $\frac{\partial E[\Pi^p]}{\partial m^{lp}} = \frac{\partial E[\Pi^p]}{\partial f^{lp}} = 0$. Hence, there is an interior solution with respect to verified proposals and financial contributions such that

$$\frac{\partial H(.)}{\partial m^{lp}} = \rho(x^+)\frac{s}{\alpha T}\Delta(\rho|x^+) \tag{A.6}$$

with $m^{lp} > 0$ and $f^{lp} > 0$ as well as $u^{lp} \geq 0$ and $r^l \geq 0$.

For the interior solution described by (ii): Suppose $\frac{\partial E[\Pi^p]}{\partial m^{lp}} > 0$ and no unverified proposal is approved, $u^{lp} = 0$, because the policymaker's time constraint binds. Then all approved proposals are verified. Using Lemma 1 it follows that the remaining resources are extracted via financial contributions, $f^{lp} > 0$.

For the corner solution with respect to contributions: If $\frac{\partial E[\Pi^p]}{\partial m^{lp}} = 0$ and α is sufficiently small such that

$$\lambda^{lp} = \frac{\rho(x^+)\frac{s}{T}\Delta(\rho|x^+)}{\frac{\partial H(.)}{\partial m^{lp}}} > \alpha, \tag{A.7}$$

then there is a corner solution with respect to verified proposals with $u^{lp} \geq 0$ and $f^{lp} = 0$. The number of verified proposals follows from

$$H\left(m^{co} + \sum_{h \neq p} m^{lh}\right) = n^l k - \sum_{h \neq p} f^{lh} - G\left(n^l\right) \tag{A.8}$$

with $u^{lp} \geq 0$.

For the corner solution with respect to verification: Suppose $\alpha > \rho(x^+)\frac{s}{T}\Delta(\rho|x^+)$. In this case, the marginal benefit from a financial contribution outweighs the marginal benefit from a verified proposal independent of the amount of verification. The policymaker extracts all resources via financial contributions and approves only unverified proposals.

A.4 Proof of Lemma 2

Assuming the economically meaningful case where there are sufficiently active and inactive lobbyists such that citizens still choose to hire lobbyists. Suppose $C > n^l L$ for a symmetric market equilibrium. An inactive lobbyist realizes a private payoff of zero. Entering the lobbying industry given k, he could represent a discouraged citizen and contest the lobbying market equilibrium. Operating at lower marginal processing costs, $G'(.)$, the entrant has more resources to provide in exchange to political access. Now suppose $C < n^l L$ for a symmetric market equilibrium. It is not feasible that there are more clients than citizens. Therefore, $C = n^l L$.

A.5 Proof of Lemma 3

It follows from Lemma 1 that lobbyists earn no expected private benefits. The second part of the statement, that citizens realize no expected private benefits, follows from (4.14). Therefore, competition for political access by citizens and CLFs allows policymakers to extract all expected private benefits.

A.6 Proof of Proposition 3

The policymaker's first-order condition with respect to verification can be written for the interior solution as

$$\frac{\partial H(.)}{\partial m^{lp}} = \rho(x^+)\frac{s\Delta(\rho|x^+)}{\alpha T}. \tag{A.9}$$

To compare this to the social planner's first-order condition with respect to verification we can replace the right-hand side with the social planner's first-order condition. We get

$$\left.\frac{\partial H(.)}{\partial m^{lp}}\right|_{m^{lp}=m^{**}} = \frac{1}{\alpha T}\left(\left.\frac{\partial H(.)}{\partial m^{l}}\right|_{m^{l}=m^{*}} + \left.\frac{\partial G(.)}{\partial n^{l}}\right|_{n^{l}=m^{*}}\right). \tag{A.10}$$

When is $m^{**} \gtreqless m^*$ – i.e., $\left.\frac{\partial H(.)}{\partial m^{lp}}\right|_{m^{lp}=m^{**}} \gtreqless \left.\frac{\partial H(.)}{\partial m^{l}}\right|_{m^{l}=m^{*}}$?

Suppose $\left.\frac{\partial G(.)}{\partial n^{l}}\right|_{n^{l}=m^{*}} = (\alpha_1 T_1 - 1)\left.\frac{\partial H(.)}{\partial m^{l}}\right|_{m^{l}=m^{*}}$. Then (A.10) can be written as

$$\left.\frac{\partial H(.)}{\partial m^{lp}}\right|_{m^{lp}=m^{**}} = \left.\frac{\partial H(.)}{\partial m^{l}}\right|_{m^{l}=m^{*}}. \tag{A.11}$$

Therefore, $m^{**} = m^*$.

Suppose $\frac{\partial G(.)}{\partial n^l}\Big|_{n^l=m^*} < (\alpha_2 T_2 - 1)\ \frac{\partial H(.)}{\partial m^l}\Big|_{m^l=m^*}$. This can be written as $\frac{\partial G(.)}{\partial n^l}\Big|_{n^l=m^*} = (\alpha_2 T_2 - 1)\ \frac{\partial H(.)}{\partial m^l}\Big|_{m^l=m^*} - \epsilon$ with $\epsilon > 0$. Then (A.10) can be written as

$$\frac{\partial H(.)}{\partial m^{lp}}\Big|_{m^{lp}=m^{**}} = \frac{\partial H(.)}{\partial m^l}\Big|_{m^l=m^*} - \frac{\epsilon}{\alpha_2 T_2}. \tag{A.12}$$

Therefore, $m^{**} < m^*$.

Suppose $\frac{\partial G(.)}{\partial n^l}\Big|_{n^l=m^*} > (\alpha_3 T_3 - 1)\ \frac{\partial H(.)}{\partial m^l}\Big|_{m^l=m^*}$. This can be written as $\frac{\partial G(.)}{\partial n^l}\Big|_{n^l=m^*} = (\alpha_3 T_3 - 1)\ \frac{\partial H(.)}{\partial m^l}\Big|_{m^l=m^*} + \epsilon$ with $\epsilon > 0$. Then (A.10) can be written as

$$\frac{\partial H(.)}{\partial m^{lp}}\Big|_{m^{lp}=m^{**}} = \frac{\partial H(.)}{\partial m^l}\Big|_{m^l=m^*} + \frac{\epsilon}{\alpha_3 T_3}. \tag{A.13}$$

Therefore, $m^{**} > m^*$.

B Supplemental Appendix: Online

B.1 Market Equilibrium: Detailed Comparative Statics

To save on notation, we keep $\Delta(\rho|x^+) = \rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)$ for the following equations. For an overview of all selected comparative statics see Table 3.

B.1.1 Equilibrium Equations for Interior Solution

Clients per firm: $\frac{\partial G(.)}{\partial n^l} - \frac{PA\pi}{C} = 0$.

Lobbying service fee: $\frac{\partial G(.)}{\partial n^l} - k = 0$.

Lobbyists: $C - n^l L = 0$.

Political access per firm: $a^l - \frac{PA}{L}$.

Verification per firm: $\frac{\partial H(.)}{\partial m^l} - \frac{\rho(x^+)s)}{\alpha T}\Delta(\rho|x^+) = 0$.

Client portfolio per firm: $n^l - m^l - u^l - r^l = 0$.

Presentation portfolio per firm: $a^l - \rho(x^+)m^l - u^l = 0$.

Financial contribution per firm: $f^l - n^l k + H(m^l) + G(n^l) = 0$.

Entrepreneurs: $T - \bar{P} - \bar{C} - L - J = 0$.

B.1.2 Determinant of Jacobian

The determinant of the Jacobian for the system above is nonzero:

$$|J| = n^l \frac{\partial^2 G(.)}{\partial {n^l}^2} \frac{\partial^2 H(.)}{\partial {m^l}^2} > 0.$$

B.1.3 Selected Nonzero Results

1. Dishonesty/Effectiveness of Financial Contributions on
   (a) Verification per Firm: $\frac{\partial |m^l}{\partial \alpha} = -\frac{s\rho(x^+)\Delta(\rho|x^+)}{\alpha^2 T H''(.)} < 0$.
   (b) Financial Contributions per Firm: $\frac{\partial f^l}{\partial \alpha} = \frac{s\rho(x^+)\Delta(\rho|x^+)H'(.)}{\alpha^2 T H''(.)} > 0$.
   (c) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial \alpha} = \frac{s\rho(x^+)^2\Delta(\rho|x^+)}{\alpha^2 T H''(.)} > 0$.
2. Magnitude of Spillovers on
   (a) Verification per Firm: $\frac{\partial m^l}{\partial s} = \frac{\rho(x^+)\Delta(\rho|x^+)}{\alpha T H''(.)} > 0$.

(b) Financial Contributions per Firm: $\frac{\partial f^l}{\partial s} = -\frac{\rho(x^+)\Delta(\rho|x^+)H'(.)}{\alpha T H''(.)} < 0$.

(c) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial s} = -\frac{\rho(x^+)^2\Delta(\rho|x^+)}{\alpha T H''(.)} < 0$.

3. Information Gains from Verification on

(a) Verification per Firm: $\frac{\partial m^l}{\partial \Delta(\rho|x^+)} = \frac{\rho(x^+)s}{\alpha T H''(.)} > 0$.

(b) Financial Contributions per Firm: $\frac{\partial f^l}{\partial \Delta(\rho|x^+)} = -\frac{\rho(x^+)sH'(.)}{\alpha T H''(.)} < 0$.

(c) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial \Delta(\rho|x^+)} = -\frac{\rho(x^+)^2 s}{\alpha T H''(.)} < 0$.

4. Magnitude of Private Benefits on

(a) Financial Contributions per Firm: $\frac{\partial f^l}{\partial \pi} = \frac{PAn}{C} > 0$.

(b) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial \pi} = \frac{A^2P^2}{C^2G''(.)} > 0$.

(c) Number of Clients per Firm: $\frac{\partial n^l}{\partial \pi} = \frac{AP}{CG''(.)} > 0$.

(d) Lobbyists: $\frac{\partial L}{\partial \pi} = -\frac{AP}{{n^l}^2 G''(.)} < 0$.

5. Number of Policymakers on

(a) Financial Contributions per Firm: $\frac{\partial f^l}{\partial P} = \frac{A\pi}{L} > 0$.

(b) Unverified Presented Proposals per Firm: $\frac{\partial u^l}{\partial P} = \frac{A\left(1+\frac{AP\pi}{CnG''(.)}\right)}{L} > 0$.

(c) Number of Clients per Firm: $\frac{\partial n^l}{\partial P} = \frac{A\pi}{CG''(.)} > 0$.

(d) Lobbyists: $\frac{\partial L}{\partial P} = -\frac{A\pi}{{n^l}^2 G''(.)} < 0$.

B.2 Comparison of Social Optimum and Market Equilibrium: Detailed Comparative Statics

First, we describe the detailed comparative statics of the socially optimal values. Then we proceed with a detailed description of the comparative statics for the differences between socially optimal values and market equilibrium values.

B.2.1 Social Optimum: Detailed Comparative Statics

To save on notation, we keep $\Delta(\rho|x^+) = \rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)$ for the following equations. For an overview of all selected comparative statics see Table 3.

Equilibrium Equations for Interior Solution The equations of interest are the following.

Verification per firm: $\frac{\partial H(.)}{\partial m^l} + \frac{\partial G(.)}{\partial m^l} - \rho(x^+)s\Delta(\rho|x^+) = 0$.

Presentation portfolio per firm: $g_2 = a^l - \rho(x^+)m^l = 0$.

Access to policymakers: $La^l + A^c - PA^p = 0$.

Citizen-clients: $C - Lm^l - A^c = 0$.

Population: $C + L + P - T = 0$.

Note that $= u^* = r^* = En^* = 0$, $n^* = m^*$, k is not determined, and $f^* = 0$ if $\alpha < 1$ but $f^* \geq 0$ if $\alpha = 1$.

Determinant of Jacobian The determinant of the Jacobian for the system above is nonzero:

$$|J| = \left(A^p + a^l - m^l\right)\left(\frac{\partial^2 G(.)}{\partial {m^l}^2} + \frac{\partial^2 H(.)}{\partial {m^l}^2}\right) \neq 0 \text{ iff } A^p \neq \rho(x^-)m^l.$$

Selected Nonzero Results

1. Magnitude of Spillovers on
   (a) Verification per Firm: $\frac{\partial m^l}{\partial s} = \frac{\rho(x^+)\Delta(\rho|x^+)}{G''(.)+H''(.)} > 0$.
   (b) Direct Access for Citizens: $\frac{\partial A^c}{\partial s} = \frac{-A^p L\rho(x^+)\Delta(\rho|x^+)}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} \gtrless 0$.
   (c) Number of Lobbyists: $\frac{\partial L}{\partial s} = \frac{\rho(x^+)\rho(x^-)\Delta(\rho|x^+)L}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} \gtrless 0$.
   (d) Number of Policymakers: $\frac{\partial P}{\partial s} = \frac{-\rho(x^+)\rho(x^-)\Delta(\rho|x^+)L}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} \lesseqgtr 0$.
2. Information Gains from Verification on
   (a) Verification per Firm: $\frac{\partial m^l}{\partial \Delta(\rho|x^+)} = \frac{\rho(x^+)s}{G''(.)+H''(.)} > 0$.
   (b) Direct Access for Citizens: $\frac{\partial A^c}{\partial \Delta(\rho|x^+)} = \frac{-A^p}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} \lesseqgtr 0$.
   (c) Number of Lobbyists: $\frac{\partial L}{\partial \Delta(\rho|x^+)} = \frac{\rho(x^+)\rho(x^-)sL}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} \gtrless 0$.
   (d) Number of Policymakers: $\frac{\partial P}{\partial \Delta(\rho|x^+)} = \frac{-\rho(x^+)\rho(x^-)\Delta(\rho|x^+)L}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} \lesseqgtr 0$.

B.2.2 Comparison: Detailed Comparative Statics

Here, we list the not so obvious nonzero comparative statics summarize all selected comparative statics. For an overview of all selected comparative statics see Table 4.

B.2.3 Selected Nonzero Results

1. Dishonesty/Effectiveness of Financial Contributions on

   (a) Verification per Firm: $\frac{\partial(m^*-m^{**})}{\partial\alpha} = 0 + \frac{s\rho(x^+)\Delta(\rho|x^+)}{\alpha^2 TH''(.)} \gtreqless 0$ for $m^* \gtreqless m^{**}$.

   (b) Financial Contributions per Firm: $\frac{\partial(f^*-f^{**})}{\partial\alpha} = 0 + \frac{s\rho(x^+)\Delta(\rho|x^+)H'(.)}{\alpha^2 TH''(.)} > 0$ for $f^* \leq f^{**}$.

   (c) Unverified Presented Proposals per Firm: $\frac{\partial(u^*-u^{**})}{\partial\alpha} = 0 - \frac{s\rho(x^+)^2\Delta(\rho|x^+)}{\alpha^2 TH''(.)} > 0$ for $u^* \leq u^{**}$.

2. Magnitude of Spillovers on

   (a) Verification per Firm: $\frac{\partial(m^*-m^{**})}{\partial s} = \frac{\rho(x^+)\Delta(\rho|x^+)}{G''(m^*)+H''(m^*)} - \frac{\rho(x^+)\Delta(\rho|x^+)}{\alpha TH''(m^{**})} \gtreqless 0$ for $m^* \gtreqless m^{**}$ and $a = \alpha TH''(m^{**}) \gtreqless G''(m^*) + H''(m^*) = b$.

   - $\frac{\partial(m^*-m^{**})}{\partial s} > 0$ if $\{m^* > m^{**}; a > b\}$ or $\{m^* < m^{**}; a < b\}$.
   - $\frac{\partial(m^*-m^{**})}{\partial s} < 0$ if $\{m^* > m^{**}; a < b\}$ or $\{m^* < m^{**}; a > b\}$.

   (b) Financial Contributions per Firm: $\frac{\partial(f^*-f^{**})}{\partial s} = 0 - \frac{\rho(x^+)\Delta(\rho|x^+)H'(.)}{\alpha TH''(.)} \leq 0$ for $f^* \leq f^{**}$.

   (c) Unverified Presented Proposals per Firm: $\frac{\partial(u^*-u^{**})}{\partial s} = 0 - \frac{\rho(x^+)^2\Delta(\rho|x^+)}{\alpha TH''(.)} \leq 0$ for $u^* \leq u^{**}$.

   (d) Clients per Firm: $\frac{\partial(n^*-n^{**})}{\partial s} = \frac{\rho(x^+)\Delta(\rho|x^+)}{G''(.)+H''(.)} - 0 \gtreqless 0$ for $n^* = m^*$ and $n^* \geq n^{**}$.

   (e) Direct Access for Citizens: $\frac{\partial(A^{c*}-A^{c**})}{\partial s} = \frac{-A^p L\rho(x^+)\Delta(\rho|x^+)}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} - 0 \lesseqgtr 0$ for $A^p \gtreqless \rho(x^- m^*)$.

   (f) Number of Lobbyists: $\frac{\partial(L^*-L^{**})}{\partial s} = \frac{\rho(x^+)\rho(x^-)\Delta(\rho|x^+)L}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} - 0 \gtreqless 0$ for $L^* \gtreqless L^{**}$ and $A^p \gtreqless \rho(x^-)m^*$.

   - $\frac{\partial(L^*-L^{**})}{\partial s} > 0$ if $\{L^* > L^{**}; A^p > \rho(x^-)m^*\}$ or $\{L^* < L^{**}; A^p < \rho(x^-)m^*\}$.
   - $\frac{\partial(L^*-L^{**})}{\partial s} < 0$ if $\{L^* > L^{**}; A^p < \rho(x^-)m^*\}$ or $\{L^* < L^{**}; A^p > \rho(x^-)m^*\}$.

3. Information Gains from Verification on

   (a) Verification per Firm: $\frac{\partial(m^*-m^{**})}{\partial\Delta(\rho|x^+)} = \frac{\rho(x^+)s}{G''(m^*)+H''(m^*)} - \frac{\rho(x^+)s}{\alpha TH''(m^{**})} \gtreqless 0$ for $m^* \gtreqless m^{**}$ and $a = \alpha TH''(m^{**}) \gtreqless G''(m^*) + H''(m^*) = b$.

   - $\frac{\partial(m^*-m^{**})}{\partial\Delta(\rho|x^+)} > 0$ if $\{m^* > m^{**}; a > b\}$ or $\{m^* < m^{**}; a < b\}$.
   - $\frac{\partial(m^*-m^{**})}{\partial\Delta(\rho|x^+)} < 0$ if $\{m^* > m^{**}; a < b\}$ or $\{m^* < m^{**}; a > b\}$.

   (b) Financial Contributions per Firm: $\frac{\partial(f^*-f^{**})}{\partial\Delta(\rho|x^+)} = 0 - \frac{\rho(x^+)sH'(.)}{\alpha TH''(.)} \leq 0$ for $f^* \leq f^{**}$.

   (c) Unverified Presented Proposals per Firm: $\frac{\partial(u^*-u^{**})}{\partial\Delta(\rho|x^+)} = 0 - \frac{\rho(x^+)^2 s}{\alpha TH''(.)} \leq 0$ for $u^* \leq u^{**}$.

   (d) Clients per Firm: $\frac{\partial(A^{c*}-A^{c**})}{\partial\Delta(\rho|x^+)} = \frac{\rho(x^+)s}{G''(.)+H''(.)} - 0$ for $n^* = m^*$ and $n^* \geq n^{**}$.

   (e) Direct Access for Citizens: $\frac{\partial(A^{c*}-A^{c**})}{\partial\Delta(\rho|x^+)} = \frac{-A^p}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} + 0 \lesseqgtr 0$ for $A^p \gtreqless \rho(x^- m^*)$.

   (f) Number of Lobbyists: $\frac{\partial(L^*-L^{**})}{\partial\Delta(\rho|x^+)} = \frac{\rho(x^+)\rho(x^-)sL}{(A^p-\rho(x^-)m^*)(G''(.)+H''(.))} - 0 \gtreqless 0$ for $L^* \gtreqless L^{**}$ and $A^p \gtreqless \rho(x^-)m^*$.

   - $\frac{\partial(L^*-L^{**})}{\partial s} > 0$ if $\{L^* > L^{**}; A^p > \rho(x^-)m^*\}$ or $\{L^* < L^{**}; A^p < \rho(x^-)m^*\}$.
   - $\frac{\partial(L^*-L^{**})}{\partial s} < 0$ if $\{L^* > L^{**}; A^p < \rho(x^-)m^*\}$ or $\{L^* < L^{**}; A^p > \rho(x^-)m^*\}$.

4. Magnitude of Private Benefits on

   (a) Financial Contributions per Firm: $\frac{\partial(f^*-f^{**})}{\partial\pi} = 0 + \frac{PA^p n}{C} > 0$ for $f^* \leq f^{**}$.

   (b) Unverified Presented Proposals per Firm: $\frac{\partial(u^*-u^{**})}{\partial\pi} = 0 + \frac{A^p P}{CG''(.)} > 0 \leq 0$ for $u^* \leq u^{**}$.

   (c) Clients per Firm: $\frac{\partial(n^*-n^{**})}{\partial\pi} = 0 - \frac{A^p P}{CG''(.)} \lesseqgtr 0$ for $n^* \gtreqless n^{**}$.

   (d) Number of Lobbyists: $\frac{\partial(L^*-L^{**})}{\partial\pi} = 0 + \frac{A^p P}{n^{i^2} G''(.)} \gtreqless 0$ if $L^* \gtreqless L^{**}$.

5. Number of Policymakers on

   (a) Financial Contributions per Firm: $\frac{\partial(f^*-f^{**})}{\partial P} = 0 + \frac{A^p \pi}{L} > 0 > 0$ for $f^* \leq f^{**}$.

   (b) Unverified Presented Proposals per Firm: $\frac{\partial(u^*-u^{**})}{\partial P} = 0 + \frac{A^p\left(1+\frac{A^p P\pi}{CnG''(.)}\right)}{L} > 0 > 0$ for $u^* \leq u^{**}$.

   (c) Clients per Firm: $\frac{\partial(n^*-n^{**})}{\partial P} = 0 - \frac{A^p \pi}{CG''(.)} \lesseqgtr 0$ for $n^* \gtreqless n^{**}$.

B.2.4 Overview: All Selected Comparative Statics

	Comp. Statics Market Outcome					**Comp. Statics Social Optimum for $\alpha < 1$** $f^* = 0 \quad u^* = 0 \quad n^* = m^*$						
	dm^{**}	df^{**}	du^{**}	dn^{**}	dL^{**}	dm^*	df^*	du^*	dn^*	dA^{c*}	dL^*	dP^*
$d\alpha$	$-$	$+$	$+$	0	0	0	0	0	0	0	0	0
ds	$+$	$-$	$-$	0	0	$+$	0	0	$+$	$-/+$	$+/-$ [3]	$-/+$
$d\Delta(\rho\|x^+)$	$+$	$-$	$-$	0	0	$+$	0	0	$+$	$-/+$	$+/-$	$-/+$
$d\pi$	0	$+$	$+$	$+$	$-$	0	0	0	0	0	0	0
dP	0	$+$	$+$	$+$	$-$	0	0	0	0	NA	NA	NA

Assumption: $A^p \neq \rho(x^-)m^*$.
3: if $A^p > \rho(x^-)m^*$ / if $A^p < \rho(x^-)m^*$.

Table 3: Selected Comparative Statics for Market and Socially Optimal Values.

	Comp. Statics Differences Socially Optimal and Market Values for $\alpha < 1$					
	$m^* \gtreqless m^{**}$	$f^{**} \geq f^*$	$u^{**} \geq u^*$	$n^* \gtreqless n^{**}$	$A^{c*} \geq A^{c**} = 0$	$L^* \gtreqless L^{**}$
	$d(m^* - m^{**})$	$d(f^* - f^{**})$	$d(u^* - u^{**})$	$d(n^* - n^{**})$	$d(A^{c*} - A^{c**})$	$d(L^* - L^{**})$
$d\alpha$	$+/-$ [1]	$+$	$+$	0	0	0
ds	$+/-$ [1,2]	$-$	$-$	$+/-$ [3]	$-/+$ [4]	$+/-$ [4,5]
$d\Delta(\rho\|x^+)$	$+/-$ [1,2]	$-$	$-$	$+/-$ [3]	$-/+$ [4]	$+/-$ [4,5]
$d\pi$	0	$+$	$+$	$-/+$ [3]	0	$+/-$ [5]
dP	0	$+$	$+$	$-/+$ [3]	NA	NA

1: if $m^* > m^{**}$ / if $m^* < m^{**}$;
2: if $\alpha T H''(m^{**}) \gtreqless G''(m^*) + H''(m^*)$;
3: if $n^* > n^{**}$ / if $n^* < n^{**}$;
4: if $A^p > \rho(x^-)m^*$ / if $A^p < \rho(x^-)m^*$;
5: if $L^* > L^{**}$ / if $L^* < L^{**}$.

Table 4: Selected Comparative Statics for Comparison of Market and Socially Optimal Values.